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North American Energy, 2000-2007: What a Difference Those Years Make!

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Canada, the United States, and Mexico are a natural continental market for energy, based on contiguity, complementarity, and prudent cooperation. Statistics for the first half-decade of the 21st century continue to bear that out.

How much progress has been made, though, in supporting the respective energy interests of all three North American partners since closer cooperation became a hallmark of their relationship? I contend that more has been accomplished than was expected in 1990, but less than might have been anticipated in 2000. However, a simple statistical analysis is insufficient to tell the whole story.

We often understate the time it takes for national governments to get things done; and we often underestimate what the private sector can accomplish . . . once opportunities are recognized. Above all, most forecasts fail to allow for the unexpected.

North America is (and has been, for some time) the largest and most effective regional market the world has ever seen for a combination of oil, natural gas, and electricity. [1] Depending on price levels, the combined trade in these three energy sources now hovers in the neighborhood of US$60 billion annually[2]; and this does not include the hard-to-measure added value of having a convenient, secure market that serves both buyers and sellers well by reducing transaction costs and adding reliability.

Some barriers persist. Mexico continues its traditional resistance to private investment in energy. There are some instances in all three countries of energy subsidies or price controls. Each has inconsistencies in subnational groundrules. By any comparison globally, however, this is a remarkably free market for a huge geographic area that uses more than one-quarter of the Earth's energy consumption[3] and comes close to matching that in energy production. Furthermore, our continent has an unrivaled infrastructure for exchanging energy across its national borders.

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[1] I have chosen to focus only on these three categories because continental coal trade is relatively minimal and Canada's supply of uranium to the United States for nuclear reactor fuel is entirely a one-way proposition (which strays from my basic theme of interdependence).

[2] Calculated from volumetric and average price data available in various publications of the U.S. Department of Energy's Energy Information Administration.

[3] USDOE, EIA, *International Energy Outlook 2006*, Table A2 (based on interpolations from final data for 2003 and reference case projections for 2010.

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All this enables energy enterprises (public, private, and cooperative) to plan ahead while helping to provide hundreds of millions of end-users each day with reliable supplies for a large fraction of their total demand. The considerable degree of regional competition serves increasingly to link prices with long-term marginal costs over greater and greater areas.[4] Finally, the market that has developed here offers a multinational structure within which the respective national standards of environmental protection and energy efficiency can be mutually reinforcing while preserving national sovereignty . . . and even respecting legal and traditional differences within a variety of federal systems.

Nevertheless, "energy interdependence" for Canada and the United States (and Mexico, the third partner in the North American Free Trade Agreement, the North American Energy Working Group, and the Security and Prosperity Partnership -- NAFTA, NAEWG, and SPP, respectively) may not be progressing with as much joint benefit as it might. At the same time, it should be understood that the continent as a whole cannot reasonably aspire to complete independence from foreign supplies of either oil or natural gas for the foreseeable future without substantial disruption. The combined energy resources of North America are vast; but – even counting oil sands in Canada, shale gas in the U.S., and coalbed methane in both countries – they cannot match the total energy demand projected for the next couple of decades (even if energy efficiency is pushed to the extent that all three countries have pledged jointly to attempt).[5]

This presentation will survey some key changes in continental energy trade and cooperation since 2001 and how they have been influenced by regional, national, and global events -- focusing particularly on cooperative efforts at the national level. It will assess the current situation and occasionally venture a few projections (not predictions) for the future. Because of the bilateral context of this conference, however, I shall mention Mexico only in passing – and primarily in reference to aspects of the trilateral accords that affect Canada-U.S. bonds.

Although the strongest energy links in North America will remain those between Canada and the U.S. for the foreseeable future, there is a critical and potentially expanding role for Mexico – especially now that the presidential sash has been assumed by a strong-minded, independent, politically astute, and resourceful figure with personal knowledge

[4] For example, *North America: The Energy Picture II* (issued by the trilateral North American Energy Working Group in January 2006) notes on p. 28 that the emergence of geographically dispersed trading points for natural gas "increasingly make use of auction prices rather than long-term contracts." Futures markets might accomplish the same thing for oil within North America if it were not for the fact that oil prices are set globally. Marginal cost competition for electricity sales can take place in any integrated network – which in North America means that cross-border economic competition exists.

[5] The reference case in *International Energy Outlook 2006* projects a continental requirement by the three countries for 30 mmbd of oil by 2020, but combined production (conventional and unconventional) of only 19 mmbd (Tables A4 and E1). Sensitivity analyses that postulated higher or lower rates of economic growth and higher or lower world oil prices did not materially affect such a huge disparity. Personally, I believe that EIA has underestimated the potential of unconventional recovery and expect to see this putative gap diminish in *IEO 2007*'s projections, but it seems too large to close entirely in such a relatively short time. Even a rapid shift to more fuel-efficient vehicles (while highly desirable) would probably fall short of making up the difference.

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of energy factors such as Felipe Calderon. President Calderon, although only 44 years old, is a former Secretary of Energy, legislator, and leader of his party who now faces the test of a lifetime. Beyond the threats to national order posed by a defeated electoral opponent who refuses to acknowledge a close-but-fair vote count, the new Mexican President faces fiscal dependence on a national oil-and-gas company (Pemex) that provides roughly one-third of all federal revenue, but -- as a result -- cannot reinvest its own earnings in the fresh exploration, development, and technically challenging production required by surging domestic energy demand and sagging output from mature fields.

