The Strategic Impact of Energy Dependency

Edited by
Brian MacDonald

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THE STRATEGIC IMPACT OF ENERGY DEPENDENCY

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Sous la direction de
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Foreword

John Scott Cowan

For all of human history, and, according to the archaeological record, throughout pre-history as well, access to resources has been a strategic issue. Much of human confrontation and conflict has been over access to resources, frequently exacerbated by resource scarcity. In pre-history the resources deemed strategic were at first game and naturally occurring foodstuffs, followed later by land, water, domestic animals and workers. In antiquity, certain metals got added to the equation. But energy only became strategic with the industrial revolution.

That first high-density transportable energy source was coal, and while its distribution was not uniform, with some states being especially favoured and others much less fortunate, its supply was so widespread and so extensive that the question of scarcity never arose, and indeed even today coal reserves are immense. In the 19th century there were so many sources that the only strategic consideration beyond keeping sea-lanes open was price.

Today, the developed world has a huge appetite for energy and the developing world hopes to follow suit as fast as it can. And that energy has come to mean largely oil, with lesser but still significant roles for four other well established energy sources: coal, natural gas, hydroelectric, and nuclear. Immature technologies, such as wind, solar, biofuels and tidal power will increase in importance, but to a lesser extent and less quickly than their advocates hope. Costs aside, the first two are episodic, the third has a dubious net energy equation and the last, while potentially the most promising, has been resistant to easy technological solutions for its capture and conversion.

In terms of total energy production, Canada is self-sufficient, in the simplistic sense that its entire production of energy and fuels roughly equals its total consumption. But this is misleading. Much of Canada's oil and gas is exported to the US from western Canada, as pipeline capacity is inadequate to supply the eastern portion of Canada from our own sources. Consequently, Canada is just as dependent as the United States (or China for that matter) upon free passage of trade on the high seas and upon stability in other oil-producing regions. Indeed, most oil markets are very tightly coupled.

So in terms of grand strategy, Canada, like its closest allies, the US and European NATO members, remains vulnerable to oil being used as a weapon, and must be clearly engaged and vigilant about events in potentially problematic oil-producing zones such as the Middle East and Russia. And we are engaged in both because it validates our role in alliances and because we need constancy and predictability of trans-national energy supplies ourselves. So unrest and conflict in Iraq, truculence in Iran, a transitional kleptocracy in Russia, endless conflict between Israel and its unwelcoming neighbours, piracy off the coasts of failed states, and the recent prominence of an extreme fundamentalist movement in parts of the Muslim world (Dar al Islam) which hopes fervently for the collapse of the rest of the world (Dar al Harb), are all features which must inform and modify any Canadian approach to grand strategy.

On the whole, however, Canada does grand strategy only by proxy, letting others lead and then demonstrating our sovereign status by deciding whether or not to join initiatives launched by others, and, when doing so, by retaining a degree of control over the extent of our participation and the attendant constraints (and ROE, in the case of military participation). In the twenty years since the end of the Cold War, Canada has not reached even a modest consensus on a cohesive Canadian vision of our contemporary interests, let alone a grand strategy to further them. Indeed, it is only very recently that it has become somewhat fashionable to acknowledge that we have interests. The previous mythology was that, not being a former colonial power, we had no interests, and our role in the world was exclusively to promote "Canadian values", which were somehow to be preferred over the values of the other liberal democracies.

Nonetheless, the beginnings of convergence across the political spectrum are apparent. Even the "realists" seem to accept that some export of Canadian values may contribute to a more hospitable international milieu, and thus further our interests. And the "idealists" are beginning to suspect that the post Cold War world might be dangerous even for benign Canada, and that, in keeping us secure and provided for, hope is not a plan.

But as no grand strategy has yet emerged, it cannot yet provide guidance as to the steps we must take or the capabilities we will likely need, including the capabilities of the Canadian Forces. Hence successive governments have found it in Canada's interest to commit the CF to various *ad hoc* expeditionary tasks,

only to find later that missing capabilities needed to be sidestepped, borrowed from allies or added piecemeal in theatre.

On the smaller canvas of ordinary strategy, the Canadian Forces remains heavily dependent on relatively vulnerable Canadian civilian infrastructure, an undesirable situation for a force of last resort. This observation has been highlighted in various studies, including the Defence Science Advisory Board (DSAB) study of the asymmetric threat (2002). One fairly critical element of that dependence relates to reliance upon civilian energy supply and distribution systems, including the power grid and the hydrocarbon distribution chain. Department of National Defence contracts with external suppliers have not customarily contained express requirements for robustness in such systems, but rather have focussed on lowest price. We pay scant attention to the hardening of civilian infrastructure or to the question of strategic reserves.

Nor is there likely to be a technological magic bullet for energy concerns anytime soon. The extraction, distribution and use systems are so capital-intensive and their reform so dependent on new science and engineering that major shifts are generational or longer, though some of these are discussed in the concluding chapter of this volume.

The contributors to *Vimy Paper* 2009 examine key aspects of the strategic impact of energy dependency, each from their own vantage point. The result is not a recipe book, in that they raise more questions than they answer. But these are perspectives from outstanding experts on some of the hottest topics (and in one case simultaneously the coldest topic) in global development and security. The CDA Institute is delighted to have brought them together in this volume.

Avant-propos

John Scott Cowan

Pendant toute l'histoire de l'humanité et aussi, selon les archives archéologiques, tout au long de la préhistoire, l'accès aux ressources a été un enjeu stratégique. Une grande partie des confrontations et des conflits humains ont eu lieu autour de l'accès aux ressources, fréquemment exacerbés par la rareté de ces ressources. Pendant la préhistoire, les ressources considérées stratégiques étaient d'abord le gibier et les aliments présents dans la nature, puis ce fut la terre, l'eau, les animaux domestiques et la main-d'oeuvre. Dans l'antiquité, certains métaux sont venus s'ajouter à l'équation. Mais l'énergie n'a acquis un statut stratégique qu'avec la révolution industrielle.

C'est le charbon qui fut cette première source d'énergie transportable de haute densité et, bien que sa distribution n'ait pas été uniforme, sa disponibilité fut si étendue et si considérable que la question de la rareté ne s'est jamais présentée, même qu'aujourd'hui encore les réserves de charbon sont immenses. Au 19e siècle il y avait tellement de sources que la seule considération stratégique qui surpassait celle de garder les corridors maritimes ouverts était celle du prix.

Aujourd'hui, les pays développés ont un immense appétit pour l'énergie et les pays en voie de développement espèrent emboîter le pas aussi vite qu'ils le peuvent. Et cette énergie a fini par signifier largement le pétrole, avec des rôles moindres mais encore significatifs pour quatre autres sources d'énergie bien établies : le charbon, le gaz naturel, l'énergie hydroélectrique et l'énergie nucléaire. Des technologies, pas encore mûres, comme le vent, le soleil, les biocombustibles et l'énergie marémotrice vont augmenter en importance, mais dans une moindre mesure et moins rapidement que l'espèrent leurs promoteurs. Le coût mis à part, les deux premières sont épisodiques, la troisième a une équation d'énergie nette douteuse et la dernière, bien qu'elle renferme le plus de promesses en puissance, est restée résistante à des solutions technologiques faciles pour ce qui est de sa capture et de sa conversion.

En termes de production totale d'énergie, le Canada est autosuffisant, dans le sens simpliste que sa production entière d'énergie et de combustibles égale, en gros, sa consommation

totale. Mais cette observation est tendancieuse. Une grande partie du pétrole et du gaz du Canada est exportée aux États-Unis depuis l'Ouest canadien, parce que la capacité de pipelines est insuffisante pour alimenter la partie est du Canada à partir de nos propres sources. En conséquence, le Canada est aussi dépendant que les États-Unis (ou que la Chine d'ailleurs) du passage libre des navires commerciaux sur les grandes mers et de la stabilité dans les autres régions productrices de pétrole. De fait, la plupart des marchés pétroliers sont très étroitement liés.

Donc, en termes de grande stratégie, le Canada, tout comme son allié le plus proche, les États-Unis et les membres européens de l'OTAN, restent vulnérables à l'utilisation du pétrole comme arme et ils doivent être clairement engagés et vigilants concernant les événements qui se produisent dans des zones de production pétrolière pouvant poser des problèmes, comme le Moyen-Orient et la Russie. Et nous sommes engagés à la fois parce que cette position valide notre rôle dans les alliances et parce que nous avons nous-mêmes besoin que les approvisionnements énergétiques transnationaux soient constants et prévisibles. Donc, l'agitation et les conflits en Iraq, la truculence en Iran, une kleptocratie de transition en Russie, l'interminable conflit entre Israël et ses voisins rébarbatifs, la piraterie au large des côtes d'États faillis et la récente proéminence d'un mouvement d'extrême fondamentalisme dans certaines parties du monde musulman (Dar al Islam) qui espère avec ferveur l'effondrement du reste du monde (Dar al Harb), ce sont là tout un ensemble de caractéristiques qui doivent informer et modifier tout approche canadienne d'une grande stratégie.

Dans l'ensemble, toutefois, le Canada ne fait de grande stratégie qu'à titre de fondé de pouvoir, en laissant les autres mener, pour ensuite démontrer notre statut de souveraineté en décidant, ou non, de nous joindre à des initiatives lancées par d'autres et, ce faisant, en retenant un degré de contrôle sur l'étendue de notre participation et sur les contraintes attenantes (et les RDE, dans le cas d'une participation militaire). Dans les vingt ans qui se sont écoulés depuis la fin de la guerre froide, le Canada n'a pas réussi à former même un modeste consensus sur une vision canadienne cohérente de nos intérêts contemporains, et encore moins sur une grande stratégie pour poursuivre ces intérêts. À vrai dire, ce n'est que très récemment qu'il est devenu quelque peu à la mode d'accepter l'idée que nous avons

des intérêts. La mythologie précédente était que, n'étant pas une ancienne puissance coloniale, nous n'avions pas d'intérêts, et que notre rôle dans le monde était exclusivement de promouvoir les « valeurs canadiennes », qui étaient, d'une certaine façon, préférables aux valeurs des autres démocraties libérales.

Néanmoins, les débuts d'une convergence à travers l'éventail politique sont manifestes. Même les « réalistes » semblent accepter qu'une certaine exportation des valeurs canadiennes puisse contribuer à l'émergence d'un milieu international plus hospitalier et, ainsi, à faire progresser nos intérêts. Et les « idéalistes » commencent à soupçonner que le monde de l'après-guerre froide puisse être dangereux, même pour un Canada anodin, et que, pour nous garder en sécurité et pour que nos besoins soient satisfaits, l'espérance ne peut servir de plan.

Mais comme aucune grande stratégie n'a encore fait surface, elle ne peut pas encore servir de guide quant aux étapes qu'il nous faut franchir ou quant aux capacités dont nous aurons probablement besoin, y compris les capacités des Forces canadiennes. De là les gouvernements canadiens successifs ont trouvé qu'il y allait de l'intérêt du Canada d'engager les FC dans diverses tâches expéditionnaires ad hoc, seulement pour découvrir après coup que les capacités manquantes devaient être éludées, empruntées d'alliés ou ajoutées à la pièce dans le théâtre.

Sur la toile plus restreinte de la stratégie ordinaire, les Forces canadiennes demeurent lourdement dépendantes de l'infrastructure civile canadienne, relativement vulnérable, une situation indésirable pour une force de dernier ressort. Cette observation a été mise en lumière dans diverses études, dont l'étude du CCSAD sur la menace asymétrique (2002). Un élément passablement critique de cette dépendance a trait à la nécessité de se fier à une fourniture d'énergie et à des systèmes de distribution civils, y compris le réseau d'électricité et la chaîne de distribution des hydrocarbures. Les contrats du ministère de la Défense nationale avec des fournisseurs externes n'ont pas eu coutume de contenir des exigences expresses concernant la robustesse de tels systèmes, mais ils ont plutôt porté sur le prix le plus bas. Nous ne portons qu'une attention distraite à l'affermissement de l'infrastructure civile ou à la question des réserves stratégiques.

Il n'est pas non plus probable qu'il y ait sous peu une balle magique qui puisse soulager les préoccupations concernant l'énergie. Les systèmes d'extraction, de distribution et d'utilisation sont à tel point liés à la disponibilité de capitaux et leur réforme, si dépendante des progrès de la science et de l'ingénierie que les mouvements majeurs ont l'ampleur d'une génération ou plus, quoique quelques-uns soient discutés dans le chapitre de conclusion du présent volume.

Les collaborateurs de ce *Cahier Vimy* 2009 examinent des aspects clés de l'impact stratégique de la dépendance énergétique, chacun de son propre point de vue. Le résultat n'est pas un livre de recettes parce que les auteurs soulèvent plus de questions qu'ils apportent de réponses. Mais ce sont là des points de vue provenant d'experts exceptionnels sur quelques-uns des sujets les plus chauds (et dans un cas, simultanément le plus froid) en matière de développement et de sécurité planétaires. L'Institut de la CAD se réjouit de les avoir réunis dans le présent volume.

Introduction

Brian MacDonald

The International Energy Agency's *World Energy Outlook 2008* reports that:

> *Our Reference Scenario, which assumes no new government policies beyond those already adopted by mid-2008, predicts that world primary energy demand expands by 45% between 2006 and 2030—an average rate of growth of 1.6% per year. Fossil fuels account for 80% of the world's primary energy mix in 2030—down only slightly on today. Oil remains the dominant fuel, though demand for coal rises more than any other fuel.*

The IEA further predicts that "India sees the fastest growth, averaging 3.9% per year over the projection period (to 2030) followed by China at 3.5%." These estimates may be conservative since the IEA *Reference Scenario* sees Indian and Chinese economic growth slowing to 6.4% and 7.3% respectively in the 2006-2015 period, and to the low 4% range to 2030.

While the world economic crisis resulting from the collapse of the housing derivatives bubbles in the US and in Western Europe, and the forced sale of assets in the consequent de-leveraging process has driven the price of oil sharply down, this price decline may well turn out to be a temporary blip on the long term energy pricing trend. Consequently its potential impacts identified by Ambassador Richard Holbrooke writing in the September/October 2008 issue of *Foreign Affairs* may still be apt:

> *With the price of oil quadruple what it was four years ago, Americans are witnessing … or, more to the point, contributing to … the greatest transfer of wealth from one set of nations to another in history….Based on prices from the first half of 2008, that means the United States is transferring about $1.3 billion to the oil-producing countries every day … $475 billion a year …. The other major consumers, including China, the European Union, India, and Japan, are sending even greater portions of their wealth to the producing countries, for a total annual*

transfer of wealth of over $2.2 trillion …. The wealth now accumulating in the producing nations will lead over time not only to even greater economic muscle but also to greater political power…. Does anyone doubt that the current assertiveness on the international stage of, for example, Iran, Russia, and Venezuela, comes from the economic muscle that accompanies their growing petrodollar reserves?

Price is not the only dimension. Recent piracy activities in the area of the Horn of Africa and the area of the Straits of Malacca also remind us of the dependency of oil consuming states on uninterrupted access to secure energy lines of communication, a reality leading to states' efforts to bypass chokepoints by establishing alternative port facilities closer to sources, such as the Chinese development of port facilities in Pakistan and Myanmar, or the Indian development assistance to the Iranian port of Chabahar, or in largely land-based energy and transportation corridors.

Consequently, considerations of gas pipeline access and control, such as those proposed for the floor of the Baltic Sea and those from Central Asian sources to China or Europe, trigger strategic energy security concerns in Europe; and the strategic implications of railway and pipeline development on the Eurasian landmass are just beginning to be understand.

In framing this book two things stood out. The first was the importance of particularly the great sea corridor emerging from the Persian Gulf and passing through the Indian Ocean, the Strait of Malacca, and the South China Sea—a route critical to the economic security of the four big economies which depend upon it: India, China, Japan, and South Korea.

Since we have looked at China in some detail before in *Canadians and Asia-Pacific Security*, we decided to look more closely at India's emerging position as an energy consumer as well as at the continuum of United States policy with respect to Persian Gulf supplies. The sudden appearance of pirates off the Horn of Africa adds to the complexity of the analysis and leads to the naval question as to whether the international community has a fleet model which can deal with that contingency or whether a different platform mix might be needed.

The second was the "Winter Gas War" between Russia and Ukraine, which returned our attention to the European theatre of the Cold War and the possible implications for NATO of

deliberate acts of energy interruption as a means of securing political influence and/or objectives at the expense of one or more Alliance members. To put it another way—should politically driven energy interruption be considered an "armed attack" and therefore a potential NATO Article 5 matter? Or should we be rethinking our concepts of Article 5 responses to hostile energy interventions to include those along the lines of the highly effective Berlin Airlift of the early Cold War?

At home in Canada our specialist analysts are increasingly concerned about energy and the Canadian Arctic, and about the sudden realization that, while energy accounts for only about 3% the Canadian Forces' budget, sudden wild swings in energy prices can massively disrupt a finely balanced budget; and about the need to craft some sort of energy strategy as part of our national grand strategic policy.

But in Canada, of course—even in the case of energy security—we seem to cling tenaciously to the image of ourselves drawn so famously in Senator Dandurand's 1924 address to the League of Nations: "We live in a *fireproof house* far from inflammable materials."

Perhaps we might better reflect upon the image drawn from John Donne's *Meditation XVII,* written in 1624, some 300 years earlier, which seems a far better piece of advice for participants in today's grand strategic environment:

> *No man is an island entire of itself; every man is a piece of the continent, a part of the main … And therefore never send to know for whom the bell tolls; it tolls for thee.*

Good advice for Canada and for Canadians.

Introduction

par Brian MacDonald

Dans son édition 2008 de *Perspectives énergétiques mondiales,* l'Agence internationale de l'énergie (AEI) rapporte ce qui suit (notre traduction) :

> « Dans notre *scénario de référence*, qui fait l'hypothèse qu'aucune politique gouvernementale nouvelle, au-delà de celles qui étaient déjà adoptées au milieu de 2008, on prédit que la demande primaire d'énergie du monde connaît une expansion de 45 % entre 2006 et 2030 – soit un taux moyen de croissance de 1,6 % par année. Les combustibles fossiles compteront pour 80 % de la composition énergétique primaire du monde en 2030 – seulement une baisse légère par rapport à aujourd'hui. Le pétrole reste le carburant dominant, bien que la demande pour le charbon augmente plus que celle de tout autre carburant. »

L'AIE prédit de plus que « l'Inde voit la croissance la plus rapide, en moyenne de 3,9 % par année sur la période de projection (jusqu'à 2030), suivie par la Chine, à 3,5 %. » Ces estimations sont probablement prudentes parce que, selon le *scénario de référence* de l'AIE elle-même, la croissance économique de l'Inde et de la Chine ralentiront respectivement jusqu'à 6,4 % et 7,3 % pendant la période de 2006-2015, pour s'établir dans les 4 % jusqu'à 2030.

Tandis que la crise économique mondiale découlant de l'effondrement des bulles des dérivés du logement aux États-Unis et en Europe de l'ouest, et la vente forcée d'actifs dans le processus conséquent de désendettement, a fait tomber de façon abrupte les prix du pétrole, cette chute peut bien s'avérer être un soubresaut temporaire sur la tendance à long terme des prix de l'énergie. Par conséquent, son impact possible identifié par l'ambassadeur Richard Holbrooke, qui écrivait dans le numéro de sept./oct. 2008 de la revue *Foreign Affairs*, peut encore être approprié.

> « Avec le prix du pétrole au quadruple de ce qu'il était il y a quatre ans, les Américains sont témoins du… ou, plus exactement, contribuent au… plus important transfert de richesse de l'histoire entre un ensemble de nations et un autre …. Sur la base des prix de la première moitié de 2008, cela veut dire que les États-Unis transfèrent environ 1,3 milliards de dollars aux pays producteurs de pétrole chaque jour … 475 $ milliards par année … Les autres grands consommateurs, dont la Chine, l'Union européenne, l'Inde et le Japon, envoient des portions encore plus considérables de leur richesse aux pays producteurs, pour un transfert de richesse annuel total de plus de 2,2 billions de dollars ….La richesse qui s'accumule maintenant chez les nations productrices mènera avec le temps non seulement à une musculature économique encore plus forte, mais également à un pouvoir politique plus grand…. Est-ce que quelqu'un doute que l'assurance actuelle de pays comme, par exemple, l'Iran, la Russie et le Venezuela sur la scène internationale, vient du muscle économique qui accompagne la croissance de leurs réserves de pétrodollars ? »

Le prix n'est pas la seule dimension. Les récentes activités de piraterie dans la région de la Corne de l'Afrique et du détroit de Malacca nous rappellent aussi la dépendance des États consommateurs de pétrole à l'égard d'un accès ininterrompu à des lignes de communication énergétiques sûres; une réalité qui amène les États à faire des efforts pour contourner les points d'étranglement en établissant des installations portuaires plus proches des sources, comme le développement chinois d'installations portuaires au Pakistan et au Myanmar, ou l'aide au développement consacrée pas l'Inde au port iranien de Chabahar, ou dans des corridors d'énergie et de transport largement établis par voie terrestre.

En conséquence, des considérations d'accès et de contrôle des pipelines de gaz, comme ceux qui sont proposés pour le plancher de la mer Baltique et ceux des sources du centre asiatique vers la Chine ou l'Europe déclenchent des préoccupations de sécurité énergétique stratégique en Europe ; et on ne fait que commencer à comprendre les implications stratégiques du développement de chemins de fer et de pipelines sur la masse terrestre eurasienne.

En montant la charpente de ce livre, deux choses sont ressorties. La première a été l'importance particulière du grand corridor maritime provenant du golfe Persique et passant par l'océan Indien, le détroit de Malacca et la mer de Chine occidentale—une route critique pour la sécurité économique des quatre grandes économies qui en dépendent : l'Inde, la Chine, le Japon et la Corée du Sud.

Depuis que nous avons examiné la Chine un peu en détail, dans *Les Canadiens et la sécurité en Asie-Pacifique*, nous avons décidé d'étudier de plus près la position émergente de l'Inde comme consommatrice d'énergie, ainsi que le continuum de la politique des États-Unis à l'égard des approvisionnements du golfe Persique. L'apparition soudaine de pirates sur la Corne de l'Afrique ajoute à la complexité de l'analyse et conduit à la question navale, à savoir si la communauté internationale dispose d'un modèle de flotte qui peut s'occuper de cette contingence ou si un mélange de plateformes différent sera nécessaire.

La seconde chose a été la « Guerre du gaz d'hiver » entre la Russie et l'Ukraine, qui a ramené notre attention vers le théâtre européen de la Guerre froide et les implications possibles, pour l'OTAN, d'actes délibérés de coupure d'énergie comme moyen d'assurer une influence et/ou des objectifs politiques aux dépens d'un ou plusieurs membres de l'Alliance. Pour le dire d'une autre façon—une interruption d'énergie à motifs politiques serait-elle considérée comme étant une « attaque armée » et, donc, une possible question d'application de l'article 5 ? Ou devrions-nous repenser nos concepts de réponses en vertu de l'article 5 à des interventions énergétiques hostiles pour inclure celles-ci selon les lignes du très efficace pont aérien de Berlin du début de la Guerre froide ?

Chez nous, au Canada, nos analystes spécialisés s'inquiètent de plus en plus de l'énergie et de l'Arctique canadien ; et de la réalisation soudaine que, bien que l'énergie ne compte que pour environ 3 % du budget des Forces canadiennes, de fortes oscillations soudaines dans les prix de l'énergie peuvent perturber un budget finement équilibré ; et concernant le besoin de ciseler une sorte de stratégie de l'énergie dans le cadre de notre grandiose politique stratégie nationale.

Mais au Canada, bien sûr—même dans le cas de la sécurité énergétique—nous semblons nous accrocher avec ténacité à l'image de nous-mêmes tirée de la si célèbre phrase

prononcéepar le Sénateur Dandurand en 1924 devant la Ligue des Nations :

> « Nous vivons dans une maison *à l'épreuve du feu*, loin de matériaux inflammables. »

Peut-être vaudrait-il mieux que nous réfléchissions sur l'image tirée de la *Meditation XVII* de John Donne, écrite en 1624, quelque 300 ans plus tôt, et qui semble être un bien meilleur conseil pour ceux qui participent au grand environnement stratégique d'aujourd'hui :

> « Personne n'est une île, entière en elle-même ; tout homme est un morceau de continent, une partie du tout. … et donc, n'envoie jamais demander pour qui sonne le glas ; il sonne pour toi. »

Bon conseil pour le Canada et les Canadiens.

The Canadian Forces' Bedevilling Dependency on Oil

Gary Rice

Abstract

Modern armed forces have developed a profound reliance on oil. This becomes abundantly clear when one visits any military installation and looks at the equipment in use. The navy is all about fleet support and sea-delivered weaponry. The air force is all about airlift and platforms that can deliver weapons, troops, and cargo from the air. And the army is all about moving and fighting, and securing and holding. All of these operations are fuel intensive and fuel dependent. Consequently, the continuing availability of liquid fuel remains one of the fundamental and critical requirements at all levels of security and defence planning. Of necessity modern commanders are increasingly conscious that their military's dependence on timely delivery of large quantities of fuel makes future operations increasingly risky. Thus, for the foreseeable future, energy derived from liquid fuel will remain a critical factor at the heart of our military capability.

Résumé

Les forces armées modernes ont développé une dépendance profonde vis-à-vis le pétrole. Cette situation devient tout à fait claire quand on visite n'importe quelle installation militaire et qu'on regarde l'équipement qui est en service. La marine parle de l'appui de la flotte et de l'armement livré par mer; la force aérienne de ponts aériens et de plateformes qui peuvent livrer des armes, des troupes et des marchandises par voie aérienne; et l'armée parle de mouvements et de combats, et de sécurisation et de maintien de positions. Toutes ces opérations nécessitent beaucoup de carburant et en sont dépendantes. En conséquence, la disponibilité ininterrompue de carburant liquide reste une des contraintes fondamentales et critiques à tous les niveaux de la planification en matière de sécurité et de défense. Par nécessité, les commandants modernes

> sont de plus en plus conscients du fait que leur dépendance vis-à-vis la livraison de grandes quantités de carburant représente un risque de plus en plus élevé pour les opérations futures. Ainsi, pour l'avenir prévisible, l'énergie dérivée de combustibles liquides restera un facteur critique qui est au coeur de notre capacité militaire.

Effective investments in training, equipment, and weaponry depend on the accuracy with which leaders can, in effect, foretell the future. However, in peacetime, correctly envisioning the nature of a future war is a most difficult problem. To help with their predictions, strategists commonly seek to identify relevant lessons from past conflicts. As early as the First World War, strategists for all the major powers realized that oil had become an essential military asset, due to the adoption of oil-powered warships, and vehicles such as trucks, tanks and 'aeroplanes'. The experts of the day also recognized that oil was growing increasingly important in the civilian economy and had become a vital component of a nation's economic strength.[1] They perceived that oil was so important during the Great War that the Secretary of the British War Cabinet, Sir Maurice Hankey, speculated that it was absolutely vital to Britain, and that in the future the oil resources of Mesopotamia (today's Iraq) would be essential.[2] Presciently, though, in the years before the Second World War, the United Kingdom and Germany both developed and sold bio-fuels[3] mixed with petrol or diesel made from crude oil. However, with a cheap and plentiful oil supply, there was then no requirement for a hybrid petrol system to support military operations.

At the outbreak of war in 1939, Germany depended on external sources for its supply of oil and its reserves consisted of a total of fifteen million barrels. The Nazi campaigns in Norway, Holland, Belgium, and France added another five million barrels in booty, while imports from the Soviet Union in 1940 accounted for a further four million barrels and 1.6 million barrels in the first half of 1941. Yet, a German High Command study in May of

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[1] James A. Paul, "Great Power Conflict over Iraqi Oil: The World War I Era," *Global Policy Forum*, October, 2002.

[2] As cited by Daniel Yergin, *The Prize* (New York, 1991), p. 188.

[3] In the broadest sense, bio-fuels are any kind of fuel made from living things or the waste they produce. The list is endless and includes: wood, wood chip, straw pellets or liquids made from wood, bio-gas (methane) from animal excrement and ethanol, diesel or other liquid fuels made from processing plant material or waste oil.

1941 concluded that with the military's monthly requirement of 7.25 million barrels and imports and home production of only 5.35 million barrels, they would exhaust their stocks by August 1941 unless they could make up the 26 percent shortfall from Russian sources. The need to secure the needed extra 1.9 million barrels per month and the urgency to gain possession of the Russian oil fields in the Caucasus mountains, with Ukrainian grain and Donets coal, thus became prime elements in Hitler's decision to invade the Soviet Union in June 1941.[4]

Had the German forces been able to capture and hold the Russian oil fields and refineries, Germany's petroleum worries would have been over.[5] All were not captured, however, and only the Maikop field yielded to German exploitation; the others were destroyed or dismantled by the retreating Russian forces. By January 1943, when they compelled the German forces to withdraw from Maikop to avoid entrapment after the fall of Stalingrad, Germany had failed to obtain a single drop of Caucasian oil.[6] The Allies' air raids on Romania's Ploesti oil fields and refineries in August 1943 destroyed 50 percent of their refinery capacity. Aerial mining of the Danube River was an additional serious transportation impediment. Though Romanian deliveries amounted to seven million barrels in the first half of 1944 and were not halted until additional raids on Ploesti had been flown in the late spring and summer of 1944, overland oil imports after 1939 would never make up for the loss of overseas shipments.

Long before the Second World War began, however, German scientists worked to discover synthetic methods of producing gasoline and oil. In view of the country's wealth of coal, looking in this direction for a solution was logical. By the time Hitler became chancellor in 1933, four methods of achieving this were available or in early stages of perfection. Two of these, the Fischer-Tropsch[7] process and the hydrogenation process, changed coal directly into gasoline. By 1933, they had

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[4] W. Tomberg, *Wehrwirtschaftliche Erkenntnisse von 5 Kriegsjahren*, (November 1944), pp. 58, 61; see also Speer's remarks in Imperial War Museum, FDC 1, Interrogation of Albert Speer, 5th Session, 30 May 1945, p. 3.

[5] Remarks by Professor Hettlage, economic adviser to Speer, on the condition of the war economy, November 7, 1942.

[6] Dieter Petzina, *Autarkiepolitik im Dritten Reich: Der nationalsozialistische Vierjahresplan* (Stuttgart, 1968), pp. 143-44.

[7] The Fischer-Tropsch method is the use of a bio-fuel blended with normal jet engine fuel.

tested the latter method and were ready for large-scale practical application. Between 1938 and 1943, synthetic fuel output underwent a respectable growth from ten million barrels to thirty-six million. The percentage of synthetic fuels compared with the yield from all sources grew from 22 percent to more than 50 percent by 1943. The total oil supplies available from all sources for the same period rose from forty-five million barrels in 1938 to seventy-one million barrels in 1943.[8]

In the autumn of 1942 there appeared to be only two ways in which fuel production could be expanded. One was to secure the Russian oil fields, but as we have seen, that expectation quickly evaporated; the other was to increase the number and output of hydrogenation plants. Such a plan was devised late in 1942, projecting an annual production of synthetic fuel of sixty million barrels by 1946. Yet when they finally tried toward the end of 1943, it was decidedly too late. The onset of Allied air attacks on the hydrogenation plants in May 1944 foiled all expectations and sounded the death knell for the German war machine.

In 2009, more than sixty years after the end of the Second World War, oil remains not only essential for a nation's economy and for the successful conduct of military operations, it has been suggested as a cause for going to war. In a lecture delivered in February 2009, the British government's former chief scientific adviser, Sir David King opined that it [the war with Iraq] would come to be regarded as "the first of the resource wars."[9] According to Sir David, the United States was concerned about energy security and supply and this was a significant factor behind the decision of Britain and the United States to invade Iraq.

When he was recently asked in the British House of Commons, whether bio-fuels might be used for military aircraft, the Secretary of State replied: "Right now there are no aviation fuels produced from biological sources that entirely meet the particular requirements of military aircraft. Current military turbine engines would need considerable modification to be compatible with bio-fuels and this is unlikely in the near future." However, the potential uses of bio-fuel, and hydrogen energy alternatives, continue to be actively tested by major engine

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[8] *United States Strategic Bombing Survey* (USSBS), Office of the Chairman, Overall Report, European War, p. 74. Washington: GPO, September, 1945.
[9] Richard Norton-Taylor, "Cost of War in Afghanistan Soars to £2.5bn," *The Guardian*, February 13, 2009.

manufacturers, governmental, and armed forces agencies in Great Britain and in other nations, including France and the United States. For the foreseeable future, though, the continued security of Canada and its Western allies will primarily depend on oil in one form or another.

Arguably, the continued sufficiency and security of Canada's petroleum supply and infrastructure tops the list of major factors influencing the nation's security, its foreign policy, and its defence strategy. Without an assured and adequate supply of oil, Canada's armed forces can neither enter the international arena to underwrite the nation's foreign policy, nor render timely assistance to distressed Canadians in their own far-flung backyard.

Napoleon famously said "an army marches on its stomach." However, what Napoleon's aphorism was really getting at was the importance of the supply line. Logistics—getting ammunition, food (and, for more than the last one hundred years, oil) to the front—is what makes or breaks a nation at war.

Today, logistics are just as important—if not more so. A middle-power like Canada owes much of its military capability to the fact that it can muster the necessary supporting logistical operations that provide the oil needed to keep our armed forces in the field. Without oil, our navy's ships cannot put to sea, our army is confined to its garrisons, and our air force's planes are grounded. It is indisputable that, along with sufficient numbers of trained people, ammunition and food, oil remains among the most important components of our military's combat power. The same holds true for all other nations—whether they are our friends or foes.

The conduct of warfare across the spectrum from irregular to conventional conflict is today more than ever dependant on oil. Nearly all weapons systems rely on oil-based fuel—tanks, trucks, armoured vehicles, self-propelled artillery pieces, airplanes, and naval ships. Consequently, the governments and general staffs of all nations strive to ensure a steady supply of oil during both peace and war. National governments view their nation's need for oil as a vital national interest and they readily support efforts to control new production sources, and to gain the most favourable pipeline routes and other transportation and distribution channels. Just as oil is seen driving the foreign policy of our closest ally, America, so too are China's geopolitical strategies increasingly influenced by the country's inability to meet its energy needs solely through domestic production and

the imperative to secure oil and gas supplies from all over the globe.

China National Offshore Oil Corporation's (CNOOC) pursuit of oil autarky through its aggressive efforts to secure reliable supplies of oil and natural gas around the world reflects just how strong China's thirst for fossil fuels has become. Its recently booming economy and burgeoning appetite for cars and other modern conveniences have caused energy demand to soar. China's oil imports have doubled over the past five years and surged nearly 40 percent in the first half of 2004 alone. These increases vaulted the mainland ahead of Japan and into second place among the world's biggest oil consumers, behind only the United States.[10] Over the long term, experts say China's energy appetite will only continue to expand. If its oil demand keeps growing at an average rate of 7 percent a year, as it has since 1990, the country in less than twenty years will be consuming twenty-one million barrels a day, matching the current consumption of the United States.

Historical studies show that government policy makers give the highest priority to oil matters during wartime, as many Japanese and German officials tried to gain oil sources during the Second World War while US and British leaders did their utmost to deny them this resource. Yet even allies could be bitter oil rivals. In many wartime meetings and cables, President Franklin Roosevelt and Prime Minister Winston Churchill wrangled over their countries' respective post-war shares of Middle East oil reserves. After the war, George Kennan, Director of the US State Department's Policy Planning Division, reacted with unbridled enthusiasm at US oil companies' primacy (to the exclusion of Britain) in the newly-discovered Saudi Arabia fields. The United States, he wrote, had just got "the greatest material prize in world history."

Since the end of the Cold War, the oil rich regions—the Persian Gulf, the Caspian Sea basin, and the South China Sea—have become strategically important. Behind this shift in strategic geography is a new emphasis on the securing of oil supplies. Economic competition drives international relations, and competition over access to these vital economic assets has intensified accordingly. An interruption in the supply of oil would entail severe economic consequences; the major importing

[10] Matthew Forney, "China's Quest for Oil," *Time Magazine*, Oct. 18, 2004.

countries now consider the protection of this flow a significant national concern.[11]

In 1980 mounting troubles over oil prompted President Jimmy Carter to create what would be known as the Carter doctrine, which states that "any attempt by an outside force to gain control of the Persian Gulf region will be regarded as an assault on US vital interests and will be repelled by any means necessary (including military force) in order to keep the oil flowing."[12] While serving as US Secretary of Energy under the Clinton administration, Spencer Abraham expressed the importance of oil and economic strength: "Energy security is a fundamental component of national security. Military force will be an increasingly important prerequisite to safeguard the flow of foreign oil."[13]

Former President George W. Bush and then-Secretary of Defense Donald Rumsfeld have stated that the protection of America's oil supplies is the most important national security priority. In fact, the very first military objective during the 2003 invasion of Iraq was to secure the oil fields and refineries of southern Iraq, and when entering the city of Baghdad, the military made it a priority to seize the oil ministry building.[14]

With global energy consumption rising by an estimated 2 percent annually, and demand soon to outpace production, competition for access to shrinking oil reserves will only grow more intense in the years to come.[15] The United States' growing dependency on foreign oil will likely reach 90 percent by 2020; therefore, the US economy will become increasingly vulnerable.[16] The US defence secretary, Robert Gates, who in 2005 took part in a war game simulating disruptions to oil trade, concluded that the United States had few short-term fixes if supplies were interrupted.[17]

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[11] Ely Karmon, "The Risk of Terrorism Against Oil and Gas Pipelines in Central Asia," http://212.150.54.123/articles/articledet.cfm?articleid=426 (January 6, 2002)
[12] Bill Ridley, "China and the Final War for Resources," *Energy Bulletin*, 4, February 8, 2005.
[13] Ibid., p. 4.
[14] Ibid., p. 7.
[15] Dick Gibson, "Some interesting oil industry statistics," p. 1-19, Gibson Consulting, 2-3 (2006).
[16] Ridley, p. 6.
[17] Chip Cummins, "As threats To Oil Supply Grow, A General Says US Isn't Ready," *Wall Street Journal*, December 19, 2006.

