The G8 and Global Energy Governance: Past Performance, St. Petersburg Opportunities

John Kirton

Paper presented at a conference on "The World Dimension of Russia's Energy Security," sponsored by the Moscow State Institute of International Relations (MGIMO), Moscow, April 21, 2006. The author gratefully acknowledges the valuable assistance of Laura Sunderland, Senior Researcher, and other members of the G8 Research Group.

1. Introduction

Since its 1975 start, the Group of Seven (G7) and now Group of Eight (G8) major market democracies has dealt with global energy governance in a major and very successful way. Indeed, energy stands out as a policy area where the G8's effective performance has been most pronounced. Energy served as a central subject for the first cycle of Summits from 1975 to 1981. It generated the achievements that earned unusually high grades for the Summits from 1977 to 1982 (Bayne 2000: 195). From 1975 to 1989 energy was the policy area where the highest compliance by G7 members with their summit commitments came (Von Furstenberg and Daniels 1992). Energy was in considerable measure responsible for making Canada and Russia members of the G8. Its component of nuclear security and safety was the subject of the first "G8" Summit Russia hosted, in Moscow in the spring of 1996. Energy was responsible for having the G8 serve as a global governor of first resort in a policy area where the United Nations (UN)-based multilateral system was absent beyond the component of nuclear energy, and where the Atlanticist response, even with the new International Energy Agency (IEA) proved inadequate when the great energy crises of the 1970's arose. And G8 members' energy vulnerability, activated by shocks to their oil supply, price stability, affordability, and security, has been an important cause of high G8 Summit performance overall (Kirton 1989, Kirton 2004, Kirton and Kokotsis 2003).

Most recently, energy as a critical component of climate change control featured as one of the two themes of the 2005 Gleneagles summit. It was a main contributor to that Summit's historic success. In its direct form and compelling frame of international energy security, its is serving as the first and most prominent of the three priority themes for the July 15-17, 006 St. Petersburg summit, the first regular annual summit that Russia will host. In its own right, and with its close connections to the summit's macroeconomic, trade development, environment, weapons proliferation, terrorism and regional security agenda, it will almost certainly serve as the defining subject by which the success of the St. Petersburg summit as a whole, and Russia's performance as a full G8 partner, will be judged.

Even with international energy security as the well chosen centrepiece, success at St. Petersburg is by no means guaranteed. For energy has been the subject of some of the Summit's greatest failures in a way hauntingly familiar to that facing the G8 in 2006. The G7's Versailles summit in 1982 energy aroused great divisions between America's Ronald Reagan and his G7 partners over the proper response to European participation in the Soviet gas

pipeline. Since then, the G8's interest in energy has been episodic, consisting often of short term reactions at rare moments when world oil prices surge. Despite recurrent efforts, the G8 has been slow to ensure the full safety of civilian nuclear reactors (Donnelly 2002). And it has done little to effectively lead an environmentally stressed world into a new age of sustainable energy, through a structural shift into energy efficiency, conservation, and renewable and alternative supply. Indeed, its most recent major foray into renewable energy, through the innovative multi-stakeholder task force created at the Okinawa summit in 2000, quickly died the following year when a suspicious George W. Bush arrived as the new American president at the G8 Summit in Genoa in 2001. And there are many who doubt whether a still skeptical, recently re-elected President Bush, keeping America outside the Kyoto protocol, will comply with his Gleneagles climate change commitments and help bring cleaner, more efficient energy sources and sustainable energy security to the world.

Whether the G8 summit and system can induce George Bush's America and his major power democratic partners to do so is currently a question of critical concern. For Russia has not only made energy security the centerpiece of its St. Petersburg summit. It is also leading the G8 in this area without the institutional advantages of its G8 partners, notably membership in the International Energy Agency (IEA), Organization for Economic Co-operation and Development (OECD), World Trade Organization (WTO) or regional European Union (EU) and North American forums. To be sure, Russia possesses world leading sources of gas, oil, hydro-electricity, uranium and nuclear reactors, and much potential in windpower, biomass and other renewable fuels. But there are many doubts, fuelled by the 1986 Chernobyl nuclear reactor explosion, the 2004-5 treatment of Yukos, and the January 1, 2006 disruption of gas supplies to Ukraine and consequently to Europe as to whether Russia can physically and politically get its supplies to where they are needed in a safe, secure, economically sensible and environmentally sustainable way. These doubts are compounded by the many energy challenges that currently afflict the global community, including high and volatile energy prices, new demands from emerging Asia, unstable suppliers in Venezuela, Nigeria, Iraq, Ecuador, and the US Gulf Coast, problems of nuclear proliferation from Iran and North Korea, and the fusion of terrorism with nuclear-based weapons of mass destruction anywhere in the world.

To determine how well the St. Petersburg summit is likely to perform in governing global energy, and how its performance can be improved, it is important to assess the G7 and G8 summit record over its full 31 year life, why the G7/8 has succeeded and failed in this task, and what host Russia and its G8 partners can do to make St. Petersburg a sustainable energy security success. The answers to these questions in the existing scholarly literature vary widely among competing schools of thought. Some see the G8 summit as largely ineffective in an area where oil and gas are central, for it is regional rather than G8-centered global co-operative solutions which make physical and market sense here (Rugman 2005). Others doubt that the G8 can do much on the central energy challenge in a world where the great supply powers of Saudi Arabia and OPEC, and the emerging demand powers of India, China, Brazil and others, lie outside the G8 club. Yet others familiar with the G8's effective past performance in global energy governance offer grounds for optimistic assessments that it can meet the new challenges of a more closely interconnected, mutually vulnerable world (Ikenberry 1988, Kirton 2004).

A close examination of the G8's performance suggests there are indeed grounds for optimism. For amidst the great debate about, and disappointments over, the G8's varied energy record, some central patterns stand out. Since the start the G8 has been an effective governor of

energy price and supply issues, especially from 1975-1981 when the need to deal with global energy crises centered on oil were most acute. It has also proven effective, if far more slowly, on the nuclear safety front. However, failures have come in addressing the underlying structural issues that could prevent such crises. For the G8 has still done little in moving the G8 and global economies to a greater reliance, across all fuels sources, on energy that is secure, safe, ecologically sustainable, available, affordable, acceptable and appropriate for all in the G8 and the globe as a whole.

Propelling G8 success on supply and price issues have been several forces: the vulnerability of America and most of its more powerful G8 partners to shocks from outside; the failure of existing international organizations in response; the globally predominant and internally equalizing energy capabilities among G8 members, especially now that Russia has become a full member; the close connection between energy insecurity and the core democratic principles of the G8; and the political capital and control that leaders have enjoyed at home and use to do innovative integrative deals in the constricted G8 club they own and operate. Accounting for the much weaker performance on sustainable energy is the weak domestic political capital on energy issues in North America and continental Europe after 1979, and the growing membership of oil and gas rich, nuclear reactor and uranium laden, but environmentally lagging Russia in the G8 since 1992. This has left only the climate change endangered islands of Britain, running out of North Sea oil, and hydrocarbon short Japan, after its Tokaimura nuclear explosion, to reliably promote the sustainable energy cause. Yet as the twenty first century unfolds, changes in global and domestic forces have led to rising G8 performance in conventional, renewable and newer realms. It is thus possible that St. Petersburg could prove to be the most successful G8 energy summit ever, if a way is found for the leaders to build on the forces that have proven successful in the past.

To develop this argument, this study looks first at a quantitatively based overview of G8 energy performance from 1975 to 2005 across the G8's six major governance functions of domestic political management, deliberation, direction-setting, decision-making, delivery and the development of global governance. It then conducts an historical, process-tracing review of the G8's energy governance at selected annual summits from 1975 to 2005 where the G8's greatest successes and failures in global energy governance have come. It next examines the causes of this varying governance performance, focusing on the six forces that the concert equality model of G8 governance highlights (Kirton 2004). It concludes that the model provides a sound account of high performance, and offers on this basis ten recommendations about how the St. Petersburg Summit can produce a strong energy success.

This analysis adopts a definition of energy as a policy area that is consistent with the way it has been treated over the years in the G8. Here energy has consisted primarily of four component areas. By far the earliest, most ample and frequent has been the supply, price, transportation and consumption of traditional energy sources such as oil, natural gas, coal and nuclear power. A second, and close companion, has been alternative and renewable energy sources, as well as more demand side measures such as energy efficiency and conservation. A third has been nuclear safety, including the safe operation of civilian nuclear reactors and the transfer and use of nuclear materials. A fourth has been energy trade, including Soviet gas trade with Europe and Japan, Russia's energy pricing policies as part of its quest for accession to the WTO and the role of markets in global energy trade. In all cases, the G8's strong link from the start between energy and the natural environment is taken fully into account.

2. An Overview of G8 Energy Performance

A. Overall Assessments

There are many different ways to measure G8 performance in energy (Appendix A). By the most traditional of these measures, G8 effectiveness in energy governance appears at first glance to have peaked long ago, during the Summit's early years from 1977 to 1980. The master grader of Summits, Sir Nicholas Bayne, awarded high marks to the Summits from 1977 to 1980, in part due to their energy accomplishments (Bayne 2000, 2001, 2002, 2003). Nuclear power helped give 1977 a B-, and energy helped give 1978 an all time record A, 1979 a B+, and 1980 an average C+. Then performance slipped, as east west trade, a subject related to the Soviet gas pipeline dispute, helped give 1982 a C. Seven years later, in 1989, a B+ came from accomplishments in the environment, with energy included within. Since that time, energy has not featured as an accomplishment in Bayne's assessment.