Sidney Weintraub suggests that Mexico will most likely have to experience some sort of crisis before it finds a way to resolve this energy dilemma, because it is grounded in a constitutional barrier to private investment in certain aspects of energy development and a tradition of socioeconomic disparities that have prevented tax reform.[6] Personally, I am more sanguine; but even a truncated explanation of my own view on this complex point would digress too much in this discussion of U.S.-Canada energy relations. Suffice it to say that a healthy North American market necessarily involves Mexico too. In 2005 that country was still producing nearly a million barrels a day more crude oil than Canada, although the difference is narrowing.[7] It also exports almost as much of that commodity to the United States as does Canada,[8] while simultaneously depending indirectly on Canadian natural gas[9] to generate the bulk of its own electricity. Mexico is carrying through with its resolve to replace heavy, high-sulfur domestic oil as the primary fuel for generation with cleaner-burning natural gas. Parenthetically, although Canada is one of the world's foremost net energy exporters, it continues to import close to a million barrels of petroleum a day itself; and this ties it inextricably to the global oil market -- in which Mexican production and exports weigh considerably with respect to overall supply and price, as does U.S. domestic production and demand for oil. We are all in this together.

The Autumn 2000 issue of *The American Review of Canadian Studies* (*ARCS*) carried my article entitled "The Evolution of the North American Energy Market: Implications of Continentalization for a Strategic Sector of the Canadian Economy".[10] Despite some unforeseeable landmines in its path, I believe that the rapid pace at which this market has been operationalized overall and institutionalized since then justifies my original basic optimism. However, I must admit that the path has been more uphill than I anticipated – especially because of exogenous factors that I shall mention below.

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[6] Sidney Weintraub *et al*., *Energy Cooperation in the Western Hemisphere: Barriers and Impediments*, Center for Strategic and International Studies, Washington, DC (forthcoming, 2007), Chapter 3.
[7] *MER*, table 11.1b.
[8] *MER*, Tables 11.1b, 3.3e, and 3.3f.
[9] Molecules of Canadian gas do not travel all the way to Mexico, but purchases can be handled through book-entry displacement of gas originating in the United States. As far back as 1989, the Technology Assessment Division of the Louisiana Department of Natural Resources reported in its Natural Gas Outlook that the State's gas production was meeting "head-to-head" competition from Canadian gas "in certain market areas in the Midwest and Northeast" . . . and that one deal even involved the purchase of Canadian gas for use in Louisiana via substitution.
[10] See pages 349-359 in that issue.

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For example, my speculation in that 2000 ARCS article[11] that Canada's gas exports to the United States would rise sharply by 2015 has proven to be off track. They increased only 10 percent between 1999 and 2005.[12] And Natural Resources Canada now cites a "consensus" view (coinciding with projections by the Energy Information Administration of the U.S. Department of Energy) that "Canada's domestic natural gas consumption will increase more rapidly than its production", so that net exports annually to the United States will hover in the 3 trillion cubic feet range through 2015.[13]

Development of the U.S.-Canadian-Mexican energy relationship did not begin with SPP, NAEWG, or even with NAFTA; and it has been due primarily to private-sector initiatives, although it could not have reached the stage it has without trilateral governmental cooperation – at both the national and state/provincial level. Yet timidity and narrow or shortsighted thinking are still evident in segments of both government and business; and chauvinism has had a recent resurgence. More of this later.

Canada and the United States have been cooperating in energy production for more than a century, dating back to the joint exploitation of the Niagara River as a source of hydroelectricity in 1901.[14] By the time of the first "Oil Crisis" in 1973, the U.S. was also buying from Canada more than a million barrels of crude oil per day (mmbd) and more than a trillion cubic feet (tcf) of natural gas annually – as well as 325,000 barrels per day of petroleum products.[15] Trade in both energy sources dropped shortly thereafter, however; and it was threatened by Canada's 1980 National Energy Program. NEP purported to seek "energy independence" for the country as a whole, but it served largely to exacerbate resentments of the energy-producing Canadian West toward the more populous, politically more powerful, and ever-energy-hungry East. By looking inward, NEP hurt both Canada and the United States.

I first became interested in the potential of a continental energy market after the ratification of the 1989 Canada-U.S. Free Trade Agreement (CUSFTA). That treaty wrote an official "finis" to NEP (which had already eroded) by eliminating various national barriers to trade and by incidentally recognizing electricity as a commodity rather than a service (a distinction that further safeguarded the power trade against possible indirect

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[11] See p. 357.

[12] Energy Information Administration, U.S. Department of Energy, *Monthly Energy Review*, October 2006, Table 4.3e. Unfortunately, publication in "hard copy" of this venerable and invaluable document (referred to hereafter as "*MER*") is scheduled to cease at the end of 2006 -- undoubtedly for budgetary reasons. Its data will continue to be collected and issued regularly in the same general format on the EIA website – http://www.eia.doe.

[13] Natural Resources Canada, Natural Gas Division, Petroleum Resources Branch, Energy Policy Sector, *Canadian Natural Gas: Review of 2004 & Outlook to 2020* (January 2006), p. 47 and Fig. 47.

[14] USDOE, EIA, *U.S. Electricity Trade with Canada and Mexico* (Washington, DC, January 1992), p. vii. For a fuller description of how the broader continental energy market evolved – especially during the 1990s -- see Joseph M. Dukert, *The Evolution of the North American Energy Market*, Policy Papers on the Americas, Center for Strategic and International Studies (CSIS), Volume X, Study 6 (Washington, DC, October 19, 1999.)

[15] *MER*, Tables 3.3f and 4.3.