Not only would oil supply disruptions hurt the US economy, they would adversely affect the US military, which consumes oil in quantities greater than most nations. As strong as these views and concerns are, they are equally held by Chinese leaders regarding their country's national security and economic well-being. China's minister for state land and resources remarked in 2002 that rising demand for imported oil will "increase supply side risks…and will damage the country's capacity to ensure its oil resources and economic and political security."[18]

In the summer of 2008, the West learned from Russia's invasion and occupation of South Ossetia that Moscow aspires to be an energy superpower. Russia is already the world's second-largest producer of oil, pumping nearly ten million barrels a day, and is the largest supplier of natural gas. Like all energy-exporting countries, Russia benefited enormously from the run-up in prices over the last decade. Every $1 increase in the price of a barrel of oil transferred about $1 billion into Russia's state budget. As a result, Russian foreign exchange reserves grew from $12 billion in 1999 to $470 billion at the end of last year, a balance equalled only by such countries as China, India and the Middle East oil producers.[19]

When its tanks rolled into Georgia last year, the Kremlin signalled its intention to dominate the oil and natural gas resources of the former Soviet republics in the Caspian Sea basin and raised the threat of supply disruptions to Europe. That possibility could give Russia political leverage over Germany, the Czech Republic, Slovakia, and other Central and East European countries that rely heavily on Russian fuels. In early January 2009 the possibility became reality when Russia decided to turn off the tap to Ukraine.

As rising oil prices strengthened the Kremlin's hand, then-Russian president Vladimir Putin clamped down on Russian businesspeople, most notably prosecuting and imprisoning Yukos Oil Company Chief Executive Officer Mikhail Khodorkovsky. Many in the West have yet to realize that Russia has a potential stranglehold on its European allies and will not hesitate to play its energy card should it wish to block the further expansion of NATO, for example, or the European Union.

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[18] Ridley, p. 7.
[19] William F. Shughart II, "Russia is a key link to oil," Hattiesburg American.com, December 13, 2008.

Russia's next likely move, which they could delay until the global economy starts picking up again, will be an attempt to orchestrate a global natural gas cartel patterned on the Organization of Petroleum Exporting Countries. About fifteen gas-producing countries, led by Russia and Iran, met in 2004 and agreed to establish an "executive bureau" to coordinate "interests" in the global gas market. As world demand for natural gas begins to outpace supply, incentives for collectively reducing production and increasing prices will strengthen. For Canada and the West, a combination of conservation, increased energy production and improvements in energy efficiency may be the best defence against volatile oil and gas prices and Russian blackmail.

Elsewhere, the war waged by terrorists and insurgents is not against conventional armies or nation-states. They wage it against economic and social infrastructures. The operational objective of global terrorist warfare is to separate a large urban population from its infrastructure and take advantage of the collapse and chaos that result. There are literally hundreds of active terrorist groups and insurgencies throughout the world. Their ability to disrupt production is different today from any terrorist threat faced in the past, where the potential of damage has always been from a single large attack on a major facility or node (extremely difficult to accomplish and relatively easy from which to recover). Today's threat is based on sustainable disruption—ongoing, easy, low-tech attacks ranging from pipeline destruction to employee kidnappings that are nearly impossible to defend against.

As such, terrorists pose, and will continue to pose, a constant threat to oil and gas operations, export facilities, pipelines, transports and wells. Therefore, higher costs of operating in conflict zones, and of protecting and repairing infrastructure, are factored into oil prices. Energy is essential to our daily lives. The ability of Canada's pipeline transportation system to deliver energy in the form of natural gas, natural gas liquids, crude oil and petroleum products is critical to Canada's economic well-being. In 2007, the economic benefit was approximately $121 billion.

Speaking at the International Pipeline Security Forum in Ottawa in October 2007, the Minister of Natural Resources, the Honourable Gary Lunn, emphasized the importance of energy security, noted Canada's status as an emerging energy superpower, and observed that this position involved being more

than a major energy supplier. He said that it also involved being a dependable supplier and that sight must never be lost of the fact that if our infrastructure were destroyed or damaged, the disruption could affect the safety, security, health and economic well-being of all Canadians. The Minister concluded that for economic and security reasons, protecting our energy infrastructure is very important to the prosperity of both Canada and the United States.[20]

Canadians depend on Canada's more than 100,000 kilometres of oil and gas pipeline for a safe, reliable, and efficient domestic energy supply. Closely integrated with the United States' system, Canada is also the largest oil and gas supplier to the United States, shipping well over half its daily production of about 2.5 million barrels of oil across its southern border via pipelines. These lines run through remote territory and densely populated regions, and while most are buried and therefore difficult targets, pumping stations, terminals and other facilities remain vulnerable to both accidents and malicious acts. Within our government, Natural Resources Canada has the lead in protecting critical energy infrastructures.[21] The National Energy Board oversees pipeline security, and stringent security measures that involve coordination with the Royal Canadian Mounted Police and the Canadian Security Intelligence Service have been in place since the attacks of September 11, 2001.

Security experts have, nevertheless, repeatedly pointed to the exposure of the domestic oil and natural gas pipeline system, and the vulnerability of Canadian refineries operating at or near full capacity. The threat of terrorism has caused pipeline operators in the industrialized nations to take steps to prevent terrorists from harming petroleum infrastructures, such as: 1) increasing system redundancy; 2) deploying state-of-the-art surveillance equipment; 3) deploying aerial and ground patrols; and 4) fortifying pipeline systems against cyber-security breaches.

According to a 2006 threat assessment by GlobalSecurity.org, a US company that monitors and analyses military, intelligence and national security issues, the effect of a terrorist attack on oil and gas facilities would largely depend on

[20] Natural Resources Canada, Speech by The Honourable Gary Lunn, P.C., M.P., Minister of Natural Resources to the 2007 International Pipeline Security Forum, Ottawa, Ontario, October 24, 2007.
[21] Ibid.

where the attack took place. Three major pipelines deliver crude oil, mostly from Alberta, to domestic and US refineries. Another system of high-pressure steel pipelines carries raw natural gas from wells in Alberta, British Columbia and Saskatchewan to processing plants and then on to the Canada-US market. The largest oil pipeline stretches from Edmonton to Montreal. Another travels through Regina, crosses into the United States from Manitoba and then back into Canada at Sarnia and on to Montreal. The third runs from Edmonton to Vancouver, with a subsidiary line leading to refineries in northwest Washington State. "While remote areas are easy to attack and hard to defend, there would be comparatively little damage done to the infrastructure itself," the assessment says. An attack in a city would be more difficult to execute, "but much more costly in terms of lives lost and damage to the infrastructure…Assuming that most terrorist groups want to do serious damage in either real or symbolic terms, an attack on remote pieces of pipe is less likely although they are easier to execute."

The level of service disruption and damage to public confidence also depends on the size, location and duration of an attack, writes Aaron Shull, the report's author. "Destroying a small section of pipeline in a remote location would be likely to cause little, if any, noticeable disruption in service to most Canadians. While there would be a definite impact on public confidence, no loss of life and the modest disruption of daily affairs would mitigate against any real undermining of public confidence." However, an attack in a city or on an offshore oil rig, while more difficult to pull off, would affect service delivery and public confidence.

The economic costs would be huge, as would be the political impact on Canada-US relations. Costs would include increased expense on security and repairs, lost revenues and decreased production: "It would frighten investors and foreshadow higher market prices for energy. An initial attack would also spark fears of future attacks, lowering confidence even further. There would be a corresponding increase in security-related spending, making both the production and distribution of Canadian energy more expensive. This would prove problematic in the oil and gas sector especially because Canada sits on massive unconventional reserves that are commercially viable only because of high global prices and heavy technological input. A terrorist attack could drive up costs so

that this formerly economically viable recovery process becomes an unattractive option for investment."

While an attack on Canada could create a strong emotional solidarity between Canada and the United States, it also could exacerbate political tensions by threatening US security. "The safety of Canadian energy should be viewed as an issue that encompasses, fundamentally, the safety of the US supply. There is no doubt that this fact has implications for both the level of the threat currently facing Canada from Al Qaeda and for the political relations between the two countries if there were a terrorist strike."[22]

In today's troubled world the strategic importance of oil as an energy source continues to influence a nation's defence strategy and challenges its ability to fight wars. The US Republican leader of the Foreign Relations Committee, Senator Richard G. Lugar got it right when he addressed the German Marshall Fund conference on November 27, 2006 in Riga, Latvia, ahead of the NATO summit, and said:

> *We are also beginning to understand not only the military configuration of the threats that are before us, but also the likely basis for future conflict. In this new century, one of the most likely sources of armed conflict will be energy scarcity and manipulation. It is abundantly apparent that the jobs, health, and security of our modern economies and societies depend on the sufficiency and timely availability of diverse energy resources.*
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> *We all hope that the economics of supply and pricing surrounding energy transactions will be rational and transparent, and that nations with abundant oil and natural gas will reliably supply these resources in normal market transactions to those who need them. We also hope that pipelines, sea lanes, and other means of transmission will be safe, that energy cartels will not be formed to limit available supplies and manipulate markets, and that energy rich nations will not exclude or confiscate productive foreign energy investments in the name of nationalism. And we hope that vast energy*

[22] Ian MacLeod, "Big cities' oil sectors top targets for terror," *The Ottawa Citizen* February 15, 2007.
http://www.globalsecurity.org/org/news/2007/070215-oil-target.htm

wealth will not be a source of corruption within nations that desperately ask their governments to develop and deliver the benefits of this wealth broadly to society.

Unfortunately, past experiences provide little reason to be confident that market rationality will be the governing force behind energy policy and transactions. The majority of oil and natural gas supplies and reserves in the world are not controlled by efficient, privately owned companies. Geology and politics have created oil and natural gas superpowers that nearly monopolize the world's oil supply. According to PFC Energy, foreign governments control up to 79 percent of the world's oil reserves through their national oil companies. These governments set prices through their investment and production decisions, and they have wide latitude to shut off the taps for political reasons.

At least one of three problems afflicts the vast majority of these oil assets: lack of investment, political manipulation, or the threat of instability and terrorism. As recently as six years ago, spare production capacity exceeded world oil consumption about 10 percent. As world demand for oil has rapidly increased in the last few years, spare capacity has declined to 2 percent or less. Thus, even minor disruptions of oil supply can drive up prices. Two years ago, a routine inspection found corrosion in a section of BP's Prudhoe Bay oil pipeline that shut down 8 percent of US oil output, causing a $2 spike in oil prices. That the oil market is this vulnerable to something as mundane as corrosion in a pipeline is evidence of the precarious conditions in which we live.

Within the last five years, the international flow of oil has been disrupted by hurricanes, unrest in Nigeria, and sabotage in Iraq. Al Qaeda and other terrorist organizations have openly declared their intent to attack oil facilities to inflict pain on Western economies. We should also recognize that NATO members are transferring hundreds of billions of dollars each year to some of the least accountable, autocratic regimes in the world. The revenues flowing to authoritarian regimes often increase corruption in those countries and allow them to insulate themselves from international pressure and the democratic aspirations of their own peoples. As

large industrializing nations such as China and India seek new energy supplies, oil and natural gas may not be abundant and accessible enough to support continued economic growth in both the industrialized West and in large rapidly growing economies. In these conditions, energy supplies will become an even stronger magnet for conflict.

Under the worst case scenarios, oil and natural gas will be the currency through which energy-rich countries leverage their interests against import dependent nations. The use of energy as an overt weapon is not a theoretical threat of the future; it is happening now. Iran has repeatedly threatened to cut off oil exports to selected nations if economic sanctions are imposed against it for its nuclear enrichment program. Russia's recent shut off of energy deliveries to Ukraine demonstrated how tempting it is to use energy to achieve political aims and underscored the vulnerability of consumer nations to their energy suppliers. Russia retreated from the standoff after a strong Western reaction, but how would NATO have responded if Russia had maintained the embargo? The Ukrainian economy and military could have been crippled without a shot being fired, and the dangers and losses to several NATO member nations would have mounted significantly.

Writing in the December 18, 2008 issue of *Maclean's*, Michael Friscolanti wrote of the military's sudden love affair with the Earth and attributed it almost entirely to high oil prices.[23] After decades of relative stability, the cost of a barrel of crude nearly tripled to US$140 between the start of 2007 and the summer of 2008. The price has since dropped significantly, but those eighteen months wreaked havoc on military finances.

The CF have been hit hard. During the 2005-06 fiscal year, the fleet fuel bill was approximately $220 million. Last year, it jumped to $318 million. The CF also has many wheeled and tracked vehicles in Afghanistan. To power that fleet the logistics system must move huge quantities of fuel into the country in truck convoys. And while vehicles and military weapons use a lot of fuel, the single-largest battlefield fuel consumers are the generators needed to power the air conditioners, heaters,

[23] Michael Friscolanti, "Lean, green war machine," *Maclean's*, 18 Dec 2008.

lighting, refrigeration and communications that define contemporary battlefield operations management. All that fuel gives our soldiers a tremendous battlefield advantage in communications, mobility, and firepower, among other things. Still, overseeing and carrying out this process requires the work of Canadian service members and private contractors.

Besides the challenges posed by the sheer volume of fuel needed, the armed forces' logisticians must also deal with a variety of fuels. Like his counterparts in most other NATO members the Canadian service member is among the most energy-consuming soldiers ever seen on the battlefield. For computers and GPS units, Leopard tanks and helicopters, today's soldier is in constant need of energy as battery power, electric power, and petroleum. Actual Canadian usage figures for Afghanistan have not been made public. However, US forces in Iraq and Afghanistan consume more than 68 million gallons of fuel every month, and each soldier on the ground consumes roughly nine gallons of fuel a day; that figure has been steadily rising.

Part of the rise in consumption in Afghanistan is due to insurgents' use of improvised explosive devices (IEDs), which account for most Canadian combat deaths. Cheap, easy to use, and highly effective, IEDs have forced our armed forces to purchase heavily armoured vehicles. The armour helps protect soldiers, but it also means higher fuel consumption for their vehicles. Which means, in turn, that more tanker trucks have to be driven into Afghanistan, and those trucks provide more targets for insurgents. It is a vicious cycle: attacks on convoys produce a need for more armour, which produces a need for more fuel, which produces larger convoys, which produce more targets for attack.[24]

Given that the longer the fuels supply lines are and the greater the vulnerability for our military, logic would suggest we try to reduce our fuel requirements. But over the past few years the Department of National Defence has purchased many millions of dollars' worth of tanks, trucks, and other vehicles with little or no consideration to their fuel efficiency. In decades past, military logisticians assumed that 50 percent of the tonnage moved onto a battlefield was ammunition, 30 percent was fuel, and the rest was food, water, and supplies. Today the fuel component may be as high as 70 percent, while ammunition

[24] Robert Bryce, "A $20 Billion Solution to an Intractable Problem," *The Washington Spectator,* September 15, 2007

accounts for 20 percent,[25] according to a study done in 2001 by the US Defense Science Board.

The insurgents' tactics may not stop the flow of fuel to Canada's troops, but they are part of the broader war that is forcing NATO in Afghanistan to defend pipelines, refineries, tanker trucks, and fuel depots. Meanwhile, the CF are in a bind. They have decided to deploy an Air Wing comprised of CH-47D Chinook and CH-146 Griffon helicopters, and to employ heavily armoured mine-resistant ambush protected vehicles such as the RG-31 Mk 3 Nyala, the Leopard 2A 6M main battle tank, and the LAV III infantry armoured fighting vehicle, all of which have high fuel consumption.[26]

The CF in fact have become so concerned about rising fuel consumption and the cost of oil that they recently created a new position, the Directorate of Fuel and Lubricants, to track consumption and oversee research into alternate options such as bio-diesel and ethanol. These and other initiatives are part of a concerted, CF-wide plan to reduce carbon discharge and slash fuel prices in the process. Some military vehicles now run on B5, a mixture of bio diesel and conventional fuel. Also, a "green procurement" plan is in the works that will encourage fuel-efficient purchases.[27]

Turning coal into liquid fuel is another possibility. As noted earlier, the Germans pioneered the process in the 1920s and used it in the Second World War; and the South Africans also used it during apartheid when trade embargoes limited the country's access to petroleum. US Air Force leaders see having a reliable domestic source of synthetic petroleum as a critical issue. The service burns about 2.6 billion gallons of petroleum-based fuel annually and it wants to begin using a 50-50 blend of synthetic and conventional aviation fuel by 2016, which would significantly reduce its dependence on petroleum. In January 2009, after reviewing industry bids to build a synthetic fuel plant at its Malmstrom Air Force Base in Montana, the Air Force was obliged to cancel a controversial plan that would have allowed a contractor to construct a facility for converting coal into liquid fuel. Environmentalists in Montana opposed the plant because of concerns about greenhouse gas emissions and other pollution.

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[25] Douglas Kirkpatrick, "Energy as a Tactical Asset," *Military Technology Magazine*, Vol XXXII, Issue 6 - 2008, p.163.
[26] Richard Rhames, "Wag the Tail, Frag the Dog," *CounterPunch Newsletter*, Weekend Edition, September 29 / 30, 2007.
[27] Michael Friscolanti, "Lean, green war machine," *Maclean's*, 18 Dec 2008.

They were also worried about its effect on the Missouri River, since the production process would require millions of gallons of water daily. Additionally, depending on the properties of the coal being used, it can take as much as a ton to produce a single barrel of fuel, exacerbating the environmental impact from coal mining. Nevertheless, the US Air Force says it is on track to certify its entire fleet of aircraft for using the 50-50 blend by 2011.[28]

According to the US Defense Advanced Research Projects Agency (DARPA), part of the future answer to armed forces' energy needs is to be found in bio-fuels. DARPA estimates that for medium-scale, battalion level applications, the metric of affordability is the current cost of about US$10 per gallon for truck-delivered fuel. For smaller, more remote applications, what's "affordable" should be compared to the current cost of US$400 to US$600 for resupply by air.[29] But until this or some other workable vision is translated into reality, there is absolutely nothing on the immediate horizon that will appreciably reduce the CF's constant dependency on oil.

[28] Katherine McIntire Peters, "Air Force scuttles plans for coal-to-liquids fuel plant in Montana," *Government Executive*, January 30, 2009.
[29] Douglas Kirkpatrick, "Energy as a Tactical Asset," *Military Technology Magazine*, Vol XXXII, Issue 6 - 2008, p.164.

Energy and the Arctic

Peter Johnson

Abstract

Arctic resources of conventional fossil fuels, either proven or estimated, are not the solution to short or medium term energy security. Oil reserves are too small to be economically feasible, and although there are substantial proven reserves of natural gas, the challenges of extraction and transport imply decades in the development process. Governments of nation states do not possess the financial resources to force development. In the long term gas hydrates, abundant throughout the Arctic, may be the energy source of the future. It would be necessary for the nation state actors in the Arctic to develop a common policy with respect to resources. There are also internal issues at regional government level, with respect to resource ownership, requiring solutions that would allow wealth generated in the region to remain in the region. Settlement of international boundaries through the UNCLOS process will only be the first step in resolving resource ownership in the Arctic Ocean basin. The Canadian government policy of 'use it or lose it' with respect to territory and energy resources is not the solution to development in the Arctic as there are only boundary issues to be determined. Alternative energy sources may be the solution for local communities except where small natural gas fields are in close proximity to settlements or mining activities.

Résumé

Les ressources arctiques de combustibles fossiles conventionnels, confirmées ou estimées, ne sont pas la solution à la sécurité énergétique à court ou à moyen terme. Les réserves de pétrole sont trop petites pour être économiquement exploitables et, bien qu'il existe des réserves substantielles confirmées de gaz naturel, les difficultés d'extraction et de transport signifient des décennies en processus de développement. Les gouvernements des États-nations ne possèdent pas les ressources financières pour forcer un

développement. À long terme, les hydrates de gaz, abondants dans tout l'Arctique, peuvent être la source d'énergie de l'avenir. Il serait nécessaire que les États-nations présents dans l'Arctique élaborent une politique commune vis-à-vis les ressources.Il y a aussi, chez les gouvernements régionaux, des enjeux internes touchant la propriété des ressources qui nécessitent des solutions qui permettent à toute richesse ainsi générée de rester dans la région. Le règlement des frontières à travers le processus UNCLOS ne sera que la première étape de la résolution du problème de la propriété des ressources dans le bassin de l'océan Arctique. La politique de préemption du gouvernement canadien (« use it or lose it ») quant au territoire et aux ressources énergétiques n'est pas une solution au développement de l'Arctique parce qu'il y a seulement des questions de frontières à déterminer. Les sources alternatives d'énergie sont peut-être la solution pour les communautés locales, sauf là où de petits champs de gaz naturel se trouvent à proximité d'agglomérations habitées ou d'activités minières.

Conceptualizing "security"

Our understanding of the concept of security has changed dramatically over the last 25 years. Originally defined in purely military terms, security now encompasses a number of sectors. Energy security and the role of the Arctic in energy security must be seen in this broader concept.

Energy resources in the Arctic include conventional fossil fuels, renewable energy and vast stores of elusive gas hydrates. Liquid fuels are required for civilian transport and military purposes whereas liquid fuels and natural gas are needed for electricity generation and industrial and domestic purposes. Renewable solar, wind, geothermal and hydro resources must also be part of the energy security equation, given their potential for reducing demands on oil resources required for transport.

Arctic oil resources will not contribute significantly to world oil markets unless much larger reserves are discovered and/or countries such as the United States make exploitation a priority. On the other hand, natural gas and in the long term, gas hydrates may become important to regional energy security. In January 2009 the White House released National Security and Homeland Security Presidential Directives on Arctic Region Policy that emphasized the importance of Arctic oil and gas and other

resources. The new administration has, however, chosen to focus on renewable resources.

Technologies to detect and exploit gas hydrates are in the early stages of development. Even the exploitation of natural gas reserves will take decades to become a major factor in national and regional energy supplies. Nevertheless, natural gas and gas hydrates may well be behind long term strategic and political decisions regarding the Arctic Ocean basin.

Introduction

Over the last two decades, significant national and regional concerns about energy security have emerged. The two major reasons for these concerns are reactions to political ideology and the need for continuity of supply.

Some of the main regional non-renewable fossil fuel suppliers have become politically less stable or have changed political allegiance over the last quarter century. Secondly, predictions are that the peak in global oil production will occur in the first quarter of the 21st century and coincide with dramatic increases in demand by emerging economies such as China, India and Brazil. Keeping in mind that the economies of many of the main regional producers are totally dependent on oil and gas revenues, it stands to reason that they will have to continue to market their resources to support national objectives. Additionally, the increase in demand from the emerging industrialising countries highlights the fact that few major markets possess fossil fuel refining capacity. Until alternate refining capacity is developed, conventional suppliers of oil and gas will have to continue marketing to North America and Europe.

In order to extend the time frame of availability of marketable oil and gas resources, exploration and exploitation have been pushed into environments considerably more challenging, from the standpoint of engineering and financing, than those of the Middle East and a number of other land-based locations. Some years ago, offshore technologies were developed for the Gulf of Mexico. More recently, the severe storm, iceberg and ice environments of the continental shelf off eastern Canada, the North Sea and the Barents Sea have been brought into production. Brazil is also rapidly developing its deep water offshore technical capacity. Historically, these developments have usually been close to processing sites and markets, with

the Gulf of Mexico supplying North America, the North Sea, Europe, and the eastern Canadian sites, the United States. Other locations such as the Barents Sea are being developed with more distant markets, such as Western Europe and North America in mind. Potentially the Far East will be important if the polar shipping routes open as a result of climate change. The overall trend, however, is for exploration and exploitation to move into deeper and deeper water and more hazardous environments.

For the foreseeable future, the West will continue to rely on supply from politically less stable regions such as Venezuela, whose supply has been threatened by the Chavez government's plans to nationalise the industry and supply other countries in South and Central America with lower priced fuel. The decline in the price of oil in the last half of 2008 has caused economic problems for Venezuela, however. Nigerian supply has been threatened by the activity of terrorist groups in the Niger Delta. Iraqi supply will remain uncertain as the country continues to experience attacks on infrastructure and faces uncertainty in the period after the withdrawal of American troops. There are also concerns about the Middle East in general, due to political and economic pressures brought about by fundamentalist governments, particularly Iran's.

It is not surprising that domestic or regional solutions to ensure energy supply have become a political focus for many countries. The majority of oil and gas companies however are national, particularly in the Middle East, or are global multi-national corporations with continuing roles in most of the current supply regions. There is, therefore, an inherent conflict between national and regional aspirations on the one hand, and the global perspectives of the oil industry on the other. The pressure to expand production 'at home' has also been behind confrontations between populations and governments. For example, the continuing issue of drilling in the Arctic National Wildlife Reserve (ANWR) has pitted native groups in Alaska and First Nations in Yukon against federal and state governments. ANWR has also pitted environmental groups such as the World Wildlife Fund against governments. The potential reserves in the Beaufort Sea have been foremost in the rhetoric about the Canada-US boundary in the Arctic and will figure strongly in the development of submissions to the United Nations Convention on the Law of the Sea (UNCLOS). Other areas, including the French territory of St. Pierre and Miquelon, with its potentially

large gas reserves, have so far remained under the media radar with respect to UNCLOS submissions.

Arguably the largest unexploited reserves of conventional fossil fuels lie in the Arctic Ocean Basin and surrounding regions, but widespread speculation about the size of these reserves continues. There are substantial proven resources (natural gas, predominantly), and investment of capital in research and technology will be required for their production. With the reduction of Arctic Ocean ice cover and the prediction of an increasingly rapid decline in summer ice cover in the next decade and beyond, interest in Arctic resources has peaked. This will expand interest beyond current exploration areas where in most cases ownership is not an issue. Expansion of exploration and exploitation of Arctic resources will depend on the political will of nations and their ability to override questions of cost effectiveness during swings in the global economy. At the early 2008 price of $140 per barrel, Arctic oil and Alberta oil sands would be cost effective, if not environmentally acceptable, but at $50 a barrel, the economics are much less favourable. The decline in price in the last six months of 2008 has already resulted in the scaling back of some oil sands proposals. Bitumen upgrader projects were delayed or shelved in late 2008. This may result in more bitumen being exported to the United States for processing. StatoilHydro ASA, a Norwegian based company, blamed lower oil prices, high costs of operating in Alberta, and problems with regulatory processes for their change in plans. Significantly there are also environmental movements in the United States, particularly in California, that are against 'dirty' fuel sources such as the tar sands.

The role that renewable energy will play in energy security discussions needs to be explored, especially for the sake of small and remote communities. Oil will always be exported from remote regions for processing and then returned in refined form for local economies at a price differential detrimental for these communities. Natural gas can be used locally on a small scale, as has been demonstrated by the community of Inuvik in the Northwest Territories, but this in many ways has occurred through the fortuitous opportunity to use a small exploration well for local consumption. Drilling small wells, specifically for smaller communities, would probably not be feasible economically, but regional supply from larger production wells could be an option, even a significant one, for energy security for northern military infrastructure.

As mentioned earlier, currently the largest unexploited proven global reserves lie in the area surrounding the Arctic Ocean basin. There is also debate and speculation about resources in the basin and advances in exploration technologies will probably demonstrate significantly larger potential. Any Arctic resource exploitation, energy or mineral, will depend on the resolution of governance in the region to exploit the resources. Governance issues range from the establishment of national boundaries through the UNCLOS process, to the rights and roles of regional, sub-regional and indigenous governments. The timetable for resolution through UNCLOS will depend on ratification by the United States, and its submission of a claim. The resolution of issues arising, for example, from agreements between Canada and Nunavut, between Denmark and Greenland, and between the United States, Alaska, and the natives of Alaska will be critical to exploitation of energy resources.

Three fundamental questions arise:

1) What will be the effect of the fundamental conflict between national and regional energy security demands of political and military systems and the global interests of multi-national energy companies transcending national or regional requirements?
2) What will be the timetable for fossil fuel projects resulting from energy security concerns? (It is suggested that the time will be measured in terms of decades including exploration, proving of resources, the development of technologies for extraction, and transport of the resource).
3) What will be the effect of energy security concerns on the development of alternative energies?

Global economy dependence on fossil fuels

At the start of the 21st century, the global economy is almost totally dependent on non-renewable fuel sources. The maritime shipping industry has virtually no alternatives that are likely to replace conventional fuels for decades although options exist for cleaner fuels. The few nuclear powered vessels, currently mostly in military or special applications, are banned from many countries and will continue to be so for the foreseeable future. A change to nuclear emphasis will require a shift in government and public perceptions of nuclear power. In particular the question of access to nuclear technology will drive

political agendas because of concerns about terrorist groups. The ongoing problems with North Korea and Iran at the start of this century are symbols of this situation.

Prior to the economic collapse of late 2008, predictions by the International Energy Agency were that global energy demands would increase by about 50 percent in the next 25 years and that 80-85 percent of that would be met by fossil fuels. In many developed parts of the world, the proportion of imported energy is growing despite efforts to develop energy alternatives. Parts of the EU have expanded alternative energy sources but it is predicted that reliance on imported energy may increase to 70 percent in the next few decades. Thus it is obvious why the EU is developing policies with respect to Arctic Ocean oil and gas resources:

> *There are clear indications that the EU's new interest in the Arctic is strongly driven by energy related considerations, which are in turn linked to climate change issues.*[1]

Existing fossil fuel resources in the Arctic

The Arctic contains proven oil and gas reserves in all areas where the five Arctic nations (Canada, Denmark, Norway, Russia and the United States) have undisputed sovereignty as well as in the areas where there are conflicting claims.

Canadian energy resources lie mainly in the Mackenzie Delta and in the offshore areas and islands of the western archipelago. Three geological sedimentary basins in the west contain proven resources: the Mackenzie corridor, which is already being exploited at Norman Wells; the Mackenzie Delta and Beaufort Sea, where there are some proven resources; and the Sverdrup Basin where, from 1970s exploration, there are proven reserves of 1.85 billion barrels of oil (BBO). However, these proven reserves are only a fraction of the production from Alberta. There are very few proven reserves in the eastern Arctic, Baffin Bay and the Davis Strait. Proven oil reserves, perhaps most critical when considering fuel for commercial transportation, military activities and for conducting search and rescue operations, are far smaller than natural gas reserves. A number of natural gas wells have been capped, but currently there is

[1] Adele Airoldi. *The European Union and the Arctic: Policies and Actions*. Copenhagen: Nordic Council of Ministers, 2008. Available online at http://www.norden.org/da/publikationer/publikationer/2008-729

little production due primarily to the absence of transport facilities to markets in the south. The Mackenzie Valley Pipeline will provide a land link for resources in the delta and the near-shore Beaufort Sea, although, if approved by the regulatory process, completion may be as much as a decade away.

Denmark's Greenland has few proven resources, but the United States Geological Survey (USGS) has identified potential resources along the Davis Strait and off the Arctic Ocean coast. Russia has extensive reserves on the mainland and along the whole of the continental shelf and in the Barents Sea. There are existing pipelines into the Russian subarctic which will be extended into the Arctic as resources come on stream, but there have been concerns about the condition of the existing network. Russia is likely to vigorously promote the development of its Arctic resources. In the Barents Sea region there are jurisdictional issues between Russia and Norway, but Norway views its energy resources' future as being tied to the region as North Sea production declines. Discussions between the two nations are ongoing and, because large areas lie outside the provisions of UNCLOS settlement of development issues, they will not depend on the conclusion of the UNCLOS process.

US resources lie primarily on the North Slope. Some of these, in the Beaufort Sea and the Chukchi Sea, are currently being exploited. There has been extensive exploration, and exploitation will depend on connection to the Alyeska pipeline, the Mackenzie Valley pipeline, the proposed Alaska Highway pipeline, or on development of liquefied natural gas (LNG) facilities. Progress on the Alaska Highway pipeline route has, to date, been slower than on the Mackenzie Valley route, but planning is moving ahead. Attempts at developing a Polar Gas Pipeline and a Mackenzie Valley Pipeline have been abandoned.

There is still too much speculation on the magnitude of proven and unproven reserves in the Arctic. One of the problems for assessing reserves centres on the release of detailed data from exploration companies, which complicates multinational and bilateral discussions.

Coal cannot be ignored in discussions about energy security and there are widespread deposits in the circum-arctic region. There are substantial resources in most mid-latitude regions of the developed world and power generation in the United States and China still depends heavily on coal. Advances in technology for the production of liquid or gas products from coal cannot be ruled out as concerns about energy security

escalate above present levels. During the industrial revolution and into the second half of the 20th century, coal gas was one of the dominant fuels, and by-products such as coke were important sources of household and industrial fuels.

Undiscovered conventional fossil fuel reserves

In 2008 the USGS released an appraisal of undiscovered Arctic oil and gas reserves. This appraisal is based on existing geological knowledge (still limited in much of the Arctic Ocean basin and the Canadian Arctic Archipelago) and on sophisticated modelling techniques. The USGS Appraisal concluded that these Arctic oil and gas reserves amount to an estimated 90 BBO, 1670 T ft³ of gas and 44 BB Natural Gas Liquids. These estimates must be set in the context of remaining world resources. In January 1996, these were estimated at 96 BBO, but by January 2008 they were estimated at 1,238 BBO. The 90 BBO of conventional Arctic oil would represent 13 percent of the estimated world total. The 1,670 T ft³ of gas would represent about 30 percent of global undiscovered resources. There is considerable uncertainty surrounding these numbers and it is questionable whether the oil reserves are significant enough to be a factor in regional energy security. Gas reserves are, however, significant in the world picture, and Russia and Norway are pushing ahead with exploitation.

The long term future of energy resources in the Arctic may lie in Gas Hydrates. In 2008 the Council of Canadian Academies (CCA) released a report assessing the opportunities and challenges for Canada:

> *The gas held in naturally occurring gas hydrate is generated by microbial or thermal alteration of organic matter under the seafloor or permafrost, producing methane and other gaseous byproducts*.[2]

The estimation of the volume of gas hydrates worldwide is a problem due to the paucity of data. The CCA report provides recent estimates of 1–120 x 10^{15} cubic metres (35,000 to 4,200,000 trillion cubic feet) and contrasts this with

[2] Council of Canadian Academies. *Energy from Gas Hydrates – Assessing the Opportunities and Challenges for Canada*. Ottawa, 2008. http://www.scienceadvice.ca/hydrates.html

conventional natural gas reserves of 4.4 x 10^{14} cubic metres (15,500 trillion cubic feet).

The Arctic contains a large proportion of the gas hydrate resource. The potential reserves in the Mackenzie Delta/Beaufort Sea region alone may be between 8.8 and 10.2 x 10^{12} m^3 (310 to 360 trillion cubic feet).

The technology for the exploitation of the resource is in the early stages of development. The CCA panel concluded that:

> *While there will be a growing market for Canadian gas exports to the United States, these will have to compete with imported LNG. Once major investments are made to accommodate imported LNG, its competitive advantage could become insurmountable. This suggests that a 'security premium', or other such incentive for the development of domestic gas supplies, may be required to bring northern and perhaps other unconventional gas on stream. It is therefore likely that there would have to be government incentives, at least in the early phases, to stimulate development of gas hydrate.*[3]

Political actors in the Arctic

There are a number of political actors or groups of actors in the Arctic region, each with their own agendas.

The Arctic Ocean Five

Canada, the United States, Denmark, Norway, and Russia are the states which border on the Arctic Ocean. They are the players in the UNCLOS discussions on national boundaries in the Arctic Ocean region. In May 2008, at the invitation of Denmark, senior bureaucrats of the five met in Ilulissat, Greenland, to discuss management strategies in the Arctic Ocean. The Ilulissat declaration included support for the current legal regime, a framework for management, the safety of marine navigation, and support for tourism, research, and resource development. This meeting was controversial in that representatives of the

[3] Council of Canadian Academies. *Energy from Gas Hydrates – Assessing the Opportunities and Challenges for Canada*. Ottawa, 2008. http://www.scienceadvice.ca/hydrates.html

Indigenous peoples were not present at the table and invitations to other states and stakeholders were not made.