Nor has energy been even a priority objective in the G8 Research Group's summit performance assessments since 1996. From 1996 to 2002 the Group included energy only once, awarding Okinawa 2000 a B for its renewable energy achievements. Yet as this 2000 addition hints, the G8's energy performance may have started to rise again in the twenty first century. A closer look at the individual functions of G8 governance shows this to be the case. It also points to an effective energy performance in some respects that has endured from the start to the present day.

B. The Domestic Political Summit

The first component governance function of the G8 is domestic political management – helping G8 leaders manage their policy, political and electoral priorities at home. In the G8's most powerful member, the US, both Presidents Ford and Carter tried to use their G7 energy achievements for domestic political management, by making explicit reference to them in their annual State of the Union address. But both did it most robustly after rather than before their Presidential election defeats, by speaking of the G8's energy performance in their "farewell addresses" in 1977 and 1981. Carter made a brief mention of it in 1978. But he ignored it completely in the critical energy and electoral crisis years of 1979 and 1980. Nor did any US Presidents raise it after 1981. The most recent State of the Union Address, on January 31, 2006 featured the policy priority of energy security, while not mentioning the G8 at all.

Beyond trumpeting their summit success to their domestic audience, G8 energy governance has been used by leaders to help secure desired domestic policy change. The classic case is that of Jimmy Carter's US following the 1979 Summit, which Putnam and Bayne gave one of the highest overall grades for any summit over their full 31 year life. John Ikenberry (1988) details how the Tokyo G7's actions on energy helped President Carter finally overcome a long recalcitrant Congress to secure American oil decontrol. But this success in domestic policy change did not translate into one on domestic electoral management. For Carter was soundly defeated by his Republican rival Reagan in the 1980 Presidential election the following year.

In the case of the G7's smallest and other North American member, neither domestic policy change nor electoral success came. This was a result both of minority government, and the particular policy instrument used. Canada's Joe Clark did return from Tokyo determined to put his energy conservation commitments into immediate effect (Clark 1988). He tried to do so by raising taxes on gasoline. This move led directly to the defeat of his minority government in the House of Commons and to his subsequent defeat at the polls in the general election that ensued.

C. The Deliberative Summit

While the G8's energy performance in regard to domestic political management has been dated, slender, and ineffective, its deliberative performance has been cyclically recurrent and robust. As Appendices A and B show, the subject of energy received considerable attention during the first Summit cycle. It returned to the Summits of the twenty first century to a similarly high degree.

More specifically, the peaks in summit attention to energy have come from 1975 to 1981, from 1990 to 1997, and again, in an African context, in 2002. G8 attention thus inductively appears to be a reaction to global oil shocks, in 1973, 1979 and 1990 (when Iraq invaded Kuwait). The 2002 peak suggests that the G8 may be starting to act proactively and preventatively, to achieve broader development, sustainability and democratization objectives in the twenty first century world.

D. The Directional Summit: Energy Priority Principles, Linkages and Trade-Offs

In its directional performance of setting principles and norms, the G8's energy performance has been much more continuously high. During its first thirty-one years, the G8 has normatively done much to embed energy in a dense web of causal connections with core concerns, from macroeconomic performance (including growth, inflation and employment), to environmental protection, nuclear proliferation, nuclear safety, and most recently terrorism. It has also addressed energy in regard to both producers and consumers, G8 and outside (including developing) countries, and the supply, demand and market sides.

As Appendix C shows, the annual Summit has at times given energy as an issue area pride of place, by including it in the preamble to its central communiqué or in the separate Chair's Statement that has appeared since 2002. It did so in 1978 and 1980, defining energy as the central cause and solution of all other problems in 1980. In 1986 it similarly noted oil prices as causally central to non-inflationary growth and trade. In 1989 and 2003, energy received such priority attention only indirectly, as an invisible part of the priority on the environment and sustainable development.

If the entire Chair's Statement can be treated as the chapeau for the massive documentation produced in separate papers for the summits starting with Kananaksis in 2002, the return and rise of the G8's twenty-first century directional priority performance on energy is clear. While Kananaskis 2002 made no mention of energy, Evian 2003 highlighted cleaner more efficient energy and the safe and secure use of civilian nuclear technology. Sea Island 2004 profiled oil production, and balanced energy policies with increased supplies, efficient

energy use, and conservation, including through new technologies. At this US-hosted summit, the G7's early trilogy of principles had returned.

Gleneagles 2005 continued this priority principle direction setting. It did so most clearly in promising urgent action, developing markets for clean energy technologies, their availability to developing countries, and assistance to vulnerable communities to adapt to climate change.

E. The Decisional Summit

Furthermore, the G8 has taken many, often bold collective decisions in the field of energy. Its greatest early triumphs came, proactively, in 1978, and reactively, in 1979, in response to the second oil shock. Moreover, in the field of nuclear safety, since the 1986 Chernobyl nuclear explosion, it has acted through persistent iteration and by mobilizing money to finally close Chernobyl (Bayne 1999).

As Appendices A and D suggest, the Summit's concentrated deliberative attention to energy has carried through into the decisional domain. This was the case in 1997 and 2002, where high attention yielded a high number of commitments as well. This implies that focusing a summit on energy, as St. Petersburg 2006 is doing, is likely to generate many concrete, future-oriented commitments from the members states and EU.

F. The Delivery Summit

Over the G7/8 Summit's 31 years, these collective energy commitments publicly produced at the Summit have been reliably complied with, or delivered by, G8 members, often to a very high degree. As Appendices A and E show, from 1975 to 1989 G8 energy commitments were complied with +66% of the time, on a scale ranging from -100% to +100% (Von Furstenberg and Daniels 1993). This was a level twice as high as that in any other field.

From 1988 to 1995, in the energy-related area of climate change, the United States and Canada also produced quite high compliance. As Ella Kokotsis identified, from 1989-1995 there were 34 climate change commitments (Kokotsis 1999). The US complied at a level of +18% (a net six of the 34) and Canada +71% (a net 24 of the 34), for a combined compliance level from the G7's most and least powerful countries of +45%. The US and Canada showed a rising compliance level over this period. Canada complied completely from 1993, and the US from 1994 on.

Since 1996, the available evidence from the G8 Research Group's annual compliance studies shows that compliance with G8 energy-related and energy commitments has usually been very high. Compliance with priority environment and nuclear safety commitments has been on the rise. Compliance with the priority energy commitment in 2003 was +75% and in 2004 +78%. This very high level came despite the move from French to US hosting and the division between the two countries over the 2003 invasion of Iraq. In both years no country showed a lack of compliance, while France, Germany, Japan and the United States complied fully in both years.

In 2003, much of the compliant behaviour came in the second half of the post summit period, while in 2004 it came in the first half. This made calendar year 2004 as a whole – the US year as G8 host - a high compliance year. Six months after the July 2005 Gleneagles

Summit, compliance with the priority commitments on renewable energy and on climate change both came in at a perfect +100%.

Taken together, the 31 year G7/8 record shows that in both energy and the related field of climate change, G8 commitments are the ties that bind. There is thus good reason to focus a G8 summit on energy and climate change if major power real world change is the desired result.

G. The Development of Global Energy Governance

Energy has also been an area where the G8 has done much to develop the institutions of global governance, especially by generating G8-centered energy institutions of its own. At the leaders' levels, energy, in the form of nuclear safety, served as the subject of the G8's only full scale inter-sessional Summit - the Moscow Nuclear Safety Summit hosted by Russia in 1996. At the ministerial, official, and multi-stakeholder levels, the G8 has been particularly active in creating energy-oriented bodies, especially in the years from 1977 to 1980, and again from 2000 to 2003.

At the ministerial level, G8 energy ministers started meeting in 1998, in Moscow, with Russia as the first host. They did so again in 2002, in Detroit, with G8 chair Canada and its US neighbour serving as co-hosts. In 2005 energy ministers met with their environment colleagues from the G8 countries and beyond. Russia in 2006 is reinforcing this evolving trend, with a G8 energy ministers meeting on March 15-16 in Moscow, in the spring, and another with the outside "plus five" partners being held prospectively in Mexico in the fall. These meetings have been robust decisional forums. The April 1, 1998, Moscow meeting produced 11 commitments. The May 2-3, 2002, Detroit meeting generated seven.

However, when compared with the overall ministerial-level institutionalization, energy has been a lagging field, despite its importance at the leaders' and official level. Stand-alone, at least annual, G8 ministerial forums began for trade in 1982, foreign affairs in 1984, finance in 1986 (and 1973 as the G5 before), environment in 1992-4, employment/labour in 1992, terrorism in 1995, and justice/interior in 1997. Other less frequently meeting ministerial forums have also emerged for information, crime, and development. There are thus good grounds for strengthening the G8 energy minister's forum.

Another important ministerial forum for G8-energy governance has been the club of finance ministers. It started as the G5 in 1973, became the G7 with Canada and Italy added in 1986, and is slowing becoming the G8 with Russia in recent years. The February 10-11, 2006, G8 Finance Ministers meeting in Moscow, which started Russia's year, focused on energy as its major concern. The meeting importantly affirmed that "market mechanisms are vital" to secure energy for the world.

At the official level, as Appendix F shows, energy in its nuclear dimension served as the subject of the first body the then G7 members created, along with Russia at the time the Summit was born. This was the Nuclear Suppliers Group established in November 1975. In this field and forum Russia was a full, indeed founding member of the G8 club from the very start. Energy served as the subject of all of the seven bodies the G7 created from 1975 to 1980, and seven of the eight it created in its first cycle. Energy made a major comeback in the North American hosted summits of 2002 and 2004.