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attacks by isolationists on either side of the border).[16] CUSFTA, of course, became a prelude to NAFTA. Although Mexico pointedly abstained in NAFTA from the application of such provisions as bilateral burden-sharing in the event of a new energy crunch (to which the U.S. and Canada had agreed), CUSFTA's provisions and pledges were further enshrined in the trilateral agreement – which came into effect on January 1, 1994.

NAFTA was accompanied officially by two side agreements, one establishing a trilateral North American Commission on Labor Cooperation (which has accomplished relatively little) and the other setting up the North American Commission for Environmental Cooperation. The latter is headquartered in Montreal with a staff of about 80, and it is headed by the top federal environmental official from each of the three signatory countries. The Environmental Commission has been active as a data collection and information exchange group, but its effectiveness as a gadfly (much less an influencer of policy in such related matters as energy) has been limited by its low profile and lack of political "clout" in any administration to date.

Searching first for quantitative validation of the effects on energy trade between Canada and the U.S. from official, trinational cooperation, I looked at annual data from 1994 (the birthdate of NAFTA) to the most recent years available for trade in oil, gas, and electricity. Then I compared the figures through 2000 to those since 2001, when the North American Energy Working Group came into being. NAEWG was established originally in March 2001 by the energy ministers of the three countries,[17] but given an unusual top-level blessing only a month later by Canadian Prime Minister Jean Chrétien, President Vicente Fox of Mexico, and U.S. President George W. Bush during the Summit of the Americas.

The numerical data from 1994 to 2000 and from 2001 until recently were inconclusive on their face. They showed no more than that the market is complex and opportunistic, so that I will have to continue to rely on subjective evaluations of interdependency's success or failure. In fact, some of the statistics themselves cried out for explanations. Before I summarize them, however, let me offer some background on NAEWG and its activities to date. One of my criticisms of the Working Group -- even after it was absorbed by the Security and Prosperity Partnership at a later trilateral summit (March 23, 3005, in Waco, Texas) – is that it has made almost no effort to publicize its efforts or ambitions. As a result, I have encountered numerous academics, energy industry executives, legislators, and state or provincial officials who have been barely aware of either NAEWG's or

[16] The significance of the far-reaching energy chapter in CUSFTA (Chapter 9) has not been appreciated adequately. It became the model for the same agreement's Chapter 4, applying to commodity trade overall. For a description of personal and political factors in this "tail that wagged the dog," see pp. 152-162 of my 2004 dissertation at the Johns Hopkins School of Advanced International Studies, *Creation and Evolution of North America's Gas and Electricity Regime: A Dynamic Example of Interdependence.* This section grew out of an earlier, unpublished manuscript cited in my Autumn 2000 article for *ARCS*.

[17] The incumbents then were Ralph Goodale (Canada), Ernesto Martens (Mexico), and Spencer Abraham (United States).

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SPP's existence. Since I am still convinced that each entity has contributed importantly to bilateral and trilateral energy cooperation, I find this disappointing.

NAEWG began confidently, with mid-level federal officials from the three energy ministries agreeing to come together about twice a year (rotating the meeting sites among the countries) and to operate more or less continuously through sub-groups. It took NAEWG only a single year to release its first (and perhaps its most challenging and significant) publication. It was a document entitled *North America: The Energy Picture*. For the first time, the three governments issued a joint enumeration of their energy reserves, energy production, and both the supply and the demand for petroleum, natural gas, coal and electricity projected for 2010 – using common units of measurement, so that direct comparisons could be made, and stating assumptions on which each was making its individual projections. The legal and policy framework governing energy development was outlined for each country, ongoing energy trade volumes were presented, reserves were located in general terms, and the existing and contemplated infrastructure for energy transport was indicated[18]. The document was published in English, French and Spanish; and it was made available on the Internet as well as in printed form, dated June 2002.

In January 2006 a followup publication was issued, entitled *North America: The Energy Picture II*. It followed the same overall format, but gave more detail about plans for future developments in infrastructure. But it eliminated projection tables for either supply or demand; and an independent evaluation showed that many of the forecasts in the first *Energy Picture* had been overly optimistic about moving closer to matching continental supply with demand.[19] Interestingly, the first *Picture* briefly mentioned Canada's "vast reserves of oil sands, of which about 308 billion barrels are economically recoverable",[20] and the second edition noted that "Canada has proven reserves of oil sands of approximately 175 billion barrels, over four times the total of North America's conventional crude oil"[21]; yet in neither of the documents do the accompanying pie charts reflect these facts. They show only "Proved Reserves of Conventional Crude Oil" for 2000 and 2004 respectively.

Recognition of the oil sands' potential has come hard, although they are now credited with making Canada the runner-up only to Saudi Arabia in what I have termed "pinpointed and producible" reserves.

Between the appearance of these two reference documents, there were other NAEWG publications -- some dealing in more detail with energy regulation. But a far more significant development in that direction was that periodically scheduled meetings began

[18] In its initial format on the Internet, *Energy Picture* included maps of energy infrastructure within the United States; but – in the spirit that prevailed shortly after the attacks on the World Trade Center -- concern about additional terrorism prompted their removal. They do not appear in printed versions.
[19] A more comprehensive critique of *Energy Picture II* can be found in Joseph M. Dukert, "North American Energy – 2006: Three Governments Offer a New Self-Portrait", William E. Simon Chair in Political Economy, Occasional Contributions (March 2006, Number 3), Center for Strategic and International Studies, Washington, DC .
[20] *North America: The Energy Picture* (June 2002), p. 7.
[21] *North America: The Energy Picture II* (January 2006), p. 11.