The Circum-Arctic Eight

This is the group that is most commonly involved in circum-arctic discussions. It consists of the Arctic Ocean Five plus Sweden, Finland and Iceland. With the permanent participants of indigenous people, these nation states make up the Arctic Council. The Inuit Circumpolar Council, The Saami Council, Gwich'in Council International, Arctic Athabaskan Council, Aleut International Association, and the Russian Association of Indigenous People are permanent participants in the Arctic Council. The Arctic Council does not have policy-making powers, although it has attempted to make policy recommendations from assessments such as the Arctic Climate Impact Assessment (ACIA). These policy recommendations were strongly opposed by the United States. The January 2009 United States Directive on Arctic Region Policy does, however, suggest that policy recommendations from the Arctic Council will receive consideration.

The Arctic Council has a number of working groups:

CAFF - Conservation of Arctic Flora and Fauna
AMAP - Arctic Monitoring and Assessment Program
SDWG - Sustainable Development Working Group
EPPR - Emergency Prevention, Preparedness and Response
PAME - Protection of the Arctic Marine Environment
ACAP - Arctic Contaminants Action Program

An oil and gas assessment was released by the Arctic Council in 2008 that addressed many of the social and cultural issues of resource exploitation. An Arctic Marine Shipping Assessment (AMSA) final report is expected by the spring of 2009. The Arctic Council has always struggled with a lack of substantial supporting resources, especially for the participation of the indigenous permanent participants.

In addition, each nation state has its own Arctic agenda for sovereignty and security, resources, search and rescue, and the status of indigenous peoples; although in the case of Canada, following a number of announcements from the Conservative government, the agenda is not yet clear.

Regional governments within nation-states

Greenland was effectively governed by Denmark from 1916 when the United States decided not to oppose a broader political and economic interest by Denmark. In 1979, Greenland achieved home rule government, leaving only foreign affairs and defence in the purview of Copenhagen, but including an assured subsidy to maintain the economy. In late November 2008 the residents of Greenland voted 76 percent in favour of greater autonomy and took control over natural resources. Energy security based on Arctic resources will have a new perspective as Greenland seeks to maximise their economic benefits as the importance of marine renewable resources continue to decline in the 21st century.

The government of Canada has negotiated land claims agreements with the Inuit and First Nations of the north. This has resulted in the formation of Nunavut, through the Nunavut Land Claims Agreement and the Nunavut Act. The federal government and the governments of Yukon and the Northwest Territories have negotiated land claims agreements with most of the First Nations and the federal government has been devolving powers to the territorial governments. Although mineral rights and energy resources, particularly offshore, remain within the control of the federal government, as reflected in the announcements of exploration and infrastructure funding in recent Speeches from the Throne, Nunavut is entitled to a much greater economic benefit from resource exploitation. Due to the failure of the federal government to implement many of the terms of the land claims agreement, internal governance issues could play a major role in the development of Arctic energy resources.

In Alaska there is a role for all levels of government in energy development. For terrestrial resources, Washington still plays a major role in the permitting of exploration, as has been demonstrated in the fight for drilling permission in the Arctic National Wildlife Reserve. Revenues accrue to state, nation and native groups, as reflected in the annual payment to all state residents and agreements with native tribes.

Russia and Norway have primarily state control of resources, and discussions on Barents Sea resources are conducted at the national level.

It is apparent that the differences in governance regimes between the nation states and their regions will impact decisions

on energy resource exploitation as concerns about energy security increase in this century.

Russia

Russia, with its own agenda for the Arctic, focuses on sovereignty, the northern sea route and resources. It is also involved in discussions with Norway over jurisdiction in the Barents Sea. The new political reality in Russia is difficult to interpret with respect to energy exploration and exploitation. The rise in energy prices until the middle of 2008 gave increasing economic power to Russia but the decline in energy prices in late 2008 has caused an economic downturn and decreased the opportunities for Russia to exploit northern energy resources.

The European Union

The European Union's interest in the north, and ultimately in the Arctic started with the EU memberships of Finland and Sweden in 1995. Cooperation was already established in the Nordic Region with Russia and Norway in the early 1990s. Finland introduced a "Northern Dimension" to the European Union in late 1999:

> *Issues that worked in the background – and are still relevant – included the notion of the north forming a unique international area of cooperation. The Arctic area brings together the EU, Russia and North America. Questions related to the region's environment, especially its energy resources, have global significance. In the early 21st century, this observation has taken on further significance due to climate change and the increase in the exploitation of northern energy resources.*[4]

An Arctic Treaty, operating in a similar way to the Antarctic Treaty, is still raised in discussion, but the overall response to the concept has been negative.

The EU's interest in the Arctic reached a critical stage in late 2008 with the publication of "The European Union and the

[4] Markku Heikkil. *The Northern Dimension*. Europe Information, 2006. http://www.ndphs.org/?database,view,paper,24

Arctic, Policies and Actions,"[5] by Adele Airoldi, as input to the Nordic Council of Ministers meeting in Ilulissat, Greenland in September 2008. Subsequently the Monaco Conference, "The Arctic: Observing the environmental changes and facing their challenges" in November 2008 completed this intense period of activity.

The Ilulissat conference addressed the need for circumpolar cooperation in view of the changes taking place in the region. The Monaco conference Final Declaration urged a number of EU initiatives with respect to the Arctic. In the eleven recommendations, there is strong support for observing and monitoring, but significantly, for the need to have access to long term data sets for analysis of Arctic changes for policy making, to optimise the use of scientific data in the Arctic, and to take a greater role in Arctic Council initiatives. The latter recommendation relates directly to the application of the EU for observer status in the Arctic Council.

Political activity with respect to the Arctic Region is intense and appears to be driven by the resource agenda, particularly energy resources. Exploration and exploitation of Arctic resources will be extremely expensive and will be at the mercy of global price fluctuations, unless political decisions are made to promote the use of Arctic resources for reasons other than world market costs. The influence of world market costs over energy security can be seen in the impact of the 2008 economic crisis on the oil sands developments in Canada. Oil sands economics depend on a high world price for conventional oil; in the last few months of 2008 projects were shelved or downsized in Alberta because it was not economically viable for multinational companies to proceed.

UNCLOS in the Arctic

The United Nations Convention on the Law of the Sea (UNCLOS) provides the adjudication of national claims to Extended Economic Zones. The claims are based on a number of criteria delimiting the extent of the continental shelf and the definition of boundaries based on lines extending from national terrestrial boundary extension criteria.

[5] Available online at http://www.norden.org/da/publikationer/publikationer/2008-729

In the Arctic it appears that there will be overlapping claims between Canada and the United States, Canada and Denmark/Greenland, Russia and the United States, and Russia and Norway. UNCLOS is not a tribunal process and overlapping claims will still need to be negotiated bilaterally. Establishment of boundaries will provide nations, and hopefully the indigenous peoples of the north, with the exclusive rights to oil, gas and mineral resources. Resources have become the most critical driver for national submissions to UNCLOS and in some cases are central to energy security approaches (United States, Canada) and in others as a commodity for the world market (Norway, Russia).

Russia submitted an early claim to UNCLOS in 2001 and was asked to resubmit. Norway submitted in 2006 and Canada and Denmark are expected to submit in 2013 and 2014 respectively. The United States has not ratified UNCLOS, although the January 2009 Directive suggests a forthcoming ratification. The United States is however devoting substantial resources to delimiting its continental shelf. Major expeditions in 2006, 2007 and 2008 have focussed on the Chukchi Sea. Bilateral discussions will extend well beyond UNCLOS accepting submissions. Currently there is up to a two year delay between the submission of a claim and recommendations, and this delay will increase as the number of submissions is expected to rise in the next few years. The resolution of boundary issues is central to any long term consideration of Arctic resources as the solution to regional energy security issues. Canadian research in support of its UNCLOS submission has been criticised as being inadequate.[6]

Relationship to renewable energy supplies

Most communities in the north and the Arctic are concerned about their own energy security since there are a number of problems with the use of conventional fuels. First, the cost of conventional fuels such as diesel and gasoline has fluctuated dramatically. Diesel is used in the majority of communities for electricity generation. Second, transport of liquid fuels has become a problem for many isolated communities as the duration of winter roads has decreased with

[6] Ken Coates et al. *Arctic Front: Defending Canada in the Far North*. Thomas Allen Publishers, 2008.

climate warming and as river barge and air tanker transport has increased in cost. Third, the role of soot from fossil fuel consumption (both domestic and maritime origin), considered for two decades to be contributing to changes in the albedo of snow (the extent to which snow diffusely reflects light from the Sun) that enhances snow and ice melt, has been shown during the Circum-arctic Flaw Lead Study of the International Polar Year to be having a greater effect than previously thought. Options to replace gasoline and aviation fuels are limited, but aviation fuel is only stored at the major transport hubs and not in communities. Liquid fuel for cars, snowmobiles and small boat motors is the main community concern. The major problems lie with reliance on diesel for electricity generation. For shipping, most vessels carry sufficient fuel for Arctic voyages, but military operations requiring continuous presence in the Arctic require storage facilities. The Canadian government has proposed using the deep water port facilities at Nanisivik in the Canadian Arctic for military operations.

Increasingly, communities are looking to alternative energy options, usually with a focus on hybrid systems, although some locations have potential for a one-system focus. Inuvik in the Northwest Territories is using an exploration natural gas well to replace diesel for power generation. Iqaluit is developing hydro-electricity sources with potential to supply all the demands of the city. In Alaska, hybrid systems involving wind, solar, and hydro are being developed. There is also exploration of geothermal potential particularly in the tectonically active areas around the Pacific Rim. Iceland has developed its geothermal sources to supply power and hot water to most of its communities. In the last decade the country has been experimenting with hydrogen as a fuel source and has been running some experimental mass transit vehicles on hydrogen power. There has been some rethinking of the use of hydrogen and other potential energy sources based on the geothermal resource.

Energy security from national, regional or global energy security perspectives cannot be viewed in isolation from the needs of small northern and Arctic communities. Exploitation for global demands must be matched by energy security provisions for indigenous communities who claim ownership of the resources. Although most communities in the Arctic are in coastal locations and should presumably have easier shipping access for delivery of fuel as the extent and duration of Arctic

Ocean ice decreases, there is still a desire to reduce or eliminate dependency on diesel. Issues of resource ownership and royalties to northern governments and indigenous groups will obviously play a part in the discussions on financing of alternative energy within communities.

The Canadian "use it or lose it" philosophy

The Canadian government of Stephen Harper has taken a "use it or lose it" philosophy for the Arctic, a position which is being criticised by indigenous governance and environmental organizations. The philosophy is a political response of the Conservative government to international pressure with respect to sovereignty over the Arctic and the Northwest Passage. The status of the Northwest Passage, part of the pressure on government, has been debated intensely by lawyers, politicians, strategic studies scholars, and geographers (e.g. Rob Huebert, Franklyn Griffiths). From all of these arguments, the underlying position seems to be that there is no challenge to Canadian Arctic sovereignty, only a challenge to the status of the Northwest Passage. The United States and other maritime shipping nations propose International Strait status for the passage rather than classification as Canadian internal waters. The Northwest Passage is not the only shipping route for which the United States is seeking to establish an international strait designation. There is no question that resources in the area belong to Canada (out to the boundaries which will be determined under the UNCLOS process). Questions remain, therefore, as to how and to what extent Arctic resources should be exploited, what should be the time scale for exploitation, and how the benefits from any exploitation will be divided.

The extent to which Arctic energy resources can be exploited as part of the move towards regional energy security is questionable. Given the proven resources, particularly of liquid fossil fuels, Arctic reserves can only be seen as a stop-gap measure as conventional world energy resources are depleted. Even with some of the more encouraging figures quoted by the USGS, there will still be a depletion of the recoverable resource in the 21st century as demand continues to rise. Inevitably, alternative fuel sources will be required even if exploitation of Arctic energy resources is pursued, with all its inherent risks to the environment. Investment in new fuels and technologies must be stressed in the search for energy security.

If Arctic resources are to be exploited, the time scale is very important. There are three important considerations. First, consideration must be given to the time scale involved in project approval following regulatory and environmental impact requirements. Second, new technologies for exploitation need to be developed, especially for offshore operations. Third, transport strategies will need to be developed. Transport by pipeline or tanker for oil and LNG have major security dimensions of vulnerability to terrorist threats. Offshore production and transport will also require environmental safeguards and sufficient emergency response capability. The time frame for exploitation of Arctic energy resources is probably decades. Energy security concerns are immediate, so it is debatable whether Arctic energy resources can contribute to the search for national or regional energy security.

The Mackenzie Pipeline review process, an example of Canada's regulatory process, has been delayed from the initial promise of a final report by the joint-review panel (formed in 2004) by November 2007 to December 2009. There are also outstanding access issues with First Nations. The original completion date of 2009 for the pipeline has now been pushed back to 2014 or perhaps even later. Exploitation of Arctic energy resources in Canada as a component of regional energy security would require a restructuring of the regulatory and environmental assessment process and an acceleration of technology development.

The development of new technologies will require a major financial commitment with innovative partnerships and changed taxation regimes. The break in exploration and development of exploitation technologies between the boom of the 1970s and the boom of the 2000s will need to be overcome. This will also have to be matched with investment in Arctic research in general. There is an opportunity to build on the successes of the International Polar Year (IPY) and its legacy proposals such as the Sustaining Arctic Observing Networks (SAON). The concept of SAON had received wide political and scientific support by the end of 2008 but major funding had not been committed. The Canadian government is discussing a research commitment in the form of a High Arctic Research Station. An international panel has suggested a Canadian Arctic Research Institute, but other internal reports, notably one by the Canadian Polar Commission, have promoted the idea of a network of science and community research facilities with adequate financial

support. Unfortunately, reports from non-government agencies and other organizations have been virtually ignored by the federal government. Establishing the High Arctic Research Station and promoting new technologies will require a substantial time commitment. Current estimates for the development of the station are in the order of a decade even if everything falls into place in the decision making and financing processes.

The overall cost of exploiting Arctic energy resources will be enormous. The escalation in the cost estimates for the Mackenzie Pipeline to over $15 billion is sobering, given the deteriorating world economy and financing difficulties. The drop in oil prices by 50 percent in the second half of 2008 has already forced rethinking of some oil sands investment in Alberta.

Importance of Northern governments and communities in energy security

Northern governments and communities in the United States, Canada and Greenland represent small populations with large proportions of indigenous peoples. With the exception of Russia, they are not industrialised communities. The presence of fossil fuel resources in underdeveloped economies has a parallel in the discovery and exploitation of fossil fuel resources in the Middle East, where the economies have become dependent on escalating oil prices. The crash in the oil price in late 2008 has created economic problems, with Iran reported to be in a serious economic crisis despite very extensive oil reserves. A significant proportion of the value of Arctic energy resources must remain in the Arctic to help address the serious problems faced by northerners, particularly indigenous peoples, if energy resources are to be exploited. A new economic reality may be emerging in Greenland with the signing of the new agreement with Denmark, but care must be taken. The Nunavut land claims agreement, if fully implemented, should provide the framework for revenue sharing.

Ripple Effects: Russia, the Energy Card, and the Medvedev Doctrine

J.L. Black

Abstract

This year's short but serious "Gas War" between Russia's Gazprom and Ukraine's Naftohaz threw the difficult relationship between the world's gas producers, gas consumers, and their transit partners into stark relief. An economic question quickly became a geostrategic question as the reliability of energy supply from Russia to Europe came into question. The situation is compounded by Russia's increasingly less compromising stance in international affairs and by the onslaught of the global financial crisis. Energy security has become the order of the day, and negotiation over pipeline routes, transit policy, and source of supply is now a central issue of contemporary diplomacy. Overt and covert strategic manoeuvring over pipeline routes is underway at an almost frantic pace. This paper details how Russia has dealt with the issue by taking advantage of its existing edge in Central Asia to institutionalize and strengthen current energy ties in Central Asia and Eastern Europe.

Résumé

La «guerre du gaz », brève mais grave, qui a eu lieu cette année entre Gazprom de la Russie et Naftohaz de l'Ukraine, a mis fortement en relief la difficile relation entre les producteurs de gaz du monde, les consommateurs de gaz et leurs partenaires de transit. Ce qui était une question économique est rapidement devenu une question géostratégique, alors qu'a été soulevée la question de la fiabilité de l'approvisionnement énergétique de l'Europe en provenance de la Russie. La situation est aggravée par l'attitude de la Russie, de moins en moins portée au compromis dans les affaires internationales, et par la crise financière mondiale. La sécurité énergétique est devenue l'ordre du jour et la négociation concernant les tracés de pipelines, les politiques de transit et les sources

d'approvisionnement est maintenant la question centrale de la diplomatie contemporaine. Les manoeuvres stratégiques ouvertes et sous couvert sur les tracés de pipelines se déroulent à une cadence quasiment frénétique. Cette étude explique comment la Russie a su institutionnaliser et renforcer ses liens énergétiques en Asie centrale ainsi qu'en Europe de l'est.

The year opened with yet another "Gas War" between Russia's natural gas monopoly, Gazprom, and its Ukrainian customer, Naftohaz.[1] Details of what quickly became a bitter state-to-state quarrel have been argued elsewhere. Suffice to say here that the dispute took nearly three weeks to settle and left most eastern European countries either short or fully deprived of gas supplies during the coldest part of the winter.

For the purpose of this paper, specifics of the disagreement are not so important as its ripple effects, the most important of which was the final acknowledgement by everyone of the obvious: 1) consumers, producers and carriers of energy supplies are particularly vulnerable to political whim and, concomitantly, 2) the extent and complexity of European Union (EU) dependence on gas currently transported from Russia through Ukraine compounds that vulnerability (figure 1).

[1] The Russian government owns 51% of Gazprom. The Ukrainian government owns 100% of Naftohaz.

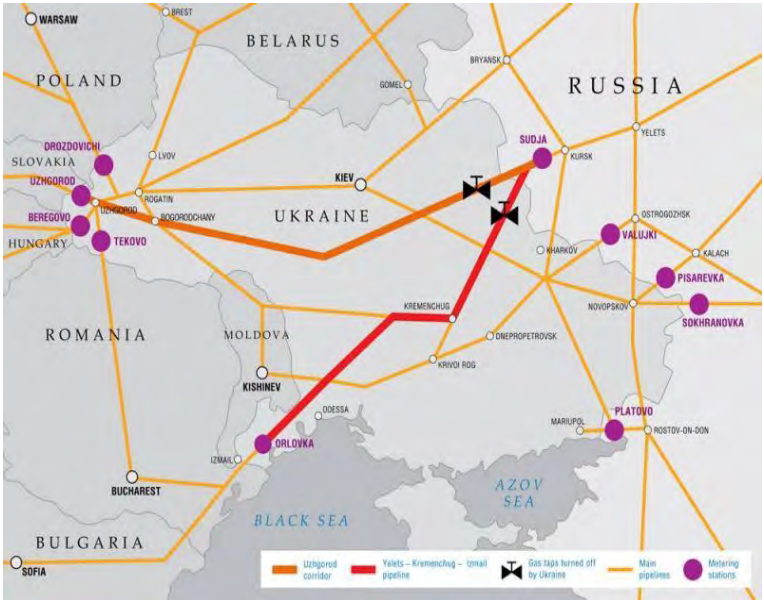

Figure 1 – Russia-EU pipelines through Ukraine

Gazprom is capable of cutting off energy supplies to Europe and many of Russia's immediate neighbours, Ukrainian officials can prevent gas and oil from flowing into Europe from Russia, and even Georgia can block the gas flow to South Ossetia. All have done so for political (while citing economic) reasons of their own. Poland and Slovakia can contribute to a freeze as well. These realities are the topic on which this paper will concentrate, with emphasis on natural gas, pipeline diplomacy, and Kremlin tactics. Such considerations as domestic politics, the obvious susceptibility of pipelines to military actions and terrorist acts, and the overall issue of energy prices must be left to more specialized study.

The Kremlin's approach to the affair with Ukraine (and, one might add, to the conflict in Georgia in August 2008) differed considerably from earlier such spats, especially in the adamancy of its position. There was no note of compromise or concession here, no hint of weakness even in the face of a relatively united European front. Interestingly, there was also a greater willingness in Europe to see both sides of the issue and to spread the blame around, rather than attribute responsibility solely to Moscow as in previous confrontations over energy and other matters. In fact, Europe was outraged that neither Russia

nor Ukraine honoured their energy contracts. EU Commission President José Manuel Barroso made it clear that Europe needed alternative sources of supply and urged his colleagues to renew support for the Nabucco pipeline project, which will bypass both Russia and Ukraine.[2]

The Medvedev Doctrine

Russia's firmer approach can be explained in part by the new Foreign Policy Concept approved by Dmitry Medvedev on 12 July 2008. In Medvedev's own words the five main principles of the Concept are:

> *First, Russia recognizes the primacy of the fundamental principles of international law which define the relations between civilized peoples. We will build our relations with other countries within the framework of these principles and this concept of international law.*
>
> *Second, the world should be multi-polar. A single-pole world is unacceptable. Domination is something we cannot allow. We cannot accept a world order in which one country makes all the decisions, even as serious and influential a country as the United States of America. Such a world is unstable and threatened by conflict.*
>
> *Third, Russia does not want confrontation with any other country. Russia has no intention of isolating itself. We will develop friendly relations with Europe, the United States, and other countries, as much as is possible.*
>
> *Fourth, protecting the lives and dignity of our citizens, wherever they may be, is an unquestionable priority for our country. Our foreign policy decisions will be based on this need. We will also protect the interests of our business community abroad. It should be clear to all that we will respond to any aggressive acts committed against us.*
>
> *Finally, fifth, as is the case of other countries, there are regions in which Russia has privileged interests. These regions are home to countries with which we share special historical relations and are bound together as friends and good neighbors. We will pay particular attention to our work in these regions and build friendly ties with these*

[2] For quotes from an angry Barroso, see Robert Wielaard, "EU: Europe Must Invest in Energy Security," *AP* (20 January 2009).

countries, our close neighbors. These are the principles I will follow in carrying out our foreign policy.

As for the future, it depends not only on us but also on our friends and partners in the international community. They have a choice.[3]

With the exception of the fifth principle, this late August summary raised few eyebrows. When he presented the Foreign Policy Concept to Russia's ambassadors in July 2008, Medvedev highlighted failures in the "Near Abroad," above all in the CIS states. "He called on us to be more decisive and aggressive so as not to be forced out of there by non-regional players such as the United States," a high-ranking diplomat told *Kommersant*. "In fact, that is why we are creating an agency for CIS Affairs under the Foreign Ministry."[4]

Among Russia's global priorities, the Medvedev Doctrine, as the Concept came to be known, included building a new world order, with the United Nations – meaning not NATO – as the central agency for mediating international conflicts. Equally important was the intensification of current Russian association with the G-8 and both the Troika (Russia, India, and China) and the BRIC (Brazil, Russia, India, and China). Developing bilateral and multilateral cooperation with CIS member states heads the list of Moscow's regional priorities. Russia hopes to strengthen the Eurasian Economic Community (EurAsEC) as the nucleus of regional economic integration, although this project suffered a setback in October 2008 when Uzbekistan decided to withdraw.[5] The Collective Security Treaty Organization (CSTO) was headlined as the key agency for maintaining stability and security in the CIS, and the Shanghai Cooperation Organization (ShCO) was named the best forum for combined political, economic and international policy.[6]

These last two organizations are institutional agencies of Russia's foreign and economic policy in Eurasia. They were

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[3] Kremlin.ru (31 Aug 2008).

[4] Quoted in V. Solov'ev and M. Zygar', "Za MID vo vsem mire," *Kommersant* (16 July 2008).

[5] The EurAsEC now includes Russia, Belarus, Kazakhstan, Tajikistan, and Kyrgyzstan. Armenia, Moldova and Ukraine are observers. The first three named inaugurated a customs union in January.

[6] On the CSTO and the ShCO see J.L. Black, "New Alliances: Russia and the Shanghai Cooperation Organization," in Brian MacDonald, *Canadians and Asian Pacific Security*, Vimy Paper 2008, pp. 42-56.

created in the 1990s and instituted by formal charter in 2001 and 2002. The ShCO now includes Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan as full members; Mongolia, India, Pakistan and Iran as official observers; Afghanistan, Turkmenistan, and Azerbaijan as unofficial but regular observers. Its headquarters is in Beijing. The population of these states and associates make up about one-half of the world's population. The CSTO includes Russia, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan. Its headquarters is in Moscow. The potential of these bodies must be factored into any discourse on energy, drug-traficking, terrorism, and the future of Afghanistan.

Medvedev noted that a treaty of strategic partnership with the EU could serve Russia's long-term interests, but when it came to NATO, the onus was placed on the Alliance to develop a partnership of equals. NATO enlargement, including its plans to admit Ukraine and Georgia and move military infrastructure to the Russian border, remains anathema to the Kremlin. Moscow requires an alternative to both NATO and the OSCE, that is, a new European security system, of which Russia would be an integral part. To this end, Russia's principal gas partners in West Europe, Germany, France, Italy, Finland, Greece, and the Netherlands were expected to serve as the Kremlin's frontline lobbyists for a general European security treaty. The effect of events in Georgia and Ukraine on that support remains to be seen.

Leading customers of Rosoboroneksport, the Russian agency for arms export, among them China, India, Turkey, Egypt, Algeria, Saudi Arabia, Syria, Libya, and Pakistan, were taken into account as strategic partners as well. Several are also involved in discussions with Russia and the ShCO on the feasibility of what pundits name a Gas OPEC, or an agency of control for gas producers.

A flurry of statements from Russian officials in January 2009 promoted their country's "special interests" in the former Soviet territory. In response to Condoleezza Rice's insistence that Russia had no right to special interests in the post-Soviet space, First Deputy Foreign Minister Andrei Denisov claimed that his country did, in fact, have such rights, but that they need not clash with the interests of other states. As Interfax paraphrased it: "Don't lecture us—we know that these countries are fully independent, but our proximity to them and the history of our

relationships make them of special interest to us, naturally."[7] Foreign Minister Lavrov later sounded the same bell. Insisting that Russia does not seek any sphere of influence in the CIS area, he noted that these countries are "privileged partners" of Russia.[8] Outcries in the West about a new Warsaw Pact in Central Asia ignore the strength those countries possess based on their own energy resources, and their resolve to remain independent of Russia, China and each other. There is no KGB or Red Army to terrorize them into line. They are, however, linked anyway by long-standing economic and cultural ties, and common political objectives unlikely to be broken productively by purposeful foreign inroads.[9]

The energy card

Collectively, the EU obtains 25 percent of its gas from Russia, 80 percent of which flows through Ukraine. In addition to Barroso's outburst, official statements from the 27-member EU called for that body to renew its search for ways to diversify its supply and build adequate strategic reserves. The US-favoured Nabucco (figure 2),[10] which had almost faded from sight because the Russia-supported Nord Stream and South Stream pipelines were less expensive, once again became a preferred project for the EU.

[7] Interfax (29 December 2008).

[8] "Lavrov: Strany SNG – privilegirovannye partnery dlia Rossii," *Regnum* (16 January 2009).

[9] There is a myth that the ShCO and the CSTO did not support Russia's actions in Georgia. They did. See the Declaration of the Moscow Session of the CSTO Collective Security Council, 6 September 2008, Kremlin.ru (6 September 2008); and Artur Blinov, "ShOS vstal na storonu Medvedeva," *Nezavisimaia gazeta* (8 September 2008). For the ShCO Declaration in English, Xinhua (30 August 2008).

[10] Nabucco (Nebuchadnezzar) is the title of a Verdi opera.

Figure 2 - Proposed Nabucco Route

This new pipeline will carry gas from Azerbaijan through Georgia to Turkey, and thence to Bulgaria, Romania, Hungary, and Austria. Even with funding, and that is by no means a certainty, construction is not likely to start before 2010 and its completion is not envisioned before 2020. During its second stage, Nabucco will have to draw from gas-rich Turkmenistan, and eventually from Iraq and Iran. None of the last three sources is guaranteed for Nabucco, and the implications of reliance on the latter two potential suppliers need not be detailed here. Another possibility, of course, is that Russia could join the Nabucco project and thereby mitigate destructive competition.[11]

The burst of general support for Nabucco began to fray early on, when Istanbul dealt its energy card. Although the Turkish prime minister retracted the suggestion that his country's participation was contingent on accession to the EU, the energy and political officials from international financial institutions, the EU and the United States (and Azerbaijan) who gathered at a hurriedly-called Nabucco summit in Budapest on 26-27 January 2009 were well aware of this looming qualification. Moreover, one day after the summit, Germany urged the EU to provide at least equal support to Gazprom's

[11] Lavrov has mentioned this in passing on more than one occasion, and the Turkish foreign minister proposed it seriously on 20 February, Interfax (20 February 2009).

Nord Stream – the projected costs for which are rising exponentially.[12]

In its turn, Gazprom hastened to secure arrangements with Slovakia, whose territory is the largest site for Russian gas transit via Ukraine to Europe. Gazprom's vice president, Aleksandr Medvedev, travelled to Bratislava on 23 January 2009 to discuss a new joint enterprise that would diminish dependence on the existing Slovak-French- and German-owned pipeline. Currently the Slovak Gas Industry owns 51 percent of the line that carries nearly two-thirds of Russian gas from Ukraine to the EU.[13] The sprint to shore up supply, customers, and partners did not stop there. The Bulgarian prime minister travelled to Moscow on 4 February 2009 to discuss energy issues and Sofia's involvement in the South Stream. Gazprom offered concessions and a deal was made. Two weeks later the president of Bolivia, where Gazprom now has an office, arrived in Moscow to sign yet another energy deal involving joint exploration projections and investments in Bolivian natural gas resources. In March, Gazprom signed a cooperative agreement involving LNG and joint exploration in Latin America with the Spanish company Gaz Natural, though Spain is not even a customer for Russian gas. Earlier, on 12-15 February 2009, the president of Turkey made a state visit to Moscow accompanied by a large delegation of businesspeople and his ministers of foreign trade and energy. Among other things, he and Medvedev signed a $60 million energy contract.[14] Russia is taking no chances.

The EU has another potential avenue for gas security, that is, via an Energy Charter linked to a renewed Cooperation and Partnership Agreement (CPA) with Russia.[15] Russian and EU representatives signed an energy charter in 1994 and all parties but Russia ratified by 1998. Most parties assumed, in fact, that it was tied to the CPA, which itself was agreed upon in 1997, but

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[12] On the German position, see Wolfgang Proissl, "Exklusiv Merkel brüskiert Osteuropäer," *Financial Times Deutschland* (29 January 2009); on upgraded projections for the cost of Nord Stream, see Sergei Kuliev, "Nord Stream s'edaet deneg bez schetu," *Nezavisimaia gaz*eta (6 February 2009).

[13] On this, see Vladimir Socor, "Gazprom to Reduce Gas Transit to Europe on Ukraine-Slovak Route," *Eurasia Daily Monitor* (2 February 2009).

[14] Vladimir Kuz'min, "Milliardy atomov," *Rossiiskaia gazeta* (16 February 2009). On Gazprom's deal with Gaz Natural, see *Nezavisimaia gazeta* (3 & 4 March 2009).

[15] See Michael Johns, "Reluctant Dance Partners: Russia and the European Union," in J.L. Black & Michael Johns, *From Putin to Medvedev. Continuity or Change*? (in press).

when the CPA lapsed in 2007 Moscow still had not formally approved the energy charter. Although Russia and the EU have re-opened negotiations for a new CPA, Moscow now hopes to link the energy pact to the larger proposed security treaty.

Russia agrees with the EU in wanting to diversify pipeline routes to Europe and has renewed pressure to get both Nord Stream and South Stream pipelines off the drawing boards. The former project, with support from Germany and France, has a scheduled completion time in 2011 and will deliver gas directly from Russia to Germany under the Baltic Sea (figure 3).[16]

Figure 3 – Nord Stream

The latter line will deliver gas from Russia under the Black Sea to Bulgaria (figure 4).

[16] On the possibility of French support, see the *EU Observer*, 21 January 2009. On 18 February, Miller claimed that Nord Stream had passed environmental tests and would be completed by 2011, Interfax (18 February 2009).

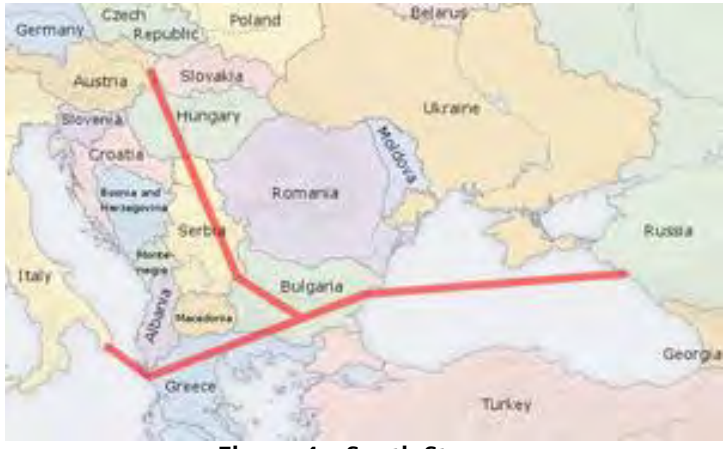

Figure 4 – South Stream

From there, a northern branch will proceed through Serbia, Hungary and Austria, and a southern branch to Greece and southern Italy. In terms of energy security, interruptions in one of these major carriers will not affect flow in the other. The key to success for all three pipelines is access to Central Asian gas.

In this latter connection, it was no accident that within days of the final Russia-Ukraine, Gazprom-Naftohaz agreement, Medvedev was in Tashkent, capital of Uzbekistan. Chairman of Gazprom's management committee, Aleksei Miller, accompanied him. Terms for gas from Uzbekistan in 2009 were finalized at that meeting, and existing long-term contracts for the years 2003-2012 were augmented. Apparently, Russia agreed to pay the average European price for Uzbek gas. Discussion points about future increases in the volume of natural gas purchases by Russia and the construction of greater gas transmission capacities were set out, and sweetened by Russian offers of investments in joint exploration, production and transportation projects. Significantly, President Karimov agreed to sell gas "only to Russia, and who this gas is going to from Russia is entirely Russia's business."[17] Somewhat similar but less binding agreements had already been signed with Kazakhstan and Turkmenistan, and Moscow worked hard to extend them.

Within a stretch of two and a half weeks from mid-January to early February 2009, the Russian president hosted Kyrgyzstan's President Bakiev, the Russia-Uzbek Inter-government Commission convened in Moscow to discuss energy

[17] Interfax (23 January 2009). Report filed from Tashkent.

issues, transportation and ongoing large joint ventures, and Medvedev conducted long talks with the Presidents of Kazakhstan and Tajikistan in Moscow. On 3 February, Moscow granted a $300 million loan to the Kyrgyz state, perhaps in compensation for the projected loss of rent money for the Manas airfield. Debt write-off and a Russian promise of major investment in Kyrgyzstan sealed the deal.[18] After a state visit to Moscow in late March, the Turkmen president proclaimed that the existing "long term accords [on gas and oil] are working well and will be expanded." Wide-ranging investments and deals were confirmed as well.[19] This did not bode well for Nabucco.

It is the reality of Russia's tight links to the Central Asian states through the ShCO, the CSTO, EurAsEC and myriad bilateral and trilateral economic agencies that will shape the outcome of the pipeline-to-Europe contest. In mid-February, Russia agreed to make a large financial contribution, $7.5 billion, to EurAsEC members to help them weather the current global financial crises.[20]

Russia's options

Complicating the issue for Moscow is the simple fact that Russia's relationships with the United States and the EU are the preferred ones, but both have fallen on hard times. As a fallback, Moscow also continues to tighten relationships with the Troika and the BRIC. Heads of state and ministries from the Russia-India-China (RIC) Troika have been meeting regularly for several years now to coordinate their postures in the international arena.[21] The BRIC foreign ministers met in New York informally in 2007 and formally in Yekaterinburg in May 2008. A subsequent gathering of foreign and finance ministers from all four countries in San Paulo in November 2008 issued a statement that they would take a common approach to world economic

[18] *Nezavisimaia gazeta* (12 February 2009). AKIpress –on line. Bishkek (6 February 2009). Moscow also agreed to construct a huge hydropower plant, and received 48% ownership of the Dastan defence company in Kyrgyzstan, Interfax (10 February 2009).

[19] ITAR-TASS (25 March 2009). For details Kremlin.ru (25 March 2009). At least one account claimed that the Trans-Caspian pipeline construction deal signed in December 2007 was not confirmed at the meeting, Politkom.ru (29 March 2009).

[20] See Sergei Blagov, "Russia Pledges to Rescue Post-Soviet Economies," *Eurasia Daily Monitor* (13 February 2009).

[21] See Dmitrii Trenin, "Prospects for Trilateral Russo-Indo-Chinese Collaboration on International Issues," *From Putin to Medvedev*.

problems. A month later, the BRIC was back in Moscow where a forum brought foreign affairs and finance analysts together from all four countries and again called for coordinated activities on the world stage.[22] The BRIC's agenda is unshaped, and may have little to do directly with energy security, but it has the potential of strengthening Russia's hand within the G-8 (where the other three have been invited guests), the G-20 (where the BRIC could form a bloc), and the UN (where Russia and China may sponsor India for permanent membership to the Security Council). Brazil is linked informally to the ShCO, where Russia and China are the co-leaders and India is a valued observer.[23] There is New World Order potential here.