Four aspects of this record should be highlighted. First, energy has made Russia a G8 member from the very start. Second, G8 energy working groups have a long and rich summit

history, and are now a familiar feature, indeed part of the routine repertoire of the G8. Third, Russia's two North American neighbours have supported this approach. Fourth, energy has lead the twenty first century G8 into outreach, by involving other countries and international institutions, and into "downreach" with the multi-stakeholder Renewable Energy task Force in 2000-1. There are thus good grounds for accepting the suggestion made at the first sherpa meeting of the Russian presidency to have St. Petersburg create energy working groups.

3. The G8's Energy Performance, 1975-2004

To see how and why this largely successful G8 performance in global energy governance has been secured, it is useful to examine in detail the dynamics at selected individual summits where the energy agenda was in the forefront, and where the summit diplomacy of the G8 members produced great failure or success.

1975 Rambouillet

At the very first Summit in Rambouillet France in November 1975, energy as an issue took pride of place. It appeared in four of the concluding communiqué's 16 paragraphs, and was the central subject of paragraph 13. "Degree of resource endowment" was one of the diverse dimensions the G7's inclusive global governance was meant to unite. "Serious energy problems" was, along with high unemployment and continuing inflation, one among the trilogy of afflictions facing the industrial democracies the G7 was designed to address. "Raw materials, including energy" was similarly one of the trinity, along with trade and money, the G7 would concentrate its new efforts on. In the G7's principled statement of fact, world economic growth depended on energy availability. Thus the G8 would co-operate to reduce "our dependence" on imported energy through "conservation and the development of alternative sources." It would also foster co-operation between producer and consumer in the long term interests of both. It is noteworthy that in the G8's creation, energy formed part of the founding trinity and in the core G7 game plan, conservation was co-equal with alternative sources and, in the ordering, stood first.

This centrality and recipe reflected directly Henry Kissinger's calculations and the new vulnerability he saw an after hegemony America facing both at home and the world as a whole. Indeed, in a US State Department memo Kissinger had identified the 1973 energy crisis as a "fundamental threat to both global economy and security" and a core reason for creating an annual G7 Summit (Kissinger 1975: 2). His 1975 public Pittsburgh speech on the eve of the Summit made the same point. As the Pittsburgh speech makes clear, in the G7's founding, function determined form. For it was Canada's G7-leading energy resources that led Kissinger to make Canada a member of the new club politically, even before the first physical summit took place, hosted by a France pre-occupied with monetary rather than energy affairs (Von Reikhoff 1974).

1976 San Juan

In an apparent paradox, energy appeared in only one of the 26 communiqué paragraphs concluding the second Summit, hosted by US President Gerald Ford and Secretary of State Kissinger at San Juan, Puerto Rico seven months later in June 1976. Yet amidst all the attention given on paper to monetary affairs and east-west economic relations, the G7's founding energy principles were reaffirmed, with "rational use" now added to conservation and alternative sources to form the trinity of the intra-G7 approach. Across the north-south divide, co-operation ripened into direct assistance. The communiqué declared, as a collective decision: "…we intend to make efforts to develop, conserve and use rationally the various energy resources and to assist the energy development objectives of developing countries."

The 1976 Summit also showed the tight interconnection between the apparently economic subject of energy and the apparently political security subject of nuclear proliferation. 1976 was the first summit attended by Canada, which had long had world leading supplies of uranium and nuclear technology and had been shocked when India exploded its allegedly peaceful nuclear device in May 1974. The strategy of Canadian Prime Minister Pierre Trudeau was to use his summit intervention on the energy agenda item to make the link to nuclear non-proliferation. This was a subject the French, as a United Nations Security Council Permanent Five (UNSC P5) member with a resulting aversion to the then G7 developing as a political security institution, did not want to discuss. Canada failed to forge the link at Puerto Rico, but did the next year and from then on.

1979 Tokyo

Tokyo 1979 was arguably the G8's highest performing energy summit. Its success was driven by several interlinked and reinforcing forces. The first was the use of a fully array of G8 responses, covering several sources and strategies and including devices such as country specific commitments and targets and timetables. This allowed an overall package deal to be produced.

The second key cause was the willingness of France to defect from a previously agreed all-European position and thus inject the flexibility required for a transatlantic and thus G7-wide deal. Also important here was the then quiet mediatory diplomacy of the Japanese, hosting the summit for the first time (Dobson 2002).

The third and most powerful forces were the shocks that activated the vulnerability of all G7 members (save Canada and Britain directly) and that afflicted most strongly the most powerful members, notably the United States. The first component was war and Islamic terrorism in the Middle East, with the Iranian revolution and second oil shock, and its heavy impact of a vulnerable and Vietnam vanquished America, whose diplomats were seized and held hostage, whatever unilateral policy change Jimmy Carter tried unsuccessfully alone. A second shock activating American vulnerability was the explosion of a civilian nuclear reactor at Three Mile Island in Pennsylvania in early 1979. This eliminated the nuclear option as a solution to America's energy security challenge, both then and ever since. The third was the physical shortage of energy in America at the gas pumps – an historically new experience for a richly endowed America – and the rising anger of American voters as the Presidential re-election year of 1980 approached.

1982 Versailles

Perhaps the greatest G8 failure in the energy field came at the 1982 Versailles Summit, over the Soviet gas pipeline dispute (Putnam and Bayne, 1984, 1987). The failure arose because of deep divisions between, on the one hand, a continental Europe led by France then hosting the G8, and, on the other, the United States. The core issue was whether the G8 would welcome the extension of Soviet gas supplies through a land pipeline to an energy short and nascently environmentally conscious Europe. Amidst the new cold war catalyzed by the Soviet invasion of Afghanistan, and deep economic distress in both America and France, the Europeans favoured a strategy of engagement and interdependence. The Americans, fearful of the Soviets' ability to manipulate the supply and price of gas to gain leverage over Europe, favoured containment and isolation, even though they could not supply the energy-short Europeans with their own gas or substitute energy supplies. France was led by a recently elected socialist president Francois Mitterrand, who had communists in his cabinet. The US was led by a recently elected Ronald Reagan, whose beliefs about the USSR being an "evil Empire" were stronger that his equally fixed convictions in the magic of the free marketplace.

In the face of such deep divisions, the G7 summit did succeed in producing a collective agreement among the members, duly recorded in its concluding communiqué. But it was a short lived triumph. For the problem arose when the protagonists, who had dispensed with their customary post summit news conference, rushed home to explain to their domestic and international constituencies what the agreement really meant, and how they would not be bound by provisions which displeased them. There ensued a competitive spiral of defection. It culminated on June 18, when "the White House, far from realizing the US pipeline sanctions as the Europeans had hoped, announced that they were being extended to cover US subsidiaries and licensees abroad" (Putnam and Bayne 1984: 167). Even Britain's Margaret Thatcher, usually an ally of Reagan, was shocked at the retroactive and extraterritorial nature of the American move.

Putnam and Bayne (1984: 167-170, 1987) attribute the failure to several forces: poor preparation for the summit (and the bureaucratic rivalries, ignorance of the depth of partners' feelings and selective perception that flourished as a result); an intolerance for ambiguity in the summit agreements that prescribed a procedural path rather than defined a pre-ordained end result; and the failure of supportive constituencies in either contending country that would make a cross-issue package deal possible. Nonetheless, there was a solution that the leaders missed – highlighting the many principles the process had created consensus on, and creating or instructing G8 working groups to flesh them out and put them into practical effect. It was a solution that Tony Blair and his colleagues were to use to good effect on the energy-related issue of climate change at Gleneagles in 2005.

2000 Okinawa

At the 2000 Okinawa G8 Summit, the first of the twenty first century, energy assumed an important place, through a singular focus on renewable energy. Okinawa gave rise to a new official level G8 Energy institution, the G8 Renewable Energy Task Force. As with the Dot-Force (Digital Opportunities Task Force) also born at Okinawa, this was a relatively new, multi-stakeholder form of G8 institution, first introduced at the G7's Information Society meeting at Brussels in 1995. The Renewable Energy Task Force members came from national

governments, business and NGO's across the G8 and beyond. The Task Force's chair was former Shell Chief Executive officer Sir Mark Moody-Stuart.

The creation of the Task Force reflected the preferences of G8 host Japan in addressing its energy supply challenge in ways that reinforced the Kyoto Protocol on Climate Change it has pioneered at the founding conference it hosted in 1997. At the last summit attended by President Clinton, and the last where the US was represented by the Clinton-Gore administration, the US willingly went along with the Japanese initiative. The G8 agreement was driven not by a crisis afflicting Japan, where energy demand and prices remained long in the wake of the Asia-turned-global financial crisis of 1997-9 and the decade of economic stagnation in Japan. Rather, they did respond to a localized energy shock in America, where California's brownouts during the summer of 2000 captured national headline in the lead up to the presidential lection in November, where Vice-President Al Gore was pitted against Republican candidate George W. Bush. In electorally consequential California, electricity prices soared from $12 per megawatt hour in 1998 to $200 by December 2000 and $250 by the time a victorious George Bush was inaugurated as US President in January 2001. For the defeated Democrats, and their presidential candidate from the south, the Japanese hosted summit of 2000, with its innovative energy agenda and accomplishments, proved to be a miniature domestic electoral management replay of the Tokyo summit of 1979.

2001 Genoa

In sharp contrast, the 2001 Genoa Summit, the first attended by George Bush, did little in the area of energy. Indeed, it was here that both the report and the very institution of the G8 Renewable Energy Task Force died a quick death. In accordance with its Okinawa mandate, the Task Force had issued a report replete with recommendations to the G8 leaders just prior to the Genoa summit. It recommended, *inter alia*, that the G8 alter the structure of subsidies for third world energy projects so that the subsidies would no longer favour traditional energy suppliers and the market could unfold on a level playing field. It estimated that such a strategy would boost renewable energy production from two percent to seven percent of the world's total energy output by 2003, and would cost less in subsidies per unit of energy production than the business-as-usual approach (Malleson 2003, G8 Renewable Energy Task Force 2001: 58). Yet the G8 leaders barely noted the receipt of the report at the Summit, did not endorse its recommendations, and failed to renew the Task Force's life.

