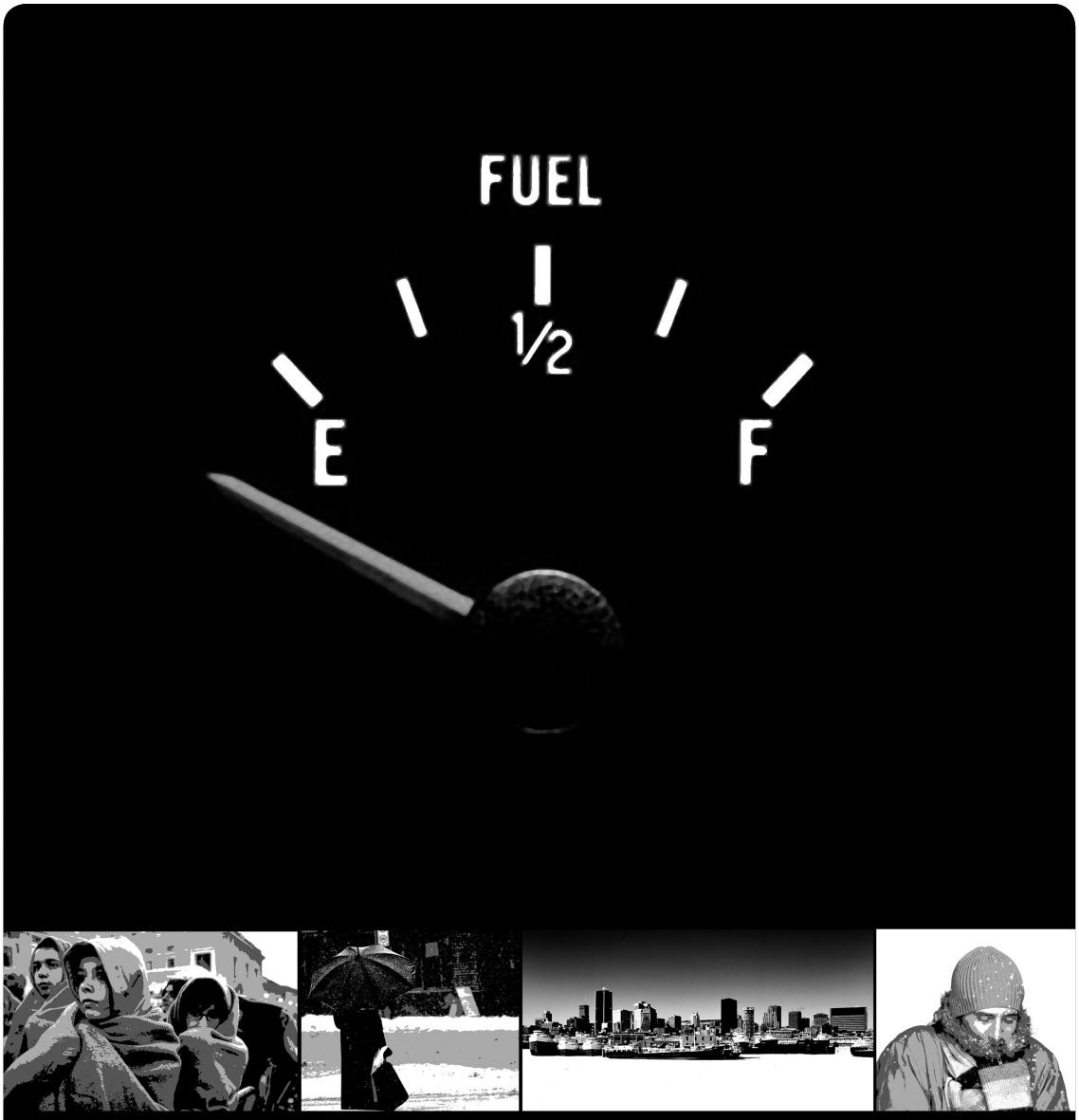
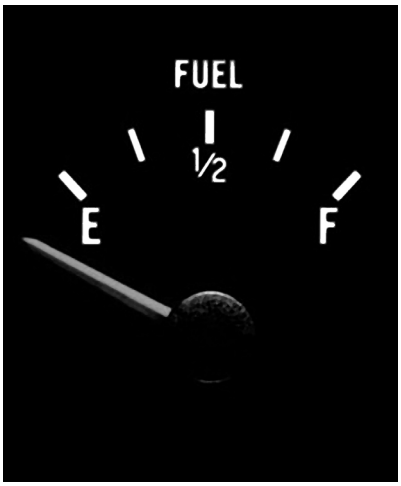


Strategic Petroleum Reserves for Canada

Parkland Institute, University of Alberta • October 2007

by Gordon Laxer / Parkland Institute and Polaris Institute



Strategic Petroleum Reserves for Canada

This report was published by Gordon Laxer,
Parkland Institute and Polaris Institute
January 2008.

Contents

To obtain additional copies of the report or rights to copy it, please contact:
Parkland Institute, University of Alberta
11045 Saskatchewan Drive
Edmonton, Alberta T6G 2E1
Phone: (780) 492-8558 Fax: (780) 492-8738
Web site: www.ualberta.ca/parkland
E-mail: parkland@ualberta.ca

ISBN ????

Acknowledgements

It was a great pleasure to write this report and get almost instant feedback on the first draft from a very knowledgeable and committed "epistemic community" of intellectual activists. Together, we are creating a new paradigm for moving Canada toward energy independence and conservation.

The quality of this report was greatly enhanced by the detailed suggestions and analysis of Kjel Oslund, Erin Weir, and John Dillon. Thanks to each. Ricardo Acuña, Duncan Cameron, Tony Clarke, Rick Munroe, Andrew Nikiforuk and Mel Watkins each gave very useful critiques.

Richard Gilbert sent revealing correspondence on complacency within Ontario's government on future oil shortages in that province. Wade Locke provided helpful information on Newfoundland's oil industry. A special thanks to two Edmonton-based volunteer researchers, Erin Krekoski and Ryan Katz-Rosene, for thorough fact checking on SPRs in other countries, which is the basis of Appendix B.

I would also like to thank Scott Harris for a great copy-editing job and Flavio Rojas for layout, illustrations and making it look so good.

Finally, it was a delight to work with David Thompson, a Research Associate with Parkland Institute, who helped guide the research, wrote the first two sections, and gave an excellent critique and suggestions for changing the order of the report.

I take responsibility for errors and omissions. I ask readers to contact me if they find any: gordon.laxer@ualberta.ca.

About the Parkland Institute

Parkland Institute is an Alberta research network that examines public policy issues. We are based in the Faculty of Arts at the University of Alberta and our research network includes members from most of Alberta's academic institutions as well as other organizations involved in public policy research. Parkland Institute was founded in 1996 and its mandate is to:

- conduct research on economic, social, cultural, and political issues facing Albertans and Canadians.
- publish research and provide informed comment on current policy issues to the media and the public.
- sponsor conferences and public forums on issues facing Albertans.
- bring together academic and non-academic communities.

CONTEXT

Parkland Institute and Polaris Institute: Canadian Energy Policy Research

Parkland Institute

This report is one of many issued from Parkland Institute's Energy Security Research Program.

This program will see a series of research papers addressing key energy challenges facing Canada in the coming decades. These papers provide both a political-economic analysis and policy recommendations for improving Canada's energy security.

The series was commenced with Parkland Institute's discussion paper, "Toward an Energy Security Strategy for Canada," published in December 2005. That paper introduced a range of long-term energy security issues.

"Fuelling Fortress America: A Report on the Athabasca Tar Sands and U.S. Demands for Canada's Energy," co-published with the Canadian Centre for Policy Alternatives and Polaris Institute in March 2006, examined the local costs of Alberta's tar sands developments, and critiqued the strategic support for exports to the U.S.

The present report focuses on Canada's - and particularly Eastern Canada's - vulnerability to short-term global oil supply shocks. In a world of increasingly tight oil supply and rising demand, coupled with political instability in many producing countries, the fact that Eastern Canada imports up to 90 per cent of its oil creates significant risks for many Canadians. Establishing Strategic Petroleum Reserves can manage those short-term risks and be an integral part of a broader federal-provincial strategy to put Canadians' energy needs first and curb greenhouse gases.

Future planned reports in this series will address NAFTA's proportionality clause (April 2008) and pipelines and Eastern Canadian energy supply (September 2008).

The Energy Security Research Program complements a large number of other energy-related reports, all of which are available on the Parkland Institute website: www.ualberta.ca/parkland

Polaris Institute

The Polaris Institute does research, education and action on national public policy issues, including energy security. In doing so, our aim is to enable citizen groups and movements to develop tools and strategies for public discussion, debate and action on such issues in order to bring about democratic social change. On energy issues, our research and analysis has been focused on Canada's rapidly growing oil and gas exports to the U.S. under the North American Free Trade Agreement (NAFTA) and the extent to which this country has become America's main energy satellite. In an world increasingly preoccupied with the demands of peak oil and climate change, our overall program objective at Polaris is to help develop a made-in-Canada energy policy and strategy that paves the road for moving away from dependency on fossil fuels to an energy future based more on renewable alternatives and ecological priorities.

In developing citizen capacities for action, our campaign work has been primarily focused on the Alberta tar sands. On this front, Polaris has been working with Alberta-based groups along with other national organizations andU.S.-based groups calling for a moratorium on tar sands crude production in the country. We have coordinated and co-produced reports like Fuelling Fortress America (in collaboration with Parkland Institute and the Canadian Centre for Policy Alternatives) and developed a web-based information and action tool — www.tarsandswatch.org — to promote citizen and community participation across the country. Serving as a catalyst, Polaris also plans to help facilitate a network of Ottawa-based civil society organizations in pressing for action on Parliament Hill concerning tar sands issues and to develop a process to make the tar sands more of a national and bi-national issue for action.

Executive Summary

Canada needs Strategic Petroleum Reserves - short-term stores of oil that can be released during supply shortages to meet regional needs.

Canada is a producer and net exporter of oil. Yet this national status masks an important regional divide; Eastern Canada is a net importer of oil, receiving up to 90 per cent of its oil from overseas, much of it from OPEC countries like Algeria, Iraq and Saudi Arabia. Eastern Canadians are vulnerable to global oil supply shocks.

The International Energy Agency (IEA), of which Canada is a founding member, requires member countries that are net importers to maintain emergency oil reserves of 90 days of net imports. It does not require this of exporters, as exporters are sensibly assumed to ensure domestic oil needs before exporting their surpluses.

Unfortunately, unlike in most industrial countries, Canadian governments in recent years have not prioritized domestic energy security. Canada exports 67 per cent of the oil it produces to the United States, and NAFTA's "proportionality" clause prohibits Canada's government from reducing this proportion, even in times of crisis. And there is not enough east-west oil pipeline capacity to transport western oil to Eastern Canadians in times of supply shock.