Guaranteeing energy security

The Medvedev Doctrine cannot be made viable without calm at home, and will undoubtedly self-destruct if Moscow insists on a stringent application of the old sphere of interest principle. Even that notion has to separate Russia's "interests" among the CIS' vacillating western membership, i.e., Ukraine, Georgia, Azerbaijan or even Moldova, from its "interests" in its eastern components. The need for internal calm explains Medvedev's surprise visit early in January to Ingushetia, a North Caucasus republic now infused with even more violence than neighbouring Chechnya. South of the border, Georgia remains a source of serious tensions for Russia, but is not the only hot spot. One of the by-products of the momentous events of August 2008, in fact, was the re-emergence of the problem of Nagorno-Karabakh, the large Armenian-controlled enclave with almost 20 years of *de facto* independence within the *de jure* territory of Azerbaijan. As one of the co-chairs of the OSCE Minsk Group (with France and the United States) charged with mediating the dispute, Russia invited the presidents of Armenia and Azerbaijan

[22] For the Russian position, which may prove more hopeful than realistic, see Aleksandr Kramarenko, "Russia and the Rise of the Dialogue Mechanism in the BRIC Format," RF Ministry of Foreign Affairs press release, 16 January 2009. Kramarenko is the foreign ministry's planning director.

[23] When the foreign ministers of the RIC met in Yekaterinburg on 15 May 2008, China and Russia agreed to push India for permanent membership in the UNSC. RIC ministers were joined by Brazil the next day, and the subsequent BRIC communiqué demonstrated complete agreement on most international issues. For the communiqué, see J.L. Black, ed. *Russia and Eurasia Documents Annual, 2008* (Gulf Breeze, FL: Academic International Press), Chapter 5 (in press).

to Moscow for talks in November 2008. They agreed to continue discussion, which will undoubtedly see the "Kosovo precedent" brandished again. Russia's recognition of Abkhazia and South Ossetia as independent states after they had enjoyed more than a dozens years of *de facto* independence from Georgia was in part a reaction to the West's quick acquiescence in the face of Kosovo's unilateral declaration of independence from Serbia. The potential for violence in the long smouldering dispute in the middle of Azerbaijan remains strong, and the ripple effects of renewed conflict in Nagorno-Karabakh would range far afield—Azerbaijan is a major oil producer, and a take-off point for Caspian Sea pipelines to Europe; Armenia is part of the CSTO and host to Russian military bases. Renewed military action in the region is the last thing the Kremlin wants.

Spreading labour unrest is another problem for the Kremlin. Associated first with the failing auto industry in the Far East in December 2008 and spreading from Vladivostok to Moscow by early February 2009, rallies and demonstrations fed new life into odd bedfellows such as the Communists led by Gennady Zyuganov, the banned semi-fascist National Bolshevik Party led by Eduard Limonov, and the strange mix of liberals in the United Civil Front headed by Garri Kasparov. The Russian government is faced with real domestic challenges to its credibility for the first time since the monetarization crisis in 2005. Even calls for Putin's resignation are heard. Russians resent what they perceive to be bailouts only to the rich, especially as the number of unemployed grows.[24] The outflow of capital has been huge and the Russian government is adamant about protecting its "national champions" first, that is, the giant state and private corporations such as Gazprom, so they can continue to project economic power abroad. That said, many of the national champions are faltering. Problem corporations include such big names as LUKoil in the energy sector, RUSAL and Norilsk Nikel in mineral extraction, Severstal, Mechel and Evraz in metals, AvtoVAZ and even the MiG Aircraft Corporation in manufacturing. By the end of January, Russian bailouts to prop up its failing bank system, collapsing industry and the ruble had used up one third of its $600 billion reserve fund. Rumours spread that the fund would be fully depleted by the end of

[24] Registered unemployed reached 1.7 million by early February, ITAR-TASS (12 February 2009), and was expected to reach 2.2 million by year's end. Even Medvedev has said that unregistered unemployed is close to 6 million, *Rossiiskaia gazeta* (6 March 2009) and Interfax (15 March 2009).

2009.[25] In spite of its still viable and valuable energy-exporting sector, Russia needs further integration into the world trading system. Such avenues as the WTO and bilateral and multi-lateral trade agreements are essential, so compromises will have to be reached.

Russia perceives itself threatened when Western forces and government-backed corporations move aggressively into Central Asia, the South Caucasus, and even Eastern Europe. No matter how the apparently inexorable NATO expansion eastward and the (now defunct) siting of US missile defence systems in Poland and the Czech Republic are explained in the West, Russians naturally see such actions as purposeful, dangerous, and humiliating challenges to them. If we really want the NATO-Russia Council to work productively, an energy charter ratified, and Russian help in Afghanistan, we can no longer shrug this off as unimportant.

In its capacity as a regional organization recognized by the UN and the OSCE, the CSTO has offered assistance to NATO in Afghanistan regularly since 2003, most recently by Medvedev himself in early February 2009 shortly after a joint meeting of the presidents of CSTO member states in Moscow, and a day after Kyrgyzstan announced that it would evict American forces from the Manas air base. Russia offered transit privileges for non-lethal supplies to European NATO forces last year and to the United States this February. Kazakhstan has agreed to allow NATO fighter planes use of the Almaty airfield in emergencies situations.[26] Russia and all of the Central Asia states want to keep the Taliban out of CSTO territory and desperately need to curb drug-trafficking. At the CSTO session in Moscow, all members agreed, finally, to prepare a Collective Rapid Deployment Force (CRDF) which would be available for action in both Central Asia and the Caucasus (because Armenia is a member). The joint rapid reaction force has been in the works for a long time, but recent circumstances have pushed it to the top of the CSTO agenda. On announcing the CRDF, the Russian Ministry of Foreign Affairs said that its first purpose was to counter "military aggression."[27] This statement was a significant departure from earlier explanations, which gave pride of place to joint action against terrorism, separatism, organized crime and

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[25] *Nezavisimaia gazeta* (12 February 2009).
[26] *Vremya novostei* (30 January 2009).
[27] Russian Federation Ministry of Foreign Affairs, *Press Release,* (4 February 2009).

drug trafficking. It may be that Azerbaijan will see this change as threatening—so the ripple effects continue.

In response to a suggestion from a reporter that Kyrgyzstan's decision could destabilize Afghanistan, Medvedev replied:

> *The Russian Federation and other member states of the Collective Security Treaty Organization, are ready for full and comprehensive cooperation with the United States and other coalition nations in combating terrorism in the region. This fight should be comprehensive and modern and be based on military and political components—only in this case will it have a chance of success.*[28]

In early March 2009, NATO's leaders were invited to Moscow to attend an ShCO conference, scheduled for 27 March, on international collaboration in Afghanistan.[29] A few days later, at a meeting of NATO foreign ministers in Brussels, US Secretary of State Hillary Clinton proposed a broader UN-sponsored conference on Afghanistan and, oddly, failed to mention the earlier ShCO initiative.[30] At the Moscow meeting, a detailed "Plan of Action" to combat drug-trafficking, terrorism, and organized crime emanating from Afghanistan was signed by all ShCO member states and the Afghan representative; and the ShCO-Afghanistan Contact Group was raised to departmental director level in each country's foreign ministry. Representatives of the UN, EU, the G-8, NATO, and the CSTO were there as observers, making it the first gathering in which all these organizations participated together. ShCO observer states—Pakistan, India, Iran and Mongolia—also sent delegations, as did the United States. It is clear that Russia is just as anxious that Afghanistan be pacified as NATO members are, and also wants NATO to join the UN and the OSCE in recognizing the ShCO and the CSTO as regional organizations capable of joint operations in the region. So far NATO has rejected any such recognition.

In terms of energy security, the Russia-EU Energy Charter awaits serious negotiation. Long-term contractual agreements, perhaps in the form of state-to-state, organization-to-

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[28] Russian Federation President website, 4 February 2009.

[29] Interfax-AVN (2 March 2009). The conference was first announced on 4 February.

[30] AP (6 March 2009). Afghanistan and Turkmenistan sent observers as well, for details see *Nezavisimaia gazeta* (17 March 2009).

organization treaties, represent the only realistic solution to worldwide energy security. This is a political issue that cannot be resolved by market forces. At present, it is Russia that appears to have the best set of options: an already expanding ShCO Energy Club and various versions of a GasOPEC remain open to Gazprom. The ShCO includes two of the world's largest energy consumers, China as full member and India as official observer. Iran is an active ShCO observer as well, and Afghanistan is a regular unofficial observer. In October 2008, Russia, Iran and Qatar announced that they were forming a "gas troika." Though they made it clear that the project was a matter for the distant future, they confirmed that representatives would meet four times a year to discuss price issues. In late February 2009, the Russian Gas Society took it on itself to approve the formation of a Eurasian Energy Forum to work out both concept and mechanisms for an international gas regulator to replace the existing Energy Charter.[31] It would appear that the Society's decision was a follow up to a speech delivered by Medvedev on 18 February at the opening of Russia's first liquefied natural gas (LNG) plant – itself another step forward in strengthening Russia's role in the international energy sector. In that speech, Medvedev called for more efficiency in Russia's energy cooperation, and voiced concerns over his country's current dependency on transit countries.[32] Almost simultaneously, two large state-owned Russian oil companies, Rosneft and Transneft, signed a huge $25 billion long-term oil deal as part of an even larger energy cooperation pact with China.[33] So, the Russian energy people are very busy.

Still, Russian economists are well aware that their economy is floundering badly and that none of the absolutely essential domestic programs and infrastructure building promised by Medvedev are possible without regularized contracts for its commodity exports. In fact, because Medvedev's political survival depends on his domestic, not foreign, success, there is an important window of opportunity here for reasoned Western

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[31] ITAR-TASS (21 February 2009).

[32] Medvedev, "Making Russia's Participation in International Energy Cooperation More Efficient," Yuzhno-Sakhalinski, 18 February 2009. RF Presidential website. Japan and South Korea will be the main customers of the LNG plant.

[33] For details, "China, Russia Strike $25 Billion Oil Pact," *The Wall Street Journal* (18 February 2009), and Sergei Blagov, "Russia's New Energy Doctrine," *Eurasia Daily Monitor* (24 February 2009).

negotiation. It may be for that reason that Medvedev now ties ratification of the EU-Russia Energy Charter to a broader European security architecture.[34]

One can safely take the Medvedev Doctrine to mean that the Russian president wants to see his country restored to a position of respect among the major players in the world. To achieve that end, economic levers clearly are the best medium for Russia to use. Long term loans and huge joint enterprise undertakings in Central Asia and Iran (e.g. railway and road construction, university linkups, hydroelectric plants, joint aircraft manufacture, energy exploration, and so on) already provide Russia with special status in Eurasia – whether we like it or not. This simple reality does not herald a Warsaw Pact in the Caucasus or in Central Asia, where individual countries remain fiercely independent of Russia and each other, and are both able and willing to compete for higher returns for their energy resources and strategic bases. Turkmenistan, for example, is negotiating separate oil and gas deals with Iran and China, much to the consternation of Gazprom.[35] Because they provide mutual benefits, pipeline and other forms of diplomacy are far less expensive and much more effective than sanctions, phony outrage, and military adventures. This, to be frank, is a lesson that the West seems not to have learned very well. There is lots of room for productive cooperation on both sides, and recognition of the ShCO and CSTO as agencies for joint efforts in Central Asia would go a long way towards muting other points of contention.[36]

Delays in working out accommodation on both sides could lead to even more serious unravelling in Europe. Scattered, mostly unrelated events in mid-March all had greater potential for escalation than they would have had a year ago: Georgia again cut off gas supplies to South Ossetia; the Czech parliament

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[34] On 6 February, Medvedev told Barroso and other members of the Commission of the European Communities, in Moscow, that the Energy Charter should be linked to a pan-European treaty, "Shaiba dlia Barrozu," *Vremya Novostei* (9 February 2009).

[35] See, e.g. *Nezavisimaia gazeta* (16 February 2009). The Turkmen president was in Teheran, 14-15 February and signed deals on joint oil and gas projects.

[36] In her "Russia, China, and the United States in Central Asia: Prospects for Great Power Competition and Cooperation in the Shadow of the Georgian Crisis," Strategic Studies Institute, United States Army War College paper (February 2009), Elizabeth Wishnick proposes just such a policy for the US, the EU and Japan.

turned against missile defence sites in their country; Ukraine asked Russia for a $5 billion loan to help pay for gas purchases, and then irritated Russia by signing a pipeline rebuilding deal (23 March) with the EU that excludes Russian participation; and the EU adopted an "Eastern Partnership" policy that Lavrov labelled a "sphere of influence" in eastern Europe. Even renewed Russia-NATO dialogue will be awkward in the face of the Russian population's recurring belief that NATO is both aggressive and dangerous.[37]

Accommodation in Central Asia should be less complicated because the expressed interests of the main actors coincide. Canada has cards to play in that dimension of the Great Game. As a major gas exporter, an Arctic owner, a NATO member, and a combatant in Afghanistan, Canada is a player in Central Asia and in other sectors important to Russia. Surely it is time for us to conduct a proactive—as opposed to a uselessly reactive—diplomatic campaign in Russia and Central Asia, perhaps even a facilitator role in bringing broader collaborative forces to bear on the global energy and geostrategic problems that originate in the region? If not, we stand to be left on the sidelines.

[37] For a detailed survey of Russian beliefs about NATO, see "Otnoshenie k NATO," *Fond Obshchestvennoe mnenie* (19 March 2009). 51% saw NATO as a threat to Russia, 25% said it was not a threat; 61% saw NATO as an aggressive military bloc, only 16% thought it was not. States included in the EU's new "Eastern Partnership" are Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

European Energy Security: Moving Beyond the Riga and Bucharest Summits

Andrew Monaghan

Abstract

Emerging to prominence on the political and security agenda in 2006, NATO began to formulate an agenda and consider possible contributions the alliance might make on energy security. This complex process led to energy security being explicitly mentioned for the first time in the declarations at the Riga and Bucharest summits in November 2006 and April 2008 respectively. The crisis in the South Caucasus in August 2008 and the gas dispute between Russia and Ukraine, though not directly involving the alliance, and the issue of piracy off the Horn of Africa in which the Alliance was involved, have all ensured that the issue remains prominent, and energy security once again received mention in the Strasbourg-Kehl summit declaration in April 2009. Indeed, as the discussion about diversification of sources and transit routes takes shape, it becomes ever clearer that NATO cannot avoid discussing this important issue. This article examines the context in which a NATO role in energy security evolved, considers its potential contribution and how this links to the wider international response.

Résumé

L'émergence, en 2006, de la question de la sécurité énergétique sur l'agenda politique et sur celui de la sécurité, a mené à sa parution dans les déclarations des sommets de l'OTAN tenus à Riga en novembre 2006 et à Bucharest en avril 2008. La crise qui a eu lieu au Caucase du Sud en août 2008 et la dispute du gaz entre la Russie et l'Ukraine, même si elles n'impliquaient pas directement l'Alliance, et le problème de la piraterie au large de la Corne de l'Afrique auquel l'Alliance a été mêlée, ont ensemble fait en sorte que la question est encore une fois paru dans la déclaration du sommet de l'OTAN tenu à Strasbourg-Kehl en avril 2009. Bien sûr, au fur et à mesure que prend

forme la discussion concernant la diversification des sources et des tracés de transit, il devient de plus en plus clair que l'Alliance ne peut éviter de discuter de cette importante question. Cet article examine le contexte dans lequel a évolué un des rôles que l'OTAN pourrait jouer dans la sécurité énergétique et considère sa contribution potentielle et la façon dont cette participation se relie à la réponse internationale.

Energy is becoming securitised. This securitisation process, still contentious given that many across Europe continue to argue that the security of energy supply is an economic and market issue, has evolved since the autumn of 2005 in the context of political concern about the reliability of producer states and the potential for energy to be used as a tool for political pressure. Indeed, Europe's "dependence" on Russian supplies has been the predominant focus of energy security debates in Europe and the wider transatlantic community, a focus only enhanced by the gas price disputes between Gazprom and Ukrainian gas company Naftohaz, which resulted in shortfalls in the delivery of Russian gas to markets in the European Union (EU) in 2006 and emphasised by the dispute between Russia and Belorussia over oil prices in 2007.[1]

At the same time, in broadly parallel but often separate discussions, questions have arisen about the possibilities of armed interruptions of energy supply. Although the threat of large scale, state-to-state conflict is thought by many to be receding, energy resources and security of access to them are considered by many to be one of the potential triggers of such a conflict. Thus in the US discussion, commentators have asserted that conflict over access to resources may become an object of a large-scale armed struggle is "almost incontestably the single most alarming prospect facing the international system today" as concerns about the ramifications of energy scarcity encourage states to take action to protect their access to it.[2] This can of

[1] For a discussion of the levels of Europe's "dependence" on Russian energy – which is a considerably more complex question than many allow, see this author's *Russia and the Security of Europe's Energy Supplies: Security in Diversity?,* CSRC Paper, 07/01. Swindon, Defence Academy of the UK, January 2007. pp.8-9.

[2] Moran, D. & J. A. Russell, "The Militarisation of Energy Security", Strategic Insights, Vol. 7. No.1. 2008. See also the discussion in *Global Trends 2025: A Transformed World*. Washington: National Intelligence Council, November 2008. www.dni.gov/nic/NIC_2025_project.html. Such concerns are

course take a number of forms – violence or conflict driving up the prices of resources, the impact of using control of certain geographical choke points to cut off the transit of energy, or by seizing control of the resources themselves, among others. Such concerns are underscored by lower intensity, but nonetheless significant threats to energy security from terrorist attacks and piracy, including in NATO member and partner states.

Thus from early 2006, in an international context of threatened and actual attacks on major energy installations and supply routes and concerns about the reliability of major partners, NATO's Secretary General, Jaap de Hoop Scheffer announced that energy security should become an subject of discussion for the alliance; indeed, it would be "alarming" if the alliance did not discuss it, he stated. NATO could not simply "stay on the sidelines" watching such threats emerge.[3] Since then, the security of energy supplies has become ever more prominent, threatened by armed conflict and ongoing price disputes between suppliers, transit states and consumers – all of which have ensured that energy security remains on the alliance's agenda.

This chapter first sketches an outline of the evolving discussions about an energy security role for NATO, briefly touching on both the "founding declarations" about energy security (following the Riga and Bucharest summits in 2006 and 2008 respectively) and the potential contributions the alliance could make. It then turns to weave together subsequent NATO discussions with the evolving international context. Finally, the chapter assesses a number of the complications of an energy security role for the alliance.

The key points to emerge from the chapter are that NATO clearly has a limited contribution to make to international energy security – indeed, given the international context of energy insecurity, this contribution, conceptually at least, becomes ever more relevant as the Euro-Atlantic community seeks to diversify its energy sources, transit routes and energy types. Such discussions, it should be remembered, can take place under existing frameworks, particularly Article IV of the Washington

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widespread: the new Russian National Security Concept, currently being drafted, for instance also notes the potential for conflict over energy resources. See Soloviev, V. "Otechestvo v gosbezopasnosti", *Kommersant*, 25 December 2008.

[3] Speech by NATO Secretary General Jaap de Hoop Scheffer at the 44th Munich Security Conference, 9 February 2008. www.nato.int

Treaty. Yet a number of problems, particularly a lack of consensus, are likely to continue to undermine the role played by the alliance.

Energy security is a broad subject, and it should be noted at the outset that many important dimensions of the current discussion, such as the status of reserves and production and price fluctuations, which although important for energy security, lie outside the remit of this paper.[4] Even the discussion about the securitisation of energy and a NATO role is multifaceted, addressing complex and contentious issues; on one hand linking as it does regional and thematic security issues such as the high north and climate change and terrorism and piracy; on the other touching on the war in Georgia and the dispute between Gazprom and Naftohaz.[5] This paper seeks to draw together these strands but cannot hope to examine each in depth.

NATO and energy security

A NATO role in energy security has emerged to greater prominence since February 2006. Discussions led to the first explicit mention of energy security as a subject for NATO's attention in the Riga summit declaration. Reflecting an important degree of consensus, the following paragraph is an important starting point for any analysis of NATO's role in energy security:

> *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 infrastructures*

[4] See, for further information BP's *Annual Statistical Review of World Energy*. London: BP, 2008. www.bp.co.uk & the International Energy Agency's *World Energy Outlook*, Paris: IEA, 2008. For analysis of the wider international energy security picture, see Kalici, J. & D. Goldwyn (eds.) *Energy and Security*. Baltimore: The Johns Hopkins University Press, 2005.

[5] Useful starting points on these issues are *Whither Georgia? The Impact of Russian Actions Since August 2008*, Chatham House Seminar Summary, Dec. 2008, available at http://www.chathamhouse.org.uk/research/russia_eurasia/papers/view/-/id/693/; Roberts, J. *Russia and the CIS: Energy relations in the Wake of the Russia-Ukraine Gas Crisis*. Paris: EUISS, Feb.2009; Pirani, S, J. Stern & K. Yafimova. *The Russo-Ukrainian Gas Dispute of January 2009: a comprehensive assessment*. Oxford Institute for Energy Studies Paper, NG27. February 2009. http://www.oxfordenergy.org/pdfs/NG27.pdf; Chow, E. "Where East Meets West: European Gas and Ukrainian Reality", *The Washington Quarterly*, January 2009.

and to promote 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 interests where NATO may add value *to safeguard the security interests of the allies and, upon request, assist national and international efforts.*[6]

Three points emerge, illustrated by the emphasis added to the quotation above. First, NATO is adopting a primarily discursive position to define more clearly the nature of the threats. This is not to be a simplistic reactive military response or simply putting "boots on the ground"; instead, NATO seeks to assess the types of threat, estimating threat levels and prioritising threats.

Second, NATO seeks to "support a coordinated international effort," and "upon request assist national and international efforts." These are important indicators that the alliance understands energy security to be a multi-dimensional issue in which other actors have key, and, in many cases, leading roles. Therefore, NATO's role is a *complementary* one, one in which it seeks to "add value," having defined clearly what this may be in an international discussion.

Third, the declaration clarifies the existing parameters of discussion for the alliance, and illustrates the limited nature of the role envisaged by NATO itself. Previously, the alliance had noted the issue rather vaguely as "disruption of the flow of vital resources."[7] Defining "disruption" has been a key challenge for the alliance, illustrating the gaps in consensus between military threats to vital resources and political ones; the Riga mandate provides some clarity of the interests of the alliance in focusing on energy infrastructure security, rather than other dimensions of energy security.

The restricted agenda sketched in the Riga declaration thus shaped the context for subsequent discussions. The Secretary-General emphasised that NATO considers energy security to be a "collective" challenge requiring a "collective" response which reflects a "multifaceted approach" and a "great

[6] Riga Summit Declaration, Paragraph 45. http://www.nato.int/docu/pr/2006/p06-150e.htm Emphasis added by the author.

[7] See the Alliance's Strategic Concepts of 1991 and 1999, paragraphs 12 and 24 respectively. The documents can be found at http://www.nato.int/docu/comm/49-95/c911107a.htm and http://www.nato.int/docu/pr/1999/p99-065e.htm.

deal of coordination between national governments and international organisations."[8] NATO's role in such a collective response would be focused on where it could "add value": the alliance could consider a role protecting shipping lanes, particularly with regard to liquefied natural gas (LNG) tankers on the high seas, and protecting *critical energy infrastructure* when there is a *specific high level threat*.[9] Thus discussions sought to identify potential niche roles for the alliance where it would *not infringe* on areas where other organisations were already active or where they are better placed to intervene.

At the Bucharest summit in April 2008, the same approach was confirmed: the alliance will ensure that NATO's efforts "add value and are fully coordinated and embedded within those of the international community, which features a number of organisations that are specialised in energy security"; "sharing" and "supporting" are key terms. While there are still some vague phrases—the alliance will engage in "projecting stability" and advancing international and regional cooperation – the focus on civil defence and emergency management and energy infrastructure remains clear.[10]

NATO offers a two-fold potential practical niche role. First, it offers civil defence and emergency management capability. This would be of benefit both within the territory of the EU, but also in response to emergencies that would affect energy security more broadly – for instance in response to natural disasters which have a major effect on international energy supply, exemplified by hurricanes Katrina and Rita, which affected about 1.5 million barrels per day of world oil supply.

Equally, second, there are a number of existing and potential military threats to international energy security, and NATO offers some capability to protect critical infrastructure, most particularly on the high seas. While the whole of the international supply chain cannot be protected, there are key choke points through which significant percentages of the world's oil and gas supplies pass each day:[11] points that NATO

[8] Speech at 44th Munich Security conference.
[9] Cited in "EU Energy", *Platts*, no.166, September 21st, 2007.p.27. Emphasis added.
[10] Bucharest Summit Declaration, NATO Press Release (2008/049) 3 April 2008. www.nato.int
[11] Some 20% of the world's daily oil supply passes through the Straits of Hormuz, for instance. Other important choke points include the Suez canal, Straits of Malacca, and the Turkish Straits.

considers it should be ready to protect in case of disruption caused by conflict, terrorism or piracy. At this level, the difficulties of carrying out a strategic attack on energy infrastructure mean that there have been only a few successful attacks by terrorist organisations or pirate groups, such as that on the tanker *Limberg* off the coast of Yemen in 2002, an attack claimed by Al Qaeda.[12] But this obviously remains an important problem, not least given the statements of intent by key figures in Al Qaeda, and any serious sustained disruption at these points would undoubtedly affect the EU's energy security. It is a threat to which NATO can contribute part of the solution, offering maritime surveillance and alert capabilities and thus adding to situational awareness and coordination.[13] The chapter now turns to examine events since the Bucharest summit and how this has affected the NATO debate.

Beyond Bucharest

Since Bucharest, NATO officials have continued in various fora to assert an energy security role for the Alliance. Jaap de Hoop Scheffer reiterated the importance of energy security, the range of potential problems and the need for a system of international cooperation to encourage sharing energy and energy saving technologies as a means of avoiding a "beggar thy neighbour process" competition between states to control supply, which risks greater international instability.[14] Thus, he emphasised that the alliance should assume a "real mission," where it has value to add, in the field of energy security.[15] This position was underscored in the communiqué following the

[12] Single attacks on pipelines are frequent. But their overall impact is limited both in the scale and time of disruption. These usually have limited impact on the infrastructure and can be easily and quickly repaired. It is much more difficult to carry out the kind of sustained attack on energy infrastructure which would have a greater impact – not only does this require significantly more resources and coordination, but beyond the advantage to the attackers of the initial surprise, the responsive role of the defence forces becomes more important.

[13] For discussion of this, see the chapter by RAdm. H. Haas, "Energy Security and Dependence on the Sea", in Cornell, P. (Ed.) *Energy Security and Security Policy. NATO and the Role of International Security Actors in Achieving Energy Security*. Oberammergau: NATO School, November 2007.

[14] Keynote speech by Jaap de Hoop Scheffer, "Energy Security in the 21st Century", 23 October 2008. www.nato.int.

[15] Speech by Jaap de Hoop Scheffer, 45th Munich Security conference, 8 February 2009. www.securityconference.de

Strasbourg-Kehl Summit in April 2009, which noted in paragraph 59 that the alliance would continue to consult on the most immediate risks in the field of energy security. Furthermore, the communiqué reiterated the alliance's decisions taken at Bucharest and underscored the intention to "support efforts aimed at promoting energy infrastructure" and ensure that NATO's "endeavours add value and are fully coordinated and embedded within those of the international community".[16]

The focus of NATO's role in energy security predominantly remains the alliance's maritime capacities in two overarching ways, framed in NATO's new concept of Maritime Situational Awareness which seeks to facilitate monitoring of activity on the high seas and share data among NATO navies – essentially developing an 'information and sensor network' which could detect anomalies in maritime activity.[17]

First, NATO's High North agenda is linked to energy security by climate change which will lead to the Northwest Passage opening up to allow greater access to energy resources, and a concomitant increase in the need to monitor and protect shipping in such a geographically hostile area.[18] It may also be expedient to offer coordinated emergency response capacity here.

On the other hand, the relevance of NATO's maritime capacity to protect sea lanes and shipments of oil and gas against the threat of attack from pirates and terrorists is illustrated by events in Africa. Nigeria, a key oil producer for NATO member states, is an important focus for NATO attention given the violent activity and threats posed by the Movement for the Emancipation of the Niger Delta which seeks a larger control of the oil produced in the Niger Delta. Such activity clearly affects supplies, the effective exploitation of resources and thus the price of oil.

A second focus has been to counter piracy off the Horn of Africa, and indeed this has since become increasingly prominent in 2008 off the coast of Somalia. NATO deployed Operation Allied Provider from 24 October to 12 December 2008 and

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[16] Strasbourg-Kehl Summit Declaration, 4 April 2009. www.nato.int

[17] Speech by de Hoop Scheffer, "Energy Security in the 21st Century".

[18] Speech by de Hoop Scheffer, "Security Prospects in the High North". 29 January 2009. www.nato.int. For more discussion of NATO's High North agenda, see Holtsmark, S. & B. Smith-Windsor (Eds.) "Security Prospects in the High North. Geostrategic Thaw or Freeze?", *NATO Defence College Forum Paper*. Rome: NDC, May 2009.

coordinated the handover to the EU's Operation EUNAVFOR ATALANTA.[19] While piracy is a problem for all shipping, its relevance to energy security was highlighted when pirates seized the *MV Sirius Star*, a super-tanker which carries about 25 percent of Saudi Arabia's daily oil production. A number of other attacks have been launched on tankers, including the *Abdul Kalam Azad* and the *Kriti Episcopi*, the latter calling on the EUNAVFOR which responded and thwarted the attack.

It is not just at sea, however, that energy security has been prominent since Bucharest. Indeed, two of the most important events have been on the territory of the former Soviet Union. The first major event was the conflict in the Caucasus in August 2008. Although not fought directly over energy, the war had ramifications for energy security – British Petroleum temporarily suspended oil supplies through the Baku-Supsa pipeline.[20] Moreover, as de Hoop Scheffer noted, pipelines pass through unstable areas, and thus these sophisticated supply networks can be threatened, and in that regard the crisis was also partly about energy security.[21]

Others were more direct. UK Prime Minister Gordon Brown asserted that "no nation can be allowed to exert an energy stranglehold over Europe and the events of August have shown the critical importance of diversifying our energy supply."[22] In so doing he simultaneously echoed the persistent calls for diversification that have been made in the EU during the last four years and pre-empted the focus on the need for alternative sources and transit routes that re-emerged during the gas dispute between Russia and Ukraine in January 2009, which resulted in a significant shortfall in gas deliveries to markets in the EU. Though the gas dispute subsequently featured in NATO's Strasbourg-Kehl Summit declaration ("The disruption of the flow of natural gas in January 2009 seriously affected a number of Allies and Partner countries"),[23] the alliance made no public intervention in the dispute. Nonetheless, the resultant discussion about enhancing energy security has again highlighted the

[19] de Hoop Scheffer, "Energy Security in the 21st Century"; "NATO Hands Over Counter-Piracy Operation to EU", 15 December. www.nato.int.
[20] This was rendered all the more significant since the Baku-Tbilisi-Ceyhan pipeline was closed due to an explosion.
[21] de Hoop Scheffer, "Energy Security in the 21st Century".
[22] Brown, G. "This is how we will stand up to Russia's naked aggression", *The Observer*, 31 August 2008.
[23] Strasbourg-Kehl Summit Declaration, 4 April 2009. www.nato.int

discussion about diversification of energy types, sources and routes, which in turn emphasises the potential for a NATO role in energy security in two main ways: through its political relationships and its military capacities.

First, calls for diversification tend to emphasise the wider membership of the alliance, including major producers and transit states—particularly, of course, Norway, a major supplier, and Turkey, a key transit route, both of which are member states of NATO but not the EU. Regarding Turkey, the alliance can clearly add value, since many of the options for such diversity centre on Turkey's potential role as a transit state: the main alternative transit routes for Caspian and Central Asian gas pass through Turkey, including the Baku-Tbilisi-Ceyhan (BTC) and Baku-Tbilis-Erzurum (BTE) oil and gas pipelines and the planned Nabucco pipeline project.[24] Given that Turkey is not a member of the EU, and has a complicated relationship with the organisation, its membership of the alliance provides an important political and institutional mechanism for engagement. The search for diversification stretches beyond transit routes, to include enhanced relations with suppliers, and here NATO's partnerships add value through the various partnership programs with South Caucasus, Mediterranean and Gulf states.[25]

Second, the search for greater diversity leads towards areas of greater political instability, particularly as noted above areas in Africa and areas vulnerable to terrorist and pirate attack and with a concomitant greater need for military protection for such routes. Moreover, as the Euro-Atlantic community seeks to diversify away from natural gas to LNG, this will increase the amount of shipping in congested and vulnerable areas, increasing the need for the Maritime Situational Awareness that NATO can offer.

Complications for a NATO role

Yet if a potential role for the alliance appears ever more relevant following the events of the last year, a number of complexities continue to hinder the development and implementation of a NATO role. First, while the alliance seeks to engage in debate with the EU, for instance, the complexities of the broader EU-NATO relationship undermine the ability to

[24] See "EU is losing its grip on Caspian gas corridor", *The Financial Times*, 15 February 2009.
[25] Strasbourg-Kehl Summit Declaration.

formulate a coherent cooperative agenda. Also, while the alliance seeks to engage private companies in debate about how best to ensure energy security, particularly at sea, it remains unclear how such a relationship could be developed practically – how costs might be covered, for instance. Such relationships therefore remain in their infancy.[26]

Moreover, achieving consensus within the alliance about the role NATO might play in energy security remains complex, illustrated by the somewhat contradictory impression given by the Strasbourg-Kehl declaration. The dispute between Gazprom and Naftohaz was not unexpected and yet the discrepancy between NATO's silence during the events in January 2009 and the subsequent explicit mention of the effect the dispute had on member states suggests both that the alliance's approach remains reactive and that consensus on the type of threat the alliance should address and the means the alliance has to meet it remains difficult. In this respect, the tensions between those on the one hand who view energy security to be an economic issue best managed by the EU and market mechanisms, and those on the other who believe that the issue is politically securitised, remain clear. A shortfall of energy supplies clearly has an important, NATO relevant impact on member states, not just in terms of the effect on their economic stability but also in terms of effect on their societies (for instance if a shortage of energy in very low temperatures leads to fatalities). Equally, and although many in the Euro-Atlantic saw the gas price dispute as becoming increasingly politically influenced as the dispute wore on, it remains unclear exactly how the alliance might have contributed to resolving the dispute, and exactly which tools it might have brought to bear, especially given the tense relationship between Russia and NATO emphasised by the Russia-Georgia war in August 2008.[27]

Conclusions

Clearly, given the range of threats to the energy security of the Euro-Atlantic community, there is a role for NATO. Moreover, this role will become more prominent as the Euro-Atlantic

[26] Jaap de Hoop Scheffer, "Energy Security in the 21st Century".

[27] Russian officials, including the Ambassador to NATO have emphasised that they do not see an energy security role for NATO. See, for instance, Rogozin, D. *Russia, NATO and the Future of European Security*. Roundtable, Chatham House, February 2009. http://www.chathamhouse.org.uk/research/russia_eurasia/papers/

community looks beyond its current, established partnerships, to areas that are less stable and more vulnerable to armed attack. Equally, a tension remains between the roles that the organisation seeks to address – and is competent to do so – and the pressures of international developments to which the alliance will need to respond. In essence, therefore, there remains therefore a split between two agenda: one, the agenda that is officially advocated by the alliance, an active but limited role that focuses on the maritime aspects of NATO competencies; the other, an agenda that is advocated by a range of important political interests on the fringes of the NATO agenda, one which proposes both a reconsideration of NATO's Article V to include energy disruption.[28] These remain contentious proposals without widespread support throughout the alliance, and so in themselves complicate NATO discussions and consensus, undermining the alliance's ability to shape a role in what is clearly an increasingly important strategic issue for the Euro-Atlantic community.

[28] See John Vinocur, "US nudges Europe over energy security", *International Herald Tribune*, 10 February 2009. Senator Lugar initially outlined such views in 2006 in which he also notes the need to consider further NATO enlargement to include Caspian and Central Asian states such as Azerbaijan and Kazakhstan. See his "Energy and NATO" keynote speech to the German Marshall Fund Conference, in Riga.
http://lugar.senate.gov/energy/press/speech/riga.cfm. As it stands, of course, Article V may be relevant to energy security, since it stipulates that an armed attack on a member state may be cause for invoking the Article – this could conceivably be an armed attack on energy infrastructure.

New Players in the Energy Great Game: India's Increasing Global Presence

Divyabh Manchanda

Abstract

Strengthening its means to ensure India's energy security is the focus of the government's efforts today. The world's attention over the last year was drawn to its need for more nuclear power. However, the main resource available to one sixth of the world's population in this nation is that of coal and emphasis in its strategies will continue to lie in that, in addition to oil, natural gas, hydro-power and renewable resources of energy. Given its limited proven reserves, it is obvious that India's dependence on foreign supplies of hydrocarbon products will further deepen in the future.