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among the staff representatives of the three national energy regulatory bodies: the National Energy Board in Canada (NEB), Mexico's *Comisión Reguladora de Energía* (CRE), and the Federal Energy Regulatory Commission in the United States (FERC). Three times each year, these informal meetings take place to exchange information about current or upcoming issues. The intent is not to adopt identical solutions, because there are far too many differences among the three countries in law, tradition, structure, and circumstances. However, each regulatory body is made pointedly aware of the continental context for energy, and Commissioners themselves have alluded to the desirability of "conscious parallelism".

In January 2005 NAEWG published a document that turned another page in the unfolding volume of North American energy interdependence; and it would have had even greater effect if it had fully lived up to its title: *North American Natural Gas Vision*. Produced by NAEWG's subgroup on Natural Gas Trade and Interconnections, the 100-page-plus *Gas Vision* offered a valuable compendium of information on market structure, resource base, supply, demand, prices, infrastructure, and trade with respect to natural; gas; and this time NAEWG included fairly detailed projections to 2012 – but really no "vision". Its data implied the possibility of a mid-term crunch between supply and demand if LNG receiving facilities did not become operational as quickly as possible, but the cautious document (clearly one that had to be passed upon by a trinational committee) failed to spell out the likely consequences, much less offer a call to arms to avoid it.[22]

Perhaps I have been too demanding of NAEWG. It is made up of competent career public servants, but they are simply not high enough in rank to issue such appeals on their own. There may have been a missed opportunity for that to change in March 2005. That is when the three heads of state (including by that time Paul Martin as Canada's Prime Minister) announced the Security and Prosperity Partnership (SPP). Although SPP was again an agreement among national leaders rather than a treaty, it gave notice from the outset that the partnership was being committed to continue indefinitely – that is, beyond changes in national administrations. The leaders assigned responsibilities at cabinet level in a number of areas (of which energy was only one) to come up with a progressive series of "benchmarks" – each with a targeted completion date -- for steadily increasing trilateral cooperation. Sadly, though, top-level attention waned after the first round.

NAEWG (which was to continue operating under the aegis of SPP) was pledged to hold "joint discussions with key stakeholders and scientific experts" that would enable it to lay out by January 2006 "the mid- to long-term aspects of the oil sands product market development and the infrastructure and refinery implications for increased oil sands market penetration." Later in the year it was supposed to delve further into oil sands issues in the context of "future fuel options for North America" -- and by June 2007 to produce a paper examining the long-term prospects for using CO_2 from oil sands operations to enhance oil recovery in Canada and the United States while removing this "global warming gas" from the atmosphere. Similar deadlines were set for objectives

[22] See Joseph M. Dukert, "Yellow Alert for North America on Natural Gas", William E. Simon Chair in Political Economy, Occasional Contributions (March 2005, Number 1), Center for Strategic and International Studies, Washington, DC.

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associated with collaboration in research and development, energy efficiency, renewable energy, hydrocarbons generally, and nuclear power.[23]

A core promise in SPP was that participants within the executive branch of each government would consult "stakeholders" at every step along the way. Although the term has never been defined officially, "stakeholders" are presumed to include both subnational governments and a variety of persons and groups in the private sector of each country – industry, business, nongovernmental organizations, and even academia and "think tanks".

"Stakeholders" have indeed been involved in a variety of workshops on aspects of energy sponsored by SPP. By extension, some are included in a broader North American Competitiveness Council that the three leaders ordered at their summit in March 2006. But there has been little true outreach: such meetings have not been announced publicly in advance, and their results (while technically not secret) are not widely distributed.

Toward the end of 2006 (again without any public disclosure), the structure of NAEWG began to undergo changes that hinted at retrenchment. The transformation is still underway as this is written, but the subgroups are starting to vanish as distinct entities. It appears that NAEWG will focus instead on broad tasks or cross-cutting projects. These areas might include: 1) energy efficiency -- with an effort to expand the number of equipment standards that have already been made compatible among the three countries; 2) national strategies to encourage the deployment of advanced technologies in such elements as biofuels, clean coal, hydrogen fuel, and (farther down the road) methyl hydrates; and 3) the facilitation of public-private partnerships – which presumably might range from R&D to demonstrations designed to hasten commercialization.

Some "benchmarks" have been delayed or postponed, while others are quietly being dropped. For instance, a joint modeling effort is still supposed to be on track to provide better continental projections of supply and demand by mid-2007; but a workshop "to obtain stakeholder perspectives, discuss gas market issue, and review current regulations and siting processes in each country for major pipeline projects and liquefied natural gas import terminals" is behind schedule. Plans have been all but canceled for one new, public, trinational website that had been promised to "provide timely information on electricity regulatory actions taken in each country that affect cross-border electricity trade" and another for natural gas that was supposed to "allow for the posting of regulatory changes and other industry information, as well as allow for interactive comments by stakeholders on issues and needs." Those websites have been deemed too expensive (although industry and consumer groups were probably not consulted on the cost-benefit balance).