Strategic Petroleum Reserves have been employed for nearly a century to protect against short-term oil shortages. They have been created in the IEA countries, the European Union, China, India, the Anglosphere countries of Britain, Australia and New Zealand, and other countries. In addition to its very large SPR, the United States also has a smaller home heating oil reserve in its northeast.

Global demand for oil is growing and supply is increasingly tight. Peak global oil production will arrive soon, if it hasn't already. A report prepared for the U.S. Department of Energy reviewed 12 studies of peak oil; of these, eight predicted global peaking by as soon as 2010, several predicting the peak earlier. Tight supplies mean that small disruptions have big effects on both price and availability. Disruptions can occur because of natural disasters such as hurricanes, terrorist attacks or embargoes.

At the same time as demand growth is outpacing new supplies, producing countries are beginning to re-nationalize oil reserves and production. Currently, about 80 per cent of global oil reserves are controlled by state-owned oil companies. Most of these public oil companies have a nationalist orientation, looking after domestic

needs first. At the same time, the proportion of Canada's imports from North Sea countries is rapidly shrinking, while our imports from OPEC countries are growing.

The growth in global oil demand is now being led by East Asian and South Asian countries with large populations. These countries are increasingly purchasing oil through long-term supply contracts, which will further reduce global market availability during times of oil supply shocks.

With Eastern Canadians dependent on oil imports, with severe trade and infrastructure limits on Canada's ability to re-direct western oil to the East in the near future, and with a global oil supply that is increasingly tight and vulnerable, Canada needs to develop SPRs.

What would Canadian SPRs look like?

IEA guidelines call for SPRs to have 90 days supply of imported oil, which for Canada would mean approximately 76 million barrels. However, SPRs are expensive to build and operate, and slow to fill. We can reduce the size of SPRs needed, and Canada's vulnerability to oil supply shocks, by reducing our oil imports.

If Canada reversed the flow of the Montréal to Sarnia pipeline, which currently brings foreign oil through southern Ontario, it could bring Western Canadian oil to Québec and reduce imports by almost a third. Taking the portion of Newfoundland oil that is currently exported and re-directing it to Eastern Canada could further reduce import levels. In combination, the pipeline reversal and redirecting Newfoundland's oil would cut imports to perhaps half of current levels. This would reduce the size of the SPRs needed to approximately 38 million barrels. Finally, taking measures to reduce oil consumption could further reduce imports, as well as help Canada comply with our international legal obligations to reduce greenhouse gas emissions.

Locations of SPR facilities would need to be determined by a combination of environmental, economic, social and political factors, and would need to take account of vicinity to refineries and transportation logistics. SPR sites are needed in Southern Ontario, Québec and Atlantic Canada. Siting and designing SPRs would require research and public deliberation. Environmental and social impact assessments, including cumulative impacts, would have to be carried out.

Such processes need to be done properly, and would be time-consuming. However, in the meantime, Canada could develop temporary emergency supplies. Many European countries have long required their oil industry to hold emergency supplies. Eastern Canadian refinery inventories - currently hovering at eight to 21 days of supply - could be required to rise to provide the emergency cushions.

Part of a broader Canadian Energy Security Strategy

Canada needs to protect its eastern citizens by developing national strategic petroleum reserves. This would address our vulnerability to short-term supply shocks. At the same time, the Canadian government needs to put Canadians first by developing strong federal-provincial partnerships aimed at energy security and environmental protection.

This strategy would include:

- Strategic Petroleum Reserves;
- Removing our import dependency through prioritizing domestic oil production to satisfy Canadian needs, at world prices, ahead of exports;
- Getting a “Mexican exemption” from NAFTA’s proportionality clause, or, failing that, giving the required six months notice to leave NAFTA;
- Reintroducing the requirement that there be 25 years of proven supply of oil before exports are allowed;
- Reducing domestic oil consumption and carbon emissions.

It is time that the Canadian government recognized the vulnerability of Canadians, and particularly Eastern Canadians, to oil shocks in the coming years, and took steps to protect them.

Introduction

Strategic Petroleum Reserves are emergency storage pools of oil that can be released by governments to meet consumer demand, usually for 90 days, during periods of local or international oil supply disruptions. The pools can be below ground in salt caverns or above ground in storage tanks. The emergency oil can be stored in government facilities or held by oil companies as mandated by governments. Strategic reserves can hold crude oil or refined oil.

The main purpose of Strategic Petroleum Reserves is to temporarily replace the physical volumes of imported oil and / or refined petroleum products that could be lost in the short-term during an emergency. The role of governments is to protect the economic and physical well being of its citizens, and oil disruptions have had large, negative impacts on modern economies. Canada shares that condition with other countries, but given its northern location, has the added responsibility of ensuring that Canadians do not physically suffer during severe winters. The ice storm in Québec and Eastern Ontario a decade ago reminded Canadians how precarious we are when we rely on modern forms of energy to keep us alive and well in winter.

Canada is recklessly unprepared for the next global oil crisis. Despite its abundance of oil, Canada is the most vulnerable member of the International Energy Agency (IEA) to short-term shocks. Canada imports about 40 per cent of its oil needs, almost half coming from OPEC countries. Yet Canada has no Strategic Petroleum Reserves (SPRs).

Without an SPR Eastern Canada will be vulnerable to supply disruptions and will likely experience spot shortages. A December 2007 news story reported a shortage of furnace oil on Cape Breton Island that could well be a harbinger of much more frequent and severe interruptions over all of Atlantic Canada and Québec. "An early winter and a late-arriving fuel tanker have revealed to many Cape Bretoners a precarious home heating oil supply," reported CBC News[1]. "People used up their furnace oil quickly because winter came early this year," the article quoted a company spokesperson as saying.

This report has been written to make sure that Cape Bretoners' recent, fleeting experience is not extended across Eastern Canada and for longer periods.

The world is about to experience a series of international oil supply shocks over the next decade. No one is sure when the first one will strike, but it will be soon. When it does, countries which lack at least one of the following alternatives will experience the severest crisis: 1) long-term oil supply contracts, 2) the military might to requisition other countries' oil, 3) prioritization of their own citizens' needs above those of oil exports, or 4) Strategic Petroleum Reserves. Despite its plentiful oil, Canada is in the severe-crisis camp because it currently lacks all four options.

This report makes the urgent case for Canada to set up Strategic Petroleum Reserves. With oil supplies bumping against international production ceilings while demand is rising rapidly, Canada must quickly take steps to ensure that Eastern Canadians have sufficient supplies for the coming series of crises.

Strategic petroleum reserves help short-term crunches, not long-term ones. Unlike most countries, Canada has the potential to secure energy supplies for the medium- to long-term, but only if it changes policy direction 180 degrees. To ensure the long-term security of supply, Canada must revert to the Canada-first policies in place before the 1989 Free Trade Agreement with the U.S. Those policies denied

1 CBC News, 'Heating oil runs low in Cape Breton', December 18, 2007. http://www.cbc.ca/canada/nova-scotia/story/2007/12/18/cb-imperial.html?ref=rss#skip300x250. Thanks to Andrew Nikiforuk for alerting me to this story.

the export of gas and oil unless there was 25 years of "proven" supply for Canadians' use, and brought western oil to Québec via the Sarnia to Montréal pipeline. Since 1999, the pipeline's flow has been the other way, bringing offshore oil through Southern Ontario to the Michigan border.

Once these policy changes are in place, Canada could withstand a long-term decline in international oil supplies by aggressively cutting the domestic consumption of carbon fuels. This would be of great benefit in pushing Canada to meet its international environmental obligations to cut greenhouse gases.

Canada at Risk

It will surprise most Canadians that their country is at risk. After all, Alberta's tar sands are estimated to hold the second largest amount of oil in the world. Only Saudi Arabia is thought to have more[2]. Canadians' energy security problem lies in the fact that three-quarters of tar sands production is currently exported to the U.S. With five new export pipelines to the U.S. in various stages of planning, that share is expected to rise. Meanwhile, Eastern Canada imports 90 per cent of its oil and Canada gets almost half of its oil imports from OPEC countries such as Algeria, Saudi Arabia[3] and Iraq. None are secure[4] suppliers.

Canada is the most vulnerable IEA country to short-term disruptions because of a loophole in IEA requirements, combined with complacent government institutions such as Natural Resources Canada (NRC) and the National Energy Board (NEB). The IEA requires all of its members to maintain an emergency oil reserve. It exempts only net exporters of oil, on the sensible assumption that exporting countries will meet domestic needs before shipping surpluses abroad. If a government does not secure energy supplies for its own citizens, no one else will.

The IEA does not require Norway to have Strategic Petroleum Reserves, because, like Canada, Norway is a net exporter of oil. Norway however acts prudently and requires oil companies to stock a set level of oil reserves to be used during an emergency[5]. It ensures that its own citizens are supplied before allowing the export of excess amounts[6]. In contrast, Canada does not act prudently because current government leaders misperceive our energy role.

2 Proven reserves are those that can be extracted using current technology and economics. The Oil and Gas Journal asks governments to provide data on oil reserves. This data is as reliable as the governments which provide the information. Many governments consider proven reserve estimates to be state secrets. According to the Oil and Gas Journal (Dec 19, 2005), Saudi Arabia claims it has 264.3 billion barrels of proven reserves. Canada claims to have 178.8 billion barrels. Iran is third with 132.5 billion barrels (pp. 24-5). Most of the oil in Venezuela's huge Orinoco belt is excluded from these reserve calculations.

3 There were 3 publicly-reported attempts to target Saudi oil facilities in 2006-7. Abqaiq processes almost 8 per cent of the world's oil.

4 They are reliable suppliers in that they fulfil their contracts, but for reasons discussed below, their supplies are subject to terrorist attacks. Thanks to Kjel Oslund for the 'reliable' vs. 'secure' distinction.

5 R. Glenn Hubbard and Robert J. Weiner, 1985, 'Managing the Strategic Petroleum Reserve: Energy Policy in a Market Setting', Annual Review Energy, Vol 10, p. 528.

6 Norway imports a small amount of specialty grade oil from Russia. E-mail communication from Ole Gunnar Austvik.

Prime Minister Stephen Harper frequently boasts that Canada is an "energy superpower." This claim is hollow. Superpowers influence international events by projecting economic, military, political and cultural power on a world scale[7]. That is hardly Canada's role. Rather, Canada is an energy satellite which prioritizes American oil security demands above the needs of Canadians.

Canada's satellite role was made clear to me in April 2007 through correspondence with the National Energy Board. The reply of the NEB's "communications team" to my inquiries about Canadian energy security was astonishing. They wrote that, "Unfortunately, the NEB has not undertaken any studies on security of supply." This was quite an admission from a Board which was set up in 1959 to do precisely that - ensure the long-term security of supply for Canadians. That is still the NEB's mandate[8].