Résumé

Le renforcement des moyens dont dispose l'Inde pour assurer sa sécurité énergétique est aujourd'hui le point focal des efforts de son gouvernement. L'attention du monde entier, ces dernières années, a été fixée sur son besoin grandissant d'énergie nucléaire. Cependant, la principale ressource dont dispose un sixième de la population mondiale que représente l'Inde est celle du charbon, et c'est là que l'accent va continuer à reposer dans ses stratégies visant à assurer sa sécurité énergétique, en plus du pétrole, du gaz naturel, de l'énergie hydroélectrique et des ressources d'énergie renouvelables. Étant donné que ses réserves prouvées sont limitées, il est évident que la dépendance de l'Inde à l'égard des approvisionnements étrangers de produits d'hydrocarbures va s'accentuer davantage dans l'avenir.

Author's note: This paper is an attempt to familiarise a reader with almost no knowledge of India and her energy needs with basic information and insights. There is a pressing need for the world to be aware of the requirements of a nation so long repressed and now emerging with a liberalised economy. The views expressed here are mine and not necessarily those of the Government of India.

Introduction

With 17 percent of the world's population, India needs to sustain an economic growth rate of 8-10 percent over the next 25 years in order to eradicate poverty and meet its human development needs. This would require augmentation of primary energy supplies by nearly four times, and an increase in power generation from the current level of 160,000 MW to about 800,000 MW by 2031.

In 2007-08, with total primary energy consumption of 3.6 percent of global primary energy consumption, India was the fifth largest consumer of energy in the world. During the past decade, while the economy has grown at 8 percent per annum, energy growth has been a modest 3.7 percent.

India aspires to a medium-to-long term strategy of implementing a strategic shift from fossil fuels to non-fossil fuels, from non-renewable to renewable sources of energy, and from conventional to non-conventional sources of energy. In order to meet the increased power requirement, India will need to pursue all available forms of energy. Its energy mix is currently 51% based on coal, 36 percent on oil, 9 percent on natural gas and 2 percent each from hydropower and nuclear energy (table 1).

	India		**World**	
	2008	***2031***	***2008***	***2031***
Coal	51%	51%	29%	32%
Oil	36%	29%	36%	35%
Natural Gas	9%	12%	24%	25%
Hydro	2%	2%	6%	3%
Nuclear	2%	6%	5%	5%

Table 1 – Indian and World energy consumption

At 5.5 billion barrels of oil equivalent, India's proven oil reserves are only 0.4 percent of the world's total. Presently, it depends 78 percent on imported oil (which were 27 percent of the country's total imports in 2007-08). Gas reserves stand at 1.06 trillion cubic metres (0.6 percent of world's proven reserves). At 87 million standard cubic metres per day (MMSCMD), India produces only 72 percent of gas consumed.

Given continuing uncertainties with regard to supplies, energy security has emerged as a matter of priority and concern for the Indian government. Acquisition of energy assets overseas and efforts to promote infusion of new emerging technologies in the energy sector in both conventional and non-conventional areas, have therefore assumed urgency.

Most of India's supplies come from oil and natural gas producers in the Middle East. A growing interdependence is emerging between India (and other Asian energy consumers) and the producers. Diversification of its oil and gas supply base is also important for the promotion of India's energy security. Thus, in addition to its sources in the Middle East Area, India sourced nearly 18 percent of its oil from Africa—mostly from Nigeria, Angola and Algeria. Malaysia and Venezuela also figure among its top ten sources of crude.

In the present context, India needs to adopt a multi-pronged and coordinated energy strategy which requires:

- Increasing the domestic supply of crude oil and gas by fast-tracking upstream activities;
- substituting oil consumption with gas and coal (keeping in view the relative energy yields in dollar terms of various fuel options);
- increasing reliance on renewable sources of energy such as nuclear energy, solar energy, wind energy and bio-fuels; and
- increasing its own hydro-electricity production as well as developing mutually beneficial models to tap the hydro-electricity potential in neighbouring countries.

Energy supply changes

India's per capita energy consumption is among the lowest in the world: being 7 percent of the US consumption and 30 percent of the world's. India accounts for 17 percent of the world's population, but for only about 5 percent of world's primary energy consumption.

This figure is projected to rise faster than that in more developed countries. As noted in this volume introduction, the International Energy Agency's (IEA) *World Energy Outlook 2008* predicts that "world primary energy demand expands by 45% between 2006 and 2030—an average rate of growth of 1.6% per

year" and that "India sees the fastest growth, averaging 3.9% per year over the projection period (to 2030), followed by China, at 3.5%." Indeed, these figures may be quite conservative. The IEA has projected that India will turn out to be the world's third major net oil importer before 2025.

Some salient points emerge:

- In 2010, India's net oil imports will increase to 6 million barrels per day;
- the electricity generation capacity (most of it coal fired) will increase three times by 2030;
- from 62 percent in 2005, around 96 percent of the Indian population will have access to electricity by 2030;
- coal will remain the vital fuel and its use will triple by 2030; and
- there will be a seven-fold increase in coal imports that will increase to 28 percent in 2030 from 12 percent in 2005.

The United States is currently transferring about $1.3 billion to the oil-producing countries every day—$475 billion a year. The other major consumers, including China, the European Union, Japan and India are sending a total amount of well over $2.2 trillion annually to the producing countries.

India's ability to secure a reliable supply of energy resources at affordable prices will be one of the most important factors in shaping its future energy demand.

Domestic resources

Coal accounts for more than half of India's total energy consumption, followed by oil, natural gas and hydroelectric power. Although nuclear power currently comprises a very small percentage of total energy consumption, it is expected to increase in light of recent international civil nuclear energy cooperation deals. According to official statistics, 30 percent of India's total energy needs are currently met through imports.

Coal and conventional thermal power generation

Conventional thermal-generated power accounts for about 80 percent of electricity in India. Of these sources, coal is by far the most important fuel source for power generation, with roughly 70 percent of electricity generated in coal-fired power plants. India is both the third-largest consumer and third-largest producer of coal in the world, and although the country can supply the bulk of its needs domestically, it is currently a net importer of coal. Although the reliance on coal is unlikely to wane significantly, the power industry is largely driving the demand for natural gas in the country.

Oil

India has 5.6 billion barrels of proven oil reserves, the second-largest amount in the Asia-Pacific region after China. India produced roughly 0.88 million bbl/d of total oil in 2008, of which approximately 0.65 million bbl/d was crude oil. India has over 3,600 operating oil wells.

India's oil consumption has continued to be robust in recent years. In 2007, India consumed approximately 2.8 million bbl/d, making it the fifth largest consumer of oil in the world. Demand grew to nearly 3 million bbl/d in 2008. Consumption growth rates are expected to flatten in 2009, due to slowing economic growth rates and the recent global financial crisis.

India's largest crude oil provider is Saudi Arabia, followed by Iran. Nearly three-fourths of India's crude oil imports come from the Middle East. As stated earlier, India also sources nearly 18 percent of its oil from Africa, most of it from Nigeria, Angola and Algeria. Malaysia and Venezuela also figure among its top ten sources of crude and it is also seriously looking at the CIS region.

Existing refinery capacity in India is 2.3 million bbl/d of crude oil refining capacity (19 Refineries, 17 in the public sector and 2 in the private sector). Indian Oil Corporation (IOC) is the largest state-owned company in the downstream sector, operating 10 of India's 19 refineries and controlling about three-quarters of the domestic oil pipeline transportation network. The country has the eighth largest refinery capacity in the world.

Earlier this year, privately-owned Reliance Industries surpassed the IOC in terms of refining capacity in the country due to additions to its recently upgraded facility. Reliance's only refinery in Jamnagar is India's largest, with an initial capacity of 660,000 bbl/d. Reliance recently enlarged the Jamnagar site to

add an additional capacity of 580,000 bbl/d, making it the largest refining complex in the world with a refining capacity of 1.24 million bbl/d.

India is slated to add 1.6 million bbl/d of refining capacity by 2015, based on current proposed projects. The remaining challenge for the country will of course be to obtain a secure supply of crude oil to feed its refineries.

From one company operating in one basin at the time of Independence in 1947, there are currently 49 companies operating in 10 producing basins. India's oil sector is dominated by state-owned enterprises. The largest is Oil and Natural Gas Corporation (ONGC), accounting for about 70 percent of the country's oil production. Oil India Limited (OIL) is the next largest oil producer. Other major state-run players include the IOC and the Gas Authority of Indian Limited (GAIL), although these companies are primarily involved in downstream activities such as petroleum refining and gas pipelines and distribution, respectively. In addition, Reliance Industries has become a significant operator in the oil sector and is the largest private oil and gas company in the country. Cairn India, a branch of UK-based Cairn Energy, and BG Exploration are other important private sector operators in the industry.

The government has introduced several initiatives to encourage exploration and production by foreign entities, including:

- New Exploration Licensing Policy (NELP) in 1997;
- Competitive process inviting significant risk capital from Indian and foreign players; and
- 100 percent Foreign Direct Investment in the exploration and production sector.

Under the NELP, the following successes have been noted:

- Seven rounds of international bidding have been completed;
- 206 blocks awarded; 67 discoveries made in NELP Blocks;
- Strike Rate in 2007-08 : 24 out of 78 wells had hydrocarbons;
- $ 14.2 billion expected to be invested in Exploration ($6.1 billion) and in Development ($8.1 billion);
- $ 4.5 billion already invested in NELP blocks;

- 29 foreign companies working in India;
- Many big companies, particularly American ones, are yet to bid; and
- 8th round shortly being launched.

Natural gas

Despite major new natural gas discoveries in recent years, India is considering large-scale imports via pipelines and LNG terminals to help meet growing demand. India has 38 trillion cubic feet (tcf) of proven natural gas reserves. It is estimated that India produced approximately 1.1 tcf of natural gas in 2007, up slightly from the previous year's production levels. The bulk of India's natural gas production comes from the western offshore regions, especially the Mumbai High complex. The onshore fields in Assam, Andhra Pradesh, and Gujarat states are also significant sources of natural gas. The Bay of Bengal has also become an important source of natural gas for the country.

In 2007, India consumed roughly 1.5 tcf of natural gas. Natural gas demand is expected to grow considerably, largely driven by demand in the power sector. The power and fertilizer sectors account for nearly three-quarters of natural gas consumption in India. Natural gas is expected to be an increasingly important component of energy consumption as the country pursues energy resource diversification and overall energy security.

Liquefied Natural Gas

India began importing LNG in 2004. In 2006, India imported 0.254 tcf of LNG, making it the seventh largest importer of LNG in the world. India's LNG imports come from Algeria, Egypt, Nigeria, Oman, Qatar, United Arab Emirates, Australia, and Malaysia. Qatar is by far the largest supplier, accounting for nearly 86 percent of imports. India imports LNG through both long-term contracts and spot shipments.

Currently, India has two LNG import terminals—both in the State of Gujarat—the Dahej terminal (Petronet LNG, a consortium of state-owned Indian companies and international investors, owns and operates the facility with a capacity of 5 million tons per year) and Hazira LNG (which started operations in April

2005, and is owned by a joint venture of Shell and Total. The facility has a capacity of 2.5 mta, which may be expanded to 5 mta).

In addition, Petronet LNG is currently finalizing a deal with a foreign consortium to build a 2.5 mta LNG import facility at Kochi, Kerala by March 2012. Another proposed LNG facility is the 5 mta LNG processing plant in Dabhol, Maharashtra scheduled to begin operations this year.

In order to secure supply of natural gas to India and meet growing demand, India is currently looking to invest in liquefaction projects abroad, for example in Iran and in the Sakhalin-I LNG project.

Natural Gas Imports

Turkmenistan-Afghanistan-Pakistan-India Pipeline

The project consists of a planned 1,050-mile pipeline originating in Turkmenistan's Dauletabad natural gas fields and transporting the fuel to markets in Afghanistan, Pakistan, and India. In 2008, all parties agreed to induct India as a full member into the project. Work on TAPI is expected to commence in 2010, with supplies scheduled to flow in 2015. Concerns about the project have included the security of the route, which would traverse Afghanistan and Pakistan. Furthermore, a review of the TAPI project raised doubts about whether Turkmen natural gas supplies are adequate to meet proposed export commitments.

Iran-Pakistan-India Pipeline

India has considered various proposals for international pipeline connections with other countries. One such scheme is the Iran-Pakistan-India (IPI) Pipeline, which has been under discussion since 1994. The plan calls for a roughly 1,700-mile pipeline to run from the South Pars fields in Iran to the Indian State of Gujarat. A variety of security concerns about transit through Pakistan and the pricing of gas have delayed a project agreement.

Imports from Myanmar

Another international pipeline proposal envisions India importing natural gas from Myanmar. In March 2006, the

governments of India and Myanmar signed a natural gas supply deal. However, a specific pipeline route has yet to be determined. Initially, the two countries planned to build a pipeline that would cross Bangladesh. After indecision from Bangladeshi authorities over the plans, India and Myanmar have studied the possibility of building a pipeline that would terminate in the eastern Indian state of Tripura and not cross Bangladeshi soil.

Assets overseas

In recent years, Indian companies have acquired equity stakes in exploration and production projects overseas (figure 1). Today Indian Companies are present in over 23 countries having 60 oil and gas projects. The most active company abroad is ONGC Videsh Ltd (OVL), the overseas investment arm of ONGC. OVL conducts oil and natural gas operations in 17 countries, including Vietnam, Myanmar, Russia (Sakhalin Island), Iran, Iraq, Sudan, Brazil, and Columbia. In addition to ONGC, other Indian companies are also actively involved in exploration and production projects abroad. OIL, for example, is working on projects in Libya, Gabon, Nigeria, and Sudan, and IOC, GAIL, and Reliance are also pursuing overseas assets.

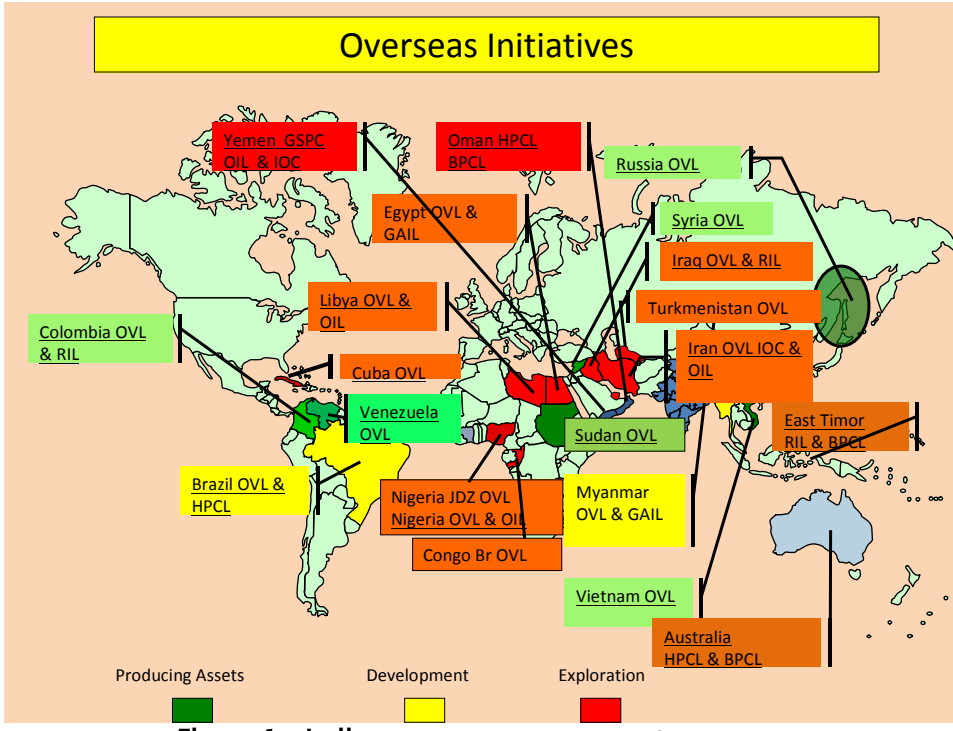

Figure 1 – Indian overseas energy assets

Alternate/Renewable sources of energy

India is eager to encourage—largely through direct subsidies and other fiscal incentives—the development of alternative sources of energy. The market in India for renewable energy is estimated at US $500 million and is growing at an annual rate of 15 percent. The major areas of investment are gas hydrates, solar energy, wind energy, small hydro projects, energy from wastes, and bio-fuels.

The renewable energy policy of the Indian government is aimed at generating 10,000 MW through renewable and non-conventional sources by 2012. The federal government has set a medium scale goal of electrification of 18,000 remote villages.

Gas Hydrates

Gas hydrates are naturally occurring solids comprised of water molecules forming a rigid lattice of cages, each containing a guest molecule of natural gas. Methane is the most abundant guest molecule in gas hydrates. The extent of worldwide gas hydrate occurrences has been evaluated for permafrost and offshore regions by seismic techniques and drilling. The estimate of total global carbon based on the inferences of gas hydrates and fossil fuels from both oceans and land deposits and atmosphere is of the order of eighteen trillion tonnes, of which the gas hydrates alone amount to ten trillion tonnes. Thus, the huge reservoirs of gas hydrates are perceived to be a future alternate energy resource. Natural gas hydrate studies have rapidly expanded globally in recent years, with large programs in Japan, the United States, India, Canada and the Republic of Korea. A memorandum of understanding has been signed by India with the United States for further research and development work in this field.

Solar energy

The scope of generating power and thermal applications using solar energy is promising. Only a fraction of the aggregate potential in solar energy is being used so far. Processed raw material for solar cells, large capacity solar photovoltaic (SPV) modules, film solar cells, SPV roof tiles, inverters and charge controllers have good market potential in India.

Biomass energy

In a country like India, biomass holds considerable promise as 540 million tons of crop and plantation residues are produced every year, a large portion of which is either wasted or used inefficiently. Conservative estimates indicate that even with the present utilization pattern of these residues and by using only the surplus biomass materials, estimated at about 150 million tons, about 17,000 MW of distributed power could be generated.

Hydro projects

With numerous rivers and their tributaries in the country, the small hydro sector presents an excellent energy opportunity

with an estimated potential of 15,000 MW. About 10 percent of this has been exploited so far.

Energy from wastes

The piles of garbage in urban areas caused by rapid urbanization and industrialization throughout India represent another source of non-conventional energy.

Bio-fuels

The government mandated (January 2003) the blending of 5 percent fuel ethanol in 95 percent gasoline in nine States and four Union Territories. This led to the creation of a demand for about 3.6 billion litres of fuel ethanol and also to a further increase in the fuel ethanol component of the blend to 10 percent (October 2003).

Nuclear Energy

Nuclear power holds a great deal of potential in India and the government is increasingly relying on its development to meet its power generation targets. For decades, India's nuclear establishment worked in almost total isolation, the result of US-led international sanctions against the development of India's nuclear weapons program. Barred from obtaining nuclear fuel or technology from abroad, the state-owned Nuclear Power Corporation of India, working with private firms, installed a mere 4,000 MW of nuclear power capacity, with another 2,600 MW under construction.

However, when New Delhi was finally accepted in 2008 as a *de facto* member of the global nuclear club—following a 2005 agreement with the United States—India became an accepted partner for the international civil nuclear trade.

In light of the deal, the Indian government has set its nuclear generation target at 40,000 MW by 2020, already showing an increase from its original goal of 20,000 MW. India currently has 14 nuclear reactors in commercial operation, with more planned. Recently, India bought six nuclear reactors from Areva of France and four from Rosatom of Russia. Combined, the ten new reactors will add 11,000 MW of electric capacity.

Conclusion: Maritime security for energy supplies

India could be termed a "sea-locked" nation, with access through its land borders being difficult due to natural or political reasons. The neglect of maritime security eventually led to the colonisation of the Indian sub-continent and the consequent loss of India's independence for nearly three centuries. These harsh lessons of history are not lost upon modern, independent India.

India's geographical location — at the natural junction of the busy international shipping lanes that criss-cross the Indian Ocean — has a major impact upon the formulation of her maritime strategy in support of the pursuit of her national interests. In terms of shipping density, the sea area around India is one of the busiest waterways of the world, with over 100,000 ships transiting the international shipping lanes of this region every year. The Strait of Malacca alone accounts for some 60,000 ships annually. India itself has a 7,500 km coastline and several far-flung island territories. These include the 27 islands of the Lakshadweep chain on her western seaboard and the 572 islands of the Andaman and Nicobar chain to the east. It is of note that the southernmost island of Great Nicobar is only 90 nautical miles from Indonesia, while the northern most tip of the Andaman is less than 9 nautical miles from Myanmar. The 13 major and 185 minor ports that mark India's coastline constitute the landward ends of the country's sea lines of communication.

In terms of international trade, as much as 90 percent by volume and 77 percent by value transits over the seas. Ensuring the safety and freedom of this seaborne trade is, consequently, a major strategic imperative. More and more of India's trade is now with the economies of the Indian Ocean region and East Asia. In fact, there have been significant changes in India's direction of external trade over the past decade and a half. The United Arab Emirates is today India's largest export partner. China is emerging as among India's largest trading partners and trade with South Africa, Singapore, Malaysia and Indonesia, too, is extremely significant. In fact, India's trade with the countries to her east is now vital to India's economic well-being and this, among other things, underscores the growing centrality of the Strait of Malacca.

After trade, the next strategic maritime imperative is energy security. Of all the cargo that moves along the international shipping lanes of the Indian Ocean, perhaps the most critical is energy, as defined by petroleum and petroleum

products. Almost a billion tonnes of oil from West Asia passes close to Indian shores annually. Some part of this is, of course, destined for Indian ports, to feed the increasing demand for energy to fuel India's current economic growth. A much greater proportion, however, is destined for the oil-intensive economies of the United States, China and Japan. Today, in fact, almost 45 percent of all new world oil demand is attributable to the rising energy needs of China. Over 70 percent of China's oil imports come from West Asia and Africa and all of this is transported by sea.

One only has to look at the investments OVL is making in extra-regional but energy-rich areas such as Sakhalin, Sudan, Nigeria and Venezuela to realize how India's maritime interests are growing. We thus see the Indian Navy and the Indian Coast Guard as major stabilising forces in this great movement of energy across the Indian Ocean, not just for India, but for the world at large.

Energy Security in the Coastal Zone

James Kraska

Abstract

Not since the Iran-Iraq "tanker war" of the 1980s has maritime security infrastructure—primarily crude oil tankers, and oil platforms and terminals in the coastal zone—been at such a high risk of disruption by armed attack at sea. The bitter conflict between Baghdad and Tehran swung open the door to new and irregular maritime threats and hybrid littoral warfare against maritime energy infrastructure, resulting in damage to more than 500 oil tankers and the memorable "reflagging" of Kuwaiti tankers by the United States. During the "tanker war" the threat of attack arose from the seam between conventional naval warfare and unconventional threats at sea, and included naval mines, seaborne terrorism, small, fast boat "swarms" and littoral insurgency. Today, those threats still exist, and added to them is maritime piracy. Natural gas carriers and oil tankers comprise 40 percent of the world shipping fleet, and offshore sources of energy are becoming more important for new development. Addressing the threats against energy vessels and infrastructure in the maritime domain is essential for maintaining economic prosperity, especially in Asia, which is dependent upon Gulf oil. An effective approach requires the right strategy and carefully selected tools to accomplish the task—a large, dispersed fleet of small patrol craft is best suited for the mission.

Résumé

Depuis la « guerre des pétroliers » entre l'Iran et l'Iraq dans les années 1980, l'infrastructure de sécurité maritime – principalement celle des pétroliers de brut et des plateformes et terminaux de pétrole situés dans les zones côtières – n'a connu de risque aussi élevé de perturbation par une attaque armée en mer qu'elle n'en connaît aujourd'hui. Le conflit amer entre Baghdad et Tehran a ouvert toute grande la porte à des menaces maritimes nouvelles et irrégulières et à la conduite d'une guerre littorale hybride contre l'infrastructure énergétique

maritime, ce qui a causé des dommages à plus de 500 pétroliers et suscité le « changement de pavillon » des pétroliers koweïtiens par les États-Unis. Pendant la « guerre des pétroliers », la menace d'attaques provenait du point de jonction entre la guerre navale conventionnelle et les menaces non conventionnelles en mer et incluait des mines marines, un terrorisme par mer, des « essaims » de petits bateaux rapides et un mouvement d'insurrection sur le littoral. Aujourd'hui ces menaces existent encore et la piraterie maritime vient s'y ajouter. Les transporteurs de gaz naturel et les pétroliers constituent 40 pour cent de la flotte de transport de marchandises et les sources d'énergie en mer deviennent plus importantes pour le nouveau développement. Pour avantager le développement économique, les menaces contre les pétroliers et l'infrastructure maritime doivent être éliminées, surtout en Asie qui est tributaire du pétrole du Golfe. Une approche efficace exige qu'on ait la bonne stratégie et les bons outils pour accomplir la tâche — une grande flotte dispersée de petites embarcations de patrouille convient le mieux à la mission

The views presented here are those of the author and do not constitute the policy or position of the US Government.

Not since the Iran-Iraq "tanker war" of the 1980s has maritime security infrastructure—primarily crude oil tankers, oil platforms and terminals in the coastal zone—been at such a high risk of disruption by armed attack at sea. The bitter conflict between Baghdad and Tehran swung open the door to new and irregular maritime threats and hybrid littoral warfare against maritime energy infrastructure, resulting in damage to more than 500 oil tankers and the memorable "reflagging" of Kuwaiti tankers by the United States. During the "tanker war" the threat of attack arose from the seam between conventional naval warfare and unconventional threats at sea, and included naval mines, seaborne terrorism, small, fast boat "swarms" and littoral insurgency.

Today, those threats still exist, and added to them is maritime piracy. Natural gas carriers and oil tankers comprise 40 percent of the world shipping fleet, and offshore sources of energy are becoming more important for new development. Addressing the threats against energy vessels and infrastructure in the maritime domain is essential for maintaining economic

prosperity, especially in Asia, which is dependent upon Gulf oil. An effective approach requires the right strategy and carefully selected tools to accomplish the task—large numbers of small, fast patrol craft.

In the United States, an effective strategy for addressing maritime threats to energy security is contained within the 2007 *Cooperative Strategy for 21st Century Seapower*. Successful implementation of the strategy for inshore and littoral security, however, suggests the existing naval force structure should be supplemented with smaller warships that can operate in the narrow seas.

The *Cooperative Strategy* is the new conceptual foundation for the US sea services, the Marines, the Coast Guard and the Navy, to conduct naval coordination, combined training and exercises, maritime security capacity-building with partner nations, and maritime security operations (MSO) which are also known as maritime "constabulary" operations. Signed and released by the three maritime service chiefs, the strategy is well-positioned to serve as a guide for the spectrum of American interests in sea power. Although the strategy ideally is designed to strengthen maritime energy security against the most likely threats in the maritime domain, US naval force structure is less well-focused.

Policy makers should consider whether the existing force structure is up to the task of patrolling the coastal zone. Among the most pressing missions or constabulary functions in the geographically narrow and politically complex operating environment of the inshore areas, energy security ranks at the top. Ensuring maritime energy security is most likely to require smaller vessels such as corvettes and patrol craft that are numerous and widely distributed, and that may be integrated easily into combined operations and exercises with coastal navies throughout the oil-producing world.

In contrast, the "high end" force structure of the US Navy is dense, concentrated and aggregated around prohibitively expensive capital warships. Consequently, in order to better implement the *Cooperative Strategy* to safeguard oil and gas vessels and infrastructure at sea, nations should build or purchase a large number of small, fast and versatile corvettes and patrol craft that can accomplish critical maritime energy security missions at a fraction of the cost (and yet more effectively) than capital warships.

Conventional naval forces from major maritime powers, of course, also may hold energy supplies at risk. As China has moved from being a net exporter of oil to importing 80 percent of its oil, for example, Beijing has become increasingly worried that its dependence on Arabian Gulf oil is vulnerable to disruption by US or Indian sea power. Japan, also dependent upon an energy lifeline to the Middle East, ponders its ability to protect sea lines of communication against a rapidly expanding People's Liberation Army (Navy). China has demonstrated a willingness to use naval force to secure recognition of its expansive offshore claims over the Paracel and Spratly chains of islets, reefs and elevations—regions rich in oil and natural gas deposits.

The rising Asian superpower remains caught in a web of maritime territorial counter-claims by its neighbours over the tiny geographic features sprinkled throughout the East China Sea. Last year, Beijing settled conflicting oil and gas claims with Japan in the East China Sea, but the Philippines, Malaysia and Vietnam have more at stake in the Spratlys and Paracels, which lie farther south. While many of these specks in the ocean do not warrant an exclusive economic zone (EEZ) under the rules in the Law of the Sea Convention, most of them lie within the legitimate EEZs of Vietnam, the Philippines and Malaysia.

Military skirmishes have occurred over conflicting claims in the South China Sea. In 1976, China invaded and captured from Vietnam the Paracel chain, and in 1988 China and Vietnam clashed once again at Johnson Reef in the Spratlys. China also has "occupied" Mischief Reef, a submerged elevation claimed by the Philippines, and positioned only 130 miles from the Philippine island of Palawan.

So while small warships are needed to protect oil and gas infrastructure in most of the littoral areas of the globe, such as the Middle East and Africa, they should not be developed by sacrificing the versatile and capable battle fleets required to deter conventional threats. The high-end American naval force structure, comprised of aircraft carrier strike groups (CSGs) with cruisers, destroyers and nuclear attack submarines (SSNs), is not well-suited for inshore energy security, but will continue to be necessary to deter near-peer competitors. But the high-value force structure should be complemented by a greatly expanded force of smaller warships that are more capable of protecting coastal oil and gas infrastructure.

A milieu of potential energy scarcity, international resource competition and powerful unconventional threats at sea poses particular safety and security challenges for worldwide oil and gas production and delivery. The Gulf of Guinea, for example, holds over 33 billion barrels of oil reserves including 10 billion offshore, and the region has become one of the most important energy fields in the world. Nigeria is the largest US trade partner on the African continent, supplying 10 percent of America's demand for oil. Yet corruption and instability siphon $3 billion worth of Nigerian oil every year to armed insurgencies and criminal gangs—a practice known locally as "bunkering." Meeting this maritime challenge requires configuring both strategy and force structure.

While the US Navy has developed a powerful and effective strategy that will contribute to maritime security in the littoral regions, it should develop a more coastal-oriented force structure in order to better conduct training and combined operations with a greater variety of partner nations. Ensuring maritime energy security will become a key objective in the coming years, and CSGs are ill-suited to the task.

Oil accounts for 40 percent of the world's energy use, and fuels 95 percent of transportation needs. In 2007, the world consumed 85 million barrels of oil per day (bbl/d), and slightly more than half of the consumption reached market via tanker shipping.

The world's daily offshore oil and gas production is about 43 million barrels of oil equivalent (boe), and this figure is expected to grow to 53 million boe as early as 2010.[1] Estimates suggest over 80 percent of the undiscovered worldwide oil and gas lies offshore, so maritime security will become increasingly intertwined with energy security. Despite an increasing role for renewable sources of energy, and the reluctance to exploit oil and gas reserves in ecologically pristine areas such as the Arctic Ocean, fossil fuels will continue to be essential sources of energy in the coming decades.

Technological advances have propelled maritime oil and gas extraction and delivery activity farther from shore. In 2008, Shell Oil Company successfully drilled for oil in nearly 10,000 feet of water, 1.77 miles below the seabed.[2] Some significant oil

[1] World Offshore Oil and Gas Production and Spend Forecast, Energy Business Reports, Mar. 2008, available at: http://www.researchandmarkets.com/reports/c89312.

[2] Shell Drills Deepest Offshore Oil Well, Energy Current, Dec. 2, 2008,

producing states, including Iraq and Brazil, extract nearly all of their oil wealth from offshore ocean areas. Even the United States may have as much as 93 billion barrels of oil recoverable beneath its continental shelf.[3] (In comparison, Saudi Arabia is widely thought to have reserves of 267 billion barrels of oil overall.[4]) Traditional energy supplies are particularly vulnerable to economic, political and military disruption, so successful attacks against maritime energy infrastructure could have a drastic impact on oil markets.

The price of oil is especially sensitive to supply interruption. Oil also may be used as an effective economic weapon, as illustrated by thirty-five years of oligopolistic price-setting by the members of the Organization of Petroleum Exporting Countries (OPEC) and Russia's coercive "energy diplomacy" against its European neighbors.

The global energy industry is even more exposed to dramatic and violent attack than it is to manipulation by predatory suppliers. Oil tankers and terminals, in particular, are vulnerable. Of the 120,000 ocean-going vessels in the world, only about 4,000 (about three percent) are oil tankers.

Less than one year after the attacks of 9/11, the French-flagged oil tanker *Limburg*, loaded with nearly 400,000 barrels of Iranian crude oil bound for Malaysia, was struck by a dinghy laden with explosives. The vessel caught fire and 90,000 barrels of oil poured into the Gulf of Aden.

Al Qaeda was found responsible for the attack and the perpetrators were sentenced to prison in Yemen. The terrorists later appear to have escaped from jail.

The attack on the *Limburg* was remarkably similar to the deadly bombing of the warship *USS Cole* two years earlier. The *Limburg* did not sink, but fire raged on board the tanker for four days, and repairs cost millions of dollars.

Similarly, on April 24, 2004 suicide boats conducted coordinated attacks against the al-Basra oil terminal (ABOT) and the Khawr al Amaya oil terminal (KAAOT), situated in the Northern Arabian Gulf only miles from the shoreline of Iraq. The terminals are the only national facilities capable of handling Iraqi

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available at:
http://www.energycurrent.com/index.php?id=2&storyid=14623.

[3] Energy Information Administration, *Annual Energy Outlook* (2009), at p. 35.

[4] PennWell Corporation, *Oil & Gas Journal*, Vol. 105(48) (Dec. 24, 2007).

crude oil for export, and the entire economy of the country depends on them.

In November 2008 the *Sirius Star*, a Liberian-flagged Very Large Crude Carrier (VLCC) was hijacked 450 nautical miles off the coast of Kenya by Somali pirates. The ship was loaded with 2 million barrels of oil valued at $100 million. After months of negotiation, $3 million in ransom was paid for the release of the supertanker and its 25 crew members.[5]

Similarly, in the Gulf of Guinea, the Nigerian militant group Movement for the Emancipation of the Niger Delta (MEND) has demonstrated a continuing ability to disrupt production from Nigeria's mature, onshore oil fields. In 2008, however, the organization increased attacks offshore, successfully attacking and shutting down Shell Oil's Floating, Production, Storage and Offloading (FPSO) vessel, *Bonga*, which was loitering 120km offshore.

The attack against the *Bonga* was alarming because 90 percent of Nigeria's future growth of oil production is expected to come from seabed development. More than one million barrels per day is anticipated to come on line from offshore sources in the next five years, but that figure may be unrealistic if skilled workers from Western oil companies are deterred from working in the area by MEND's violent attacks.

In order to transport oil or gas to wealthy and stable consumer economies, the commodity must travel through concentrated chokepoints—pipelines, straits, canals and narrow seas. Global, diffuse and fragile, the offshore industrial infrastructure for the extraction and movement of oil and gas is especially vulnerable to disruption by organized criminal gangs operating at sea.

Acutely exposed to the range of lower-order asymmetric threats, oil tankers, drilling platforms, oil terminals, roadsteads, fixed, floating, semi-submersible structures, FPSOs, dynamic positioning rigs and offshore terminals and port storage facilities are high-impact targets. This distributed and diffuse network of high value assets is concentrated in the littorals and is exposed to damage or destruction by non-state organizations, accessible to groups with even a modicum of maritime skill.

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[5] More than 100 vessels were seized by armed Somali clans in the Gulf of Aden in 2008, and nearly 900 seafarers were taken hostage, placing at risk the major shipping route connecting the Middle East to the markets of Europe.

The geographic variety of the maritime energy infrastructure unfortunately aligns with the most politically unstable regions of the planet. Virtually only Norway and Canada are major exporting states that are not located in the arc of instability. The nations are superseded in diversity only by the colourful range of illicit criminal maritime organizations seeking to disrupt the energy economy. Al Qaeda, Somali clan pirates, the Tamil Tigers in Sri Lanka and MEND in West Africa have a proven capability of operating in the maritime domain.

Historically, these groups broadly were divided into two major categories—those organizations including pirates and armed robbers at sea that are fulfilling a private and pecuniary motive and terrorist and insurgent groups using violence to pursue a fringe political agenda. During the era of the Barbary pirate corsairs of North Africa, semi-autonomous Islamic principalities of the Ottoman Empire combined the two goals, fighting both for religious ideology and plunder. Today there is little evidence that terrorism and piracy have merged. But pirates operating from the shoreline of Somalia are flush with cash from ransom payments and operate well-organized, clan-based international financial networks ripe for supporting terrorism.