The Task Force's chair, former Shell Chief Executive officer Sir Mark Moody-Stuart, and other NGO's expressed great disappointment and displeasure with the Genoa G8's lack of action. Sir Moody-Stuart continued to work with the energy ministries of G8 governments to foster implementation of the reports recommendations. But without the imprimateur and endorsement of the G8 leaders themselves, little could be done.

One cause of the Task Force's abrupt termination was a feeling that the project belonged to the just defeated Democrats and Clinton's Vice President Al Gore. With the delay in their taking office, the Bush administration had had no time to absorb and be comfortable with its contents, nor to devise an overall energy policy of its own. Indeed, just prior to the Genoa Summit, the Bush Administration declared it would not ratify the Kyoto Protocol, thus removing any incentive for international action on renewable energy. More broadly, Genoa featured several very new G8 leaders, including Italian host Silvio Berlusconi, who had taken

office just weeks before with a summit location, agenda, and game-plan constructed by his domestic political rivals who had just been defeated at the polls. Such factors were sufficient to inhibit the incentive to co-operate produced by America's California energy crisis of 2000-2001.

However at Genoa, in the immediate wake of the American decision on Kyoto, the unlikely combination of Japan's Prime Minister Koizumi, Canada's Jean Chrétien and Russia's Vladimir Putin faced a classic collective action dilemma: if they all agreed to ratify Kyoto it would come into force even without America, but if only one of them defected, it would not have the necessary total of "weighted" votes to take effect. They decided to act together and subsequently all kept their word, with Japan ratifying first, Canada second, and Russia third.

2002 Kananaskis

Energy returned as a more prominent issue at the June 2002 Kananaksis Summit. This was due in part to the decision to hold a G8 Ministerial meeting in May, in the immediate lead-up to the Summit. Unusually, Canada as G8 host allowed this meeting to be co-chaired by its Energy Minister and the American Secretary of Energy Spencer Abraham, and to be held in Detroit, Michigan, in Abraham's home state. The co-hosting brought George Bush's America back into the G8 energy co-operation game. The location and resulting agenda shifted the energy framework from production through alternatives to consumption, especially in the critical transportation sector, and on how innovative technology could be an important part of the solution there. The communiqué dealt with a very comprehensive agenda in a very prescient way. It started with the concept of energy security, and acknowledged the important role that growing demand from Asian economies would play. It ended with a communiqué that highlighted the environmental and climate change dimension, generated seven commitments, and furthered the institutionalization of G8 energy governance by asking energy officials to follow up and calling for more regular contact among G8 energy officials (Appendix I).

At Kananaskis itself, the Chair's Summary made no reference to energy, but did recognize that "climate change is a pressing issue that requires a global solution." The Summit's centerpiece G8 Africa Action Plan did deal directly with energy. It promised to address the illegal exploitation and international transfer of natural resources, including petroleum, from Africa, which fuel armed conflicts, and to assist regional institutions in key sectors such as energy. In doing so it responded to NEPAD's desire for support for infrastructure projects in key sectors, including energy (Doumbe-Bille 2003).

2003 Evian

Evian in 2003 gave more attention to energy. Its major addition was the focus on oil tanker transport, where G8 attention and action was fuelled by the crash of the Prestige spilling its cargo of oil on the beaches of France and Spain. Here the G8 struggled to impose a new global regulatory regime of double hulls for oil tankers. But the resistance of the Japanese prevented full agreement here. Nonetheless, its lengthy Chair's Statement gave priority attention to a broad range of energy issues: science and technology for sustainable development in general; cleaner, more efficient energy and the fight against air pollution and climate change; the

marine environment and tanker safety; and nuclear safety. In the latter area, the Evian leaders, in accordance with their statement at Kananaskis, created the G8 Nuclear Safety and Security Group, and adopted its mandate and the Core Principles to promote the safe and secure use of civil nuclear technology.

2004 Sea Island

At Sea Island, rising world oil prices helped give the energy issue more prominence again. On the election campaign trail at home, Canadian Prime Minister Paul Martin promised he would raise the issue of world oil prices at Sea Island, in search of some relief. In their discussion at the Summit itself, G8 leaders turned inward from admonishing OPEC to lower prices and toward exploring solutions within the G8. These included energy efficiency, conservation and alternatives to oil. Moreover, in the one clear outburst of spontaneous combustion at Sea Island, the leaders expressed their concern with how the threat of terrorism could hurt or end the strong economic recovery now underway, both through its impact on energy prices, and in adding uncertainty and transaction costs across the G8 and global economy as a whole. The relevant passage in the Chair's Statement read: "We welcomed the increasing strength of the global economy. We agreed it was important to take advantage of the strong global economic environment to implement further reforms to accelerate growth in our countries. We noted the recent pledge by oil producers to increase production. We recognized the need for balanced energy policies, which increase energy supplies and encourage more efficient energy use and conservation, including through new technologies."

In coming to such conclusion these leaders activated their memory of past energy vulnerabilities, melded them to terrorism, focused on recent terrorist attacks on Middle East energy installations in Iraq and Saudi Arabia, and came together to confront the much broader threat posed by this deadly combination in the post September 11th world (Ikenberry 1988). In doing so they were able, in the face of this new prospective energy supply shock, to overcome their deep divisions over the American led invasion of Iraq. They also incorporated everyone's interests into their energy consensus. At the end of the summit, France's Jacques Chirac pronounced himself pleased that Bush had endorsed nuclear power.

Gleneagles 2005

Although its announced priority themes were African development and climate change control, energy featured as a focus at Tony Blair's British hosted Gleneagles G8 summit on July 6-8, 2005. Energy issues were highlighted not only in the Chair's Statement, but in the title and content of several G8 leaders documents: The Gleneagles Communiqué, signed for the first time by the leaders, on Africa, Climate Change, Energy and Sustainable Development; the separately released document on Climate Change, Energy and Sustainable Development; the Gleneagles Plan of Action of Climate Change, Clean Energy and Sustainable development; and on Global Economy and Oil.

Generating these documents was by no means easy, especially as climate change had been a source of division among G8 countries and their civil society stakeholders since 1997 and was not a high profile issue in the public mind (Donnelly 2005). To move forward Blair in

September 2004 focused on securing consensus on climate change science, promoting cleaner energy technologies, and engaging India, China and other countries in this G8 led consensus and work. The first objective was forwarded through a February 2005 experts meeting at Hadley and through a June 2005 report from the National Academies of Science from G8 States, China, India and Brazil. To mobilize business Blair went to World Economic Forum in Davos and met business leaders in London on June 9, where the Davos business leaders issued a strong supportive report. On energy more directly, the experts meeting from G8 Environment and Energy Ministries in April 2005 in London and a workshop from G8 energy research organizations (in keeping with an Evian commitment) helped foster agreement and action on technology development. At an early stage the British also mobilized the IEA and World Bank in preparation, implementation and finance and brought their representatives to Gleneagles to participate. A similar approach was taken with the "plus five" non-G8 countries of Brazil, China, India, Mexico and South Africa.

The result was agreement on exploiting cleaner technologies (including bio-energy and coal), financing investment in them in emerging economies, and fostering energy efficiency. These energy accomplishments fully benefited from and contributed to iteration and institutionalization, as key factors for Summit success (Bayne 2005). On the latter, Gleneagles launched a new, broader dialogue linking energy security with climate change, starting with a meeting in November 2005. Energy security would be a central theme for the Russian hosted summit and for the G8 energy ministers meeting they planned to hold on the way. Japan pledged to produce a report on climate change when it hosted the G8 in 2007.

Such far reaching agreement was possible because President Bush adjusted critical US positions on climate change on the Summit's eve. In part he was responding to domestic American actors, notably the business leaders who had participated in the Davos process, faith-faith NGO's from his base who had taken up the climate change cause, and action from key states such as California and in the US Congress. Propelling all were the larger systemic forces of American vulnerability, created by rising world oil prices and the large of supplies from a still conflict-afflicted Iraq.

4. Causes of G8 Energy Performance

A. Equalizing Vulnerability

The first cause of the G8's effectiveness in the field of energy is America's acute vulnerability, as activated by a steady succession of an expanding array of ever more interlinked and ever less controllable shocks. This vulnerability has persisted, indeed deepened, even after several national policy changes, such as the creation of the US Strategic Petroleum Reserve, the adoption of national standards for energy efficient household appliances in 1987, and efforts to impose a carbon tax in the 1990's. However, given the normal wide fluctuation of world and oil prices due to market changes, America's continuing, cumulating vulnerability assumes causal power primarily when it crosses the critical thresholds bred by discrete energy shocks (Appendix G).

The initial shocks came mildly from the transportation component of the energy supply-demand chain. They arrived in the form of oil tankers creating environmental damage to

American and G8 members' shores. The succession of mini-shocks ran from the beaches of Santa Barbara through the Exxon Valdez to the sinking of the *Prestige* off the French and Spanish coast in 2003. As Appendix H shows, there was a cluster of large oil spills from tankers from 1975-1980, and a smaller one from 1987-1993. Yet these still localized and seldom deadly (to humans) accidents were sufficient to inspire the G8's growing environmental awareness, rather than oil as a long distance transported source of supply.