Considering these shortcomings, has NAEWG to date made a worthwhile contribution to North American energy interdependence? My wishful judgment is still "Yes"; but, before I offer my reasoning, let's look at the multi-year statistics I alluded to earlier. All of them

[23] The full list of categories and "benchmarks" is displayed at a website – http://www.spp.gov

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come from publications of the U.S. Energy Information Administration, although (because of the spread of years) they had to be pieced together from several different publications – including the *MER* and the *Annual Energy Review*.[24]

Canadian exports of crude oil and petroleum products to the United States have increased steadily since NAFTA came into effect. They climbed from 1.27 mmbd in 1994 to 1.81 in 2000 . . . and rose further to 2.18 mmbd in 2005 (the last full year for which statistics exist). In only one year was there a slight decline (a falloff of 59,000 bbd from 1998 to 1999). The overall increase was more than 900,000 bbd – a whopping 72 percent in barely more than a single decade; but there was no appreciable difference in the growth rate of U.S. oil imports from Canada "before" and "after" the establishment of NAEWG.

What about natural gas? Considering NAEWG's emphasis on that fuel, has Canada's role as a supplier changed noticeably? Yes, it has . . . but at a considerably slower pace than with oil, although the patterns are basically similar. U.S. imports of Canadian gas have climbed every year since 1994 with the exception of 2002 to 2003 (a period when U.S. consumption fell by more than 700 billion cubic feet and its gas imports from Canada declined by almost exactly half that amount). The overall increase from 1994 to 2005 was a hearty 44 percent, but in this case imports have actually declined slightly since NAEWG came into being. At the same time, U.S. exports of natural gas to Canada have more than doubled since 2000 – although the volume of gas headed northward during 2005 (358 billion cubic feet) was still only about one-tenth of the gas being brought south (3.6 trillion cubic feet).

U.S.-Canadian total trade in electricity (exports plus imports) broke the mold of oil and gas, in that there was no clear and continuous trend upward or downward over the entire 1994-2005 span. For the period from January 1, 2001 through 2005, it was only 10 percent higher than for the period prior to that -- dating back to January 1, 1994. EIA's published tabulations of electricity imports and exports break them down into "firm sales" (a comparatively small percentage, contracted for in advance) and those that result periodically from shorter-term economic decisions (even on an intra-day basis). Lumping the two together, Table 10 in *Annual Energy Outlook 2006* projects virtually no fluctuation in the annual level of continental power exchanges between now and 2020.

How do I interpret these data?

First, they demonstrate that Canada has proved itself a thoroughly reliable energy supplier to the United States -- a fact that depends as much on realities of the marketplace as it does on friendship. U.S. domestic production has faded persistently for decades; and the continuing rise in the availability of Canadian pipeline deliveries for purchase (especially since the early 90s) has provided an invaluable safety net for the American economy. At the same time, although it would be hard to prove, I contend that the

[24] Older EIA documents, which often contain more detailed data, can be accessed via http://www.archive.org. These include the "Country Analysis Briefs" (CABs) issued periodically by EIA for numerous nations around the world. At least 10 CABs for Canada over the past decade make up an interesting history of the period.

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existence of this continental market has been a powerful factor in Canada's development of the oil sands in Alberta and the offshore hydrocarbon deposits in the Maritime Provinces. Although I might hear some objection, I believe these have been good developments for Canada overall.

Canada's conventional oil fields in the traditional search areas of the Western Canadian Sedimentary Basin (WCSB) have reached maturity; and if it were not for oil sands production (which now exceed 1.2 mmbd[25]) Canada would be a net importer of oil itself. But a recent visit to the Fort McMurray area and my discussions with government and industry officials persuade me that the rapid increase in output from the oil sands has required a combination of higher price expectations and the use of advanced technology that is most effective only on a massive scale. High production volume has been one key to economic competitiveness . . . just as the high "netback" that accompanies pipeline delivery to a ready consumer has been another. Without the United States as an interdependent market, neither of these necessary conditions would have been present.

Natural gas sales to the U.S. have grown less rapidly than oil. Part of the explanation is Canada's own requirement for more of that fuel itself. As recently as 2002-3, only six percent of Canada's electricity generation was fueled by natural gas and less than eight percent of its national consumption of gas was involved in oil sands production, but both uses have the potential to rise.[26] In fact, the *Natural Gas Vision* document reported that overall consumption of natural gas in Canada had been growing at the substantial average rate of 3.2 percent annually since 1990, although demand tended to flatten out after 1997.[27] I find the rise in U.S. exports of natural gas to Canada since 2000 particularly interesting. From 2004 through 2006 they have matched the gas exports from the United States to Mexico, which means that approximately one-fifth of the amount of Canadian gas that flows south is being re-exported – including some that simply passes through the U.S. before being redirected to the storage and distribution "hub" system farther eastward in Canada. To me, this represents clear evidence that North American gas trade is dictated by geography and seasonal economics.

I read a similar story from the statistics on total electricity trade, but specifically because they follow no consistent pattern. Between 1994 and the end of 2005, the annual U.S.-Canada trade volumes in power fluctuated by 44 percent – from just over 43,000 gigawatt hours in 1995 to more than 62,000 gwh in 2005. Another peak of 61,000-plus had occurred halfway in between (in the year 2000), and other year-to-year variations were relatively minor. In most years since 2000, Canada sold more than twice as much electricity across the border as it purchased, yet imports and exports came close to

[25] This happens to be the production target set by the Western Canadian oil industry to achieve "over the next 25 years", as cited in EIA's "Country Analysis Brief" of June 16, 1997. By the time a CAB appeared in February 2002, EIA was citing Canadian government sources as saying that "synthetic oil and bitumen priduction is expected to reach 1.2 million bbl/d by 2010."

[26] In its review and outlook document (see cite below, p. 30) NRCan pegged Alberta's use of natural gas in its oil sands operations at 21 percent of the province's total demand for that fuel, but rising gas prices and new efforts at technological efficiency promise to limit the requirement for gas per barrel of product.