The Northern Arabian Gulf is among the least stable—and most important—sources of energy in the world. Essentially the entire economy of Iraq is dependent on the security of offshore oil terminals. Each year $10 billion worth of oil flows through ABOT and KAAOT, keeping the fragile Iraqi economy afloat.[6] The terminals are protected by Iraqi and American forces living on the platforms in make-shift quarters under a blazing sun. British and Australian forces supplement the protective force. In addition to safeguarding the facilities from terrorists, the Iranian Navy and the associated Iranian Revolutionary Guard Navy (IRGCN) looms nearby.

Farther south, the Strait of Hormuz constitutes the world's most important energy chokepoint. Situated between two of the least stable countries on earth, Yemen and Iran, the passageway is the principle shipping route for 40 percent of all seaborne-traded oil. Twenty percent of the world's oil supply funnels through the strait each year, including 75 percent of Japan's oil supply. Only 21 miles wide at its most narrow point, shipping in the strait is divided between two channels, each two miles wide,

[6] Jackie Northam, Coalition Forces Watch Over Iraq's Oil Platforms, National Public Radio, Morning Edition, May 17, 2006, available at http://www.npr.org/templates/story/story.php?storyId=5409925.

one for northbound traffic and the other for southbound traffic. Fifteen crude oil tankers pass through the Strait of Hormuz each day, and other vessels carrying refined petroleum products and liquefied natural gas (LNG) also routinely make the journey.

Key Global Maritime Energy Chokepoints (table 1)

Coastal nations have addressed the vulnerability of oil platforms by creating security and protection zones around critical ocean infrastructure. Article 60(5) of the 1982 Law of the Sea Convention permits coastal states to establish a safety zone around artificial islands, installations and structures in the EEZ out to a maximum distance of 500 meters. Zones permit coastal security to protect the facilities, providing ample time, distance and space in order to deter or intercept attacks on the infrastructure.

Strait	Breadth (nm)	Bordering nations	Oil Flow (Million barrels/day)
Bab el Mandeb Strait	18	Yemen-Djibouti	3.3
Bering Strait[7]	9	United States-Russia	(prospective)
Strait of Gibraltar	8	Morocco-Spain	(not available)
Strait of Hormuz	21	Oman-Iran	17
Strait of Malacca	8	Indonesia-Malaysia	15
Turkish Straits	0.5	Turkey	2.4
Suez Canal	1,000 feet	Egypt	4.5
Panama Canal	110 feet	Panama	.5

Table 1 – Key Global Maritime Energy Chokepoints

In 2007 Brazil petitioned the International Maritime Organization in London to permit larger safety zones for areas of concentrated oil development in the Campos Basin in the South

[7] The Bering Strait could become a key energy chokepoint if Arctic oil and gas production in the region accelerates. Already, energy companies are increasing activities and exploration in the area, driven for the most part by technological advancements that are enabling access to seabed reserves in Arctic conditions.

Atlantic. Eighty percent of Brazil's oil and 42 percent of its natural gas production comes from the Basin, so a successful attack at sea could have devastating economic consequences.[8] Brazil's proposal would extend safety zones out to nearly 2,000 meters surrounding some facilities. In Iraq, the United States and the Government of Iraq maintain 3,700-meter security zones around ABOT and KAAOT due to the particular wartime dangers facing the facilities.

The East Coast of Africa forms another epicentre of maritime energy insecurity. During 2007 and 2008, Africa displaced Asia as the most dangerous region for transiting oil tankers and the safety of oil platforms. Somali pirates acquired the sophistication to operate routinely over 200 nautical miles from shore. For the first time ever, 2008 witnessed more attacks in Nigeria and Somalia than in Indonesia and the Strait of Malacca.

Because fully-laden oil tankers ride low to the water they are particularly vulnerable to swarms of fast-moving pirate skiffs which generally approach at dawn to board unsuspecting vessels at the stern, the lowest deck on the ship. The daring attack on the *Sirius Star* so far from shore suggests pirates are using the shipping industry's open-access VHF automatic identification system to intercept merchant ships. The attack was one of the most dramatic by maritime piracy gangs operating from the shoreline of Somalia against international shipping transiting to and from the Suez Canal via the Gulf of Aden and the Strait of Bab el Mandeb.

In Asia the incidence of piracy currently is lower than in years past, but the method of attack often even more sinister. Pirates in Southeast Asia are likely to take control of a ship, kill the crew and reflag the vessel—creating a "phantom ship"—a hijacked ship operated under false name and registration.

For example, in April 1998 pirates seized the Malaysian-registered *Petro Ranger* just outside of Singapore's territorial waters. The objective of the pirates was not ransom, but the theft of the ship and its cargo of 9,600 tons of diesel petroleum and 1,200 tons of A-1 jet fuel. The pirates repainted the stern with a new name, and raised the Honduran flag, converting the *Petro Ranger* into a "phantom vessel." Associated pirate ships

[8] Government of Brazil, Proposal for the establishment of an Area to Be Avoided and Modification to the Breadth of the Safety Zones around Oil Rigs Located off the Brazilian Coast—Campos Basin, Maritime Safety Committee, Navigation Sub-Committee, IMO Doc.NAV 53/3, Feb. 26, 2007.

rendezvoused with the "new" ship at sea and siphoned $2.3 million in oil for the black market.

Safe and secure energy supplies are essential for national security and economic prosperity. The energy sector is intractably connected to the maritime domain. As the world's top consumer of energy, the United States has a particularly strong interest in maritime energy security. Moreover, because oil trades on the world market, a disruption in one area affects the market worldwide.

As mentioned above, the 2007 *Cooperative Strategy* is a new approach to maritime security operations based on partnership and collaboration. Collective response to maritime piracy in East Africa poses the first real test for this new direction in maritime security. The related concepts, the "Thousand Ship Navy," which evolved into the interagency Global Maritime Partnership (GMP), also are designed to facilitate collaboration and build trusted relationships. From its inception more than two hundred years ago, the US Navy has faced the challenge of creating a force structure and implementing a strategy that is effective in addressing both higher end and lower end threats.

The cornerstone of the new approach is that the oceans are secure—and nations are safer and more prosperous—not when the seas are controlled by one nation, but rather when they are made safe and free for all.[9]

As an activity-based approach to cooperation among maritime nations with a shared stake in international commerce, safety, security, and freedom of the seas, GMP provides a forum for building greater consensus on policy principles and for undertaking common activities to address maritime challenges by improving collective capabilities. This goal can be achieved through partnering states with greater capacity with those with less capacity in order to address common objectives, such as port security, illegal, unreported and unregulated fisheries, maritime proliferation security, maritime safety and aids to navigation and the range of maritime security operations, including law enforcement at sea. The common interest and the capabilities of partner nations are leveraged with the interests of the international community, achieving a collective and cooperative approach focused on the rule of law, security and

[9] Robert M. Gates, National Defense Strategy 16 (Jun. 2008), available at: http://www.defenselink.mil/news/2008%20National%20Defense%20Strategy.pdf.

freedom of the maritime commons. Navy chiefs from over thirty nations endorsed the Thousand Ship Navy concept as a way for the sea services to meet common maritime challenges. The Chief of the Indian Navy, for example, suggested that confidence-building partnership activities conducted between India and the United States have made both forces more effective in fighting piracy in the Gulf of Aden.[10]

The problem in implementing these new maritime power concepts—the somewhat amorphous "Thousand Ship Navy," the nascent interagency version, GMP, and the *Cooperative Strategy*—is that nearly all of the coastal and littoral naval and coast guard forces of international partners that the United States seeks to work with have an entirely different maritime security force structure than the US Navy.

The US Navy is designed around robust, multi-function aircraft CSGs, $30 billion behemoths with a screen of powerful surface ships and submarines, capable of dominating high-intensity warfare in the air, throughout the electromagnetic spectrum, on the sea and underneath the waves. These forces are wholly inefficient for conducting counter-terrorism and counter-piracy operations, however, and few other countries have the ability to plug in and operate in tandem with such a force. The small number of nations that are able to do so, such as Canada, Japan, France and the United Kingdom, generally are not the same countries operating highly vulnerable, but globally critical maritime oil and gas infrastructure.

The obvious disparity between the mission of the *Cooperative Strategy* and the force structure that is supposed to accomplish it is gaping. As a result of the mismatch between strategy and force, energy in the maritime domain is more vulnerable. This chapter concurs with the recommendations from several analysts writing in the *Armed Forces Journal* and the *Proceedings of the US Naval Institute*, calling for the creation of a larger number of smaller vessels to complement the higher-end force structure.

The large ships in the CSG are more capable but too few in number and are inefficient for conducting maritime security operations in the vicinity of oil and gas infrastructure. The *Cooperative Strategy* calls for an engagement force able to work with large numbers of partner nations with small littoral and coastal forces to protect, stabilize and maintain order in the

[10] Interview with Admiral Sureesh Mehta, Indian Chief of Naval Staff, New Delhi Force, 1 Dec 08-31, Dec 2008.

narrow seas and offshore regions. Instead, the United States has a few, awe-inspiring task force battle fleets, each one capable of destroying an entire opposing navy but not particularly effective at executing the *Cooperative Strategy*.

For decades, the United States organized littoral capabilities around Amphibious Ready Group-Marine Expeditionary Units (ARG-MEUs), a combination of amphibious warships and a 2,200-strong quick reaction force of Marines. In 2001, however, the Navy added a cruiser, a destroyer, a frigate and a fast-attack submarine and converted the ARG-MEU into the more capable Expeditionary Strike Group (ESG). The ESG, like the ARG-MEU, could deliver scalable combat power for operational manoeuvre from the sea. Like the CSG, however, the ESG also is capable of conducting sustained, independent operations or work in conjunction with sophisticated air and naval forces of allied powers. Consequently, neither the CSG nor the ESG are well-suited for combined operations in the Gulf of Guinea with the nations of West Africa, with the Iraqi Navy or for counter-piracy operations in the Horn of Africa.

Writing in the *US Naval Institute Proceedings*, Commander Henry J. Hendrix suggests the mismatch between the *Cooperative Strategy* and the gold-plated force structure needs recalibration. What the US Navy needs, Hendrix maintains, is development of new "influence squadrons" composed of an amphibious mother ship (an LPD or similar vessel), a destroyer to provide air, surface, and subsurface defensive capability, a Littoral Combat Ship to extend a squadron's reach into the green-water environment and provide some mine warfare capabilities, a Joint High Speed Vessel (HSV) for intra-theatre lift, a Coastal Patrol ship to operate close in to the shoreline, and an M80 Stiletto to provide speed and versatility.[11] "We need Fords, not Ferraris."[12]

But Professor Milan Vego of the Naval War College would go even smaller, forward-deploying dozens of small surface

[11] Henry J. Hendrix, Ford, not a Ferrari: If the Navy rethinks the role of Carrier Strike Groups (Ferrari) and deploys new, scaled-down Influence Squadrons (Ford), the result will be 320 hulls in the water for three-quarters the price, US Naval Institute Proceedings (Apr. 2009), available at: http://www.usni.org/magazines/proceedings/story.asp?STORY_ID=1838.
[12] Henry J. Hendrix, Ford, not a Ferrari: If the Navy rethinks the role of Carrier Strike Groups (Ferrari) and deploys new, scaled-down Influence Squadrons (Ford), the result will be 320 hulls in the water for three-quarters the price, US Naval Institute Proceedings (Apr. 2009), available at: http://www.usni.org/magazines/proceedings/story.asp?STORY_ID=1838.

combatants varying in size from about 500 tons to 1,500 tons.[13] Professor Vego notes that modern multipurpose corvettes and missile combat craft now carry an array of powerful weapons and sensors and are fully capable of conducting a wide range of combat and non-combat missions.

During the Second World War, the United States built more than 400 patrol torpedo (PT) boats, sending them to distant war zones. Most ships larger than 1,500 tons are capable of extended operations on the open ocean.

The corvette, which started as a small anti-submarine warfare (ASW) ship designed for coastal convoy, has evolved into a multipurpose combatant capable of conducting land attack, ASW and anti-air warfare (AAW) missions. Today these fast vessels may be armed with several anti-ship missile launchers and multi-purpose guns, and even be outfitted with a helicopter landing pad. These small ships shave a low draft, a range of between 1,500-3,000 miles, are highly manoeuvrable in confined waters and can operate at high cruising speeds with high endurance.

Smaller yet fast attack craft (FAC) are between 250 to 500 tons, have a cruising range of 1,500 to 4,000 nautical miles and an endurance of a week or longer. FACs may be armed with eight anti-ship missiles, a 76mm or 57mm dual-purpose automatic gun and one or two 20mm to 40mm guns.

Professor Vego suggests that although FACs are versatile, they lack staying power and bring about rapid onset of crew fatigue. The Navy recognizes the gap in its ability to conduct operations in inshore waters and the narrow seas. Currently, the smallest surface combatants in the US Navy are the eight 355-ton Cyclone-class patrol craft, but the Navy is experimenting with the new and highly manoeuvrable 45-ton surface craft dubbed M80 Stiletto which has a range of about 500 nautical miles.

The US Navy also plans to build 55 2,800-ton Littoral Combat Ships (LCS). Two of these vessels are already completed. LCS-1 Freedom has a mono-hull and LCS-2 Independence has a trimaran hull, and the services expects selecting one of these two hull designs in 2010 after each has been evaluated. The LCS is a multipurpose ship with a range of 4,500 miles able to carry tailor-made mission modules such as

[13] Milan Vego, Think Small, Adding small combatant ships would beef up the Navy's capabilities, Armed Forces Journal (Jul. 2008), available at: http://www.afji.com/2008/07/3548183.

anti-surface warfare (SUW), ASW and mine countermeasures (MCM). The ships will also be capable of patrolling and surveillance and of maritime interception and security operations.

The smaller vessels are better suited than cruisers, destroyers and frigates for conducting the types of counter-terrorism patrols, counter-piracy and counter-smuggling patrols, partner nation training and combined operations and inshore surveillance essential for safeguarding oil and gas infrastructure and oil tankers in the littorals. Although Vego suggests creation of as many as 32 multipurpose corvettes organized in eight squadrons of four ships each, even that number is insufficient to establish an enduring presence and continuous engagement called for the in the *Cooperative Strategy*. Vego also recommends deployment of a force of perhaps 12 missile combat craft that could be deployed within a striking distance of selected choke points such as the Strait of Hormuz, the Bab-el Mandeb Strait and the Strait of Malacca.

The New American Administration and the Perpetual Problem of the Security of Energy Supplies

Charles F. Doran

Abstract

Defence of security of supply, always challenging, is likely to become increasingly difficult as the world recovers from economic recession. Exportable oil and natural gas are increasingly concentrated in the Persian Gulf where political tensions often run high. Europe is increasingly dependent upon natural gas and much of its oil from a single, often politicized source, Russia. Major force restructuring in Iraq is raising new uncertainties. War in Afghanistan continues to simmer. The Obama Administration is attempting to forge a new energy policy that reduces America's dependence on unreliable foreign suppliers of oil and natural gas while also addressing long-term problems of global warming. Canadian exports of conventional oil and gas, hydro-electricity, and energy from the oil sands grow in importance. The article argues the need for a consumer-producer joint security force, perhaps based in Kuwait, to maintain security of supply and the regional balance of power following American withdrawal from Iraq.

Résumé

Il est probable que la défense de la sécurité des approvisionnements, qui est toujours un défi, deviendra de plus en plus difficile à mesure que le monde se remettra de la récession économique. Les ressources de pétrole et de gaz naturel exportables sont de plus en plus concentrées dans le golfe Persique où les tensions politiques sont souvent virulentes. L'Europe dépend de plus en plus du gaz naturel et une grande partie de son pétrole vient d'une source unique, souvent politisée, la Russie. Une restructuration majeure des forces présentes en Iraq soulève de nouvelles incertitudes. La guerre en Afghanistan continue à mijoter. L'administration Obama tente de forger une nouvelle politique énergétique qui

réduit la dépendance de l'Amérique vis-à-vis des fournisseurs étrangers, peu fiables, de pétrole et de gaz naturel tout en tenant compte des problèmes à long terme du réchauffement planétaire. Les exportations canadiennes conventionnelles de pétrole et de gaz, d'énergie hydroélectrique et d'énergie provenant des sables bitumineux prennent une importance croissante. L'article défend le besoin d'une force de sécurité conjointe consommateur-producteur, peut-être basée au Koweït, pour assurer la sécurité de l'approvisionnement et l'équilibre du pouvoir régional suite au retrait américain de l'Iraq.

The security of energy supply is always difficult. The weight of this article is that the security of petroleum and natural gas supply is likely to get more difficult once the world recovers from the current recession. A coalescing of factors has increased the stakes and the risks for energy security:

- Reserves of exportable oil and gas are increasingly concentrated in the dangerous and overcrowded Persian Gulf area;
- petroleum prices since 1973 have been on a roller-coaster. During the next price upturn in response to tighter supply, the competition for supply threatens to frighten one or more major consumer governments, as happened in 1979, thus setting off demand rivalries that create additional political tensions with producers and among consumers;
- the Organization of the Petroleum Exporting Countries (OPEC) has lost spare capacity and can no longer regulate price on the upside of these price surges;
- the annual output of "easy oil"—of high-quality oil in large, accessible reservoirs that can be easily recovered at low cost—appears to have peaked worldwide. Higher-cost oil from aging fields, increasingly depleted, means higher-priced oil even under conditions of constant demand. Eventually the world energy market will re-equilibrate, even pushing price downwards once again as technology brings on increased amounts of non-conventional oil, gas, and alternate energy. But lags exist before these supplies become available. In the interim, pressure on existing supply is likely to increase,

thus amplifying risks of energy supply aggregated from fewer sources;

- although the level of energy consumption as a percent of GDP continues to decline for the advanced industrial countries, and although forecasted world demand continues to be reduced following each price surge, the growth in demand in the Third World, especially in India and China, continues to rise and will do so for decades. A multiplier exists in terms of the middle class in these countries and, with it, a hunger for cars, the single greatest catalyst for the consumption of oil. The rivalry among consumer governments worried about the security of supply to keep these cars running complicates the maintenance of that security;
- Europe has gotten itself into a serious dependency relationship with its principal natural gas supplier, Russia, from which Europe is not extricating itself. This problem was long in the making and was predicted. Since Russia is fond of extracting political benefits along with financial revenue, any resulting tiffs become far more serious under these circumstances of tension-ridden dependency;
- if the current scourge of piracy on the high seas leads to a refinement of technique and weaponry before NATO is able to shut down the Somali piracy for good, this irritation will further distract the major powers from concentrating on the main tasks of supply maintenance; and
- independent developments in the Persian Gulf region and central Asia, including the withdrawal of forces from Iraq and the resurgence of the Taliban, will complicate the task of maintaining security.

The paramount need is for a strategy to deal with post-Iraq preservation of the security of supply. As I have been arguing elsewhere, given the new parameters, a producer-consumer multilateral force ought to be created, perhaps located in Kuwait, which could act as a guarantor of the oil fields and supply lines through the Strait of Hormuz. This force would coordinate policy with the air forces of Saudi Arabia and the United Arab Emirates in conjunction with existing AWACS operations. Central to this mission would be the existing presence of US air and naval units.

All importers and exporters of petroleum and natural gas benefit from a stable supply environment. A multilateral capability ought to reflect this reality in terms of shared burdens as well as shared benefits.

Moreover, the difficulties and risks associated with energy security today extend beyond those tied uniquely to oil supply. Among these new parameters are the abruptly altered world financial situation and the increasingly pressing concern about global warming. The reality is that the United States must confront all of these high-risk energy security issues within a decision framework that is at once comprehensive and farsighted. How does the new Administration perceive the demands of energy policy and energy security? What are its priorities and motivations? How has it shuffled the policy deck and which cards is it playing?

Obama's new energy program

US President Barack Obama's energy program has four objectives. Each of these is long-term, speculative, and controversial and none will be met in the timeframe of his own administration. However, if the long-term objectives of the Obama energy program are met, his Administration will be regarded by historians as revolutionary. It is also possible that none of the objectives will be fulfilled, or that they will create countervailing costs within the economy that will tend to offset the benefits. The Obama plan for energy is the most innovative since that of President Jimmy Carter, and hence requires detailed analytic assessment here.[1]

The first objective of the Obama energy program is to begin the arduous task of putting the brakes on global warming. Three events emboldened the Obama Administration to act even in the heart of the recession when costs of adjustment are in practice most difficult for the economy to assume.

The first of these events that jolted the consciousness of Obama and of advisors such as energy secretary Steven Chu was the November 2007 report of the Intergovernmental Panel on Climate Change, which accepted the reality of global warming

[1] "Breakthrough: President Obama and Secretary Chu Deliver Double Dose on Energy Innovation," 24 March 2009. http://www.thebreakthrough.org/blog/2009/03/president_obama_and_secretary.shtml

and its human causation through carbon emissions. The second event was the April 2, 2007 Supreme Court ruling that carbon dioxide emitted from the burning of fossil fuels qualifies as a pollutant under the Clean Air Act. This means that the Environmental Protection Agency (EPA) housed in the Administrative Branch is able to enforce carbon dioxide emissions standards without having to go to Congress for guidelines. The third event spurring climate policy was the recession itself and the policy decision to use Keynesian deficit spending in unparalleled amounts to bootstrap the economy out of its funk. This money for "job creation" made possible expenditures on measures to cope with global warming. A huge post-election majority in the House and Senate facilitated the passage of legislation necessary to lock up the global warming package; although significant parts of the package could be modified or even dropped later.

Each of these events motivated the Obama Administration to take bold new action to begin the task of curbing greenhouse gases. However, environmental policy is not driving US energy policy. Environmental policy is but one component of a broad strategy encompassing these heretofore ignored risks and costs tied to world energy supply.

A second objective of the Obama Administration follows even more directly from the recession itself: to use energy policy as a catalyst for American economic development. As Washington assessed the economic ruins of its previous financial policies, which involved too little regulation, the full significance of the financial bubble was driven home. The financial industry could not act as the locomotive for the economy. A new leading industry had to be found, and that industry could be green energy. But, since US firms lagged behind many of their competitors in Europe and Japan, an accelerated development of alternative energy was on the map.

In fact, the pursuit of alternative energy development was seen as necessary for US energy security. Not only were its conventional oil and gas fields in decline, but the International Energy Agency (IEA) had just reported in November 2008 that production from conventional oil fields worldwide was declining at the rate of 6.7 percent per annum and could no longer be expected to meet rising demand.[2] With demand for oil accelerating throughout the developing world, especially in

[2] International Energy Agency, *World Energy Outlook*, Paris, 2009.

China and India – pushed by the hunger of the new middle class to buy automobiles, automobiles that consume 70 percent of the oil produced – only one conclusion seemed plausible: once the economy recovered from the recession, oil prices would take off, with catastrophic consequences for the US balance of payments. This was, thus, a perfect time for green energy to flower and for the United States to establish a new leading industry for its economy, the industry of alternative fuels.

A third energy objective of the Obama government was job creation *per se*. The loss of jobs in the United States has been both a cyclical and a long-term structural problem. Once a net oil exporter, by 2009 America was importing two-thirds of its oil. Once an important generator of jobs in the United States, the US energy industry was now, in effect, exporting those jobs abroad. Only by reviving its energy industry in a new form, according to the argument of the Obama Administration, could new jobs in the energy industry be created,[3] and green energy seemed a very good way of enabling American firms to bring energy-related jobs back to America.

But three potential problems with this plan soon became evident. First, any jobs created by the green energy industry would arrive too late to be of much help in escaping the grasp of the recession. Even so, the prospect of longer-term jobs was enough to propel this employment-based idea forward. Second, many of the jobs in the fossil fuel sector, although very well-paying, are blue-collar jobs, whereas most of the new jobs in the field of energy research and development are highly-skilled and likely to be fewer in number. Consequently, traditional jobs in oil, natural gas, and coal production are difficult to replace either in terms of the economy or in terms of the electoral base of the Democratic Party. Third, if the alternative energy industry were to really became competitive with the production of conventional fuels—not only replacing declining supplies of easy oil and conventional gas but also nudging aside available supplies of such conventional energy—more jobs might be lost than actually would be gained. When an oil well is drilled in the United States, Americans assume those jobs, but the manufacturing of solar cells and wind turbines might well involve jobs that get outsourced. Nevertheless, the prospect that some new high-paying jobs would be created in areas where the United States

[3] US Department of Energy, "Obama Administration Offers $535 Million Loan Guarantee to Solyndra, Inc.: Investment Could Lead to Thousands of New Jobs," March 20, 2009.

enjoyed a comparative advantage in trade terms was enough to add job creation as another justification for alternative energy development in the United States.

The fourth main objective of the Obama government's energy policy concerns the need to reduce the import of oil and natural gas from countries that are unreliable suppliers. A number of countries on three continents fall into the category of "unreliable" and may become increasingly unreliable because of regional instability and ideological politics. On the other hand, all oil comes from a single barrel or, as economists would put the matter, all oil must be regarded in terms of "full equilibrium." If the United States were to try to extricate itself from certain sources of supply, other consumer governments would be forced to import from those rejected, unreliable suppliers. The dilemma of unreliability would merely be a burden transferred to someone else.

It is not clear, however, whether everyone in the Administration or in Congress fully comprehends this notion of the complete interdependence among energy importers, let alone between importers and exporters. Thus the laudable political goal of reducing imports from unreliable suppliers cannot be approached directly or selectively, but can only be achieved indirectly, and in partial fashion, by a reduction of imports overall. This is a challenge that the Obama Administration appears ready to embrace.

Perhaps the best way to reduce imports of oil overall is to reduce its per capita consumption, which is an approach achieved in a number of advanced industrial countries. Even more striking in these same countries is the reduction achieved in the level of energy consumed as a percentage of GDP. On the other hand, if automobile efficiency increases and results in a reduction in gasoline consumed per mile, which leads to lower prices for gasoline in the short-term, the result might paradoxically be more miles driven and an increase in the ultimate amount of gasoline consumed. Hence, the best way to predict these reductions in consumption is after price increases, especially sharp price increases. Even more compelling for energy conservation is a sustained increase in the price. But such involuntary "conservation," whether caused by increases in the tax on gasoline or an increase in the world price for petroleum, is a sometimes regressive and always a politically unpopular way of achieving conservation.

The Obama Administration is trying to get ahead of the curve of probable future price increases for petroleum by funding research and development into energy reduction conservation measures such as innovations in engine and automobile design. In terms of energy prices, it is a kind of "pull" technique on the basis of innovation rather than a "push" technique stemming from a sole reliance on world petroleum price increases or government-implemented tax increases on gasoline.

Oil, natural gas, and coal

Those familiar with scale effects in energy production realize that the world is tied to a conventional oil economy for at least three more decades, perhaps longer. Since oil is getting much harder to find, to extract, and to process, it is also getting more expensive. But oil is difficult to replace for transportation in particular, and is essential for biochemical use. No one in the Obama Administration sees the commitment to green technology as some kind of end-run around the fossil fuel industry. But realism dictates prudence on the part of the country that is the world's largest energy consumer and now imports an increasingly large fraction of its total oil consumption.

What the energy realists in Washington understand is a two-pronged fact about the supply of oil and its rate of consumption. As at least one major oil company is now admitting in print, the world today possesses an estimated 1.2 trillion barrels of oil and natural gas, about the same amount of oil the world has consumed to date. But while it took 140 years for the world to consume the first trillion barrels of oil, it will consume the next trillion barrels in a mere 30 years.[4] This last trillion is also the most difficult to extract and to process. That realization is what drives the Obama Administration to adopt the energy policy that it has outlined.

At the same time, the United States will need all the oil and natural gas, including shale gas, that it can either find or import. Canada's oil sands will be a major source of those imports and Canada is proximate and reliable. Given efforts to restore areas

[4] *National Geographic*, "Repowering the Planet: Energy for Tomorrow," Special Issue associated with Royal Dutch Shell, 2009, p. 12; for the opposite argument see, Ruchir Sharma, "If Its in the Ground, It Can Only Go Down," *Newsweek*, April 20, 2009.

mined, to cope with "tailings" ponds, to use new *in situ* approaches to extraction, to use less water, and to explore carbon capture, the oil from the oil sands is becoming increasingly clean and environmentally friendly.

Multiple sources of energy will increasingly be required over time, but what is highly uncertain is which sources will predominate. As always, the cost of production will determine competitiveness. A large determinant of the success of petroleum, natural gas and coal will be their natural abundance and quality as well as their accessibility, as determined by technological innovation. The Obama Administration understands that despite its commitment to cope with carbon emissions causing global warming, the underlying cost of producing the energy source is crucial to its exploitability. That is one reason why research and development is being pursued in all areas of energy production, including those associated with traditional fossil fuels.[5] Another reason concerns coal, specifically.

The Obama Administration is spending huge amounts on carbon sequestration, because of its commitment to clean up coal. Demonstration plants are already in place worldwide and more are on their way. But the process involved in separating out carbon dioxide and fixing its placement in salt domes or elsewhere is still in its infancy. A successful and cost-effective program of carbon sequestration could make all of the traditional fossil fuels compete more attractively with "greener" sources such as wind and solar. By no means are the fossil fuels doomed by alternate energy development, especially when the scale of future energy needs is truly appreciated.[6]

Reductions in energy consumption

Behind all of its commitment to greener fuels and to a more salubrious environment, however, is the Administration's awareness that reductions in energy consumption may be the cheapest and cleanest way to proceed. It is also essential. Prospects for further declines in the ratio of energy consumption as a percentage of GDP are huge everywhere in the world

[5] Charles F. Doran, "Life after Easy Oil," *The American Interest*, July/August, 2008, pp. 43-51.
[6] US National Petroleum Council, *Hard Truths: Facing the Hard Truths about Energy*, "Energy Supply," US National Petroleum Council, 2007, pp. 89-170.

including the United States. That is why the forecasts by the IEA of world energy demand have been steadily dropping over the last decade. That is why the Obama Administration is providing support for increased use by consumers of insulation and energy-saving lighting.[7] That is why much of the research and development is aimed at ways to cut back energy use in buildings and in transportation.

Wary of the one device that would truly reduce energy consumption—a gasoline tax—because it is potentially regressive, and because of the potential electoral backlash against such a plausible and transparent mechanism for saving energy, the Administration is instead nibbling around the edge of the problem by setting targets for the auto industry to meet efficiency goals. The Administration seeks a 40 percent increase in the efficiency of cars and light trucks by 2025. Part of the reason for the long time horizon is that the turnover for a fleet of cars and trucks is in excess of 10 years (far longer than many automobile owners realize), and setting such deadlines is easy at the beginning of the time period as compared to its end when perhaps an entirely different generation will have to meet the targets.

The Obama Administration also recognizes that the carbon footprint of oil production is much smaller than the carbon footprint of the ultimate energy user. For example, as Dean of Engineering David Lynch of the University of Alberta put it, the oil sands production of fuel is far less dirty than the burning of that fuel in an automobile engine.[8] The difference in the level of emissions in the various forms of energy production is far less than that between energy production and consumption. It is at the consumption end where many of the greatest gains regarding global warming are to be found.

Energy Security and the Obama Administration

Given the commitment of the Obama Administration to develop renewable energy, does this focus undermine the commitment to defend energy security? Nothing could be more misleading or more subject to rejection. Like Bill Clinton and George W. Bush, Barack Obama understands the foundations of

[7] US Department of Energy, "Obama Administration Announces $32 Billion in Funding for Local Energy Efficiency Improvements," March 26, 2009.
[8] David Lynch, Seminar, University of Alberta, Edmonton, March 19, 2009.

energy security. Since the bulk of the world's exportable oil and natural gas comes from the Persian Gulf and some 65 percent of American oil is imported, these statistics should provide a focus for the American mind.

Partially in response to their perceived vulnerability, American imports of oil and natural gas are quite diversified. Canada is the largest exporter of oil and natural gas to the United States. Contributing one-quarter of the total value of Canadian exports to the Canadian trade balance when oil was at more than $100 a barrel, these large and welcome imports from Canada to the US economy amount to about 16-18 percent of overall US oil imports.[9] The rest of US oil and natural gas comes from more than a dozen other countries. But it would be naïve for the US government to view this diversification of oil imports as ample security of supply for its own needs.

In a tight market, a cut-off of oil anywhere in the system will produce ripple effects elsewhere such that it will be impossible for any single energy user to escape the price spike that would result. Consequently, the problem for most importers, including the United States, is not so much that the country would be without oil or natural gas because of a supply disruption. The problem would be that, as in 1979, price escalation could get out of hand as frightened governments attempt to hoard petroleum.

In the short-term, the US Strategic Petroleum Reserve, and that of Japan and some other countries, could do much to ameliorate such a price spike. But a more extended disruption could be much more troublesome. The underlying reality is that no single country could escape the negative impact of a major supply interruption, not even with supply diversification. And the Obama Administration understands this dynamic, as has every US government since the OPEC price take-over in 1973.

The security of energy supply remains a problem for the United States and for all energy importers. Since the United States cannot escape the risks to security of supply, it must learn to manage these risks. That the Obama Administration has made the reduction of energy imports an energy priority in the long-term does not mean that the government underestimates its security responsibilities. On the contrary, the severity of the US naval and ground force responsibilities within the Gulf area at

[9] U.S Energy Information Administration, 2007.

present only underscores why the Administration seeks a reduction in these pressures over the long-term.[10]

Until the world no longer relies so heavily on the Persian Gulf for oil and natural gas, the United States must sustain a strategy for the maintenance of order within the region. As events since 1990 illustrate, this is no small challenge.

At the heart of the security of supply question is the need to prevent war in the Persian Gulf. While the need to pre-empt attack at every level including that of Al Qaeda is ever present, most imperative is the prevention of a major war in the region that would lay waste to the entire system of wells, port facilities, pipelines, and other infrastructure. Saddam Hussein's destruction while in retreat of the Kuwaiti oilfields challenges the old adage that opposing states in the Gulf "hold hostage each other's fields." Although it is true that in a major war in the region a state like Iran might lose more with the destruction of its own oil fields and facilities than any single consumer government might lose, every government would suffer. Consequently, the destruction of its own oilfields might not prevent a government like Iran from acting so imprudently that it would precipitate a major confrontation. Hence for the United States the burden of defending the security of supply is made all the greater by the need to deter rather than to defend in the name of energy.

What also must always be remembered, whether or not this knowledge is fully perceived in defence circles, is that the energy context is highly dynamic, even volatile. The energy situation in 2009 with $50 oil and plenty of spare capacity is not the same as the oil situation that will emerge once the recession has ended and surging world energy demand strains output from aging fields increasingly depleted of high-value, low-cost oil. The energy situation on the upside of "Hubbert's Peak," the curve that describes the availability of so-called easy oil, is not the same as the energy situation regarding price, tightness of supply, and political risk on the downside.[11]

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[10] Robert Gates, "A Balanced US Military Strategy," Foreign Affairs, January/February, 2009, pp. 28-40.

[11] Kenneth S. Deffyes, *Beyond Oil: the View from Hubbert's Peak* (New York: Hill and Wang, 2005).

Three issues complicate protection of the oil supply lines, oil fields, and facilities in the Gulf.[12] In the context of the latter energy dynamic, each of the following security issues is likely to get tougher.

First, both the current Iraqi government and the Obama Administration agree that most American troops, with the exception of advisory personnel, and all combat troops, will have been removed from Iraq by 2011.[13] That could change, but these are the stated objectives at present. Removal of American troops from Iraq does not mean that all troops must leave the region. Leaving a residual force, for example in Kuwait, would be prudent, indeed essential. Every government in the region wants the security that American troops and other Western troops bring, but not the Western presence. It is difficult to satisfy both objectives at the same time.

What the aftermath of the Iraq-Iran War in the 1980s taught the United States was that the decision to remove all naval capability from the region created a political power vacuum into which any local belligerent government, in that case Saddam Hussein, could move. Now that Saddam Hussein is gone and Iraq remains fragile, if not divided, a political vacuum exists inside Iraq into which Iran, for example, could move. Therefore a residual US presence must exist to foreclose such an option and to maintain the regional balance of power.

Second, If Iran should develop a nuclear weapon and a middle-range missile capacity to deliver that weapon, the Middle East will not be the same. Critics argue that nuclear deterrence on the part of Israel ought to operate. But the problem is three-fold. First, the distances are so short that there would be very little time to respond following a launch but prior to the destruction of a target. Second, the populations in the Middle East are highly urban, often small, and thus are easy targets for annihilation. Third, there is a history of surprise attack in the region.

American defensive missile capability is a factor but political and technical issues remain a concern. Better by far (indeed crucial) would be the condition that Iran not develop

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[12] Charles F. Doran, "North American Energy Security," in Isabel Studer and Carol Wise, eds., *Requiem or Revival: The Promise of North America* (Washington, DC: Brookings Institution, 2007), pp. 232-246.
[13] Bennett Ramberg, "The Precedents for Withdrawing from Iraq," *Foreign Affairs*, March/April, 2009, pp. 2-8.

such a weapon. If dual proliferation occurs, the region will be on a hair-trigger. Far worse will be the plight of local populations who are truly hostage to the strategic anxiety. But oil also will be put at greater risk.