The NEB's reply to my second question was equally troubling. I had asked if Canada, as a member of the IEA, was considering setting up Strategic Petroleum Reserves. "[Canada] was specifically exempted from establishing a reserve," the NEB's communications team responded, "on the grounds that Canada is a net exporting country whereas the other members are net importers."

The IEA exemption for Canada is not warranted. NAFTA's energy "proportionality clause" undercuts the logic behind the IEA's exemption. Proportionality requires Canada, and Canada alone, to maintain its current share of energy exports to the United States, even if Canadians experience shortages. Mexico refused to sign this clause. Thus, until Canada demands, and gets, a "Mexican exemption"[9] from the proportionality clause, not much oil from Western Canada and offshore Newfoundland can be redirected to meet Eastern Canadians' needs.

In 2006, Canada exported 67 per cent of the oil it produced and 59 per cent of its natural gas to the U.S. At the same time, Canada imported about 850,000 barrels of oil per day to meet 90 per cent of Atlantic Canada and Québec's needs, and 36 per cent of Ontario's. Importing oil is particularly risky during Canada's harsh winters, because half of Atlantic Canadians still use fuel oil to at least partially heat their homes[10].

Thus, Eastern Canadians are vulnerable to international oil supply crises. To remove the threat, the federal government must quickly establish an SPR. Then, it must take steps to secure the long-term.

7 Lyman Miller, 'China an Emerging Superpower?' Stanford Journal of International Relations, Vol 6, Issue 1, Winter 2005. http://www.stanford.edu/group/sjir/6.1.toc.html. Accessed 19Dec 2007.

8 The NEB is charged to 'satisfy itself that the quantity of oil or gas to be exported does not exceed the surplus remaining after due allowance has been made for the reasonably foreseeable requirements for use in Canada having regard to the trends in the discovery of oil or gas in Canada' (118 a). http://www.neb.gc.ca/clf-nsi/rpblctn/ctsndrgltn/ct/ntnlnrgybrdctprt6-eng.html.

9 Mexico refused to accept the proportionality clause. As a net importer, the clause does not apply to the U.S. This leaves Canada as the only country this NAFTA rule applies to.

10 Natural Resources Canada, 'Canadian Petroleum Product Market Outlook - Fall 2007'. http://www.fuelfocus.nrcan.gc.ca/reports/2007-11/supply_demand_e.cfm. Accessed 31Dec 2007.

Why Strategic Petroleum Reserves?

Origins

Winston Churchill was the first to recognize the need to procure oil stocks for national security purposes when, as First Lord of the Admiralty, he switched the British fleet from coal to oil in 1911. In 1917, during World War I, France ran short of petrol and, as a result, imposed on its oil industry an obligation to reserve 91.25 days of annual domestic consumption[11]. France's decision set the precedent of establishing a three month oil reserve, which the IEA and the European Community picked up 50 years later.

European leaders became aware of the importance of keeping a store of petroleum in reserve during peace time when Egypt blockaded the Suez Canal in 1956. Finally, after the Six Day War in 1967 removed two million barrels of oil a day from the international market, the European Economic Community began to require its member countries to hold Strategic Petroleum Reserves. On December 20, 1968, six years before the IEA was established, the European Council directed each of its members to have a strategic petroleum reserve equal to 65 days of average daily internal consumption. In 1972, this was raised to 90 days[12].

The real push for SPRs came in the aftermath of the Arab Oil embargo of 1973-74 when they were set up to cushion the next international oil crisis. In this, they failed, or at least the American one did.

On July 21, 1977 – over three years after the Arab Oil embargo had been lifted in March 1974 – the first oil was deposited in salt caverns on the Gulf of Mexico to launch the U.S. oil reserve. So as not to upset Saudi Arabia, its key Middle East oil ally, the U.S. failed to use its reserve after the Shah of Iran was overthrown in 1978[13]. *The biggest ever withdrawal of oil from world markets to this day happened during the 1978-79 Iranian revolution, when 5.6 million barrels per day at peak were cut [See Appendix D]. The U.S. refrained from releasing oil from its reserves.*

Thus the 1970s, which was the last period of extreme oil supply volatility, passed without SPRs being used in a major way to counter OPEC's power.

Ironically, SPRs grew large enough to use effectively only by the 1980s, when they were no longer needed. New liberalized markets combined with world oil surpluses made SPRs redundant. However, SPRs subsequently came into their own during war and natural disaster.

11 Klaus-Dietmar Jacoby, 'Coordination of Oil stocks and Interventions in the Oil Markets', nd, but 2005 or later. http://www.l20.org/publications/16_rk_ES_Jacoby.pdf. [Jacoby is Head of Emergency Planning and Preparations at the IEA]. Accessed 18 Jan 2008.

12 Ibid.

13 The U.S. SPR had 67 million barrels of oil in December 1978, when oil Iran's oil exports were halted. U.S. Dept of Energy, 'The Iranian Oil Crisis', Monthly Energy Review, 28 Feb 1979. p. 1. Hubbard and Weiner, Op. Cit., p. 527. The U.S. did not release any petroleum reserves because Saudi Arabia threatened to cut oil production by one million b/day if the U.S. did so. The U.S. continued to buy oil to fill its SPR during the crisis. Hubbard and Weiner, Op. Cit., p. 523.

Reasons for establishing SPRs

There is broad support in the United States for their SPR. It is a non-controversial, bipartisan issue in Washington, widely viewed as improving the country's energy independence and economic security and as a cushion in times of short-term oil supply ruptures[14]. The only major debate is about whether the SPR should be used only for emergency supply shortages, or also as a tool to hold down domestic prices during oil price surges. Some economists oppose the idea of an SPR on the fundamentalist principle of letting the market determine the outcome, whatever the consequences. That sentiment seems not to have much resonance in government or public circles[15].

The rationale for establishing SPRs in other countries is similar to that in the U.S. India, for instance, set up the "Indian Strategic Petroleum Reserves Limited" in 2004 to construct facilities for SPRs. The Indian government is concerned that it already imports 70 per cent of its oil, most of it from the Middle East, which India views as politically volatile. India's dependence on foreign oil is expected to rise to 92 per cent by 2020[16]. China's rationale for starting an SPR[17] is much the same as India's. Both countries also worry about the negative impacts of rising imports on balance of payments and foreign currency reserves, as well as the effects of high energy costs on economic growth.

The U.S. SPR

The U.S. SPR is the Big One, has been used the most, and is the focus of our discussion. But we also look at the proliferation of SPRs to other countries, including those in the International Energy Agency and the European Union, as well as China, India and, more recently, the Anglosphere countries of Britain, Australia and New Zealand.

Current capacity in the U.S. SPR is 727 million barrels. In August 2005, the Department of Energy authorised it to rise to 1 billion barrels. President Bush went one better in January 2007, pledging to raise it to 1.5 billion barrels. It will take up to 10-12 years to reach even one billion barrels[18]. The latest actual U.S. reserves, as of January 10, 2008, were 698 million barrels.

Thirteen days after a U.S. president authorizes a release, the first oil can reach domestic markets. The maximum release rate is 4.4 million barrels per day, which, it is claimed, can offset 56 days of imports[19] (44 per cent of those imports[20]). Average U.S. daily consumption was 20.82 million barrels per day in the fall of 2007[21]. Thus, the maximum daily drawdown from the SPR would supply about 21 per cent of total U.S. demand.

14 U.S. National Commission on Energy Policy. 'Basic Facts about the Strategic Petroleum Reserve', p. 1. http://www.energycommission.org/files/finalReport/I.4.a%20-%20SPR.pdf. The number of days of replacing total U.S. imports [not the 4.4 million b/day maximum release], do not add up to total U.S. reserves. But, numbers cited here come from official U.S. government figures.

15 Jerry Taylor and Peter Van Doren, 'The Case Against the Strategic Petroleum Reserve', Policy Analysis # 555. 21 Nov. 2008 pps 1-21.

16 India. Ministry of Petroleum and Natural Gas. 'One Year of UPA Government: Major Decisions and Initiatives - Petroleum & Natural Gas' http://pib.nic.in/release/release.asp?relid=9285. Accessed 11 Jan 2008.

17 China Institute, University of Alberta, 'Construction of state strategic petroleum reserve system under way', Xinhua News Agency, 28 Aug 2006. http://www.uofaweb.ualberta.ca/chinainstitute/nav03.cfm?nav03=49641&nav02=43610&nav01=43092. Accessed 11 Jan 2008.

18 U.S. Department of Energy, 'Expanding the Nation's Strategic Petroleum Reserve'. http://www.fossil.energy.gov/programs/reserves/spr/expansion-eis.html. updated 10 Dec, 2007.

19 U.S. Department of Energy, 'Strategic Petroleum Reserve - Quick Facts and Frequently Asked Questions ' http://www.fossil.energy.gov/programs/reserves/spr/spr-facts.html. Accessed 10 Jan 08

20 GAO op.cit., 'Strategic Petroleum Reserve'. Aug 2006. p. 8.

21 David Bird, 'EIA: U.S. Oil Use 21 Million B/D, +1.1% Vs Year Ago'. Dow Jones. 8 Jan 2008. http://www.nasdaq.com/aspxcontent/NewsStory.aspx?cpath=20080108%5CACQDJON200801081346DOWJONESDJONLINE000557.htm.

22 U.S. Department of Energy, 'Strategic Petroleum Reserve - Profile', http://www.fossil.energy.gov/programs/reserves/spr/index.html. Accessed 12 Dec 2006.

The United States has exchanged oil from its SPR with private transnationals at least 11 times, but has drawn down major amounts only during the first Gulf War (February - April 1991) and after Hurricanes Katrina and Rita (September - October 2005). In both cases, the drawdown calmed world oil markets[22]. The U.S. also called on its allies in the IEA to help out with supplies after Hurricane Katrina. They complied promptly. Canada supplied surge oil production.

The U.S. holds most of its petroleum reserves in salt caverns off the Gulf Coast. It is by far the cheapest method of storage, with capital costs of $3.50 per barrel compared to $15 to $18 per barrel in above-ground tanks. Since the salt caverns are 600 to 1,200 metres below the surface, geological pressure seals any cracks and no oil seeps out. Salt caverns may be an environmental concern because it takes a one-time use of fresh water to dissolve the salt. Seven barrels of fresh water create storage space for each barrel of oil[23].

In addition to holding huge crude oil reserves, the U.S. also has a much smaller home-heating reserve in its northeast. Set up in 2000 by President Clinton, its purpose is to create a buffer large enough to allow commercial companies to compensate for interruptions in supply or severe winter weather. Almost eight million households in the U.S., mainly in the northeast, heat their homes with oil. The home heating reserve has two million barrels of home heating oil and is a component of its Strategic Petroleum Reserve. Half the homes in neighbouring Atlantic Canada use furnace oil for heat, yet there is no Canadian home-heating oil reserve[24].