The first acute general shock came in 1973 from a politically motivated, government controlled and consciously intended, physical cut-off of the supply at the source and the resulting price rise through the market that consumers paid at the pump. Middle East war bred OPEC supply cut-offs and price rises.

The second acute and expanded shock came in 1979, from the fall of the Shah of Iran and the installation of an Islamic fundamentalist regime in its place. The new vulnerability had arrived in its proto terrorist form. Milder shocks from the Middle East followed from the wars launched by Saddam Hussein's Iraq, first against Iran and then in 1990 against Kuwait.

A third acute shock came again from a supply source, but this one from the second best supply source, right at home. Its first instalment was the deadly explosion of the nuclear reactor at Three Mile Island in the US in January 1979. The explosion stopped America's civilian nuclear power program – its second best supply alternative, located largely (save for the uranium) right at home, and based on a high technology where America, ever since 1945, had led the world. After the shock of Three Mile Island, not a single new civilian nuclear reactor was built in the US in 25 years. By 2004 America still relied on nuclear power for 20% of its overall energy needs, but its reactor fleet was aging fast and facing the need to be replaced very soon. The US thus started to explore importing nuclear reactors from next door Canada to meet its nuclear and energy needs. A second instalment came in 1986 at Chernobyl. A third followed in Japan at Tokaimura in 1999 (Donnelly 2002).

A fourth shock came when the September 11th terrorist attack on America added a concern with emergency preparedness and physical protection of supply to the G8's energy agenda. More recently the advent of global terrorism has spread into Saudi Arabia. For even an American whose foreign policy is effective in inducing its Saudi Arabian ally and other OPEC members in keeping supplies secure and prices stable and low, cannot prevent the supply cutoffs and price spikes that terrorist acts against oil infrastructure and personnel have added in Saudi Arabia and Iraq. The deadly combination of terrorism and energy insecurity now fuels a new generation of physical and psychological energy vulnerability in the United States.

A fifth shock was an ecological one, assaulting with far greater force America's own oil and gas supply than tanker spills has to its transportation system in decades past. This was the arrival of Hurricane's Katrina and Rita, assaulting the US Gulf Coast in September 2005. By mid September 2006, the supply knocked out by these hurricanes had not fully been restored, with the next hurricane season only a few months away.

As 2006 unfolded, these interlinked vulnerabilities have arisen to affect the supply in secondary states. In countries such as Nigeria and Ecuador, "terrorist" attacks from groups with environmental and development causes have had an important impact in raising prices in a world of tight supply.

Another new source of vulnerability has arisen, after the 2000-1 recession, in the form of soaring demand from the major and emerging powers of the world. Within the G8, by the final quarter of 2005, it was clear that Japan was reviving, after a decade of stagnant growth.

Beyond the G8, the booming demand came from China and India, followed by several other emerging economies in the post cold war, globalizing world.

The cumulative result has been to render America far more vulnerable than it had been in 1973-1978. In 2004, Americans used 10 times more gasoline per capita than the global average, and more than twice as much as those in similarly wide open Australia did. The US consumed 25% of global oil production, and imported 60% of its oil requirements. The US possessed only 3% of proven global oil reserves, compared to almost 66% for the Persian Gulf states. From November 2004-5, its crude oil came from the following sources: the US 33.7%, Canada 10.6%, Mexico 10.1% and Saudi Arabia 9.6% (Freeman 2006, Rugman 2005).

Although US oil consumption dropped substantially after the 1973 Arab oil embargo, since the early 1980's it has risen steadily, to a peak higher than that in 1973. The transportation sector has been responsible for all of the increase, as more Americans have driven more often, over longer distances, and in more fuel inefficient SUV's and light trucks, which have come to account for over half of all new vehicle sales. Americans were thus importantly affected by rising gas prices, which rose 100% from 2003 to 2004 to a 21 year high (in nominal dollars) on the Sea Island Summit's eve.

Energy vulnerability is not only a US preoccupation. Rather it is a common condition and thus common aversion among virtually all Summit members, most notably Japan and continental Europe. It is currently coming to Britain, as that country's once abundant natural gas supplies, which had been critical to G8 success in the face of the first energy shock (see below), are now rapidly running out.

It is thus hardly surprising that energy vulnerability, measured by the market price of West Texas Intermediate crude oil on the month forward contract, has proven to be a cause of overall G8 performance over the Summit's first 29 years (Kirton 2004). The strength of the relationship is shown by the fact that some of the Summits with the greatest attention, action and accomplishments in energy – notably 1979 and 1980 – occur in the years with the largest spike in the inflation adjusted oil price. However similarly strong spikes (if now routine) in 1981 and 1982 led to no such strong Summit co-operation and achievement on energy, nor did new spikes in 1991 and 1997.

B. Multilateral Organizational Failure

In the face of such an acute vulnerability to America, most G8 allies, and much of the global economy, the major existing multilateral organizations have failed to develop an adequate response. The United Nations system remains without an energy organization, apart from those, such as the International Atomic Energy Agency (IAEA), partly focused on energy supply and security in specialized fields. The global community has thus had to rely on functional multilateral organizations devoted to other purposes, such as the IMF and World Bank, picking up the energy issue at times of crises, on ad hoc north-south summits or consumer producer dialogues (as in the CIEC and Cancun), or on ad hoc direct deal bilateral bargaining between OPEC or Saudi Arabia on the one hand, and America and individual major powers on the other.

Since 1974, the G7 has had at its disposal the plurilateral Atlanticist organizations, either in the form of the old OECD founded in 1961 or the newer IEA, created at American initiative over French objections in 1974 in response to the first, 1973, oil shock. Yet these institutions

have proven inadequate, especially in a world of compounding interconnected vulnerabilities and shocks. And as Russia, the G8's leading energy surplus supplier, is a member of neither the OECD nor IEA, the latter are critically incomplete international institutional nests. Thus, if intergovernmental rather than civil society bodies of global reach are required, the G8 has come to stand alone as the first line of defence for America and its major power allies through which to respond to recurring energy shocks.

C. Equalizing, Collectively Relevant Capability

Within the G8, there lies sufficient systemically relevant capability to overcome the G8's energy vulnerability to an OPEC dominated global market. There also exists a relatively equal distribution of relevant capabilities among all members of the G8, allowing balanced policy and burden sharing to easily arise (Appendix I). This is especially the case if one adds to the usual categories of supplies of oil, natural gas, coal and nuclear power, the technological capabilities of G8 members, including the full European Union, in energy efficiency and conservation, and in renewable and alternative sources such as windpower.

It was the collective predominance and equalization of energy capabilities among G7 members that drove the 1975 creation of the G7 and its success in its early years. In absolute terms, the indigenous energy production of G7 countries in million tonnes of oil equivalent changed from 1973 to 1978 in the following ways (Dewitt and Kirton 1983: 140-1). It declined in the US from 1,483 to 1,451 (-32), in Canada from 235 to 226 (-9), and in Germany from 120 to 117 (-3). In contrast, it rose in Japan from 39 to 50 (+11), France 42 to 46 (+4), and Britain 112 to 170 (+58). Among these G6 countries, it declined by 44 and rose by 73, for a net gain of 29, thanks entirely to Britain's vast new supplies. The EEC, which joined the G7 in 1977, went from 367 in 1973 to 440 in 1978, for a G8 gain of 73 (well beyond the total of the existing European and G8 big four).

A broader look at the annual trends in supply and demand tells a similar story of equalization within the G7 in these critical early years (Dewitt and Kirton 1983: 139). The energy production of first ranked USA had grown at an annual average rate of 3.5% from 1960-74, but declined at a -0.5% rate from 1974-8. Canada's decline was even deeper, moving from 8.9% to -1.3%. Germany remained constant at -0.7. In contrast, second ranked Japan moved from -1.7 to -0.8% between the two periods, reducing a still continuing rate of decline. France rose from -1.3% to 0.6%. The greatest gainer, and G7's energy supply saviour was Britain, which moved from -1.2% to 13.5%. In all G7 countries, average annual energy consumption sharply declined between the two periods, at generally the same rate. Thus G7-wide conservation and new British supplies allowed the G7 to respond collectively to the 1973 oil shock – before the 1979 oil shock and Three Mile Island nuclear explosion added new challenges.

In these early years, and into the 1980's, however, Canada's surplus oil capabilities played a part in protecting the global predominance of G8 capabilities form even deeper decline, and of equalizing G8 capabilities within the club. From 1970 to 1978 America's net energy import requirement rose fourfold to 405.5 MTOE in 1978, the net imports of Japan, Germany and France increased less dramatically, and Britain's net imports dramatically decreased. In contrast, Canada moved from net imports of 18.9 MTOE in 1960 to 4.5 in 1965, and then into a surplus of indigenous production from 1970 to 1978. During the 1970's it was

the only G7 member with a surplus, even if its surplus remained small in the context of its G7 partners' demands and its surplus declined from its 1973 peak (Dewitt and Kirton 1983: 139-143). In 1981, Canada moved its domestic oil prices to world levels, reduced its crude oil demands by 7% and its total energy needs by 2%, and with the discovery of Hibernia off Canada's east coast saw its reserves start to rise after a decade of decline. From 1980 to 1982 Canada's non oil exports rose sharply, while Canadian control of the domestic oil and gas industry rose from 22.3 to 33.1%% and ownership from 28 to 34.7% (Dewitt and Kirton 1983: 1245-6).

By the twenty first century, for the major conventional specialized energy capabilities – oil, gas, and nuclear – the distribution among G8 members had become even more equal and largely the inverse of their overall capabilities, especially when a country's supply-demand ratio is taken into account. Thus the US, Japan, Germany, France and Italy are highly energy dependent. In sharp contrast, Russia, Canada and still Britain are net energy exporters, with the first two having world leading energy reserves. Indeed, Russia stands number one in the world in natural gas and Canada number one in oil, in each case rivalling and potentially replacing Saudi Arabia as the supplier and stabilizer of last resort on a global scale.