Third, for Canada as well as the United States, Afghanistan is a preoccupation far greater than during the height of the Iraq war because both Al Qaeda and the Taliban have decided to make Afghanistan a last stand. Ironically, by including Iran in the negotiation with the Taliban, there is some hope that the majority of the Taliban (Pashtun tribes) in Afghanistan could be induced to separate from the extreme *jihadists*. After all, Iran has a lot to lose with both an unstable Afghanistan and a potentially unstable Pakistan on its borders. Of course a change in military strategy will count for even more than merely an inclusive diplomacy.

But perhaps the crucial factor will be a NATO recognition of the fact that the outcome of the war in Afghanistan will have at least as much impact on Europe as on North America. A war that gets out of hand or a war that simmers and spreads is bound eventually to affect the oil supply lines and principal oil fields everyone depends on. This volatile situation is not in the NATO interest. Greater commitment by European governments, aware that the provision of oil is in their common security interests, would help ensure stability in the region at a time when the world remains fixed to an oil economy.

Conclusion

Although the Obama Administration's energy policy is influenced by the preoccupation with global warming and the need to foster the development of alternative energy sources as well as an alternative energy industry, that energy policy is not oblivious to the reality that the current economy is an oil economy. Moreover, future energy policy must depend upon a more environmentally friendly economy still fixed to fossil fuels. Aware of the burdens of the oil and natural gas import bill and of the cost and importance of defending the oil supply lines, the Obama Administration would like to reduce the dependence on imported oil from unstable regions, difficult as this is likely to be.

In the meantime, the United States continues to think of post-withdrawal Iraq and the renewed challenges in Afghanistan in the context of the larger energy picture. Oil supply is likely to

get tighter as the world comes out of the recession. A way to foster a really big war is to take one's eyes off the events in the Persian Gulf and surrounding area.

All importers and exporters of oil and natural gas benefit from a stable supply environment in the Gulf, and all suffer from a disruption in that supply. As I have argued for several months now, a multilateral force augmenting local capabilities will ensure that a balance of power is sustained and that the supplies the world depends upon will continue to flow. However much the region may change—hopefully for the better in terms of world order—the United States and Canada cannot allow stability within the region to be neglected or a global confrontation over energy supply ever to occur. On this issue, the principle actors in world politics are also pretty much agreed. The challenge is in making this mandate a political reality.

The Energy Security Challenge: Developing an Integrated American Response

Brian Wilson and Jeff Luster

Abstract

Strikes on ships, pipelines and infrastructures have tremendous and lasting consequences on the delivery of energy, and ultimately, national security. Regardless of how much oil a nation produces or how a nation defines "energy security," ensuring there is adequate energy permeates almost all aspects of governance. Ensuring the security of oil sources and transportation routes coupled with reducing oil dependence and climate change, diversifying supply and developing alternative energy sources carry national security implications for the new American Administration and require comprehensive collaboration. Harnessing the collective efforts of federal, state, local, and private sector entities is imperative for effective action. While achieving energy security is daunting, systemic, structured and strategic integration of US government agencies on energy security issues within the National Security Council structure is the most productive way forward

Résumé

Les frappes qui touchent les navires, les pipelines et les infrastructures ont des conséquences énormes et durables sur la livraison de l'énergie ainsi que sur la sécurité nationale. Quelle que soit la quantité de pétrole qu'il produit, la nécessité d'assurer une sécurité énergétique infiltre presque tous les aspects de gouvernance du pays. Assurer la sécurité des sources de pétrole et des voies de transport, (tout en réduisant la dépendance à l'égard du pétrole et en misant sur la diversification de l'approvisionnement et au développement de sources énergétiques de remplacement) a des implications de sécurité nationale pour la nouvelle administration américaine et exige une collaboration globale. La domestication des ressources des entités du fédéral et des États, du niveau local et du secteur privé est impérative pour qu'une action soit efficace. Bien que l'atteinte d'une

sécurité énergétique pose un défi de taille, une intégration systémique, structurée et stratégique des agences du gouvernement des É.-U. responsables des questions de sécurité énergétique au sein de la structure du National Security Council offre les meilleures chances de succès.

The views expressed are those of the authors and do not reflect the official policy or position of the US Navy or Department of Defense.

During the campaign for the American Presidency in 2008, Barack Obama asserted that US oil dependence was a threat to national security, the economy and the planet. Unlike any other industry, energy uniquely powers commerce, the military and is critical to a nation's defence, sustainment and growth. In President Obama's first week in office, he directed the Secretary of Transportation to develop fuel efficiency guidelines and a special envoy for climate change has been named, signalling energy's importance in the newly formed Administration.[1]

Despite energy's import, the movement of just one source, oil, underscores the global vulnerability and exposure to attack: the United States imports 66 percent of its petroleum, an amount that is more than double the level in 1973-74, the time of the first Arab oil embargo.[2] Of the 85 million barrels of oil that travel daily, approximately 43 million barrels transit on fixed maritime routes easily within the reach of criminals and terrorists. Securing oil's safe passage is not just crucial for business—it is a national security imperative.[3] The US

[1] "The problem of climate change goes hand in hand with America's energy security challenges. Specifically, the United States remains dangerously dependent on oil. The nation's reliance on fossil fuels in general and specifically on oil products to fuel 96 percent of its transportation damages the global environment. It also subjects US foreign policy choices and economic health to the whims and vagaries of foreign oil-exporting countries, many of which are led by authoritarian or hostile regimes…America's inaction on the climate and energy fronts has left it unable to effectively influence the policies of other nations." Anne-Marie Slaughter, et al, Strategic Leadership: Framework for a 21st Century National Security Strategy, Center for a New American Society, July 2008. Available at: http://www.brookings.edu/~/media/Files/rc/reports/2008/07_national_security_brainard/07_national_security_brainard.pdf.

[2] The Presidential Climate Action Project (PCAP), available at http://www.climateactionproject.com/plan.

[3] Daniel Yergin, "Ensuring Energy Security," Foreign Affairs, March/April 2006. Some estimates state that by 2020, the number of barrels transiting the oceans, "could jump to 67 million," a day. "By then, the United States could be importing 70 percent of its oil (compared with 58 percent today

Department of Defense uses more than 55 million barrels of fuel monthly to support forces in Iraq and Afghanistan, and overall, the United States consumes 185 billion gallons of gas and diesel fuel annually.[4] An initiative launched by US Senator Richard Lugar noted that "energy security impacts every aspect of life in the United States, from the cars we drive and how much we pay at the gas pump to our vulnerability to foreign terrorism and our relationships with other countries."[5]

The US focus on energy security is unfolding amid a devastating financial crisis and global economic instability, which in turn, is forcing systemic changes on multiple fronts. A group of retired senior military officers has opined that climate change can act as a threat multiplier for instability in some of the most volatile regions of the world, calling for immediate action to mitigate the most serious risks to national security.[6] Even though the United States imports close to $680 million of oil a day, energy security and oil dependence are not US-only issues.[7] The European Union (EU), China, India, and scores of other major powers are also confronting the myriad issues associated with the collapsing economy and, specifically, energy, including threats to the supply chain, environmental challenges, efficiency and the development of emerging technologies. "Today, EU countries as a whole import 50% of their energy needs, a figure expected to rise to 70% by 2030."[8] Moreover, "17 countries in the (Western Hemisphere) region are 100 percent dependent on

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and 33 percent in 1973)" Available at: http://www.foreignaffairs.org/20060301faessay85206/daniel-yergin/ensuring-energy-security.html.

[4] "Overarching Organizational Framework Needed to Guide and Oversee Energy Reduction Efforts for Military Operations," United States Government Accountability Office, Report to the Subcommittee on Readiness, Committee on Armed Services, House of Representatives, March 2008, page 1. Available at: http://www.gao.gov/new.items/d08426.pdf. *See also*, Defining Energy Security: Ethanol Across America; Summer 2005. Available at: http://www.ethanol.org/pdf/contentmgmt/Energy_Security_Issue_Brief.pdf.

[5] Available at: http://lugar.senate.gov/energy/security/index.cfm.

[6] National Security and the Threat of Climate Change, Center for Naval Analysis (CNA), available at: http://securityandclimate.cna.org.

[7] Threats to Oil Transport, Institute for the Analysis of Global Security (IAGS), available at: http://www.iags.org/oiltransport.html.

[8] Paul Gallis, "NATO and Energy Security," CRS Report for Congress, March 21, 2006, available at: http://www.usembassy.at/en/download/pdf/nato_energy.pdf.

foreign sources of oil, most in the Caribbean and Central America."[9]

President Obama's energy policy calls for energy independence, investment in energy, focus on fuel efficiency, curbing greenhouse gases, and diversification of energy sources and partnering.[10] The United States has forged alliances with Brazil and Japan, among others, on energy security, and is developing strategic initiatives regarding improved energy efficiency, climate change and energy independence.

As varied US energy initiatives unfold, harnessing the collective efforts of federal, state, local, and private sector entities is imperative for effective, integrated action. One overarching document should be developed that serves as the template for US Government energy security action in multiple agencies and diverse venues. Such national-level guidance could support a National Security Council (NSC)-chaired Energy Security Policy Coordinating Committee to address interagency energy security policy efforts, a topic which is discussed more fully below. Integration within the NSC structure, instead of a standalone document or construct, will ensure maximum efficiency within the federal government. Much like the challenges associated with a separate Homeland Security Council and National Security Council, added bureaucracy does not always create efficiencies or organizational benefits. Ensuring the security of oil sources and transportation routes coupled with reducing oil dependence and climate change, diversifying supply and developing alternative energy sources, and increasing bilateral, regional and international partnering carry national security implications for the new Administration and will require greater direction, organization and integration.

Energy threats, vulnerability and disruptions

All forms of available energy, which includes electricity, petroleum and natural gas, require considerable logistics, security, and infrastructure investment. All have varying levels of exposure, with distinct vulnerabilities and requirements for

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[9] Subcommittee on the Western Hemisphere of the Committee on Foreign Affairs, House of Representatives, "Energy in the Americas," July 31, 2008, Serial No. 110-214, available at: http://www.internationalrelations.house.gov/110/43839.pdf.

[10] President Obama's energy plan from campaign available at: http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf.

protection. Czech Deputy Prime Minister Alexandr Vondra, at the Conference on Security Policy in Munich on 7 February 2009, remarked that energy security is a matter of strategy: "It requires us to think and build solutions well ahead. This holds for energy the same as for ballistic missiles. It is too late to start building a pipeline when gas stops flowing. And it is too late to start building a defence shield when the missile is already in the air."

Such concern is well placed. The threat is not solely from an attack; natural disasters and aging infrastructures have materially harmed energy.[11] Hurricanes Katrina and Rita shut down 94 percent of oil production in the Gulf of Mexico's Outer Continental Shelf, which comprises 7 percent of US consumption, "delivering the world's first integrated energy shock, simultaneously disrupting flows of oil, natural gas, and electric power."[12] Utilities are particularly exposed to an attack upon, by or through their power system.[13] The United States has approximately 5,300 power plants with 1,075 gigawatts of installed generating capacity.[14] "Utility executives struggle with improving security of their forty to fifty year old infrastructure which were not built with security in mind…Utilities are constantly reminded of how easy it is to access their facilities and control systems."[15]

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[11] The Lugar Energy Initiative. The Prudhoe Bay oil field in Alaska was closed due to a small leak and corrosion, resulting in a reduction of 400,000 barrels per day. Available at: http://lugar.senate.gov/energy/security/index.cfm.

[12] Daniel Yergin, "Ensuring Energy Security," Foreign Affairs, March/April 2006, available at: http://www.foreignaffairs.org/20060301faessay85206/daniel-yergin/ensuring-energy-security.html.

[13] Larry Ness, "Terrorism and Public Utility Infrastructure Protection," Journal of Energy Security, October 6, 2008, available at: http://www.ensec.org/index.php?option=com_content&view=article&id=154:terrorismandpublicutility-infrastructureprotection&catid=84:energyinfrastructureprotection&Itemid=324.

[14] Department of Homeland Security, National Infrastructure Protection Plan, Energy Sector, available at: http://www.dhs.gov/xlibrary/assets/NIPP_Plan.pdf.

[15] Larry Ness, "Terrorism and Public Utility Infrastructure Protection," Journal of Energy Security, October 6, 2008, available at: http://www.ensec.org/index.php?option=com_content&view=article&id=154:terrorismandpublicutility-infrastructureprotection&catid=84:energyinfrastructureprotection&Itemid=324.

Attacks by criminals and terrorists remain a direct threat to energy stability. Moreover, strikes on the energy sector have increased over the past five years. In 2003, approximately one in four terrorist attacks were directed at energy related targets, rising to one in three attacks in the period spanning from 2003-2007.[16] "According to the US State Department, between 1996 and 2004, there were at least 80 terrorist attacks against oil companies, world-wide, that resulted in kidnappings, casualties, damages and large monetary losses."[17] Energy infrastructure exposure is a global concern. "In February 2006, terrorists linked to Al Qaeda attempted, but failed, to destroy the Abqaiq processing facility in Saudi Arabia, where 6.8 million barrels per day of oil (some two-thirds of total Saudi production) are processed before export."[18] Even with the infusion of 14,000 security guards along vital Iraqi pipeline and at facility venues, attacks are frequently occurring.[19] Iraqi oil pipelines and installations were attacked more than 200 times in a 20-month period.[20] The piratical strikes on merchant vessels in 2008 in the Gulf of Aden, including the super oil tanker *Sirius Star* carrying two million barrels of oil, underscored the threat to energy. In fact, "[a]ttacks on energy vessels represent a significant percentage of overall maritime piracy attacks, ranging from a low of 12% of total attacks in 2006 to a high of just over 24% in 2007."[21]

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[16] Jennifer Giroux, "Targeting Energy Infrastructure: Examining the Terrorist Threat in North Africa and its Broader Implications," February 13, 2009, Real Instituto Elcano (ARI).

[17] Jennifer Giroux, "Targeting Energy Infrastructure: Examining the Terrorist Threat in North Africa and its Broader Implications," February 13, 2009, Real Instituto Elcano (ARI).

[18] Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," page 23, available at: http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf.

[19] Jennifer Giroux, "Targeting Energy Infrastructure: Examining the Terrorist Threat in North Africa and its Broader Implications," February 13, 2009, Real Instituto Elcano (ARI).

[20] Dr. Gal Luft, Executive Director, Institute for the Analysis of Global Security (IAGS), testimony before the Committee on Science, United States House of Representatives, February 9, 2005, available at: http://www.setamericafree.org/lufttestimony0205.pdf.

[21] Donna J. Nincic, "Maritime Piracy: Implications for Maritime Energy Security," Journal of Energy Security, February 19, 2009, available at: http://www.ensec.org/index.php?option=com_content&view=article&id=180:maritime-piracy-implications-for-maritime-energy-security&catid=92:issuecontent&Itemid=341.

Oil and natural gas from the Persian Gulf provides 40 percent of globe's supply, with 15.5 million barrels of oil a day, transiting through the Strait of Hormuz.[22] Vessels carrying more than half of the world's oil pass through Southeast Asian water.[23] Oil's vulnerability exists, in part, because while it is transited across enormous swaths of waters, it is also transported along very narrow areas of water on predictable routes. Pirates are exploiting this funnel-like environment, attacking ships on well-established navigational routes. The closest point in the Strait of Hormuz is 21 miles, the Strait of Malacca, 1.7 miles, Bab el-Maddab (the Horn of Africa), 18 miles and the Turkish Straits, half a mile.[24] The threat to shipping by Somali pirates in 2008 became so severe that dozens of nations deployed warships to the area to protect merchant vessels. But maritime crime has existed for thousands of years. Mumbai suffered terrorist attacks in March 1993 and again in December 2008, with both assaults emerging from the sea. The slow, low-tech assault against the *USS Cole* in Yemen in 2000 nearly sunk the powerful warship. The 2002 attack by Al Qaeda off the coast of Yemen in October 2002 on the French oil tanker *Limburg* which was transporting almost 400,000 barrels of crude oil exposed the vulnerability of energy links between the Strait of Hormuz and markets in Europe and Asia. In 2004 *Super Ferry 14* was struck by the Abu Sayyaf organization in the Philippines. "More recently, Al Qaeda affiliates have carried out attacks on oil installations in Yemen, including a June 2008 attack on the Safi oil refinery."[25]

The International Maritime Organization's (IMO) Secretary General, Efthimios E. Mitropoulos remarked that, "[w]e should continue relentlessly raising our industry's defences to the extent that terrorists may be dissuaded from launching an attack

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[22] "Energy and Maritime Security," Chapter 53rd IILL Regional Security Summit, The Manama Dialogue, available at: http://www.ids.gov.sa/IDS_PDF/DIP/pdf/Diplomat4.pdf .

[23] Tamara Renee Shie, "Ports in a Storm? The nexus between counterterrorism, counterproliferation, and maritime security in Southeast Asia, Pacific Forum CSIS, July 2004, available at: http://www.csis.org/component/option,com_csis_pubs/task,view/id,952/type,0/.

[24] Energy Information Administration, Department of Energy, available at http://www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Background.html.

[25] Jennifer Giroux, "Targeting Energy Infrastructure: Examining the Terrorist Threat in North Africa and its Broader Implications," February 13, 2009, Real Instituto Elcano (ARI).

on ships, port facilities and shipping lanes of strategic importance and significance and, in the unfortunate event that such an act has been committed, that we are in a strong position to mitigate its impact on human life, property and the environment."[26] When a pipeline or ship is attacked, the reverberations extend well beyond the individual strike: a nation's ability to function can be imperilled by the denial or delay of energy or prohibitively increased cost.

In the United States, for example, protecting these multiple platforms and means of delivery is complicated by the combination of the private sector (which owns more than 80 percent of the energy infrastructure[27]) and multiple government agencies that have oversight. The United States has 150 refineries, 4,000 offshore platforms, 160,000 miles of oils pipelines, 10,400 power plants, 410 underground gas storage fields and 1.4 million miles of natural gas pipelines.[28] Moreover, several US departments have cognizance over energy infrastructure protection. These include the Department of Energy (the Sector-Specific Agency for energy infrastructure vulnerability assessments and protection requirements), the Department of Defense (critical infrastructure protection, upon request), the Minerals Management Service (standards for offshore platforms), and the Coast Guard (protecting ports which possess critical energy supplies, including oil and gas).[29] Such diversity of oversight must be refined significantly to ensure not just efficiency, but sustained critical focus and alignment.

In addition to attacks and natural disasters, the production and delivery of energy can also be adversely affected by disruptions: "The risk of oil supply disruptions has grown in recent years and will grow in the near future for a number of

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[26] Opening address by Efthimios E. Mitropoulos, at Kuala Lumpur, September 18, 2006, "Enhancing Safety, Security and Environmental Protection, available at:
http://www.imo.org/About/mainframe.asp?topic_id=1322&doc_id=7004 .

[27] Department of Homeland Security, "National Infrastructure Protection Plan, Energy Sector," available at:
http://www.dhs.gov/xlibrary/assets/NIPP_Plan.pdf.

[28] Daniel Yergin, "Ensuring Energy Security," Foreign Affairs, March/April 2006, available at:
http://www.foreignaffairs.org/20060301faessay85206/daniel-yergin/ensuring-energy-security.html.

[29] Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," page 53, available at: http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf.

reasons including continued demand growth, increased concentration of the remaining oil reserves in a fewer number of countries, the concentration of oil use in the transport sector, and the insufficient capacity additions (both upstream and downstream) to keep pace with demand growth."[30] The cost of oil also has an enormous impact on economies and in turn affects national security interests. Moody's estimated that the United States' energy costs in 2009 will be $250 billion less than in 2008 if the price of oil remains below $50 a barrel for the year.

The national security implications associated with the diminished access to energy resulting from climate change requires that the military must be prepared to respond to potential threats in a changed environment. Climate change can result in an increase in extreme weather events such as intense tropical cyclone activity.[31] Moreover, many US military bases, both at home and overseas, may be affected by rising sea levels.[32] The diminished access to energy also means that US forces must be more energy efficient; an adjustment which requires an investment in new energy-efficient technologies.

Partnering

Bilateral, regional and international collaboration is occurring in multiple venues; some of its energy-sector specific, other aspects that benefit the energy sector. In 2002, member-states of the IMO developed and implemented the International Ship and Port Facility Security (ISPS) Code. This agreement provided a construct for ensuring port security throughout the world. Thus, there is now a template for examining security issues ranging from the movement of people and cargo to port services. The Container Security Initiative (CSI) program is another endeavour that heightens security by collaboratively screening containers. Containers that may pose a terrorist risk are inspected in foreign ports before being shipped. In part, CSI employs "intelligence and automated information," pre-screening

[30] International Energy Agency (IAE) 2007 Executive Summary, available at: http://www.iea.org/Textbase/npsum/OilSecurity2007SUM.pdf.
[31] Intergovernmental Panel on Climate Change, *Fourth Assessment Report*, 2007. *See also*, in 1992, Hurricane Andrew ravaged Homestead Air Force Base in Florida so much that it never reopened. *Supra.* 5 at 37.
[32] *Id*., noting that the British Indian Ocean Territory island of Diego Garcia, an atoll in the southern Indian Ocean, is a major logistics hub for US and British forces in the Middle East. It is also only a few feet above sea level at its highest point.

of cargo, detection technology, and encourages "smarter, tamper-evident" containers. Long Range Identification and Tracking of Ships (LRIT) is yet another international security initiative member-states approved at the IMO that can improve energy security. LRIT, which will become operational in 2009, enables states to identify, monitor, and intercept transnational maritime threats by providing the identity and position of ships.

Partnering can also include reducing dependence on oil from a particular state. US Vice President Joseph Biden and National Security Advisor James Jones have recently used the phrase "energy security" and "made clear that the administration would place an emphasis on rolling back its allies' dependency on Russian-controlled natural gas and oil."[33] In part, this policy direction is occurring because, "major energy suppliers—from Russia to Iran to Venezuela—have been increasingly able and willing to use their energy resources to pursue their strategic and political objectives."[34] Three-fourths of the world's oil reserves are controlled by state-controlled firms (national oil companies)—such as in Russia—that "do not respond to market forces as would a private, competitive firm."[35] US Secretary of State Hillary Clinton stated that Russian action in stopping the flow of gas into Europe and purchase of utilities there in January 2009 "is certainly a significant security challenge that we ignore at our own peril."[36]

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[33] John Vinocur, "Energy Security Chills trans-Atlantic Warmth," International Herald-Tribune, February 9, 2009, available at: http://www.iht.com/articles/2009/02/09/europe/politicus.2-426002.php. *See also*, "As Europe becomes even more dependent on Russian gas supply, it is likely that European governments will become even more reluctant to challenge Russia's behavior on a wide range of issues, such as nonproliferation and anticorruption." Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," page 25, available at http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf.

[34] Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," page 3, available at available at: http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf; *See also*, on page 14: the major importing nations of oil into the United States include Canada, Mexico, Saudi Arabia, Venezuela, and Nigeria.

[35] Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," pages 18-19, available at available at: http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf.

[36] John Vinocur, "Energy Security Chills trans-Atlantic Warmth," International Herald-Tribune, February 9, 2009, available at:

While it is a cornerstone of the US Navy to protect the sea-lanes, there are not enough ships in the American fleet to cover the globe. Moreover, the cost is tremendous.[37] "In an intimately interconnected world [where] the problems faced by nations are…complex and trans-boundary in nature…it is clear that problems can no longer be solved by a single power or even a small group of powers in concert."[38] In this regard, partnering is key to effectively protecting not just the sea-lanes, but to providing a stable maritime environment, and ultimately, stability in the production and delivery of energy. A US Navy initiative to expand international cooperation and engagement is the Thousand Ship Navy/Global Maritime Partnership. The concept embraces a figurative "thousand ship" navy, not actually a navy of one thousand ships. It represents the idea that no nation can do it alone and that all benefit when working together. Admirals from Ghana, India, Indonesia, Japan, the Netherlands and Norway, among others, have favourably commented on the potential value of the concept in relation to increasing effective international cooperation to counter piracy.[39] The Thousand Ship Navy provides a basis for bilateral and multilateral cooperation and coordination on suppressing piracy and in turn the safe delivery of energy, and this new approach to maritime security is the basis for the October 2007 *Cooperative Strategy for 21st Century Seapower*, jointly signed by the US Navy, Coast Guard and Marine Corps.

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http://www.iht.com/articles/2009/02/09/europe/politicus.2-426002.php; See also, "The last five years saw the rebirth of the use of oil as a critical instrument of foreign policy by key resource countries, Iran, Russia and Venezuela in particular," said Ed Morse, quoted by Steven Mufson in "Trouble Trickles From Steep Drop in Oil Prices," The Washington Post, February 20, 2009, page A01.

[37] "The most recent estimates suggest that in a non-war year the United States spends $20 to $40 billion in military costs to secure access to Middle East oil supplies, which means that the American taxpayer is paying at least an additional $4 to $5 a barrel for crude oil above market price." Dr. Gal Luft, Executive Director, Institute for the Analysis of Global Security (IAGS), testimony before the Committee on Science, United States House of Representatives, February 9, 2005, available at : http://www.setamericafree.org/lufttestimony0205.pdf.

[38] Plenary speech, Teo Chee Hean, Singapore Minister of Defense, Manama Dialogue, Dec. 14, 2008, available at: http://www.mindef.gov.sg/imindef/news_and_events/nr/2008/dec/14dec08_nr/14dec08_speech.html.

[39] The Commanders Respond, United States Naval Institute Proceedings (Apr. 2006), 34, 40-51.

On the diplomatic front, the trip to China by Secretary of State Clinton in February 2009 emphasized the emerging imperative of partnering on energy security and reducing greenhouse gases. Secretary Clinton characterized the opportunities for energy partnering there as "unmatched anywhere in the world."[40] Partnering is more than just collaborating on a specific issue, however—it can also provide alternative sources of energy, and thus reduce a nation's dependence on a single source. Secretary Clinton stated that energy partnerships with Latin American are occurring because the United States is "looking to find ways through technology and other activities we can work together to become more energy independent in this hemisphere."[41] Agreements are unfolding in multiple regional and international venues, including the International Energy Agency (IEA)[42], the Asia-Pacific Economic Cooperation (APEC) Energy Working Group, the Asia-Pacific Partnership on Clean Development and Climate (APP), the International Energy Forum, the International Nuclear Energy Research Initiative (I-NERI), the International Thermonuclear Experimental Reactor (ITER) project, the Carbon Sequestration Leadership Forum (CSLF) and the International Partnership for the Hydrogen Economy.

The China trip follows a March 2007 accord in which US Secretary of State Condoleeza Rice and Brazilian Foreign Minister Celso Amorim signed a memorandum of understanding to advance cooperation on energy. This agreement includes commitments for partnering in biofuels research and development. US and European energy security partnering has also emerged.[43] The 2007 EU-US Summit Statement on Energy Security, Efficiency, and Climate Change noted that cooperation

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[40] Mark Landler, "In China, Clinton Focuses on Climate," *New York Times*, February 22, 2009, available at: http://www.nytimes.com/2009/02/22/world/asia/22diplo.html.

[41] Nick Snow, "Clinton: Energy Security a Major US Foreign Policy Element," Oil & Gas Journal, January 26, 2009, available at: http://www.ogj.com/display_article/351434/120/ARTCL/none/GenIn/1/Clinton:-Energy-security-a-major-US-foreign-policy-element/

[42] The IAE, "was founded in 1974 with the mandate to implement the International Energy Program (I.E.P.) – a joint strategy to address oil security issues on an international scale," available at: http://www.iea.org/Textbase/npsum/OilSecurity2007SUM.pdf.

[43] Paul Gallis, "NATO and Energy Security," CRS Report for Congress, March 21, 2006, available at: http://www.usembassy.at/en/download/pdf/nato_energy.pdf.

must be intensified to "improve the security and resiliency of global energy networks and the physical security of critical energy infrastructure."[44] Another partnering initiative is the Declaration of Panama, which US officials stated demonstrates "that energy is a vital part of our hemispheric agenda and that we will work together to address the challenges of energy security, climate change, environmental stewardship, and sustainable development."[45]

The United States has also collaborated with Japan, Colombia and Peru on energy security. With Japan, there was a recognition on both sides that "improving energy efficiency and diversifying their energy mix—making wider use of clean and alternative energy, such as clean use of coal, nuclear energy and renewables, improving the investment climate in energy producing countries and engaging emerging economies are essential for ensuring the mutual energy security of the United States and Japan and addressing global climate change."[46]

One of the stronger US partnering initiatives to be introduced in Congress was the Energy Diplomacy and Security Act (S. 193), sponsored by Senator Richard Lugar. This bill was proposed in the 110th Congress but never became law. It sought to direct, among other things, that the Secretary of State establish "strategic energy partnerships with the governments of major energy producers and major energy consumers, and with governments of other countries… [and create] a regional-based ministerial Hemisphere Energy Cooperation Forum."[47]

A way ahead

A 2006 Council on Foreign Relations report concluded that, "[s]ince the United States both consumes and imports more

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[44] 2007 EU-US Summit Statement, available at: http://www.eu2007.de/de/News/download_docs/April/0430-RAA/030-StatementEnergyClimate.pdf.

[45] Testimony of Daniel S. Sullivan, Assistant Secretary, Bureau of Economic, Energy and Business Affairs, US Department of State before the Subcommittee on the Western Hemisphere of the Committee on Foreign Affairs, House of Representatives, "Energy in the Americas," July 31, 2008, Serial No. 110-214; page 22, available at: http://www.internationalrelations.house.gov/110/43839.pdf.

[46] United States-Japan Cooperation on Energy Security; Department of Energy, January 9, 2007, available at: http://www.energy.gov/news/4572.htm.

[47] Available at: http://www.govtrack.us/congress/bill.xpd?bill=s110-193.

oil than any other country…the lack of sustained attention to energy issues is undercutting US foreign policy and national security."[48] That is changing along with the recognition that partnering is imperative for effective energy security. The Energy Independence and Security Act of 2007[49] is among the more ambitious US energy laws, but it did not seek to integrate the myriad US agencies on energy issues in the way the Goldwater-Nichols legislation did for the Department of Defense in the 1980s.

Long-term US energy security requires systemic strategic coordination and alignment by agencies, the federal government, the private sector and in international venues that reflect the President's priorities and vision. One step toward ensuring comprehensive US collaboration would be the development of a Presidential Directive, along with a series of strategic and policy-level plans that establish short- and long-term goals, designates lead and supporting agencies for specific issues, and provides a mechanism to continually evaluate its effectiveness. It is critical that the various departments of the US government that are affected by energy security, including the Departments of Energy, State, Defense, Homeland Security, Commerce, Interior, EPA and the Council on Environmental Quality (among others) closely coordinate their energy actions within the NSC structure. Coordination from the initial stages of policy development through implementation with those agencies responsible for national and homeland security is essential to ensure the full consideration of potential impacts and responses to matters addressing access to energy. The Presidential

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[48] Council on Foreign Relations, 2006 report of an independent task force, "National Security Consequences of US Oil Dependency," page xi. *See also*, "America's oil dependence and lack of action on global change have eroded American leadership and left the nation vulnerable." Strategic Leadership: Framework for a 21st Century National Security Strategy, Anne-Marie Slaughter, et al, Center for a New American Security, July 2008, page 26, available at: http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf. The report continued, "This is a failure of leadership and vision, but is also a lost opportunity: a renewable energy strategy that addresses climate change can also benefit US competitiveness."

[49] In part, EISA sought to, "move the United States toward greater independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government…"

Directive could also order the development of separate but complementary plans that provide an overarching national strategy for energy security, including a National Strategy for Energy Security, with subordinate plans that address:

- Domestic Policy and Outreach, including federal energy efficiency (i.e., reducing consumption, national building efficiency goals, overhaul of efficiency standards);
- Climate Change;
- Energy Protection (i.e., supply disruption, infrastructure) which could complement and, in parts, revise Homeland Security Presidential Directive-7 (Critical Infrastructure Identification, Prioritization, and Protection);
- New Energy Technologies; and
- Coordination of International Efforts and International Outreach.

Conclusion

Strikes on ships, pipelines or infrastructures have tremendous and lasting consequences on the delivery of energy and on national security. The challenge for the United States – and most nations – is that it consumes considerably more oil than it produces, is reliant on too few sources and produces/uses energy that is not clean. Regardless of how much oil a nation produces or how a nation defines "energy security," ensuring that there is adequate energy permeates almost all aspects of governance.

Energy reduction programs, the use of alternative energy sources and partnering are key components of sustained long-range energy security. While achieving energy goals is daunting, systemic, structured and strategic integration of federal government agencies on energy security issues within the National Security Council structure is required to effectively advance the myriad programs currently underway.

Implications for Canadian Defence Policy

James Boutilier

Abstract

Canada has been slow to come to grips with the magnitude of changes in the Asia Pacific region. Distracted by the war in Afghanistan, the potential of Latin America, and global economic conditions, the government has tended to overlook the profound implications of the paradigm shift in the Indo-Pacific region. The importance of China and India are acknowledged, but at a time when the Canadian Forces are fully committed in Afghanistan, there has been little thought given to the question of what to do elsewhere in Asia. Wars in Asia have distorted the global balance and the potential for more conflicts remains very real. But there are a host of opportunities, particularly in the maritime realm, to contribute to regional security. This will not be easy but the evidence suggests that maritime cooperation has become vitally important and there seems every reason to believe that Canada can contribute her well established maritime capabilities to the common good.

Résumé

Le Canada a mis du temps à se rendre compte de l'ampleur des changements qui se sont produits dans la région Asie-Pacifique. Distrait par la guerre en Afghanistan, le potentiel de l'Amérique latine et les conditions économiques mondiales, le gouvernement a eu tendance à ignorer les implications profondes du changement de paradigme dans la région indopacifique. L'importance de la Chine et de l'Inde est reconnue, mais à une époque où les Forces canadiennes sont totalement engagées en Afghanistan, nous avons peu réfléchi à ce que nous devrions faire ailleurs en Asie. Les guerres qui se sont livrées en Asie ont créé une distorsion dans l'équilibre mondial et le potentiel d'autres conflits reste très réel. Mais il y a un tas de possibilités, particulièrement dans le domaine maritime, de contribuer à la sécurité régionale. Cela ne sera pas facile, mais force est de constater que la coopération maritime a pris une importance vitale, ce qui porte à croire que le Canada peut contribuer de sa capacité maritime bien établie au bien commun.

The views presented in this paper are those of the author only and do not represent the official policy of Canada's Department of National Defence.

There is a curious ambivalence in Canada, at the official level, about the new Asian reality. Despite incontrovertible evidence regarding the importance of Asia, and of China in particular, Ottawa's gaze has been directed elsewhere. Canada, of course, is not alone in failing to appreciate the speed and magnitude of the paradigm shift to the Pacific. For a variety of historical, cultural, and institutional reasons Ottawa has remained focused on the United States, Europe and the Atlantic. Latin America, rather than Asia, is the current foreign policy priority in Ottawa. The same lack of interest in Asia in terms of foreign policy and trade is reflected in a lack of interest in Asia Pacific security issues. At its simplest, the lack of an Asian NATO, of an Asian security framework to which Canada can relate, is a major disincentive. Furthermore, changes in the international political and security landscape have tended to direct Ottawa's attention toward the United States and a recalibrated NATO. What is ironic, in a way, is the fact that as Canada's ties to NATO have been reinvigorated in the post Cold War era, as a result of military campaigning in south-eastern Europe and Afghanistan, NATO has begun to discover Asia. Indeed, the plan to deploy the Standing NATO Maritime Group (SNMG1) to Southeast Asian and Australian waters in the first half of 2009 was unprecedented. As it happened, SNMG ships came to be engaged in anti-piracy operations off the coast of Somalia and the Southeast Asian and Australian dimensions of the deployment were largely unrealized, but the concept was, nonetheless, history in the making. Whether subsequent SNMG's realize this Asian ambition remains to be seen, but the fact of the matter remains that, whatever the case, the world centre of gravity has moved into the Pacific. By virtually any metric – economic dynamism, arms acquisition, political power and regional instability – Asia is the global centre for security concerns. The question addressed in this paper is what do these developments mean in terms of Canada's defence and security priorities?

Canada has long been a trifurcated nation. It has powerful immigration, linguistic, cultural and institutional ties that link it with Europe. Over the years the European connection broadened, expanding outwards from the British Isles and France to include migrant populations from the Ukraine, Eastern Europe,

Italy and the Balkans. More recently, migration flows have undergone a profound shift and now 50 percent or more of Canada's migrants originate out of Asia; but the ties to Europe remain deep and significant. At the same time Canada has been party to one of the most profound integrative processes in contemporary history; an economic integration that has witnessed upwards of 86 percent of Canada's economy becoming tied directly to the economy of the United States. Thus, the cultural axis across the Atlantic has been matched or more than matched by a North-South economic axis. This integration has been powerfully reinforced since the terrorist attacks on Washington and New York in September 2001, by continental security initiatives. Command structures have evolved on both sides of the border that have resulted in Canada being drawn deeper and deeper into Washington's gravitational field. Simultaneously, there was a realization in Ottawa that Canada had, all too frequently, taken the United States for granted and that Canada's diplomatic and trade facilitating arrangements needed to be multiplied and reinforced. While these initiatives – for example, the opening up of new trade and diplomatic posts in key American cities – predated the new American administration, the inauguration of President Barack Obama removed a major perceptual obstacle to closer Canada-US relations. Canadians had tended to be critical – and not infrequently, scornfully dismissive – of the Bush administration and they found the relaxed and more accommodating style of the new president and his colleagues much easier to relate to.