The American SPR - not a solution for Canada

The U.S. SPR has a "Foreign Oil Storage" program to store other countries' strategic reserves in its unused storage space[25]. Canada or other countries can make a deal to buy oil to store in the U.S. SPR, pay the U.S. for storage and then rely on the U.S. to allow us access to the reserve when we need it. The store of oil would not necessarily have to be shipped directly to Canada. It could be sold in the U.S. to offset a diversion of oil to the Canadian market from other sources. The Atlantic provinces, for example, could be supplied by tankers filled in the U.S.

Relying on the U.S. SPR system would be a bad idea. It would fail to provide a system for ensuring the needs of Canadians are prioritized, and in Canada's control. It would thereby undermine the very rationale for having an SPR. Using the U.S. SPR would give the current continentalist-oriented federal government an excuse, if

23 Ibid.

24 U.S. Department of Energy, 'Northeast Home Heating Oil Reserve - Profile', http://www.fossil.energy.gov/programs/reserves/heatingoil. Accessed 18Jan 2008. Thanks to Rick Munroe for making this point.

25 U.S. Dept of Energy, 'Strategic Petroleum Reserve. Annual Report for 2006', p. 31. http://www.fossil.energy.gov/programs/reserves/publications/Pubs-SPR/spr_annual_rpt_06.pdf

forced to create an SPR, to preserve the continental market and U.S. control over Canada's oil supplies[26]. It would give the United States too much leverage over Canadian energy policy and allow them to withhold or threaten to withhold Canadian oil if Canada decided to follow more independent energy, military, environmental or other policies.

International Disruptions: Frequency and Intensity

Demand for oil is rising rapidly, while supplies are increasingly tight. This means that future oil supply crises will be more frequent, longer lasting and more devastating. In its 2007 World Energy Outlook, the IEA predicts that demand for oil will rise 37 per cent from 84 million barrels per day to 116 million barrels per day by 2030[27]. China and India alone are expected to spark almost half the increased demand.

The IEA is more optimistic than most observers that world supplies will rise to meet demand, but even it warns that "it is very uncertain whether [new oil production capacity additions] will be sufficient to compensate for the decline in output at existing fields and keep pace with the projected increase in demand"[28].

Many observers are considerably less sanguine that world oil production will ever grow to anywhere near 116 million barrels per day. More and more experts think we have already reached peak oil production, the moment in time when oil production stops growing[29].

Matthew Simmons, who heads the largest energy investment banking firm in the world, contends that global crude oil production peaked in May 2005. Simmons argues that the conventional oil peak has been temporarily masked by a short-term rise in total petroleum liquids production, coming largely from natural gas rather than oil. In addition to natural gas liquids, increased oil production is also coming from refinery processing gains and the drawing down of inventory. These are providing very temporary boosts. Nor is Simmons counting on tar sands, oil shale or biofuels to substantially boost world oil production levels. He evaluates current and near-term production of synthetic crude and biofuel as "tiny amounts," and too "inconsequential" to significantly affect the outcome[30].

26 Thanks to Kjel Oslund for pointing out the U.S. foreign oil storage option, and for explaining possible political implications of this for Canada.

27 IEA, World Energy Outlook. 2007, p. 43. http://www.worldenergyoutlook.org/. Oil Production hit 85.7 million barrels per day in the summer of 2006. Tyler Hamilton, "Is oil supply at its peak?", Toronto Star, 3 Jan. 2008. http://www.thestar.com/printArticle/290582.

28 IEA, World Energy Outlook. 2007, Op. Cit. p. 43.

29 Kelpie Wilson, 'Hey Bubba, Where You Going with That Oil?' Truthout, 29 Nov 2007.

30 Matthew R. Simmons, 'Gauging The Risks of Peak Oil'. ASPO World Conference. 18 Oc 2007. Houston. http://www.simmonsco-intl.com/files/ASPO%20World%20Conf.pdf.

Fierce debates rage amongst oil geologists about when peak oil will hit. Robert L. Hirsch, who, along with Roger Bezdek and Robert Wendling, prepared the 2005 report for the U.S. Department of Energy entitled the "Peaking of World Oil Production: Impacts, Mitigation, and Risk,"[31] compiled the following list of experts and their predictions of peaking.

Table 1 Predictions of World Oil Production Peaking

Projected Date	Source of Projection
2006-2007	A.M.S. Bakhtiari
2007-2009	Matt Simmons
After 2007	C. Skrebowski
Before 2009	Kenneth S. Deffeyes
Before 2010	D. Goodstein
Around 2010	Colin Campbell
After 2010	World Energy Council
2010-2020	J. Laherrère
2016	EIA [Energy Information Administration - U.S.] (Nominal)
After 2020	CERA [Cambridge Energy Research Associates]
2025 or later	Shell
No visible Peak	M.C. Lynch

Source: Hirsch Report p.8

Hirsch and his colleagues make the following observations about peak oil[32]:

- When it will occur is uncertain because of the poor quality and possible political biases of oil reserves data;
- Peaking will not be temporary;
- Peaking will create a severe problem for the transportation sector, not a general energy crisis;
- Peaking will result in dramatically higher oil prices;
- Peaking will hit developing countries hardest;
- Greater energy efficiency alone will not be enough;
- Government intervention will be required, otherwise economic and social implications would be too chaotic.

31 Robert L. Hirsch, Roger Bezdek and Robert Wendling, 'Peaking of World Oil Production: Impacts, Mitigation, and Risk', Feb 2005, prepared for the United States Department of Energy, p. 8. Management' http://www.mnforsustain.org/oil_peaking_of_world_oil_production_study_hirsch.htm

32 Ibid., p. 5.

After going through the reports of many experts, the evidence seems to favour the pessimists.

The way OPEC sets quotas for oil production from member countries creates a perverse incentive to falsify their official reserve levels. Current OPEC production quotas are set as a proportion of "proven" reserves. As well, some precarious governments in oil producing states could fall if they admit that oil reserves have declined substantially.

In 1988, Venezuela more than doubled its reserves. The United Arab Emirates, Iran and Iraq immediately followed suit and boosted their official reserves by two to three times. Saudi Arabia raised theirs by 50 per cent two years later[33]. It strains credulity to believe that huge, simultaneous discoveries occurred in all these countries in that brief time span. Current official reserve estimates for these countries are still derived from those boosted levels in 1988-1990. Recently, it was discovered that, according to internal Kuwaiti records, Kuwait's oil reserves are only half those officially stated[34]. Observers are asking if official reserves are anything more than "political reserves." Curiously, the reserve levels of these countries have not fallen significantly after an additional 20 years of production. Yet several agencies accept and repeat these official, political reserve figures.

Some oil corporations may have the equivalent of political reserves. Shell Oil, which had a reputation for being "overly cautious about almost everything,"[35] was caught out in 2004 for overestimating its "proved" oil reserves by four billion barrels. Shell's admission of error cut the value of its shares by _3 billion (CDN $4.42 billion) in a single day[36].

History

The two largest single oil fields ever found were Burgan in 1938 in Kuwait and Ghawar in 1948 in Saudi Arabia[37]. The last "elephant" or "Super Giant" fields were found in 1967 and 1968. Super Giants are, according to Robert Hirsch, generally the "easiest to find, the most economic to develop, and the longest lived."[38] Given the intensity of oil explorations over the world in the past 70 years, finding new Super Giants is very unlikely.

The exception is perhaps in the deep ocean. The recent Tupi discovery 4.5 miles below the ocean surface off the shore of Brazil has caused a buzz in oil circles. It could hold as much as eight billion barrels of oil. But it presents difficulties, as does all deep sea oil. The Tupi field is under 2,100 metres of ocean water and more than 4,800 metres of rock, sand and salt, including a two-kilometre-thick layer of

33 Planet for Life, 'The problem of reliable data', http://planetforlife.com/oilcrisis/oilreserves.html. accessed 20De 07. Some governments in OPEC argued that past reserve assessments were too low, prior to nationalization of the oil industry, because private companies underreported reserves for financial and political reasons. Energy Watch Group, Crude Oil. The Supply Outlook. 2007. p. 33. http://www.energywatchgroup.de/fileadmin/global/pdf/EWG_Oilreport_10-2007.pdf.

34 Reuters, 'Kuwait oil reserves only half official estimate-Petroleum Intelligence Weekly', Jan 20, 2006, http://today.reuters.com/news/articlebusiness.aspx?type=tnBusinessNews&storyID=nL20548125&imageid=&cap=&from=business.

35 Kenneth S. Deffeyes, Beyond Oil. The View from Hubbert's Peak. New York: Hill and Wang, 2005 p. xiii.

36 David Strahan, The Last Oil Shock. London: John Murray, 2007 p. 67.

37 Energy Watch Group, Crude Oil. p. 34.

38 Hirsch, Peaking of World Oil Production, p. 11.

rock-hard salt[39]. Unlike Super Giants on land, near the surface, it is not cheap. Nor does it hold enough to reverse peak oil worldwide[40]. Deepwater fields usually reach peak quickly, followed by steep declines soon after41. However, even if additional deep-sea Super Giants were found, they would require much more energy to extract and process than conventional oil[42].

Discoveries of conventional oil peaked in the world in the 1960s. New finds have declined substantially since then[43], falling below yearly production levels since about 1980[44]. The point about oil production "isn't that it peaks, but that it declines rapidly afterward, at a time when the world demand would be moving rapidly in the opposite direction," said former Acting U.S. Assistant Energy Secretary Joe Romm,[45]

Putting aside the question of whether oil has peaked already or will do so in five years, it is widely agreed that we have entered a new era where the oil market has lost most of its flexibility and capacity to handle disruptions to world oil supplies. "For most of the 1980s and 1990s," wrote Bassam Fattouh, "spare capacity of OPEC, chiefly that of Saudi Arabia, helped offset large demand and supply shocks" and acted as a stabilizer for world oil prices[46]. As late as 2002, spare capacity exceeded world oil consumption by about 10 per cent. Now it is down to less than two per cent. That is why oil prices have been so volatile recently.

There is currently no important alternative to oil for transportation[47]. That is why prices rise so much when supplies dip slightly. Demand for oil for transport is so inelastic that in the short-run industry and consumers will pay higher prices to continue using existing vehicles.