[27] *Natural Gas Vision*, pp. 52-3.

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matching each other in 2003. The single obvious trend leading up to 2003 was in rising U.S. exports, since in 1994 they had been almost miniscule – less than 1,000 gwh.[28]

The fact that patterns are hard to discern in binational electricity trade is more understandable when one examines the figures on a province-by-province basis. The north-south transmission links that connect most provinces with adjoining U.S. states are generally much more robust than those that enable provinces to trade with each other. Quebec's enormous hydroelectric capacity enables it to be a perennial net exporter to the U.S. Northeast, but the other provinces along the border have all been net importers of electricity at one time or another. Much depends on seasonality or special factors.

Lingering problems with Ontario's nuclear reactor generating units forced it to be a net buyer for years at a time. Even hydro-rich British Columbia has been a net purchaser after semi-drought conditions and a lighter-than-usual snowpack. The maps in *Energy Picture* (p. 32) and *Energy Picture II* (p. 49) display the back-and-forth trade for the years 1999 and 2004 respectively. They also show another thought-provoking fact: Cross-border interconnections for electricity had not seen any substantial increase in capacity. Since *Energy Picture II* was put together, however, at least three of the proposed new power interconnections it mentions have either broken ground or passed key regulatory milestones – New Brunswick-Maine (scheduled for service by the end of 2007), Alberta-Montana (a merchant transmission line), and Vancouver Island to Port Angeles in Washington state (underwater cable).[29] Power trade may increase.

No new oil pipelines have crossed the border in decades; but existing pipelines have been upgraded or expanded, and other projects are on the horizon – especially in connection with bringing a great variety of oil sands products into the States.[30] According to the Canadian Energy Pipeline Association, however, oil pipeline capacity will be tight until 2009; and it could actually fall short after that unless new projects become operational.[31]

Nor have there been any major new conduits for natural gas export since the Alliance pipeline was completed in December 2000, although two giant projects will (it is hoped) get underway before too long. Both the Alaska Gas Pipeline (which must pass through Canada before it can deliver its product to the Lower 48) and the one from the MacKenzie Delta in the far-North (bringing additional gas to central Alberta for oil sands development and also feeding into Canada's domestic-and-export supply network) have been long delayed; but both will be needed by the time they can become operational. The

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[28] These figures were drawn recently from an EIA table on the Internet site http://www.eia.doe.gov/cneaf/electricity/epa/epat6p3.html , which was based on the latest *Electric Power Annual*.

[29] Personal communication from Paul Connors, of the Canadian Embassy in Washington, DC (December 7, 2006), supplemented by Internet searches of the projects..

[30] *Ibid*.

[31] A Power Point slide provided to me by J. Kyle Keith, Director of Operations for CEPA, in December 2006 shows a crossover point based on the growth in exports forecast by Purvin & Gertz, headed "Oil Pipeline System Near Capacity: New Pipeline Capacity Urgently Needed".

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Alliance pipeline[32] brought physical export capacity to 12.1 bcfd, which would theoretically permit transport of 4.4 trillion cubic feet per year; and Canada has at times used more than 90 percent of that pipe space. Nevertheless, Natural Resources Canada's latest "Market Review and Outlook" does not assume any augmentation of the delivery system prior to 2010 and thus projects a plateau in international gas sales beyond 2007. Other analysts (including EIA) see capacity being added and gas deliveries from Canada approaching 5 tcf by 2010.[33]

Once again, the attractive market to the south has encouraged Canada to look for (and find) new avenues of energy production. Despite record drilling in 2004 (15 percent more gas wells than the previous year), production of conventional gas barely rose (less than 0.5 percent).[34] As a result of downward revisions in Alberta and offshore Nova Scotia, Canadian reserves of conventional natural gas fell 4 percent to 56.6 tcf – 30 percent of the proved gas reserves in the United States.[35] But production of coalbed methane is expected to increase, and any realistic outlook forecast for Canada's natural gas future includes the importation of some foreign fuel in the form of liquefied natural gas (LNG). The National Energy Board forecasts that Canadian imports of LNG will reach 1.2 billion cubic feet per day (0.44 tcf annually) by 2020, but I would not be surprised if that figure is not reached sooner. It will enter the consolidated North American market, along with greater volumes of LNG that will come into the United States and Mexico – presumably on both coasts and via the Gulf of Mexico. Direct imports of LNG into the United States are projected by NEB to be "the largest incremental supply of natural gas to the North American natural gas market" by the end of the next decade.

Whether one speaks of oil, natural gas, or electricity, Canada and the United States are aided in any quest to forge useful new trade patterns by the extensive delivery corridors and networks (notably in the Lower 48) that already exist and need merely to be augmented. There are still roadblocks from the "NIMBY" syndrome ("Not In My Back Yard") that sometimes hamper the construction of even modest new connections; but, overall, the situation compares favorably with most parts of the world.[36] And the National Energy Policy Act of 2005 (NEPact 2005) took another step to ease the problem. It authorizes the Federal Energy Regulatory Commission (FERC) to step in and take over after 12 months if state regulatory processes are deemed to have improperly delayed an application for new electricity transmission capacity in what the U.S. Department of Energy has designated as a "National Interest Corridor". In accordance with the Act (and coincident with its first anniversary), DOE completed its first "National Electric

[32] The Alliance pipeline extends from Western Canada to the environs of Chicago, and originally interconnections were planned to carry its reach all the way into Central Pennsylvania – thus providing multi-source competition from several directions to supply much of the U.S. East Coast.
[33] Accessed via the Internet at http://www2.nrcan.gc.ca/es/erb/prb/english/View.asp?x=447&oid=672
[34] Natural Resources Canada, Natural Gas Division, Petroleum Resources Branch, Energy Policy Sector, *Canadian Natural Gas: Review of 2004 & Outlook to 2020* (January 2006), p. iii.
[35] I have used here the numbers from p. v of the preceding NRCan document because they are the most recent published, even though Canada's reserves are listed considerably below the 87.8 cited in *Energy Picture II* (p. 11). Prior to publication I shall try to resolve this unseemly discrepancy.
[36] Of course, there are exceptions. The Millennium gas pipeline project received a FERC certificate in 2002 but has still not been completed, thanks to delays by route opponents in New York State.