In the case of Russia, the G8's weakest member overall, current oil exports now makes Russia Europe and Japan's secure Saudi Arabia right next door. Prior to the collapse of the Soviet Union, the USSR produced more than 12.5 mbd, or one fifth of global production and one third more than Saudi Arabia produced at its end of 2000 peak (Morse and Ricard 2002). It was thus a compellingly attractive trade partner to continental Europe in the immediate wake of the second oil shock as the Europeans recognized when they favoured the Soviet gas pipeline at the G7 summit in 1982. By 1996 production from the post Soviet states had plummeted to 7 mbd. However, Russia then steadily increased its production, by a world leading half a mbd in 2000 and again in 2001, at a time when Saudi Arabia was sharply cutting back. Russia now rivals Saudi Arabia as a world oil exporter. It further possesses abundant gas, coal, nuclear, hydro and wind reserves as well.

In the case of Canada, the G8's second weakest member overall, there are proven and probable oil reserves that, in the longer term world of high oil prices, make it America's secure Saudi Arabia right next door, connected by proximity, terrorist proof pipelines, and NAFTA political protections. The 2003 acceptance of Canada's 174 billion barrels of proven oils sands reserves propelled Canada into the world's number two position in oil reserves, behind only Saudi Arabia. It has long served as the largest single exporter of energy supplies to the US.

Beyond oil and gas, the historically favoured, high technology alternative source of energy, civilian nuclear power, shows a similar trend of equalization within the G8. As Appendix J shows, from 1975-9, America alone had one third of the new nuclear plants connected to the grid among the G7 (plus Russia), reflecting America's earlier investments in this lumpy capital intensive industry with very long lead times. In the 1990's the US share dropped slightly to 31%. But during the 1990's, when the Three Miles Island effect took full force, the US share dropped to 11%. From 2000-5 it fell to 0, as only Japan and Russia kept the G8's new nuclear capacity alive. This complete trend toward equalization within, however, was combined with a decline in collective predominance without, as the G8's peak of 155 new nuclear reactors from 1980-9 fell to 36 in the 1990's and to only six from 2000-5.

Turning to the fuel source required to run civilian nuclear reactors, uranium, the global and G8 distribution of capabilities shows even more strongly how the G8's two least energy vulnerable but overall least capable members, Canada and Russia, have leading specialized

energy capabilities that equalize capabilities within the G8 and move it toward global predominance overall. As seen in Appendix K on world uranium production, each year from 1998 to 2004, Canada has led the world and the G8 by a considerable margin in the first spot. Russia has ranked fifth in the world and second in the G8. The US has been eight in the world and third in the G8. In 1998 Canada alone had 31% of the global total and still 29% by 2004. Canada and Russia together had 34% of the global total in 1999 and 37% in 2004. The two, together with the US had 39% of the global total in both 1999 and 2004. Thanks to Canada and Russia, the G8 had a credible claim to both global predominance and internal equality in the uranium realm.

Looking ahead, in 2003, the top eight countries with known recoverable reserves of uranium, measured as percentage of world total, ranked in turn as follows: Australia 30%, Kazakhstan 17%, Canada 12%, South Africa 8%, Namibia 6%, Brazil 4%, Russia 4%, USA 3% and Uzbekistan 3% (World Nuclear Energy Association 2003). Within the post 1997 G8, Canada's 12%, Russia's 4% and the USA's 3% give it a total of 19%. When the G8's recent outreach partners of South Africa with 8% and Brazil with 4% are added, the G8 "plus five" total rises to 31%. When it is recalled that during the energy crisis-afflicted 1970s, the then otherwise unlikely combination of Canada, the Soviet Union, France and South Africa combined to create a secret uranium cartel aimed at an energy short United States, it is overwhelming clear why in the energy short twenty first century, the United States overwhelmingly needs the G8, and needs it to govern global energy and uranium in first place.

D. Common Democratic Purpose

Inspiring G8 members to activate this capability into a combined response has been the directness and depth of the assault that these energy shocks and vulnerabilities from abroad have represented on the fundamental democratic principles of all G8 members and the G8's mission as a club.

The first oil shock and its resulting "stagflation" was seen not just as an economic setback to G8 and most global economies but as a political "crisis of governability" that challenged the fundamental democratic principles on which G8 domestic governance was based. Within the Middle East, the G8's energy dependence was seen as imperilling the very survival of Israel, the region's only democratic state, whose defeat could well bring another holocaust to the world. The second, 1979, oil shock, which brought Islamic fundamentalists to power in Iran, and their seizure of American diplomats as hostage, added the spectre of state-sponsored terrorism and the violation of the core sovereignty principles of Westphalianism to the energy vulnerability mix.

In contrast, the 1990 invasion (quite apart from its timing immediately after the 1990 Summit) represented a more limited response. Neither oil rich Kuwait, the first victim of Saddam Hussein's aggression, nor Saudi Arabia, its second, were democratic polities. Only Israel, seen from the start by the Americans as the third and ultimate target, was. The need to fight Israel's war for it for the first time since 1948 was an appeal that had resonance in the US and Canada and most other member of the G7.

During the twenty first century, the G8's common democratic values have inspired G8 energy action is several ways. One has been the emphasis on combating corruption through measures such as the Extractive Industries Transparency Initiative in the newly democratic

polities of Africa and the Americas. Another has been the way in which rising oil prices harms development and thus social advance in the newly democratic states of the global south. Yet another is the emphasis on a stable rule of law and regime for property rights for energy-related transactions within the G8. And a final one is the concerns with openness and transparency in oil markets, as reflected most recently in the Gleneagles Plan of Action.

Perhaps the most powerful impact of the G8's core democratic principle has been the easy acceptance of America's partners for George Bush's initiative, culminating at the Sea Island summit, for the democratization of the broader Middle East and North Africa. This G8 action has been pushed in part by a desire to address the root causes of terrorism in the wake of 911, by fostering democratic development in this long largely non-democratic region, and by doing so removing the terrorist threat to a key source of America, Europe and Japan's imported oil. More recently, the growing attachment of George Bush to the democratic ideal as applied to the Middle East, and growing doubts about the security of supply, had led him to emphasize renewables in America's strategy at home.

E. Political Capital and Control

Summit success is also driven by the domestic political capital of G8 leaders, who are thus able to transcend domestic divisions and short term compromises to make strategic changes and grand bargains to ensure benefits over the longer term. In general terms, the 1980's brought considerable domestic political capital to the G8, with the arrival of the long serving Reagan, Thatcher, Kohl and Mitterrand, who each had control of their legislatures at home. However in the field of energy, domestic political weakness took its toll on the G8's attention, agreement and action on energy during those years. In North America, the memory of Carter and Clark's defeat at the polls after the 1979 Tokyo triumph, in part due to their price increasing conservationist policies, inhibited their successors for major co-operative initiatives on energy at the G8. In Germany with its coalition government, a growing Green Party's reluctance to embrace the nuclear alternative after the 1979 Three Mile Island and 1986 Chernobyl explosions inhibited easy G8 agreement on an energy program where nuclear was involved.

In the twenty first century, the G8 has experienced unusually high leadership continuity and political control, with the same eight leaders coming to every summit since 2001 (save for Canada's Paul Martin who started as leader in 2004). During this time, the G8's energy performance rose to high levels by Gleneagles 2005. The link between energy vulnerability and political control was evident in America in the lead up to the 2004 Sea Island Summit. Virtually all Americans experienced the resulting oil prices rises on almost a daily basis as they filled their vehicles up at the gas pump. A Pew Research Centre poll on June 18, 2004 showed Americans followed news about gas prices more closely than that about Ronald Reagan's recent death or the war in Iraq. Such preoccupations were important for an American president facing election on November 2 that year.

F. Constricted Participation

A final cause of G8 energy performance has been the constricted membership that facilitates easy agreement, together with the selective and contained expanded participation among

energy critical non-member states. The addition as members of Canada in 1976 and the European Community (with the Netherlands in 1977) added major supply capabilities to the club, and helped fuel the G8's high energy performance during these years. Subsequently, membership and participation were frozen, and the G8;'s energy performance declined. The addition of Russia in 1998 was important in adding collective predominance, internal equality and higher G8 performance as a result. From 2001 to 2005 the G8 Summit was attended by oil and gas rich Nigeria and Algeria, and in 2003 and 2005 by uranium rich Brazil, oil rich Mexico, and demand rich China and India, and in 2004 by oil rich Iraq.

5. Conclusions and Recommendations

The Causal Connections

In general terms, this analysis shows that the G8's performance in global energy governance has gone through three discernable phases. The first was a period of high performance during its first seven year hosting cycle from 1975 to 1981 (with a peak in 1979). The second was a period of low performance from 1982 (which featured to divisive Soviet gas pipeline dispute) to 2001 (with an Iraq war generated spike in 1991-2). And the third was a return to sustained high performance from 20o2 to 2005.

These periods of high performance coincide with, and are driven by, rising vulnerabilities and shocks in energy and related areas afflicted the G8 and in particular its most powerful member the US, in a world where the inherited multilateral institutions focus only on the nuclear component of energy supply or exclude Russia, and where the G8's energy capabilities are increasingly equal thanks to the rising and across the board supply strength of Canada and Russia. This high performance has been sustained in the latest period by growing connections between the G8's core mission and common principles of open democracy, individual liberty and social advance as an the Summit's deliberative and directional achievements; by the unusually high leadership continuity and political control of G8 leaders; and by the carefully controlled and still constricted addition of energy rich Russia, Nigeria, Algeria, Mexico and Iraq, and the great demand powers of China and India.