"Oil Shockwave"[48] was a study developed in 2005 by the U.S. National Commission on Energy Policy. Its nine person panel was a past who's who of White House cabinet and senior national security officials[49]. The report warns that a fairly minor disruption to world oil supplies would result in a 177 per cent increase in price, from $58 to $161 per barrel. Their hypothetical scenario took three million barrels per day – less than four per cent of global supply – off the world market. They calculated that the price of gasoline would have shot up to $5.74 per gallon ($1.43 per litre). Oil prices in early 2008 were already more than 50 per cent higher than they were at the time of the "Oil Shockwave" study. A disruption of that magnitude today could result in per-barrel prices rocketing to over $250, or over $9 per gallon ($2.38 per litre) of gasoline.

39 Jack Chang, 'Massive deep-water oil find in Brazil challenges technology', McClatchy Newspapers. http://news.yahoo.com/s/mcclatchy/20071201/wl_mcclatchy/2767052. Accessed 18 Jan 2008.

40 For example, output from Mexico's Cantarell field, the second largest in the world after Ghawar, declined by 25 per cent during 2007, far faster than predicted. David Luhnow, 'Mexico's Oil Output Cools', Wall Street Journal, 27 Jan 2007. http://online.wsj.com/article/SB116984658739189365.html?mod=home_whats_news_us. Accessed 18 Jan 2008.

41 Dave Cohen, 'God Is Brazilian', 5 Dec, 2007. http://www.aspo-usa.com/index.php?option=com_content&task=view&id=265&Itemid=91. Accessed 18 Jan 2008.

42 Jack Santa Barbara, 'Peak Oil and Alternative Energy', in Cy Gonick ed., Energy Security and Climate Change. Halifax: Fernwood Books, p.39.

43 Jean Laherrère, 'Future of Natural Gas Supply', ASPO Berlin 25 May 2004. p. 11 figure 5.

44 Energy Watch Group, Crude Oil. p. 33.

45 Cited in Paul Roberts, The End of Oil. Boston: Houghton Mifflin, 2004. p. 52.

46 Bassam Fattouh, 'Spare Capacity and Oil Price Dynamics', Middle East Economic Survey, Vol. XLIX No. 5 30 Jan 2006. www.mees.com/postedarticles/oped/v49n05-5OD01.htm.

47 About 95 per cent of energy used for transportation is from oil.

48 SAFE (Securing America's Future Energy), Oil Shockwave. Oil Crisis Executive Simulation. Sept 6, 2005. www.secureenergy.org.

49 Participants included: Robert M. Gates, former Director of Central Intelligence; Richard N. Haass, former Director of Policy Planning at the Department of State; General P.X. Kelley, USMC (Ret.), former Commandant of the Marine Corps, member of the Joint Chiefs of Staff; Don Nickles, former U.S. Senator; Carol Browner, former Administrator of the Environmental Protection Agency; Gene B. Sperling, former National Economic Advisor; Linda Stuntz, former Deputy Secretary of Energy; Frank Kramer, former Assistant Secretary of Defense for International Security Affairs, and; R. James Woolsey, former Director of Central Intelligence. Senators Richard Lugar (R-IN) and Joe Lieberman (D-CT) served as co-chairs of the Oil ShockWave event.

Rather than delve further into debates on oil reserves and the credibility of various experts, the main points to note are: 1) oil supplies are finite, 2) we have used up the easiest and cheapest sources, and 3) supplies are tightening and peak production will come soon, if it hasn't already.

Oil as a Political Weapon

Tight supplies mean that small disruptions have big effects on price and availability. Disruptions can occur because of natural disasters, such as Hurricane Katrina followed closely by Hurricane Rita. The two hurricanes cut world oil production by slightly less than two per cent, but price spikes were kept down by the rapid release of supplies from the U.S. SPR[50].

Terrorist attacks or embargoes aimed at selected countries have the potential for greater supply cuts. "Oil Shockwave" looked at several such scenarios: escalating violence in Nigeria, explosions at a natural gas processing plant in Saudi Arabia, and an attack on the oil port of Valdez, Alaska. Since their exercise in disaster hypotheticals, there have been three publicly reported attempts to target Saudi oil facilities in 2006-07. One unsuccessful, but concerted Al-Qaeda attack was directed against Abqaiq, Saudi Arabia, which processes almost eight per cent of the world's oil[51]. That is double the amount the Shockwave scenario forecast would lead to world oil prices almost tripling. If a U.S. bombing of Iran were to be followed by Iran closing the narrow Strait of Hormuz, 17 million barrels of oil per day would be removed from the world market. That would cut global supply by about one-fifth. The tremours from a cut of such proportions would be enormous.

Oil first became an effective political weapon after the 1973 Yom Kippur War[52] between Israel, Egypt and Syria, and as a result of the 1978-79 Iranian revolution. After that, the weapon fell into disuse because the industrial countries' counterattack temporarily succeeded. Led by the International Energy Agency, industrial countries cut oil consumption substantially. The U.S., especially under Jimmy Carter, led the way and slashed U.S. demand for oil by one-sixth between 1977 and 1986[53]. Western Europe also reduced consumption considerably.

50 About 1.5 million barrels of oil supplies were cut from the market. U.S. GAO, 'Strategic Petroleum Reserve'. Government Accountability Office. GAO-06-872. Aug 2006. p. 5.

51 Simon Henderson, 'Al Queda Attack on Abqaiq: The Vulnerability of Saudi Oil'. Policy Watch / Peace Watch #1082. 28Fe 06. www.washingtoninstitute.org/templateCO5.php?CID=2446.

52 "In reality the 'Arab embargo' occasioned only limited and temporary dislocations.... Indeed in the period of the 'embargo' ... OPEC output turned out to be virtually the same as in the following year." John Blair. 1976. The Control of Oil. New York: Vintage. p. 275. Thanks to John Dillon for this.

53 Carter left office in January 1981, but the effects of his oil cutting policies were felt until 1986.

The 1980s oil glut was also due to the development of fields in the North Sea and Alaska's North Shore starting in the 1970s. These fields greatly reduced the reliance of OECD countries on OPEC oil. If private oil transnationals had retained control of OPEC's oil fields in the 1970s, it is likely that North Sea and North Shore oil would have been developed much later[54].

As a consequence of this combination of actions, world oil prices fell by as much as three quarters, and remained in the doldrums through the 1990s. The oil glut cut the ground out from under the oil producers, who could no longer effectively target a specific country.

Oil has always been a generic product, interchangeable with oil of the same grade from all other sources in the same market. In the 1980s and 1990s, oil became globally fungible, interchangeable with oil around the world once it gets on the global market. Spot prices replaced long-term contracts and the spectacular rise of futures trading meant that no country or transnational corporation could corner the oil market. If country A embargoed oil exports to the U.S., the latter could get supplies from countries B to Z and the embargo would fail.

That scenario is rapidly changing. Oil and natural gas have once again become political weapons. Iran threatened to cut oil exports to selected countries in its dispute with western countries over possession of nuclear weapons. Venezuelan president Hugo Chavez warned that the U.S. would face an oil embargo if it tried to overthrow his government in Venezuela. Russia threatened to cut natural gas supplies to Belarus several times, and did cut gas supplies to Ukraine in the dead of winter in 2005-06.

Many adherents of the "magic of the marketplace" ideology seem not to have noticed that the world of oil is changing. Under high prices and impending shortages, it is reverting to a situation similar to the 1970s, but with unique twists in this decade.

It is important not to overstate the case, because it is a strong trend, not the complete reality. Oil is once again becoming less fungible and more manipulable by governments. Oil and gas have become effective political weapons again because of tightening supplies coupled with a wave of re-nationalizations of oil and gas resources, the return of long-term contracts[55], and a decline in the proportion of oil sold on spot markets. With "security trumping trade" since 9-11, most countries have adopted national energy strategies, not global ones. When combined, these changes spell the de-globalization of oil. Let's look at each change in turn.

54 See http://www.energybulletin.net/17262.html for a list of major North Sea fields and production start dates. Thanks to Kjel Oslund for this point.

55 W. Joseph Stroupe, 'The New World Oil Order, Part 1', in Asia Times. http://www:atimes.com/atimes/Central_Asia/HK22Ag01.html. Accessed 10 Jan 2008.

Re-nationalizations and supply

While their motivations were different, Russia and Venezuela together began the trend back to re-nationalization of energy industries between 2000 and 2003. Russian president Vladimir Putin was first off the mark in 2000 when he moved against Russian capitalist oligarchs who were plundering Russian resources and making alliances with western transnationals. Russia's re-nationalization trend first became big news in the West when Mikhail Khodorkovsky – the richest man in Russia and the 16th wealthiest in the world – was jailed. Khodorkovsky was arrested because he was about to sell a controlling stake in the Yukos petroleum company to ExxonMobil and Chevron. The spectacular arrest of Khodorkovsky stopped this deal and all other oil and gas partnerships between Russian capitalists and foreign transnationals.

Putin's moves to re-nationalize the oil and gas industry should not have surprised Russian capitalists such as Khodorkovsky. In his 1999 PhD dissertation, written just before he became President, Putin wrote that: "Russia's ownership of its strategic resources has critical importance for the country's economic development and strategic global influence ... Oil and gas ... serve as a guarantee in Russian foreign affairs ... Only the state, not corporations, shall be setting long-term strategic priorities for oil and gas development in Russia"[56].

In South America, Venezuela's revolutionary government re-ignited the trend toward economic nationalism and re-nationalization in 2002-03, when it won a protracted show-down with the corporate executives of PDVSA, the nominally state-owned oil company. The latter had been acting more and more like a private, for-profit company in league with the transnationals. Little of the PDVSA's enormous economic rent was finding its way to its nominal owners - the people of Venezuela. Chavez's victory changed that. Resource nationalism financed popular public programmes for the poor[57]. Bolivia and Ecuador have begun to follow similar energy policies.

Putin's motivation was to use state ownership to help restore Russia as a world superpower. Venezuela and other South American governments have re-nationalized oil, gas and other energy sources to get revenues for the redistribution of wealth and to gain economic and policy sovereignty from the International Monetary Fund and the U.S.

56 Igor Osipov, 'Towards Regaining Energy Control: Foreign Investment, Kovykta Project, and the Rise of Gazprom, University of Alberta School of Business. 2006-7. p. 11.

57 Michael McCaughan, The Battle of Venezuela. New York: Seven Stories Press. 2005. pp. 154-8.

Whatever the motivation, the resurgence of state-owned oil companies has turned the private transnationals into rule-takers and supplicants in Russia and much of the Global South, from which 90 per cent of new oil supplies are expected to come in the next 40 years. ExxonMobil, BP, Chevron and Shell now hold just three per cent of the world's oil reserves and produce about 10 per cent of the world's oil and gas. In contrast, nationally owned oil companies now control about 80 per cent of the world's oil reserves[58]. The big seven are Saudi Aramco, NIOC of Iran, INOC of Iraq, Venezuela's PDVSA, PetroChina, Russia's Gazprom, Petrobras of Brazil and Malaysia's Petronas. Together these seven government-owned companies control almost one-third of world oil and gas production and over one-third of total oil and gas reserves[59].