In addition, the onset of the global economic crisis created a pull-together or sink-together mentality in Ottawa and Washington. While Canadians could pride themselves on the way in which Canadian banks had been more prudent in the face of the sub-prime mortgage phenomenon than many of their US counterparts, the parlous state of the North American automobile industry, long an icon of Canada-US economic integration, brought home to both capitals the way in which the two economies had become inextricably interlinked. Survival strategies for the Big Three automakers tended to leave unsaid the degree to which global automotive competition, much of its originating out of Asia, had begun to cut the feet out from underneath a North American industry (and all of its related suppliers) that hitherto had seemed virtually impregnable.

The third vector or axis relates to Asia. Canada has had ties to Asia for more than a century, but they have been, for the

most part, local in nature. Thus in the 1990s, 38 percent of British Columbia's trade was with Asia while only 4 percent of Ontario's trade was with Asia. Ottawa, a product of the Ontario-Quebec reality, was, and remains, largely insulated, geographically, perceptually and economically, from the emerging realities of Asia. Asian migration has been referred to and, indeed, Canada has begun to Asianize a number of its key urban centres. One person in three in Vancouver considers himself or herself, Asian and were one to go to the Vancouver suburb of Richmond, the figure would rise to 44 percent. Slowly, but surely, Asian-Canadians have begun to make their mark by moving into legislative assemblies and corporate boardrooms across the nation.

A number of Asia analysts have lamented Canada's failure to establish a more robust relationship with China. Needless to say, China is only one part of the nation's Asian brief, but it is a huge part. The growth of the Chinese economy over the past three decades has no parallel in economic history and it may very well be that a China which is scheduled, in national terms, to overtake the GDP of Japan by 2014, may be the engine that will lead the world out of its current economic downturn. Certainly, Chinese economic dynamics had the effect of lifting the Japanese economic ship of state off the rocks in the late 1990s and of postponing the anticipated downturn in the US economy early in this century. There are analysts, like George Friedman at Strategic Forecasting, who are deeply sceptical about China's ability to sustain its record of remarkable economic growth. Certainly, China has deep and unresolved structural problems that threaten to endanger its economy. By the same token, the Chinese have proven to be adept at wrestling gargantuan economic problems to the ground. On balance, it seems likely that China will remain an enormously important player well into the future, exerting its influence in a number of realms.

Following the collapse of the Soviet empire, there was a good deal of uncertainty regarding the future of NATO. NATO, however, has demonstrated an impressive resilience, reinventing itself by incorporating a number of new members (thereby removing the East European "glacis" that provided the Soviet Union with a sense of geo-strategic depth) and operating unexpectedly well out of theatre. NATO's current commitments in Afghanistan reveal just how far the organization has come. Any suggestion in 1999 that NATO would be deeply involved in

Southwest Asia by 2009 would have been greeted with complete incredulity. NATO's reinvention has resulted in a reiteration of Canada's commitment to the organization and it is hardly surprising that Ottawa's attention has been diverted from developments in East Asia towards a demanding operational theatre in southern Afghanistan. The Afghan experience has recast the relationship between the Canadian Forces (CF) and the Canadian public, shifted the emphasis within the CF to the Army, and enhanced the authority and stature of Canada within NATO councils. It has also – critically – re-established Canada's reputation in Washington. Afghanistan has placed a huge burden on the CF, coming as it does at a time when the forces are experiencing the terrible legacy of the defence reductions in the 1990s. In that decade, there was a crisis of cash; in this decade there is a crisis of people, and the people who were encouraged to leave the services in the 1990s are the very ones that the services desperately need today.

All this to say that while the CF has conducted itself with characteristic professionalism and effectiveness in Afghanistan (not to mention an array of small assignments elsewhere in the world), the Afghan commitment has come at a time when personnel challenges and renewal issues have begun to loom larger and larger. The CF is under strain and it is no surprise, therefore, that key decision makers in Ottawa have not entertained what they probably perceive to be the luxury of contemplating the larger geostrategic relevance of Asia.

Furthermore, the post 9/11 climate of opinion has led many decision makers to look inwards, to look at the continental "home game" at the expense of global positions, Afghanistan notwithstanding. This focus has been reflected in the establishment of Canada Command, a transnational command designed to maximize the application of CF resources for Canadian security and to create a structure complementary to comparable commands in the United States. This continental focus has the effect of directing time and energy away from global commitments, although a companion Canadian Expeditionary Force Command has been established as part of the larger transformation of the CF.

At the same time, the Department of Foreign Affairs and International Trade (DFAIT) has suffered from dislocations similar to those that have affected the Department of National Defence: fewer resources and more commitments. What is more, DFAIT's integrity was sorely taxed by a curious, even bizarre,

restructuring that witnessed the temporary disaggregation of the trade and diplomatic communities; an absurd process for which no one was willing to admit responsibility and which greatly diminished the department's influence and momentum. The impression of Canadian diplomats in the field is that Asia has become, effectively, China and India, at the expense of the rest of the region. It should be noted, of course, that every flight that leaves Vancouver or Toronto bound for Hong Kong, Shanghai or Tokyo carries Canadian businessmen intent on penetrating Asian markets. And these are not easy markets to penetrate. The distances are great, the languages, cultures and customs are challenging, and the business environment is frequently predatory and unpredictable. The general consensus, however, is that Asia is where the action is and that the greatest opportunities will be found there rather than in Latin America.

Where do Canadian security calculations fit into this context? In theory, Ottawa should be gripped by the importance of the region. The nuclear stand-off in North Korea, the unresolved state of China-Taiwan relations, the prevalence of off-shore disputes, rivalries in the South China Sea, and Sino-Indian maritime competition are only a few of the issues threatening the stability of the region. And it is a region which, in the eyes of many analysts, is on the verge of a full blown arms race, particularly at sea. Chinese defence budgets have risen at a double digit rate for two decades, and while some may argue over the way in which the Chinese figures should be interpreted, the practical expressions of Chinese defence spending are everywhere to be seen. In the past decade alone, the Chinese have dramatically increased the scope and modernity of their Navy, adding new classes of destroyers, frigates and submarines. In addition, they have now announced their intention to acquire indigenously-produced aircraft carriers. This announcement constitutes a critical psychological threshold in terms of the defence environment in the Indo-Pacific region. Chinese commentators have maintained that much of this build up relates to the potential necessity to use maritime power to reincorporate Taiwan, but clearly the scale and nature of the build-up go far beyond that goal even if, admittedly, the Chinese see the need to hold US naval assets at bay in the Western Pacific while Beijing's forces overwhelm Taiwan. Instead, the Chinese appear to have embraced classic Mahanian precepts and see themselves doing just what all of the other great powers have done over the centuries: develop a navy reflective of their

newfound authority. What remains unclear to many is just how this navy will be used: merely to protect China's coasts and critical energy-bearing sea lines of communication or for power projection at the expense of other nations like India, Japan, and the United States. Indeed, a feature of the regional landscape has been the gradual development of a maritime "coalition" of nations that seems intent on counter-balancing or possibly curtailing Chinese maritime ambitions. India lies at the heart of this emerging community of powers, and is supported, variously, by Australia, Japan, Singapore and the United States; the last mentioned being particularly concerned about the way in which the overall balance of power is shifting at sea.

What complicates calculations still further is the fact that small and medium power navies in the region have begun to go upmarket. Singapore, for example, has moved from missile equipped patrol boats to corvettes and on to stealth frigates. Equally important is the fact that the same navies have begun to get into the submarine game. Leaving aside the nuclear-powered attack and ballistic missile submarine programs of the Chinese and Indian navies, navies like the Royal Australian Navy, the Royal Malaysian Navy and the Republic of Singapore Navy have acquired high performance conventional boats. Tellingly enough, the Vietnamese have significantly altered the regional balance by announcing their intention to acquire six Kilo-class submarines from Russia. Russia, itself, has transferred a Delta IV to the Pacific and promises to move some of its latest Borei-class submarines to the same region.

The upshot of all this is that the maritime environment has become increasingly problematic and brittle. How should Canada respond to this state of affairs, particularly in view of the lack of a NATO-style framework in the Indo-Pacific region? Sea power is clearly the coin of the realm, and if there is potential for Canada to become engaged in Asia, it probably lies in the maritime arena. The United States has already publicly recognized the military challenges associated with the region by transferring the bulk of its defence assets to Pacific Command. Thus, there are now to be six aircraft carriers in the Pacific and five in the Atlantic. Similarly, 60 percent of the US Navy's submarine strength is to be positioned in the Pacific, principally over and against the emerging Chinese navy. Continued collaboration with the US Navy provides a context for greater Canadian naval activity in the Pacific and Indian Oceans. Clearly, Canada will pursue an independent maritime policy as well. In

this regard, the Canadian, Japanese, South Korean and Australian Navies share a good deal in common in the sense that all of these navies have had a long and intimate relationship with the US Navy. As products of the Royal Navy and the commonwealth experience, the Canadian and Australian Navies are clearly most closely aligned. The Japanese and South Korean Navies, while eager to develop closer ties with navies like the Canadian Navy, constitute greater challenges because of decision making cycles, languages, and training cultures. Nonetheless, these navies are becoming increasingly ambitious in their blue water activities as illustrated by their recent deployment of anti-piracy patrols to the Gulf of Aden.

But these commonalities are only part of the story. The US Navy has articulated a number of visions of collaborative sea power over the past half decade; visions that highlight the fact that no one navy can bear the burden of maintaining peace and good order on the oceans' commons. Central to concepts like the Thousand Ship Navy is the expectation that navies, coast guards and related maritime agencies like marine police work together in the face of piracy, terrorism, and transnational crime at sea, not to mention the increasingly likely demands of humanitarian assistance and disaster relief. Such collaboration and cooperation will not be easy. Regional navies cover a spectrum of capabilities. In many cases, levels of trust are minimal or nonexistent. Navies like the Australian and Chinese spring from fundamentally different naval traditions. Intelligence sharing seems like an almost insuperable obstacle and even common rules of engagement or standard operating procedures are difficult to achieve.

However, the evidence suggests that in a maritime realm like the Indo-Pacific region, maritime cooperation is where regional nations must begin. Regional cooperation would, ideally, have the effect of muting or eliminating the emergence of an anti-Chinese coalition at sea. While there is no NATO in the Pacific, there is the Western Pacific Naval Symposium which brings together all of the regional heads of navies. This organization could prove to be one of the foundations for regional security building. There is a multiplicity of organizations in the region, but many are deemed ineffectual and almost none, save perhaps the Shangri-la Defence Ministers' dialogue, bring together practitioners of the military art.

It goes without saying that greater naval collaboration should be the product of, and a contributor to, greater

engagement in the region. It will not be sufficient merely to foster greater naval interactions. Those interactions need to be buttressed by greater levels of economic and diplomatic contact. It would be deeply misleading to underplay the formal and informal contacts that have been and continue to be fostered in the region, but these occur, by and large, in the absence of any coherent, long term vision of engagement over and against which Canada's contribution to regional security can be treated. Furthermore, it would be misleading to focus entirely on the maritime realm. Canada is linked, often unexpectedly, to a host of nations in the Asia-Pacific by virtue of "army" activities. Thus, Canadians and New Zealanders are both contributing to stability and redevelopment in Afghanistan, while Mongolians and Canadians find themselves engaged side by side in stability operations in Sierra Leone. In an area of the globe bereft of an overarching security framework, these are invaluable initiatives that help build trust and facilitate collaboration in other realms. The same could be said for cooperation in other areas like training, air transport and police work.

This paper began with the assertion that Canada, for a variety of reasons, has been slow to come to grips with the magnitude and reality of changes in the Asia Pacific region. Ottawa's attention has been directed elsewhere for the most part and comprehensive all-of-government engagement strategies have not been implemented when it comes to Asia. The nation has been distracted by the war in Afghanistan, the potential of Latin America, and global economic conditions. The importance of China and India are acknowledged, but that is about the extent of it. Not surprisingly, at a time when the CF are fully committed in Afghanistan, there has been little thought given to the question of what to do in Asia. We have already seen how wars in Asia have distorted the global balance and the potential for more conflicts remains very real. But before those occur, there are a host of opportunities, particularly in the maritime realm, to contribute to regional security. This will not be easy, in the absence of well developed organizational structures and common operating cultures, but the evidence suggests that maritime cooperation has become vitally important. Progress has been made already in such disparate locations as the Strait of Malacca and the Gulf of Aden, and there seems every reason to believe that Canada can contribute her well established maritime capabilities to the common good.

Conclusions

John Scott Cowan

I confess to unbridled admiration for the editor of this volume, Brian MacDonald, because I now realize how tricky it is to seek out, meld and place in logical sequence the contributions of a bevy of experts who tackle a problem from such disparate vantage points. And yet, as with earlier *Vimy Papers*, the whole does seem more than the sum of the parts, and that's a key measure of what is hoped for in such edited anthologies. Furthermore, it tackles an awkward set of questions.

It starts in the right place, with history. Gary Rice quite properly reminds us that these are not new questions, and that they both provoke conflict and are exacerbated by conflict. He reminds us even in the first chapter of the looming oil and liquefied natural gas (LNG) appetite of China. He is clear on oil as a driver for aspects of US decisions on the Middle East and on Russia's new role as an oil superpower. For Canada, energy security issues often come down to pipelines (or their absence), and he correctly observes that an attack on Canada is an attack on the safety of the US oil supply.

It should come as no surprise to any of us that this volume on the strategic impact of energy supply and scarcity has echoes of last year's *Vimy Paper*, *Canadians and Asia-Pacific Security*, which focussed on the impact of issues in the Asia-Pacific region on Canadian interests and security. Chapters 3 and 5 of this volume highlight the critical roles of Russia and India, plus some commentary on China in chapters 1 and 9. Russia is seen as a giant net energy exporter with a penchant for manipulation and a desire to re-establish a degree of geopolitical influence, while China and India have a huge stake in the free flow of oil and gas by sea to help meet their steeply rising demand.

But as Peter Johnson, one of Canada's foremost Arctic experts, points out in Chapter 2, a Canadian perspective also has to look north, particularly remarking on the enormous potential in the almost unimaginably large reserves of gas hydrates, along with substantial natural gas.

J. L. Black's review of the Russian stance in Chapter 3 reminds us to focus on the five points of the Medvedev Doctrine, and cautions us that if Canada does not construct for itself a modest diplomatic role on these issues as they unfold in central Asia, we risk being left out of some extremely important long term steering arrangements.

Andrew Monaghan's focus on NATO in Chapter 4 reminds us of the rather tight box that Europe finds itself in on energy, but

nonetheless does not neglect residual but important military roles for NATO in both protection of energy infrastructure and in crisis management.

In Chapter 5, Divyabh Manchanda examines the pressures which will grow with the development of India, though, looking ahead to 2031, he shows that India's proportional reliance on oil may drop a bit (from 36 percent of energy to 29 percent) by increasing reliance on nuclear, natural gas and LNG and non-imported coal. At present 78 percent of oil used in India is imported, representing 27 percent of all of India's imports. He stresses the need for open sea lanes, and, given the awkward relations with India's land neighbours, describes India as "a sea-locked nation," which is a neat turn of phrase that echoes Dr. Jim Boutilier's view of China in Chapter 9.

Chapter 6, by James Kraska and Chapter 9, by Jim Boutilier fit quite nicely together. Kraska, as a lawyer and naval officer, has written often and eloquently about the need and the techniques for keeping sea-lanes open. He points out how ironic it is that maritime aspects of energy infrastructure lie largely in the most politically unstable regions of the globe. Quoting from him: "Virtually only Norway and Canada are major exporting states that are not located in the arc of instability." His vision for international cooperation and for a return to more suitable vessels for anti-piracy operations is one he has written about from time to time, but Chapter 6 is a very up to date expression of the way ahead. Dr. Boutilier reminds us not to be seduced by our culture and history into paying insufficient attention to Asia, and to China in particular. China's drive to ensure free passage by sea has most certainly altered its strategic stance of late, with, he predicts, more to come.

Chapters 7 and 8 focus on the United States, and do relate to one another. In Chapter 7, Charles Doran explores attitudes of the new US administration that may bear on energy security, in light of President Obama's four stated goals. In Chapter 8, Brian Wilson and Jeff Luster give us a view of the same landscape, but as a "from the trenches" look at the working level, on a more immediate time scale and with a very pragmatic optic.

But for Canadians, the central issue is, or ought to be, our lack of a long term strategy. Energy dependence and the potential for energy scarcity is a security issue, both in grand strategic terms for the nation and in the more mundane strategic planning of the Canadian Forces.

A solid case could be made for Canada to have a strategic reserve of oil and various refined hydrocarbon products. Furthermore, a case might be made for additional east-west pipeline capacity and expansion of the number of loci on such a network. Maintaining reserves and building pipelines are expensive, and

some risk/benefit tradeoffs would need to be modelled. As a subset of the above, appropriate CF fuel reserves could be modelled and incorporated.

Of course, oil and gas are not the only energy sources. The CF is hugely dependent upon civil electrical, transportation and communications infrastructure. How odd it is to build an armed force on the premise that it must be the most robust structure in society, paying, in effect, an economic penalty to be assured of its ability to function when all else does not (hence the force of last resort), and then connect it to power grids and transportation and communication systems which have very limited robustness, almost no redundancy, and which in a crisis would be the first entities to fail. And yet, a robust parallel system just for the CF would be unimaginably expensive and hence utterly unattainable. What constitutes a reasonable middle ground would be for the CF to require some improved robustness of supply from its civilian suppliers, but be prepared to pay somewhat more on such contracts which had robustness specifications (and to be funded well enough to afford the contracts). This would, in effect, use modest CF subsidy to encourage Canadian suppliers of energy and energy-dependent core services to begin to develop robustness and redundancy beyond that required to recover from the odd summer electrical storm or transformer meltdown. Such recommendations have been made before, including in the Defence Science Advisory Board report cited in the foreword.

But moving public policy in this direction is problematic, because the entire political spectrum has trouble visualizing these issues, since where energy is concerned, almost all public discourse is currently swamped by the competition amongst political forces to appear the most green. And because most of our elected representatives, their publicists and the media as a whole are little versed in real science, the rush to go green has involved a handful of initiatives which are somewhat green and a host of others best described as “fake green.” Worse yet, the environmental movement has, as often as not, gone chasing after the fake green bait, missing the real opportunities that also could have strategic impact.

At least one example of fake green has already met substantial public debunking, and that is the production of ethanol as a motor fuel from corn or grain. It now seems that it does not diminish fossil fuel use, or at best trivially, as the carbon footprint of its production is so large as to approximate its fuel value. This is not true, however, for ethanol from sugar cane (which we cannot grow) and may not be true for ethanol from waste biomass, for which the production process is still being improved. So some governments hopped on the corn ethanol bandwagon to no

purpose, intentionally blurring the science issues for political but not environmental or strategic gain.

Another politically advantageous but scientifically marginal bit of fake green is the subsidy of various hybrid gas-electric cars. Yes, they use somewhat less gas. But they cost much more to make, and those extra costs represent extra industrial inputs which themselves have a carbon footprint which diminishes and may entirely consume any gains made by the modest fuel economies in use. Everything depends on how long the batteries last.

But there is one easy step no North American government has tried, and this is diesel. No, it's not sexy, but diesel engines give one horsepower for an hour for every 135-150 grams of fuel, while gas engines require 200-220 grams to do the same trick. And modern computer-controlled diesels don't smoke, so the particulate issue is vastly diminished. Hence a program to charge vastly more for the annual plate fee for gas cars versus diesel would in a decade diminish the use of motor fuel by passenger cars by a third from what it would otherwise have been. Such a gain is far greater than what could be achieved by the two fake methods above, but is not politically advantageous, as it doesn't accord with the current preferences of the fake green cult.

That same cult abhors the burning of ordinary non-recyclable waste as industrial fuel, preferring costly separation programs, with composting of some and landfill for the rest. And where it would have been used as fuel, newly unearthed hydrocarbons from fossil fuel get burned. Well, the bad news for the cultists is that all the compost and all the decaying landfill is putting all the carbon dioxide back in the air, just without the advantage of using it to spare other fuels. In fact, to the extent that much of that garbage may be wood or paper products or otherwise vegetable in nature, it's just a cycle of carbon capture during growth and carbon release during burning, a zero sum loop. In Europe, even the greenest parties favour use of waste as fuel, but not here in Canada.

We even get the spectre of "green" crusaders blocking the use of old tires for fuel in plants where the alternate fuel that would otherwise be used is coal. But the tires burn cleaner than coal. How can this make sense? Is this a reaction to what happened when they were kids and set a tire on fire down by the creek and it burned in a dirty, sooty fashion? If so, reading a bit of real science might help.

Even wind power has become a religious concept. Wind power may well evolve into a useful alternative, but just now to make it work requires costs of 2.3-3.2 times conventional sources, and nobody has analyzed those costs and their industrial inputs to see what the related carbon costs are. There is a slight risk that they might actually exceed that of conventional generation, but more likely they are modestly short of that. I could easily be persuaded

that wind power was an improvement when the costs drop to 1.5 times conventional costs, but not now. Why the rush to put it into full-scale production now? Surely fairly large-scale demo projects would suffice until the industrial input ratios look more persuasive, even on the carbon question.

Which leaves the strange opposition of some of the nominally green advocates to nuclear sources. Admittedly, nuclear power is not forever. It too is a transitional technology, as there is probably only about a millennium of fuel available for it. But that sure beats less than a century, and produces little greenhouse gas. So its opponents need to fret a lot about the spent fuel. Well, we'd be wise to keep that spent fuel relatively close at hand and be able to recover it in 300-600 years when the radioactivity of the short lived isotopes has diminished, as we can be pretty certain that there will be huge value for many purposes in the isotopes remaining.

It is all of these interesting, fashionably distorted, but politically marketable stories at the margin that take up all the political room where our real energy strategy should be. It will not be easy to bring reality to that festival of fables. But we should try.

Conclusions

John Scott Cowan

Je confesse mon admiration sans bornes pour le rédacteur de ce volume, Brian MacDonald, parce que je constate maintenant à quel point il est délicat de chercher, d'assortir et d'ordonner selon une séquence logique les contributions d'une foule d'experts qui abordent un problème à partir de points de vue si disparates. Et pourtant, comme dans les Cahiers Vimy précédents, le tout semble être plus que la somme des parties, une mesure clé de ce qu'on attend de telles anthologies rédigées sous la gouverne d'un éditeur. En plus, elle traite d'un ensemble hétéroclite de questions.

Le cahier commence là où il se doit, avec l'histoire. Gary Rice nous rappelle fort à propos que ce ne sont pas là de nouvelles questions et que, si elles provoquent des conflits, elles sont en même temps exacerbées par les conflits. Il nous rappelle même, dans le premier chapitre, l'appétit menaçant de la Chine pour le pétrole et le GNL. Il tient des propos clairs sur le pétrole comme moteur de certains aspects des décisions des États-Unis concernant le Moyen Orient et sur le nouveau rôle de la Russie comme superpuissance pétrolière. Pour le Canada, les questions de sécurité énergétique traite souvent de pipelines (ou de leur absence), et il fait remarquer, à juste titre, qu'une attaque contre le Canada est une attaque contre la sécurité de l'approvisionnement en pétrole des États-Unis.

Il n'est pas surprenant que ce volume sur l'impact stratégique de l'approvisionnement et de la rareté de l'énergie ait des échos de notre volume de l'an dernier, le Cahier Vimy numéro 3, qui traitait de l'impact des questions qui ont cours dans la région de l'Asie-Pacifique sur les intérêts et la sécurité du Canada. Les chapitres 3, 5 et 6 de ce volume soulignent les rôles critiques de la Russie, de la Chine et de l'Inde, le premier comme un géant de l'exportation nette d'énergie avec un penchant pour la manipulation et un désir de se redonner un degré d'influence géopolitique, tandis que la paire suivante a un énorme intérêt envers l'écoulement libre du pétrole et du gaz par voie maritime pour les aider à répondre à leur demande, qui est en croissance exponentielle.

Mais, comme Peter Johnson, un des experts les plus éminents du Canada sur l'arctique, fait remarquer au Chapitre 2, une perspective canadienne doit aussi regarder vers le nord, en notant particulièrement le potentiel énorme qui gît dans les réserves aux dimensions presque inimaginables d'hydrates de gaz, parallèlement a des quantités substantielles de GN.

L'examen que fait J.L. Black, au Chapitre 3, de la posture russe nous suggère de nous concentrer sur les cinq points de la doctrine Medvedev et nous avertit que si le Canada ne construit pas pour lui-même un modeste rôle diplomatique sur ces enjeux au fur et à mesure qu'ils se déroulent en Asie centrale, nous risquons de rester en dehors de certains arrangements de gouverne à long terme qui auront une extrême importance.

Le chapitre (numéro 4) d'Andrew Monaghan, axé sur l'OTAN, nous rappelle la boîte plutôt étroite dans laquelle se trouve enfermée l'Europe en matière d'énergie, mais sans toutefois négliger les rôles militaires, résiduels mais importants, de l'OTAN à la fois dans la protection de l'infrastructure énergétique et dans la gestion des crises.

Divyabh Manchanda explicitent les pressions qui vont grandir avec le développement de la Chine et de l'Inde, respectivement, bien que Manchanda, en jetant un regard vers 2031, montre que la dépendance proportionnelle de l'Inde vis-à-vis du pétrole peut fléchir légèrement (de 36 % de l'énergie à 29 %) en augmentant sa dépendance vis-à-vis le nucléaire, le GN et le GNL, et le charbon non importé. Pour l'heure, 78 % du pétrole utilisé en Inde est importé, ce qui représente 27 % de toutes les importations de l'Inde. Il souligne le besoin de corridors maritimes ouverts et, étant donné les relations incommodes avec les voisins terriens de l'Inde, il décrit l'Inde comme une « nation encerclée par la mer », une belle tournure de phrase qui fait écho au point de vue de M. Jim Boutilier, au Chapitre 10, concernant la Chine.

Le Chapitre 7, par James Kraska, et le Chapitre 10, par Jim Boutilier, vont très bien ensemble. Kraska, comme avocat et officier naval, a écrit souvent et avec éloquence sur le besoin de garder les corridors maritimes ouverts et les techniques pour y parvenir. Il signale à quel point il est ironique que les aspects maritimes de l'infrastructure énergétique se trouvent dans les régions les plus politiquement instables du globe. Pour le citer : « Virtuellement seuls la Norvège et le Canada sont des États exportateurs majeurs qui ne sont pas situés dans l'arc d'instabilité. » Sa vision de la coopération internationale et pour un retour à des vaisseaux plus convenables pour les opérations anti piraterie en est une sur laquelle il a écrit de temps à autre, mais le Chapitre 7 est une expression très à date de la voie de l'avenir. M. Boutilier nous rappelle de ne pas nous laisser séduire par notre culture et notre histoire qui nous portent à ne pas accorder suffisamment attention à l'Asie, et à la Chine en particulier. La poussée de la Chine pour s'assurer un passage libre par la mer a très certainement altéré sa posture stratégique ces derniers temps, et, prédit-il, ce n'est que le commencement.

Les Chapitres 8 et 9 mettent l'accent sur les États-Unis et ils ont bien un rapport entre eux. Au Chapitre 8, Charles Doran explore les attitudes de la nouvelle administration américaine qui peuvent avoir un effet sur la sécurité énergétique, à la lumière des quatre objectifs énoncés par le Président Obama. Au Chapitre 9, B. Wilson et J. Luster nous donnent un aperçu du même paysage, mais comme suivant un regard « depuis les tranchées » au niveau de travail, sur une échelle temporelle plus immédiate et avec une optique très pragmatique.

Mais, pour les Canadiens, la question centrale est, ou devrait être, notre manque de stratégie à long terme. La dépendance énergétique et le potentiel de rareté énergétique est une question de sécurité, à la fois en termes de grande stratégie pour le pays et dans la planification stratégique plus terre-à-terre des FC.

On pourrait faire une solide défense pour que le Canada ait une réserve stratégique de pétrole et de divers produits d'hydrocarbures raffinés. En plus, on pourrait défendre l'idée d'une capacité additionnelle d'un pipeline est-ouest et de l'expansion du nombre de lieux sur un tel réseau. Le maintien de réserves et la construction de pipelines sont chers, et il faudrait qu'on modèle quelques compromis entre les risques et les bénéfices d'une telle entreprise. Comme un sous-ensemble des idées exposées ci-dessus, on pourrait modéliser et intégrer des réserves de combustibles appropriées pour les FC.

Bien sûr, le pétrole et le gaz ne sont pas les seules sources d'énergie. Les FC sont énormément dépendantes de l'infrastructure civile pour l'électricité et les transports et communications. Comme il est curieux de bâtir une force armée sur la prémisse qu'elle doit être la structure la plus robuste de la société, en payant, dans les faits, une pénalité économique pour s'assurer de sa capacité de fonctionner quand tout le reste ne fonctionne plus (donc la force du dernier recours), pour ensuite la brancher aux réseaux électriques et aux systèmes de transports et communications qui ont une robustesse très limitée, presque aucune redondance, et qui, dans l'éventualité d'une crise, seraient les premières entités à tomber en panne. Et pourtant un système parallèle robuste, seulement pour les FC, serait cher au-delà de ce qu'on peut imaginer et, donc, tout à fait impossible à atteindre. Ce qui constitue un moyen terme raisonnable, ce serait, pour les FC, d'exiger un accroissement quelconque de la robustesse de l'approvisionnement de la part de ses fournisseurs civils, mais en étant prêtes à payer un peu plus sur les contrats comportant des spécifications de robustesse (et à être suffisamment bien pourvues de fonds pour avoir les moyens de tels contrats). Il faudrait, en effet, un modeste subside des FC pour encourager les fournisseurs canadiens d'énergie et les services essentiels qui dépendent de l'énergie à commencer à développer

une robustesse et une redondance qui dépassent ce qui est nécessaire pour se relever de l'orage électrique estival isolé et d'une fusion de transformateur. De telles recommandations ont déjà été faites, et notamment dans le rapport CCSAD mentionné dans l'avant-propos.

Mais faire avancer la politique publique dans cette direction est problématique, parce que l'éventail politique tout entier a de la difficulté à visualiser ces questions, puisque, là où il est question d'énergie, presque tout le discours public est présentement submergé par la compétition que se livrent les forces politiques pour savoir qui aura l'air le plus vert. Et parce que la plupart de nos représentants élus, leurs publicistes et les médias dans leur ensemble sont très peu versés dans la vraie science, la course au vert a fait appel à une poignée d'initiatives qui sont quelque peu vertes et à toute une bande d'autres qu'on pourrait décrire au mieux comme du « faux vert ». Encore pire, le mouvement environnemental est, plus souvent qu'autrement, à la poursuite de l'appât faux vert, ce qui lui a fait rater les vraies occasions qui auraient aussi pu avoir un impact stratégique.

Au moins un exemple de faux vert a déjà fait face à un déboulonnage public substantiel, et c'est la production de l'éthanol comme carburant automobile tiré du maïs ou du grain. Il semble maintenant que cette technologie ne diminue pas l'utilisation de combustible fossile, ou qu'elle le fait de façon banale, puisque l'empreinte carbone de sa production est si grande qu'elle approche sa valeur de combustible. Ce n'est toutefois pas vrai de l'éthanol produit à partir de la canne à sucre (qui ne peut se cultiver ici) et peut ne pas l'être pour l'éthanol tiré de la biomasse pour lequel le processus de production est encore en voie d'amélioration. Certains gouvernements ont sauté sur le char du maïs sans avoir de but, en brouillant intentionnellement les cartes des questions scientifiques pour un gain politique plutôt qu'environnemental ou stratégique.

Une autre pièce de faux vert, politiquement avantageuse mais scientifiquement marginale, c'est la subvention des diverses voitures hybrides essence-électricité. Oui, elles consomment un peu moins d'essence. Mais elles sont beaucoup plus coûteuses à fabriquer et ces coûts supplémentaires représentent des intrants industriels supplémentaires qui ont eux-mêmes une empreinte carbone qui fait diminuer et qui peut consommer entièrement les gains réalisés par les modestes économies de carburant réalisées à l'usage. Tout dépend de la durée des batteries.

Mais il y a un pas facile à faire qu'aucun gouvernement nord-américain n'a essayé, et c'est le diesel. Non, ce n'est pas sexy, mais les moteurs diesel donnent un 'horsepower' par heure pour 135-150 grammes de carburant, tandis que les moteurs à essence

ont besoin de 200-220 grammes pour donner le même rendement. Et les diesels modernes contrôlés par ordinateurs ne fument pas, ce qui fait que le problème des matières particulaires est immensément diminué. De là un programme de perception de frais beaucoup plus élevés pour les plaques de voitures à essence que pour celles au diesel diminuerait, dans une décennie, l'usage d'essence par les voitures de passagers du tiers de ce qu'il aurait autrement été. Un tel gain est de beaucoup plus élevé que ce qui pourrait être réalisé par les deux fausses méthodes ci-dessus, mais ce n'est pas politiquement avantageux, puisque ça de va pas dans le sens des préférences actuelles du culte du faux vert.

Ce même culte a horreur de la combustion de déchets non recyclables ordinaires comme combustible industriel, lui préférant de coûteux programmes de séparation, qui comportent le compostage d'une partie et l'enfouissement du reste. Et où ils auraient été utilisés comme combustible, les hydrocarbures provenant de combustibles fossiles nouvellement déterrés sont brûlés. Hé bien, la mauvaise nouvelle pour les adeptes du culte, c'est que tout ce compost et tout l'enfouissement en décomposition renvoie tout le CO2 dans l'air, seulement sans bénéficier de l'avantage de l'utiliser pour économiser d'autres combustibles. En fait, dans la mesure où une grande partie de ces déchets peut être des produits de bois ou de papier, ou autrement être de nature végétale, c'est seulement un cycle de la capture du carbone pendant la croissance et de dégagement de carbone pendant la combustion, une boucle à somme nulle. En Europe, même les partis verts sont favorables à l'utilisation des déchets comme combustibles, mais pas ici.

Nous avons même le spectre des croisés « verts » qui bloquent l'usage de vieux pneus comme combustible dans les usines où le combustible alternatif qu'on aurait autrement utilisé est le charbon. Mais les pneus brûlent d'une façon plus propre que le charbon. Comment cela peut-il avoir un sens ? Est-ce une réaction à ce qui s'est produit quand des enfants qui ont mis le feu à un pneu, en bas, près du ruisseau, et qu'il a brûlé de façon sale en faisant plein de suie ? Si c'est le cas, on pourrait utilement faire quelques lectures sur la vraie science.

Même l'énergie éolienne des devenue un concept religieux. L'énergie éolienne peut bien évoluer pour donner une alternative utile, mais pour le moment il faut de 2,3 à 3,2 fois les coûts des sources conventionnelles pour la faire fonctionner, et personne n'a analysé ces coûts et leurs intrants industriels pour voir quels sont les coûts de carbone qui s'y rattachent. Il y a un faible risque qu'ils puissent en réalité excéder ceux de la production énergétique conventionnelle, mais il est plus probable qu'ils soient modestement en-deça de ces coûts. Je pourrais facilement me

laisser persuader que l'énergie éolienne sera une amélioration quand les coûts seront tombés à 1,5 fois les coûts conventionnels, mais pas maintenant. Pourquoi l'urgence de la mettre en production à pleine échelle maintenant ? Il est sûr que des projets de démonstration d'assez grande échelle suffiraient, d'ici à ce que les ratios d'intrants industriels aient acquis un air plus persuasif, même sur la question du carbone.

Et il reste l'étrange opposition que maintiennent certains des défenseurs nominalement verts devant les sources nucléaires. Il faut reconnaître que l'énergie nucléaire n'est pas éternelle. C'est là aussi une technologie de transition, puisqu'il n'y a peut-être qu'environ un millénaire de combustible pour elle. Mais cela bat sûrement moins d'un siècle et produit peu de gaz à effet de serre. Alors ceux qui s'y opposent ont besoin de verser bien des larmes sur le combustible dépensé. Hé bien, nous serions sages de garder ce combustible relativement à portée de la main et d'être capables de le récupérer dans 300 à 600 ans, quand la radioactivité des isotopes à courte vie aura diminué, parce qu'on peut être pas mal certains qu'il y aura une énorme valeur, pour bien des buts, dans les isotopes restants.

C'est l'ensemble de ces histoires intéressantes, élégamment tordues, mais politiquement monnayables à la marge, qui prennent toute la place politique, là où devrait se trouver notre véritable stratégie énergétique. Il ne sera pas facile d'amener la réalité à ce festival de fables. Mais nous devrions essayer.

Notes on Contributors

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