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Transmission Congestion Study" in August 2006. It identified two areas as "critical" and several others (including some along the northern and southern U.S. borders) as "areas of concern"; but the Department had not yet at the time of this writing responded to applications and comments on the study by designating any official "National Interest Corridors".

The North American energy market does not operate in a vacuum; and efforts at trilateral cooperation are also influenced inevitably by world events and happenings within each country. In this respect, the years since 2001 have been unusually full of shocks to the system. To mention only a few: 1) The 9/11 attack, fears for "homeland security", and the incursions into Afghanistan and Iraq distracted President Bush from what may have been an original interest in experimenting with energy interdependence; 2) the "Enron scandal" wrecked the network of energy marketers that initially helped foster legitimate electronic trade and instigated widespread movements to reverse (or at least to stall) the processes of regulatory reform that had been aimed at increasing competition; 3) the 2003 power blackout that spread from the U.S. Midwest to Canada further shook some popular attitudes toward regional interconnections; and 4) global unrest added enormous "risk premiums" to the world oil price (and by extension to natural gas, even though these two fuels are not as closely related as they are often assumed to be). Considering the adverse impacts each one of these probably had, it is remarkable that continental energy trade (much less the national efforts at joint assessment of current and future energy issues) has moved along as smoothly as it has.

It may be pollyannish on my part, but I look also at the institutionalization of the energy relationship as a lasting benefit. Attitudes have changed markedly: Only a few years ago it was taboo for international groupings such as NAEWG to speak of "harmonization" with respect to the deservedly distinct energy policies of the three countries, but that term is now generally accepted when applied to energy practices. Instead of opening a festering wound for electricity generators and users on both sides of the border, the prompt and transparent binational investigation of the 2003 blackout helped to make the strengthening of the venerable old North American Electric Reliability Council (NERC)[37] perhaps the most widely accepted element of the comprehensive 2005 U.S. energy policy legislation. NERC is an extraordinary entity in international relations; it includes both public and private constituents, representing essentially all "stakeholders" associated with the transmission of electricity. Operating now as the Electric Reliability Organization for Canada, the United States, and part of Mexico, NERC will by mid-2007 have indirect but meaningful enforcement powers for the operating standards it adopts to ensure reliability of service. Sanctions for violations will be handled by the FERC in the United States, but by each of the Canadian provinces individually in their own territory; and they will range from fines to suspension of operations.

The apparently genuine challenge of efficiently marketing a diverse spectrum of oil sands products surfaced at a NAEWG/SPP Workshop for Experts in Houston early in 2006, but

[37] NERC was established in 1968 and has had reasonable success through peer pressure for what have heretofore been voluntary standards.

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response came almost immediately from the private sector through free market initiatives that take advantage of an already well-developed infrastructure. Only relatively modest adjustments to existing pipelines were required for Enbridge to piece together a new delivery route for Alberta bitumen all the way to refineries along the Gulf Coast. Exxon-Mobil announced a similar, 2300-mile reconfiguration. Pacific Energy Partners of California is building a new system to handle an array of different products (widely variable in viscosity and purity) from both Alberta and the U.S. Rocky Mountain area. It will carry segregated blocks of liquids that can range from bitumen to light synthetic crude.

It remains to be seen whether the bulk of what comes out of the Canadian oil sands in the future is sent to the United States for processing (in most cases at refineries that will have to be adapted for offbeat feedstock) or transformed into end-use products within Canada (thus securing additional value-added in export revenues). This is largely up to those who must make private capital available up front . . . and to the Alberta government, which acts quite independently from the national Parliament in encouraging investment.[38] It is also up to Canadians to decide how fast the oil sands should be developed – in the face of problems with the availability of labor, water, and natural gas, not to mention acceptance of at least temporary stresses on the environment and local/provincial socio-economic infrastructure.[39]

This matter of national choice within the North American partnership as to how the three separate energy policies will be formulated and implemented is important. Each country has a federal system, which means that decisions about energy policy are reached effectively at multiple levels. The regional conferences that take place routinely among Canadian premiers and the governors from adjoining U.S. states along the eastern, western, and middle border (or among subnational legislators) can be important if they accomplish no more than to dispense knowledge and understanding of energy issues in the energy task forces that are almost automatically set up.

The heads of national governments (who blessed NAEWG and created SPP) are only part of the energy story in this instance. Canada's provinces, of course, have greater authority and responsibility in respect to most energy developments than do NRCan, NEB, and even the National Parliament. But U.S. states have taken the initiative in some aspects of energy policy too. Consider renewable portfolio standards, facility siting, and moves to curb potential climate change. Involving many players can be a barrier to efficient energy

[38] On October 6, 2006, an article by Ian Austen in *The New York Times* ("Conoco and EnCana Plan Oil Sands Venture") reported that the two companies would combine ownership of two Conoco refineries in Texas with oil sands properties controlled by EnCana. But it added that "the decision to send more of that material to the United States for processing may prove unpopular in (EnCana's) home province, Alberta."