The importance of these publicly owned companies is that they are instruments of the governments that own them. With the exceptions of occupied Iraq and Stat-Oil of Norway, the big national companies are not in the U.S. or western spheres of influence. They are by their nature economically nationalist, and generally put the interests of their own citizens and of those elites close to government above those of exports and other countries' interests. They also tend to engage in long-term contracts and help in developing each other's reserves.

Return of Long-term Contracts

Before the 1970s oil crises, bilateral long-term contracts between exporting states and individual consumer states dominated the world oil market. The long-term contracts were often negotiated through exporting countries' national and transnational oil companies. Contracts could be for one or two decades. This system meant that oil was much less fungible, and less able to deal with supply disruptions than it became in the 1980s and 1990s. If an exporting country or group of countries decided to break their long-term contracts with a specific consuming country, the latter had a difficult time finding alternative sources of oil[60]. That is why oil embargoes were effective.

Things fell apart for would-be wielders of oil boycotts in the 1980s as the neo-liberal revolution led by Margaret Thatcher and Ronald Reagan took hold. Oil markets rapidly changed, as a world glut of oil combined with deregulation and the creation of new exchanges, including oil futures contracts and spot oil markets in New York and

58 Robin West, 'Panacea or Pipe Dream? Energy Policy and the Search for Alternatives: Session I: A Foreign Policy Mandate: Thirty Years of Oil And Gas.' [U.S.] Council on Foreign Relations, Washington D.C., March 13, 2007. http://www.cfr.org/publication/12845/panacea_or_pipe_dream_energy_policy_and_the_search_for_alternatives.html?breadcrumb=%2Fissue%2Fpublication_list%3Fid%3D426%26page%3D3.

59 Carola Hoyos, 'The New Seven Sisters: Oil and gas giants dwarf western rivals', Financial Times, 12 Mar 2007. http://www.ft.com/cms/s/471ae1b8-d001-11db-94cb-000b5df10621,dwp_uuid=0bda728c. Accessed 16 Ma 2007.

60 Stroupe, 'The New World Oil Order, op cit, Part 1'.

London. Much shorter-term contracts undermined the old standard long-term ones.

As Joseph Stroupe put it:

> "Extremely liquid oil-futures contracts ('paper oil') that looked forward only a few months to a few years at most and that could be freely and openly bought and sold on a daily basis on the new exchanges replaced the traditional, rigid, discrete long-term supply contracts negotiated directly between exporting and importing states. The global oil-market order was becoming tremendously liberalized, open and highly liquid under U.S. leadership and control."

The new oil exchanges led to a single "global pool of oil denominated in U.S. dollars into which nearly all exporters sell their oil and out of which nearly all importers purchase oil."[61] This new liberalized market undermined the power of oil exporters in general, and of targeted oil embargoes in particular. The effect was to strengthen the hand of the oil transnationals.

But rapidly changing conditions in this decade are undermining the Western corporate market. As oil supplies tighten, the anxiety of Asian countries about securing long-term supplies has risen. This has led to a circumvention of the U.S.-dominated system in favour of long-term, state-to-state contracts once again. Rising East Asian and South Asian economies are making alliances with West Asian and Central Asian oil producers to create an Asian-centric system. It is replacing the U.S.-centric system[62].

In this context of a fracturing global oil market, most countries are adopting national energy strategies. Canadian authorities appear unaware of the new reality, leaving Canada as the odd country out.

61 Ibid.

62 Ibid.

Protective Value of SPRs

The IEA was born in the aftermath the 1973 Yom Kippur war between allies Egypt and Syria against Israel. Having lost the war, Arab countries continued the struggle by other means. Oil was the great, strategic Arab resource which they wielded to punish the United States and the Netherlands for supplying weapons to Israel during the 20-day war. Arab members of OPEC withheld oil exports to both countries between October 17, 1973 and March 18, 1974.

John Blair argues convincingly that the Arab members of OPEC could not have engineered the spectacular rise in world oil prices without the tacit collaboration of the oil transnationals[63]. Non-Arab members of OPEC also helped by cutting production. Oil prices shot up not only in the U.S. and the Netherlands, the embargoed countries, but throughout the non-Communist world[64].

The oil embargo led to the first major international oil-supply crisis. With 4.3 million barrels of oil per day withdrawn from world markets, oil prices quadrupled within three months, from $3 per barrel to $11.[65] [See Appendix D].

As they lined up for gasoline, ordinary Americans became aware that their country was no longer self-sufficient65 in its previously bountiful supplies of energy. Rather, the U.S. was dependent on unfriendly parts of the world for Americans' economic well being. U.S. leaders found their country's strategic dependence intolerable and took action, such as encouraging greater domestic exploration and energy conservation, to reduce their vulnerability to future embargoes. One important U.S. initiative was to set up an association of industrial countries to counter OPEC's boycotting power. The IEA was founded in 1974 with 15 original members, including Canada, and has has since grown to include 26 countries (See Appendix C).

The IEA's purpose was to protect the U.S. and other industrial oil-importing countries from another oil boycott. But much of the U.S. government's motivation was also to support Israel in its struggles with the Arab world. According a secret codicil in the 1975 agreement whereby Israel withdrew from its occupation of Egypt's Sinai Peninsula, the U.S. is obligated to make oil available to Israel for up to five years[66].

63 John Blair, 1976. The Control of Oil. New York: Vintage. p. 275.

64 Thanks to Erin Weir for reminding me of this point.

65 The U.S. was self-sufficient in oil until about 1950.

66 James A. Phillips, 'The Iranian Oil Crisis'. The Heritage Foundation. Backgrounder #76 28 Feb 1979. http://www.heritage.org/Research/MiddleEast/bg76.cfm.

The official goals of the IEA's International Energy Programme are:

- Net importer IEA countries agree to maintain oil reserves equivalent to at least 90 days of net oil imports;
- All IEA countries agree to have other measures, including demand restraint, fuel switching and surge oil production; and
- Participation in oil allocation amongst IEA member countries during a severe supply disruption[67]

Under the last clause, if any IEA member country experiences a seven per cent or greater decline in crude oil supplies, less impacted members are obligated to share their supply with that country or countries. Each IEA member has a national emergency organisation which coordinates emergency operations with the IEA emergency operations team in Paris. Each country has complete discretion over the measures it implements to reduce domestic demand, bring on surge production capacity and share oil with other member countries68.

Our focus is on the first IEA objective: Strategic Petroleum Reserves.

Every Country but Canada

The Americans may have the biggest SPR, but more and more countries are creating their own. All 27 IEA member countries – with the exception of net exporters of oil, which exempts only Britain, Denmark, Canada and Norway – are required to have one. Thus 23 IEA countries are supposed to have them.

As we saw in the "Origins" section above, the European Union was the first organisation (1968) to require each member country to have an SPR. The EU currently has 27 member countries. Eighteen EU members are also members of the IEA. Nine, mainly Eastern European countries, are not[69]. As net oil exporting countries, Britain[70] and Denmark have been exempt from the IEA's requirement, but they are subject to the EU's directive to have an SPR. In theory then, 34 countries in the IEA and the EU should have SPRs.

SPRs have recently spread to other parts of the world as energy security issues surge to the top of the agenda in this security-conscious era. The following Asian countries, none of which are IEA members, either have SPRs or plan to establish one: China, India, Iran, Israel,

67 Klaus-Dietmar Jacoby, 'IEA Emergency Response Policies - 30 years of experience with oil'. Université Paris-Dauphine, 15 November, 2005. http://www.dauphine.fr/cgemp/Manifestations/security%20supply/KLaus%20Jacoby.pdf.

68 Kristine Kuolt, 'Overview of IEA Emergency Procedures and Measures in IEA Member Countries', IEA / China Seminar on Oil Stocks and Emergency Response. 9-10 Dec. 2002. Beijing, China.

69 Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Malta, Poland, Romania and Slovenia are EU members, which are not members of the IEA.

70 Britain is forecast to become a net importing country in 2010.

Singapore, Thailand and Turkey. South Africa and Mexico also have SPRs. In Europe, Iceland, Poland and Russia also have SPRs. That makes 46 countries which are supposed to have SPRs.

There is no central information source which lists all SPRs in the world. Nor do the IEA or the EU list member countries with SPRs. It can be considered a sensitive topic for some countries. Thus, while we have not been able to independently confirm that all these countries actually have SPRs, we can confirm that 32 countries do indeed have one [Appendix B].

Following France's lead in 1925, many IEA countries require the petroleum industry to hold sufficient stocks to meet their SPR needs, backed by penalties for non-compliance. The IEA lists Australia, Austria, Belgium, Greece, Italy, Luxembourg, New Zealand, Portugal, Sweden, Switzerland and Turkey as countries with "commercial-stocks reserves," that is no government reserves[71].

Most countries with SPRs are net importers of oil but a growing number of oil exporting states also have SPRs: Britain, Iran, Mexico, Russia and Saudi Arabia.

Canada is the odd country out in all this. It is one of the few industrial countries without an SPR. Canada is the only NAFTA country without an SPR and the only Anglosphere country (Australia, Britain, New Zealand and the U.S.) without one. Given Canada's high levels of oil imports, and its current inability to re-direct exports to Eastern Canada in an emergency, it should be amongst the growing number of exporting countries with an SPR.

71 Enno Harks, 'IEA Security of Oil Supply Oil Crisis Mitigation Stocks', nd. http://www.ecn.nl/fileadmin/ecn/units/bs/INDES/indes-eh.pdf. Accessed 18 Jan 2008. Thanks to Kjel Oslund for making this point.

Urgent Need for Canadian SPRs

OPEC countries dominate Canadian imports

The case for Canada establishing SPRs is clear. Canada used to get the largest portion of its oil imports from Norway and Britain. As recently as 2004, these North Sea countries supplied 48 per cent of Canada's imports, with an additional 41 per cent coming from OPEC countries. By 2006, these import figures were reversed, with 45 per cent coming from OPEC countries and only 37 per cent from North Sea countries (see Appendix A). The trend lines are apparent; North Sea production is in serious decline. Norway's oil production peaked in 2001 and the UK hit peak oil in 1999 (see Appendix B].

Oil exports from Norway and Britain are considered very safe, while oil from many OPEC countries is not. Canada's big three OPEC sources in descending order are Algeria, Iraq and Saudi Arabia. In 2006, Algeria accounted for 21 per cent of Canadian imports, while Iraq and Saudi Arabia each supplied eight per cent. Nothing needs to be said about the security of Iraqi oil, as the Iraqi resistance regularly blows up pipelines as part of the ongoing war. We have previously discussed recent concerted attacks on Saudi Arabia's oil facilities.

How secure is Algeria as a source of secure oil imports for Canada? Algeria matters because it supplies one-fifth of Canada's imports, bringing it to a very close second to the level of imports from Norway. Algeria is likely to become Canada's single largest source of supply in the next few years.