The Current Conditions

In the months leading up to the 2006 St. Petersburg Summit on July 15-17th, many of the conditions that make for a highly successful energy summit are increasingly in place. Oil prices have been kept high by global demand and energy targeted terrorist attacks. The UN at its World Summit did nothing to create a full-strength energy organization and Russia remains outside the OECD and IEA. Russia, as G8 host, and Canada remain the leading and only full strength energy supply powers within the G8. Questions of openness, transparency and the rule of law are rising to the top of the energy security priority that Russia has selected as St. Petersburg's signature theme. There is a great deal of cumulative leadership continuity and political control, even with newcomers from Germany, Canada and possibly Italy as well. And

Russian has found an efficient formula for involving relevant outsiders, by inviting the executive heads of the IEA and World Bank.

These current conditions, when combined with the G8's 31 year record, point to several evidence-based recommendations for making the St. Petersburg Summit's energy performance even more of a success. The following ten, arranged from the most general to the most specific, stand out.

1. Focus Fully on Energy

The first recommendation is to focus full on energy, making it the overall singular summit theme, rather than just one of three alongside infectious disease and education. In energy, the G8 offers a rich historical experience under varying conditions, a consistently high compliance performance, and a rich institutional edifice. At the same time energy vulnerabilities are rising, the UN system remains devoid of a comprehensive energy organization, Russia remains excluded from the IEA, the veteran leaders of the G8 – Putin, Bush and Blair – and newcomer Stephen Harper from Canada are well versed in energy issues and the closely related question of climate change. The St. Petersburg energy agenda can be ambitious, comprehensive and cross-cutting as a result.

2. Frame It as Environmentally Sustainable Energy

The second recommendation is to frame the energy security agenda as environmentally sustainable energy. President Putin as host has publicly pledged to do so. Environmental issues are currently scheduled to appear nowhere else as a stand alone subject on the St. Petersburg agenda. Iteration breeds summit success and energy and climate change featured at Gleneagles last year and will likely feature again in Germany in 2007 and Japan in 2008. And the G8's climate change commitments generate high compliance, including by George Bush's US. Moreover the G8 Summit is ideally designed for and best at issue linkage, and the energy-environment link is an easily available and highly potent one.

3. Mobilize the Market

The third recommendation is to mobilize the market as much as possible to define and deliver the agreements that St. Petersburg will take. Indeed, as G8 Finance Ministers declared in early February 2006 "market mechanisms are vital," not as a matter of ideological preference but because they have been proven to work. Moving to market mechanisms in the US through US oil decontrol in 1979 was critical to the Tokyo summit's success. Canada has become an even greater G8 and global energy power after and because it moved to market mechanisms in the 1980's by charging citizens at home the same price for oil and gas as it did customers abroad. And Canada, like the G8's other full-strength energy surplus power is a cold dark country, with a dispersed population across a large continent bordering on the three great oceans of the world.

4. Rebalance Subsidies and R&D

The fourth recommendation is to rebalance subsidies. This should be done for three purposes: The first is to create a level playing field that will allow market winners to freely and fairly flourish. Because of the international institutional privileging of the IAEA's nuclear energy and its close connection with national security concerns, it has since 1945 received the lion's share of the subsidies in R&D and technology that the global community has devoted to increasing energy supply. The second purpose is sustainable energy, to privilege the cleaner and more sustainable sources. Coal and heavy oil tend not to meet this test. The third purpose is to encourage energy equity or "energy for all" - the energy sources that most or all countries and citizens have, rather than just a hydrocarbon or uranium rich few. The latter two purposes point to re-orienting subsidies toward wind-power, which is rapidly emerging as profitable in the marketplace, and solar power and biomass, which are available almost anywhere in the world.

5. Reduce Taxes

A fifth recommendation is to avoid measures that depend on tax increases, no matter how desirable these might be in economic theory in dampening demand. To be sure, the economic and environmental principle of the full cost pricing of and internalization of natural resources should be fully respected. Moreover, there may be a case for selective user fees, such as a charge on international passenger airline travel to compensate for the atmospheric ecological capital that such flights consume. Yet Joe Clark's effort to meet his Tokyo 1979 conservation commitments by raising oil taxes led quickly to his defeat at the polls. And in the United States energy or carbon taxes have fallen into disrepute.

6. Introduce Ecological National Accounting

A sixth recommendation builds on the recent G8 agreement in the field of energy and elsewhere to promote transparency and combine it with the core market economics and ecological principle of the full cost pricing of natural resources. Full cost pricing supplements the use of the GDP as a common comparative metric through the development of a comparable measure of a country's Net Ecological Product – the balance of how much natural or ecological capital is being consumed and restored each year. Building on existing exercises in the scientific community, the OECD and IMF could be charged with such a project. Its development and application would encourage moves, desired by the G8, toward greater transparency in oil, gas, uranium and other energy reserves, and their annual production and consumption, on the part of all countries and relevant actors in the world.

7. Use the Global Partnership for Nuclear Waste Disposal

A seventh recommendation is to address one of the critical impediments toward adding civilian nuclear power in an affordable, secure and safe way to the required energy supply mix. This is

the question of how to safely dispose of nuclear waste, particularly the mid-life wastes that constitute a large share of the total. Since 2002, the G8 through its Global Partnership has developed a formidable capacity to safely dispose of nuclear waste from assets in the military realm. The relevant G8 institutions could be charged with exploring how this existing capacity could provide a foundation for dealing with civilian nuclear waste, especially when the currently military-related requirements ease.

8. Generate a G8-centered Global Gas Market

An eighth recommendation is to foster the desired diversity in supply, by type and country source, by generating a global, rather than merely regional natural gas market among the members of the G8. Rather than relying on a system in which Russia's surplus natural gas serves Europe and Japan through land and sea based pipelines, and Canada's surplus similarly serves the US it is desirable to connect the continents, in the first instance by having Russian gas arrive in North America through a liquefied natural gas system. Such a connection would use existing LNG technologies, and would best be grounded on the east coast of North America where the greatest demand lies and which lies furthest from the new sources of North American gas located in the west and north. Such a system would also reduce the need for North America to rely on dirty coal, or other greenhouse gas intensive sources, until such time as the economic and environmental challenges surrounding such sources can be satisfactorily addressed.

9. Renew the G8 Energy Institutions

A ninth recommendation is to make greater use of G8 energy institutions, at the ministerial, official and multi-stakeholder level, of the sort that have served the G8 in its energy governance so well in the past. This is a call for G8 institutionalization for a purpose, and not for its own sake. Three particular purposes can be identified. The first is to engage energy rich Russia as an equal in a dialogue as open, intensive, analytically grounded and consensus oriented as that which the other G8 members have long enjoyed with each other and outsiders in the IEA and OECD. The second is the institutionalization, as an annual forum, the G8 Energy Ministers meeting and G8 Environment ministers meeting and to entrust them together with the task of forwarding the G8 leaders program of sustainable energy security and climate change control. A third is to create a new multi-stakeholder G8 Renewable Energy Task Force with the dual task of advancing sustainable and equitable energy security and climate change control in a post Kyoto-ratified world. Much has changed in the world of conventional and renewable energy, and in the global regulatory framework, since the G8's last such task force was disbanded in 2001. Such a task force would be a concrete way of assisting America to realize the priority President Bush proclaimed in his State of the Union address in January 2006.

10. Mobilize the Common Democratic Commitment

A tenth and final recommendation is to frame the St. Petersburg energy agenda and achievements announced in the concluding communiqué fully in the framework of the G8's core missions of globally promoting open democracy, individual liberty and social advance. Doing so would directly mobilize the common principles and shared social purpose that has proven to be effective in generating high G8 energy governance performance in the past and that have diffused into broader G8-related institutions over the past six years (Kirton 2005). In such a framework, the core principle of "open democracy" would frame the G8's treatment of moving toward more accessible, participatory and popular energy systems and supplies, to transparency and openness in data, markets and much else, and stronger international co-operation with democratically dedicated and dominated clubs (starting with the EU, IEA, OECD, and Arctic Council). The core principle of "individual liberty" and the rule of law would frame the G8's treatment of the need for stable, high standard regulatory regimes at the national and international level for investment, transit and access, and for natural resource exploitation and environmental protection. And the core principle of "social advance" would frame the treatment of accessible, affordable, acceptable, and appropriate "energy for all," of the need for energy security, safety and supply systems that empower and protect all, for diversity of supply sources by country and type, and for a free, fair market in which all can and more do participate.