[39] In June 2006, the National Energy Board released *Canada's Oil Sands: Opportunities and Challenges to 2015:* An Update, superseding a similar document it had published two years earlier. Analyzing pluses and minuses in light of the fact that "conditions surrounding oil sands development have changed significantly," NEB said it expected rapid development to continue, but that "The rate of development will depend on the balance reached that is reached between the opposing forces that affect the oil sands." NEB concluded that production by 2015 would reach 3 mmbd – which happens to be more than EIA's *International Energy Outlook 2006* had projected for 2020.

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development, but recognizing that policy really originates from many sources can also assist those who are patient enough to search out ways in which actions can bring mutual benefits to both (or all three) countries . . . and to communicate that possibility to the multiple sources of influences and public acceptance within each.

Overall, the national framework of policy should be determined on the basis of national self-interests; and these differ dramatically between Canada and the United States. We must also realize that interests and priorities are not uniform across either country. Californians and Texans do not see eye-to-eye on energy. Public utility commissions (PUCs) at the state level may have totally different outlooks (and even different definitions for a term such as "renewable energy" – which can be quite disconcerting to those who generate electricity from "big hydro"). I have also discussed the matter of federalism recently with Albertans who felt so strongly about the fact that their province owns its natural resources that they were furious at the very suggestion that they might be asked to participate in a NAEWG/SPP meeting as mere "stakeholders".

It may seem overly idealistic, but I submit that a workable energy policy at any level must somehow achieve consensus – which implies exchanges of views and some compromise. I believe this explains in part why NAEWG has ground along slowly but steadily – and generally forward. Once the infrastructure of energy interdependence is in place, its benefits become habitual. Pipelines and powerlines persist . . . and tend to be utilized. Even if we succeed in slowing our growth in demand for scarce, non –renewable fuels (as I hope we will), rising populations and care for the energy "have nots" will gradually boost our overall energy consumption as a continent for another generation.

Chauvinism in this case is, I believe, illogical and unjustified. Unfortunately, SPP has prompted some U.S. fringe groups (who seem to consider any international cooperation tantamount to national submission) to launch bitter attacks via radio and TV talk shows, newspaper columns, and the Internet. In extreme cases, there have even been death threats against individuals who were associated publicly with SPP. Nor is dissatisfaction limited to far-right conspiracy theorists. Some on the left argue that the U.S. is bullying its partners into adopting an attitude toward supply-side economics that ignores sustainability and externalities. By contrast, a handful dismiss SPP as far too weak, preferring that we try to emulate the European Union and its Energy Charter (despite the fact that the North American energy system has been far more successful in matching supply and demand).

Such scattered opposition does not excuse the SPP bureaucracy for its failure to speak out on what has been accomplished – either on its own or (more often) via private sector initiatives. The idea of trilateral cooperation through continuing discourse with industry and multiple levels of governance is a worthwhile concept that has been poorly communicated. Broader understanding of it should build support. That is why I close with four simple recommendations:

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1) The work of NAEWG (whether or not it continues to use that designation) should be far more visible. The promised websites (and the original, understaffed one at www.spp.gov) should become interactive.
2) The energy and environmental arms of SPP should be in regular contact wit each other . . . and should coordinate whenever possible, along the lines used by the energy regulators of the three North American countries. Similarly, the North American Commission for Environmental Cooperation and SPP should work together.
3) Once Canadian and U.S. modeling systems are coordinated in 2007, some objective and respected entity with the necessary expertise (public, private, or a combination thereof) should begin to publish an annual "North American Energy Outlook", similar to EIA's *Annual Energy Outlook* for the U.S. and its *International Energy Outlook*.
4) Federal legislators for the three countries (or at least appropriate members of their energy staffs) should meet trilaterally at least once each year or so to swap information and ideas about issues – including achievable goals of energy efficiency. The importance of such intercommunication among legislators representing states and provinces is perhaps not sufficiently appreciated by Canadians because of their parliamentary system and the fact that Canadian-Mexican energy contacts are mostly indirect.

One sweeping change that I have implied but not yet emphasized is that the exploitation of Canada's oil sands have changed forever its position within the world oil market. The members of OPEC frequently disagree about quotas because of differences in their respective reserves. Those with relatively small amounts of oil have an incentive to seek very high prices so as to achieve a quick economic boost. This leads them to call for low quotas (and often to cheat on them). Today, Canada is more in the position of Saudi Arabia – whose almost incredible hydrocarbon riches suggest that a policy of price (and supply) stability offers long-term security for itself.

SPP and NAEWG cannot order investment in energy production or marketing. They certainly cannot open up avenues of investment in Mexico. Most unfortunately, they are not in a position unilaterally to guarantee that more attention be paid to energy efficiency. But they can help provide a continental public vision. They can inform. These national governmental bodies deserve support . . . and prodding.

I have often said and written that North America will not have a single, homogenized energy policy in my lifetime. Perhaps it never will have one, and this is understandable. But this does not mean that a mutually reinforcing common strategy cannot continue, structured on free market principles within our separate definitions and evaluations of energy adequacy and security.

My simplest suggestion . . .? That we should think (and preach) continentally. Yet we know that we will usually act regionally, so we need not hesitate to offer supporting arguments for energy interdependence that are regional . . . or even local. There is no

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single locus of energy policy formation and application in either Canada or the U.S. Yet, when we move forward in energy, we will almost inevitably move forward together!

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