Ever since Algeria's military government annulled elections in 1992, Algeria has been in a low-level civil war. Elections were cancelled because the Islamic Salvation Front was poised to win and take power from the military. Since then, as many as 200,000 Algerians have been killed. Overt opposition to military rule has declined, but bombings and attacks have continued, with the latest occurring on December 10, 2007[72]. Rule by military fiat is rarely stable, and Algeria cannot be considered a secure source for oil imports to Canada.

72 Jeffrey Fleishman, 'Car bombs Kill at least 22 in Algerian Capital', The Los Angeles Times, http://www.truthout.org/docs_2006/printer_121107A.shtml.

Canadian SPR: Location, Size and Function of Canadian SPRs

Size

Strategic Petroleum Reserves are seen as a national insurance policy. The question is how big that insurance should be and at what cost. Strategic storage facilities are expensive to build, incur significant operating costs and are slow to fill. Each barrel of oil bought and stored incurs a cost. [73]

Now that we have made the case for the need to urgently create an SPR for Canada, we turn to questions of its size, location and use. The initial target size of a Canadian SPR would appear to be clear. Following IEA guidelines, it should be 90 days supply of imported oil. In 2006, Canada imported 849,000 barrels per day. Ninety days worth of oil at that rate is approximately 76 million barrels. That would be about 11 per cent of the current size of the U.S. SPR, before its projected expansion.

However, planning for an SPR of that size would be the result of static thinking and would be a mistake. We should not take all elements of current supply and demand as givens. We can alter both so that Canada's SPRs are brought up to full capacity more quickly, are of a manageable size and are not too costly.

Canada needs a three-track strategy. First, Canada's SPR would take years to plan, get approvals, build and finally fill. If everything went smoothly – which is not that likely – it would take several years before Canada had a single barrel of oil in its SPR reserves. That would be too complacent a speed given the likelihood of early supply disruptions. To speed things up, Canada should temporarily follow the example of many European countries and require the oil industry to hold emergency supplies of oil in Eastern and Central Canada. The oil industry in Canada is not used to the state requiring it to do non-market things for national security reasons, but the case is sufficiently compelling to overcome this objection. If Canada followed this track, it could quickly build up sufficient oil reserves before government storage facilities are up and running. In 2006, refiners in Atlantic Canada averaged more refined oil inventory on hand (21 days) than did refiners in Ontario and Quebec (11 and 8 days respectively)[74].

73 Hubbard and Weiner, Managing the Strategic Petroleum Reserve, p. 519.

74 Derived from StatsCan, "The Supply and Distribution of Refined Petroleum Products in Canada", Cat. No. 45-004-X. Thanks to Kjel Oslund for this.

At the same time, Canada must go down track two, which is to start the planning and environmental assessments needed to initiate SPRs. Canada needs to simultaneously follow a third track of reducing dependency on oil imports through measures that substitute domestic oil for imports and cut Canada's wasteful level of oil consumption. This strategy would also allow Canada to become a leader rather than a laggard in complying with our international legal obligations to reduce greenhouse gases.

There are a two measures which would reduce by 40-50 per cent the required size of Canada's SPR. First, the Montreal to Sarnia pipeline should be reversed, bringing western crude to Montreal again, as it did until 1999. Reversing the pipeline would displace 250,000 b/day from about 850,000 b/day of total oil imported. Second, all offshore Newfoundland oil should be diverted from exports to supply Atlantic Canada's markets. In 2007, Newfoundland oil production averaged 368,411 b/day. Since Newfoundland has an oil refinery that refines only non-Newfoundland oil, and there is a lot of importing and re-exporting going on, it is difficult to determine how much of Newfoundland's oil goes to Canadian markets and how much is exported[75]. However, if we assume that half of Newfoundland's oil reaches Canadian markets in Atlantic Canada and via the Portland Maine to Montréal pipeline, this move would displace about 185,000 barrels of imported crude per day.

The effects of the combination of these measures would be to cut imports by close to half. Using the IEA's rule of requiring an SPR to replace 90 days of imported oil, the target size of Canada's SPR would therefore be cut to approximately 37.35 million barrels (415,000 b/day x 90 days).

Reversing the pipeline direction and diverting all of Newfoundland's oil to Canadian markets would require Canada to challenge and quickly overcome NAFTA's proportionality clause. Earlier, we discussed how Canada needs to get a Mexican exemption on proportionality, or if that undertaking fails, withdraw from NAFTA after giving the required six months notice. In the meantime, Canada could reduce oil exports to the United States simply by reducing imports. NAFTA's proportionality clause is based on a proportion of Canada's total supply rather than on its total oil production. If Canada imports less, we could reduce our exports to the U.S. by a proportional amount. This however, would not free up enough Canadian production to fully replace the lost imports.[76]

75 Professor Wade Locke at Memorial University kindly supplied me with these figures, which he obtained from the Canada-Newfoundland and Labrador Offshore Petroleum Board. http://www.cnlopb.nl.ca/. Locke explained the difficulties of determining how much of Nfld oil is consumed in Canada. Personal communication 17 January, 2008.

76 This measure would not quickly free up much oil for Canadian use, because proportionality is determined on the basis of the average of the past 3 years. Thanks to Erin Weir for making the point about dropping imports freeing up oil for Canadian use under the proportionality clause.

In the longer run, Canada needs to reduce greenhouse gases through a comprehensive program to get industry and citizens across Canada to substantially cut oil consumption. Besides helping the environment, such a program could reduce imports further, perhaps eventually to zero.

The redirection of Canadian oil supplies to Canadian markets is not an attempt to create a domestic oil price that is lower than the world price, as was done in the 1970s and with the 1980 National Energy Program. To encourage conservation and to enable producing provinces to collect maximum royalties on the oil they and their citizens own, we do not advocate a lower domestic price for oil and gasoline in Canada. Protection against temporary surge prices is another matter, one we discuss below.

Siting the SPRs

Details of siting and design require significant research and public debate. The following discussion outlines some of the issues.

No storage facilities should be built without thorough environmental impact assessments, including cumulative impacts. SPRs that are deemed environmentally unacceptable should not be built. If, however, appropriate environmental reviews give the green light, then other considerations come into play.

Canada needs to have a number of regional storage facilities for ease of distribution as well as for the politics of perceived regional fairness and job opportunities. Québec politics for instance, would likely require that its SPR allocation be located in Québec. Provincial governments in the six central and eastern provinces would likely support the economic stimulus that building such storage facilities would provide.

Likely SPR locations in Eastern Canada would be along the coasts of the Atlantic provinces and accessible shores of the St. Lawrence River. Sites must be capable of berthing large oil tankers or getting supplies from Western Canada by pipeline. SPR facilities should be sited near refineries in such places as Sarnia, Ontario, Montréal, St. John, New Brunswick and on Newfoundland's Avalon Peninsula. Or they should be at access points along the crude oil distribution network. Most sites are likely to be above ground, which is more costly than in underground salt caverns. While attempting to reduce costs, they must at the same time carry little environmental risk. In partnership with provincial governments, appropriate federal government entities should research ideal sites in Eastern Canada.

The United States stores most of its strategic reserve in salt caverns. Should Canada do the same? Lambton County is a good location to serve Ontario, as three of Ontario's four operating refineries are located nearby at Sarnia, and the fourth is at Nanticoke, connected by pipeline. There are 61 salt caverns in Lambton Country, located about 600 metres below ground level. They have been used to store hydrocarbons since the early 1950s. The total current capacity is about 5 million cubic metres, sufficient to hold about 31 million barrels of oil. That is said to be equivalent to about 300 large surface petroleum tanks[77].

The Lambton County caverns have several advantages. They are likely a low-cost option and are well located for distribution to Southern Ontario. However, they have disadvantages. They would take a one-time application of fresh water[78], which could create environmental concerns. Their location makes them inadvisable to use beyond Ontario's borders, since at 250,000 barrels per day capacity, the Sarnia to Montréal oil pipeline is insufficient to bring enough oil to Québec and Atlantic Canada in an emergency, and shipping by rail is costly.

Uses of Canadian SPRs

The main use of a Canadian SPR would be to shield Eastern Canadians from oil supply shortages. This goal must take priority over other goals. However, an oil price surge protection policy is a worthy secondary goal. A price protection policy would use the SPR to cushion Canadians from surprise surges in international oil prices. Such a policy in itself would likely be wildly popular amongst Canada's motoring citizens, and would in their eyes help justify spending tax dollars on Canadian SPRs. However, a price protection policy is open to abuse and must include safeguards. The price surge policy could be used to lower gas prices before or during elections, or to subsidize oil corporations when low prices hurt their bottom line. Both criticisms have been levelled against non-crisis releases from the U.S. SPR[79]. Strict limits to a price protection policy should be built into the terms of reference, and an arms-length body could be established to make release decisions.

Emergency use must be the paramount goal of a Canadian SPR. But, given that priority, the petroleum reserve should be filled according to the principle of "buy low and sell high." That is, fill the SPR as much as possible when international oil prices are below normal for any given year, and use or sell oil from the reserve when international prices are high. Otherwise, the government and taxpayers will be on the hook, to the advantage of big oil.

77 Lambton Industrial Society, 'Deep-Well Storage in Salt Caverns - Lambton County'. Sarnia Ont. revised 1995. www.sarniaenvironment.com/pdf/SLEA-Monograph-L3.pdf. Accessed 12 Jan 2008.

78 In 2000, Toronto's average daily water consumption was 1.2 billion litres. The total estimated volume of the Lambton SPR would be equivalent to about 10 day's of Toronto's water consumption. It would be large, but likely within the capacity of Lambton County's watershed. The water would eventually find its way back into the watershed. Thanks to Kjel Oslund for making this point and providing the calculations.

79 Thomas Palley, 'Manipulating the Oil Reserve'. Economics for Democratic and Open Societies. http://www.thomaspalley.com/?p=65. January 26, 2007.

Conclusion

Canada must develop its own Strategic Petroleum Reserves as part of a broader reorientation of Canadian petroleum and energy policies. Like other countries in the world, Canada is faced with huge new challenges in this decade and the next, and requires a paradigm shift to think about and deal with these challenges.

A decade ago, few citizens had heard of, let alone deeply thought about climate change and its catastrophic consequences if humans do not take quick and decisive action. Similarly, it was simply assumed that the world had plentiful supplies of cheap oil and that there were no physical limits to ever-increasing energy consumption by individuals and industry. It was also assumed by almost everyone that globalization would eclipse nations and the state, and that we were inevitably moving toward a borderless world. None of these assumptions hold in this decade.

Several epoch-changing jolts to the system have challenged those predominant assumptions. Recognition of the need to urgently act against climate change is growing. The response to 9-11 in the United States and elsewhere led to the era-shifting idea that "security trumps trade." The world has been re-bordered, with security states restricting international mobility of people more effectively than ever. The rise of resource nationalisms in petroleum-rich countries that challenge U.S. imperial power has weakened the hold of private oil transnationals, which were a mainstay of trends towards neoliberal globalization.

All of these changes point to the need for Canadians to re-orient their policies away from the neo-liberal globalism and "free" trade of the 1980s and 1990s. A new emerging paradigm is evolving towards that of a conserver, post-carbon society in which the economy will be re-embedded in society under the sovereign control of citizens, with a strong international orientation to saving the future of humanity and all life forms.

We advocate a Canadian energy security strategy as an integral part of moving toward this broader vision and paradigm shift. In doing so, we call for the following road map to a new, environmental oil policy[80]:

1. Declaring a Canada-first energy policy as the foundation for a new federal-provincial partnership on energy and the environment;
2. Locating, assessing and designing viable storage sites for SPRs with a corresponding development plan;

80 Thanks to Tony Clarke for contributing ideas to this section.

3. Reversing the Montréal to Sarnia oil pipeline and diverting Newfoundland's exports to Québec's and Atlantic Canada's needs;
4. Obtaining a Mexican exemption from NAFTA's energy proportionality clause and, if rejected, proceeding to withdraw from NAFTA after giving the required six months notice;
5. Quickly moving down a three-track strategy to develop Strategic Petroleum Reserves including: a) following the European model of requiring oil corporations to temporarily hold specified levels of reserves in Eastern Canada, b) reducing the necessary size of the emergency petroleum reserves as outlined in point number three above, and c) quickly filling the SPR sites with petroleum;
6. To ensure the long-term energy security of Canadians, reintroduce the requirement that was in place before 1989 that there be 25 years of proven supply of oil before exports are allowed;
7. Complementing the above with vigorous campaigns for reducing oil consumption and carbon emissions by industry and citizens.

To be effective, these seven steps must be pursued simultaneously. We cannot allow Eastern Canadians to remain vulnerable to the shut off of oil. Eastern Canadians must not be left to "freeze in the dark" in the next international oil supply crisis.

Appendices

Appendix A

Canadian oil imports by source

Year / imports barrels per day	**OPEC**	**North Sea**
2004 960,000 b/day	**41.3%** Algeria 14.6% S. Arabia 8.1% Iraq 7.8%	**47.5%** Norway 26.9% UK 20.6%
2005 950,000 b/day	**41.3%** Algeria 17.6% S. Arabia 8.2% Iraq 7.1%	**41.7%** Norway 26.0% UK 15.7%
2006 849,000 b/day	**45.0%** Algeria 20.7% Iraq 8.1% S. Arabia 8.0%	**37.0%** Norway 21.7% UK 15.3%

Appendix B

Countries with Strategic Petroleum Reserves[81]

[All European Union countries and all member countries of the International Energy Agency except Canada are included here, but only those which are indicated with references have been confirmed. Other countries are listed here only if they have been confirmed.]

	IEA member	**EU member**
Australia[82]	Yes	No
Austria	Yes	Yes
Belgium	Yes	Yes
Bulgaria	No	Yes
China[83]	No	No
Cyprus	No	Yes
Czech Republic[84]	Yes	Yes

81 This may not be a complete list of all countries with SPRs. There does not seem to be a master list of all countries with SPRs. For example the EU requires all of its members to have an SPR. The IEA also requires all its members which are not net exporters of oil to have a 90 day reserve. However, not all EU members are on this list because I could not get confirmation from a number of individual countries. The same is true for some IEA countries which are not members of the EU. Only countries for which there was available confirmation from reputable sources, are included here.

82 Nigel Wilson, "Australia - Plan to Protect Oil Supply", The Australian, Aug 2004. Energy Bulletin: http://www.energybulletin.net/1691.html.

83 "Official: China starts filling strategic oil reserve ", AP. 6 Oct 2006 http://www.iht.com/articles/ap/2006/10/06/business/AS_FIN_ECO_China_Oil_Reserve.php; "China's Strategic Oil Reserves to Be Ready", 28 Jun 2007 originally from China Daily, posted China Radio International.com. http://english.cri.cn/3130/2007/06/28/262@243241.htm.

84 U.S. Department of Energy, Country Analysis Briefs. http://www.eia.doe.gov/emeu/cabs/visegrad.html.

Denmark	Yes	Yes
Estonia	No	Yes
Finland	Yes	Yes
France85	Yes	Yes
Germany[86]	Yes	Yes
Greece	Yes	Yes
Hungary[87]	Yes	Yes
Iceland	No	No
India[88]	No	No
Iran	No	No
Ireland	Yes	Yes
Israel	No	No
Italy	Yes	Yes
Japan[89]	Yes	No
Latvia	No	Yes
Lithuania	No	Yes
Luxembourg	Yes	Yes
Malawi (planning one)[90]	No	No
Malta	No	Yes
Mexico	No	No
Netherlands	Yes	Yes
New Zealand[91]	Yes	No
Norway (requires oil corps to keep oil reserves)	Yes	No
Philippines[92] (planning one)	No	No

85 France's Embassy in the U.S. Sep 2005 http://www.ambafrance-us.org/news/statmnts/2005/oilreserve_katrina_090205.asp.

86 PennEnergy, http://www.pennenergy.com/display_article/114993/120/ARTCL/none/none/1/GERMANY/

87 ABC money.co.uk, http://www.abcmoney.co.uk/news/6200783775.htm.

88 'India to form crude oil reserve of 5 mmt', 10 Jun 2007. http://economictimes.indiatimes.com/India_to_form_crude_oil_reserve_of_5_mmt/articleshow/2137148.cms.

89 IEA, "Oil Supply Security The Emergency Response Potential of IEA Countries in 2000". 2001. http://www.iea.org/textbase/nppdf/free/2000/oilsecu2001.PDF; Institute for Analysis of Global Security, "Energy Security in East Asia", op-ed 13 Aug 2004. http://www.iags.org/n0813042.htm; Japan Oil, Gas, and Metals National Coporation website. http://www.jogmec.go.jp/english/index.html.

90 "Malawi to increase fuel storage", Nyasa Times News Service. 13 Jan 2008 http://www.nyasatimes.com/index.php?news=1915.

91 Reuters. "Nippon Oil sells emergency oil reserves option to NZ", Dec 2007, http://uk.reuters.com/article/oilRpt/idUKT20877720071227?rpc=401&.

92 Abigail L. Ho, "Energy Conservation Takes Center Stage in the Philippines", Philippines Daily Inquirer. Aug 2005. available at Energy Bulletin: http://www.energybulletin.net/8226.html.

Poland[93]	No	Yes
Portugal	Yes	Yes
Romania	No	Yes
Russia[94]	No	No
Singapore[95]	No	No
Slovakia[96]	Yes	Yes
Slovenia	No	Yes
Spain[97]	Yes	Yes
South Africa[98]	No	No
South Korea[99]	Yes	No
Sweden	Yes	Yes
Switzerland	Yes	No
Taiwan[100]	No	No
Turkey	Yes	No
United Kingdom	Yes	Yes
United States	Yes	No

Total number of countries: **47**

93 U.S. Dept of Energy, http://www.eia.doe.gov/emeu/cabs/visegrad.html.

94 Randy Kirk, "Impact of Additions to Strategic Petroleum Reserves on World Oil Demand", Energy Bulletin. 2 Dec 2005. http://www.energybulletin.net/11386.html.

95 Vijay Sakhuja, "A regional approach to strategic oil reserves?", Opinion Asia, 25 Dec 2006. http://www.opinionasia.org/Aregionalapproachtostrategicoilreserves

96 http://findarticles.com/p/articles/mi_kmafp/is_200509/ai_n15327212.

97 Staff writer, "El Consejo de Ministros aprueba el envio del 2% de las reservas de crudo para ayudar a EEUU". El Mundo, 9 Sep 2005. article in Spanish.

98 International Marketing Council of South Africa, "South Africa's Energy Industry", http://www.southafrica.info/doing_business/economy/key_sectors/energy.htm.

99 "Bush Oil Reserve May Support Prices as Asia Also Buys", http://www.bloomberg.com/apps/news?pid=20601103&sid=a9fd3ke3h1c0&refer=us

100 Paul N. Leiby,' Improving Energy Security Through an International Cooperative Approach to Strategic Oil Stocks', Sep 2003. http://www.ea.org/textbase/work/2003/berlin/leiby.pdf.

Appendix C

Oil Producing Countries past their Peak Oil Production

Mexico	2004
Denmark	2004
NGL* / U.S.	2002
Yemen	2001
Norway	2001
Oman	2001
Australia	2000

UK	1999
Ecuador	1999
Colombia	1999
Venezuela	1998 / 1968
Argentina	1998
Malaysia	1997
Gabon	1997
Syria	1995
India	1995
Egypt	1993
Alaska	1989
Indonesia	1977
Romania	1976
Canada conv.	1974
Lower 48 U.S.	1971
Texas	1971
Germany	1967
Austria	1955

NGL = natural gas liquids condensate

Source: Energy Watch Group, Crude Oil. The Supply Outlook. 2007, p. 11. http://www.energywatchgroup.org/Oil-report.32+M5d637b1e38d.0.html

Appendix D

Member countries of the International Energy Agency

[All 27 countries are also members of the OECD [Organization for Economic Co-operation and Development], as the IEA is an autonomous agency linked with the OECD]

Australia

Austria

Belgium

Canada

Czech Republic

Denmark
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Japan
South Korea
Luxembourg
The Netherlands
New Zealand
Norway
Portugal
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

Appendix E

Major world oil supply disruptions

Gross Peak Supply Loss (mb/d)

Sep 2005	Hurricane Katrina	1.5
Mar - Dec 2003	Invasion of Iraq	2.3
Dec 2002 - Mar 2003	Lockout Venezuela	2.6
Jun - Jul 2001	Iraqi oil export suspension	2.1
Aug 1990 - Jan 1991	First Gulf War	4.3
Oct 1980 - Jan 1981	Outbreak Iran-Iraq War	4.1
Nov 1978 - Apr 1979	Iranian Revolution	5.6

Oct 1973 - Mar 1974	Arab oil embargo & Yom Kippur War	4.3
Jun - Aug 1967	Six Day War	2.0
Nov 1956 - Mar 1957	Suez Crisis	2.0

Source: OECD / IEA, 2007.http://www.iea.org/textbase/speech/2007/ramsay/house_of_lords.pdf. accessed 11 Jan 2008.

11045 Saskatchewan Drive,
Edmonton, Alberta
T6G 2E1
Phone: (780) 492-8558
Email: parkland@ualberta.ca
Website: www.ualberta.ca/parkland

ISBN ?????