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Appendix A: The G8's Energy Performance, 1975-2005

Year	Bayne Grade	Number of Paragraphs[1]	%Paragraphs	Commitments[2]	Compliance: energy[3], (overall[4])	G8 Ministerial meetings	Official level bodies[5]
1975	A-	04	25%	03	+66% (+41%)	--	01
1976	D	01	04%	01	+66% (+35%)	--	00
1977	B-	13	15%	05	+66% (+38%)	--	01
1978	A	15	03%	17	+66% (+34%)	--	00
1979	B+	26	70%	23	+66% (+62%)	--	02
1980	C+	25	45%	25	+66% (+16%)	--	02
1981	C	11	21%	09	+66% (+27%)	--	00
1982	C	02	10%	01	+66% (+82%)	--	00
1983	B	04	09%	02	+66% (+07%)	--	00
1984	C-	03	04%	00	+66% (+35%)	--	00
1985	E	00	00	00	+66% (+20%)	--	00
1986	B+	07	15%	01	+66% (+77%)	--	01
1987	D	02	02%	00	+66% (+86%)	--	00
1988	C-	01	01%	00	+66% (-45%)	--	00
1989	B+	06	04%	01	-50% (+19%)	--	00
1990	D	11	09%	01	-14%	--	00
1991	B-	32	19%	12	00%	--	00
1992	D	27	19%	16	+63%	--	01
1993	C+	07	09%	01	+75%	--	02
1994	C	11	12%	10	+100%	--	00
1995	B+	10	05%	03	+100%	--	00
1996	B	17	06%	07[6]	+14%** +29*** (+36%)	01[7] (Moscow)	02
1997	C-	25	17%	12[8]	+50%** (+27%)	--	00
1998	B+	05	04%	08[9]	+100** (+45%)	01 (Moscow)	01
1999	B+	10	06%	04[10]	-- (+39%)	--	00
2000	B	14	07%	07[11]	-- (+80%)	--	01
2001	B	04	04%	02[12]	+17** (+53%)	--	00
2002	B+	29	14%	25[13]	+25%**** (+33%)	01 (Detroit)	02
2003	C+	05[14]	18%	40	+75% (+51%)	--	01
2004	C+	04[15]	29%	15	+78% (+55%)	--	04
2005		07[16]	21%	77		01 (London)	02

Notes:

1 The number of paragraphs refers to all paragraphs from all documents released by the leaders at the Summit.

2 These commitments are derived from all documents released by the leaders at the Summit.

3 From 1975-1988, the average energy score was 66%, as determined by Von Furstenburg and Daniels. From 1989-1995, the energy score is based on climate change commitments by Canada and the US as determined by Kokotsis.

4 Compliance is the overall compliance score of the Summit. From 1975-1989, the scores come from Von Furstenburg, George and Joseph Daniels, *Economic Summit Declarations, 1975-1989: Examining the*

Written Record of International Cooperation, Princeton Studies in International Finance 72, Princeton, N. J., Department of Economics, 1992. The scores from 1996-2004 were generated by the G8Research Group and can be located at www.g7.utoronto.ca/evaluations/2004seaisland_final/index.html#tablec.
5 Refers to official level bodies with mandates to deal with energy-related issue areas.
6 References include nuclear safety w/ score of +0.29, and non-proliferation.
7 Nuclear Safety and Security Summit, Moscow, leaders-level meeting
8 References include nuclear safety, global energy, and non-proliferation.
9 References include energy, NSWG, nuclear safety, and non-proliferation.
10 References include nuclear safety, and non-proliferation.
11 References include nuclear safety, renewable energy, and non-proliferation.
12 References include renewable energy.
13 References include arms control and disarmament w/ score of +0.25.
14 With 5 additional documents released separately (references include just the Chair's Summary, as do percent of paragraphs)
15 With 2 additional documents released separately (references include just the Chair's Summary, as do percent of paragraphs)
16 With 6 additional documents released separately (references include just the Chair's Summary, as do percent of paragraphs)

Appendix B: Energy Passages in Selected G7/8 Summit Documents

1975 Rambouillet (3 energy paragraphs of 15 total paragraphs)

4. The industrial democracies are determined to overcome high unemployment, continuing inflation and serious energy problems.
7. We also concentrated on the need for new efforts in the areas of world trade, monetary matters and raw materials, including energy.
13. World economic growth is clearly linked to the increasing availability of energy resources. We are determined to secure for our economies the energy sources needed for their growth. Our common interests require that we continue to cooperate in order to reduce our dependence on imported energy through conservation and the development of alternative sources. Through these measures as well as international co-operation between producer and consumer countries, responding to the long term interests of both, we shall spare no effort in order to ensure more balanced conditions and a harmonious and steady development in the world energy market.

2. 1976 San Juan (1 energy of 25 total paragraphs)

(21.) In the field of energy, we intend to make efforts to develop, conserve and use rationally the various energy resources and to assist the energy development objectives of developing countries.

3. 1977 London 1

Declaration: Downing Street Summit Conference (11 Paragraphs)

(7.) We will further conserve energy and increase and diversify energy production, so that we reduce our dependence on oil. We agree on the need to increase nuclear energy to help meet the world's energy requirements. We commit ourselves to do this while reducing the risks of nuclear proliferation. We are launching an urgent study to determine how best to fulfil these purposes.

Appendix (37 Paragraphs)

(1.) …The world has not yet fully adjusted to the depressive effects of the 1974 oil price rise.
(22.) – (27)

2004 Sea Island

Chair's Statement (1 energy of 14 total)

(8.) "We welcomed the increasing strength of the global economy. We agreed it was important to take advantage of the strong global economic environment to implement further reforms to accelerate growth in our countries. We noted the recent pledge by oil producers to increase production. We recognized the need for balanced energy policies, which increase energy supplies and encourage more efficient energy use and conservation, including through new technologies.

Science and Technology for Sustainable Development: "3r" Action Plan and Progress on Implementation, Sea Island, June 10, 2004

Cleaner, More Efficient Energy

- Launched the International Partnership for a Hydrogen Economy (IPHE). Developing and implementing IPHE Implementation-Liaison Committee work plan.
- Launched the Carbon Sequestration Leadership Forum (CSLF). Working to approve first set of CSLF projects, taking into account environmental assessments, and various countries' developing or supporting complementary technologies for low- or zero-emission coal-fired power plants.
- Supported and advanced international cooperation to facilitate wider use of renewable energy and energy efficiency technologies through such initiatives as the Renewable Energy and Energy Efficiency Partnership (REEEP) and the Bonn International Conference for Renewable Energies. Continuing implementation and follow up.
- Those countries that will continue to use nuclear energy and that are members of the Generation IV International Forum (GIF) drafted multilateral arrangements on next-generation nuclear energy technologies. Work continuing on six high-priority next-generation nuclear energy systems.

Appendix C: Priority Energy-Related Principles in Communiqué Preambles or Chair's Statement

1975-1977: None

1978: We agreed on a comprehensive strategy covering growth, employment and inflation, international monetary policy, **energy**, trade and other issues of particular interest to developing countries.

1979: None

1980: In this, our first meeting of the 1980's, the economic issues that have dominated our thoughts are the price and supply of **energy** and the implications for inflation and the level of economic activity in our own countries and for the world as a whole. Unless we can deal with the problems of **energy**, we cannot cope with other problems.

1981-85: None

1986: …For the industrialized countries, and indeed for the world economy, the recent decline in **oil prices** will help to sustain non-inflationary growth and to increase the volume of world trade, despite the difficulties it creates for certain oil-producing countries.

1987-2001: None

2002: …We agreed on a set of six **non-proliferation Principles** aimed at preventing terrorists - or those who harbour them - from acquiring or developing **nuclear**, chemical, radiological and biological weapons; missiles; and **related materials**, equipment or **technologies**. We called on other countries to join us in implementing these Principles.

We launched a new *G8 Global Partnership Against the Spread of Weapons and* ***Materials*** *of Mass Destruction*, under which we will undertake cooperative projects on the basis of agreed guidelines. We committed to raise up to US$ 20 billion to support such projects over the next ten years.

2003: …We adopted an Action Plan on how best to use science and technology for sustainable development focused on…
- cleaner, more **efficient energy** and the fight against air pollution and climate change;

... In accordance with our statement at Kananaskis, we established the **G8 Nuclear Safety and Security Group**, and adopted its mandate and the Core Principles shared by each of us, to promote the **safe and secure use of civil nuclear technology**.

… we note with concern the remaining threats of terrorist networks, the challenges of **proliferation of weapons of mass destruction** in several countries and the risks to peace and security that unresolved conflicts pose to the world.

…We adopted a Statement on the **proliferation of weapons of mass destruction** and endorsed an Action Plan on the prevention of radiological terrorism and the securing of radioactive sources.

…We reaffirmed our Kananaskis commitments to prevent terrorists, or those that harbour them, from acquiring weapons of mass destruction. To that end, we reviewed the implementation of the **Global Partnership Against the Spread of Weapons and Materials of Mass Destruction launched last**

year. We welcomed the progress achieved so far. We are determined to sustain and broaden our efforts towards:
- reaching our Kananaskis commitment of raising up to US$20 billion over 10 years;
- developing and initiating concrete and worthwhile projects;
- fully implementing the guidelines;
- opening this initiative to new countries.

To this end, we endorsed an **Action Plan on the Global Partnership**.

…We addressed the **North Korean nuclear issue** in our Statement on **non-proliferation**. We support the efforts made by the different parties to seek by peaceful means a comprehensive solution to the **North Korean nuclear issue** and to other matters, including unresolved humanitarian problems such as the abductions.

…We addressed the proliferation implications of **Iran's advanced nuclear programme** in our Statement on **non-proliferation**.

2004: …At Evian, we recognized the **proliferation of weapons of mass destruction** and their delivery systems, together with international terrorism, as the pre-eminent threat to international peace and security. Determined to prevent, contain, and roll back **proliferation**, we adopted a **G-8 Action Plan on Nonproliferation** to reinforce the global **nonproliferation** regime. This Action Plan enhances and expands ongoing efforts, such as the Proliferation Security Initiative, which now includes all G-8 members, and the **G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction**. The Action Plan addresses **transfers of enrichment and reprocessing equipment and technologies**, and takes steps to strengthen the **International Atomic Energy Agency** and to counter bioterrorism. The Action Plan calls on all states to implement the recently passed U.N. Security Council Resolution 1540, and addresses the **proliferation challenges** in North Korea, Iran, and Libya.

…We noted the recent pledge by **oil producers** to increase production. We recognized the need for balanced **energy policies**, which increase **energy supplies** and encourage more **efficient energy use and conservation**, including through new technologies.

…We addressed the DPRK nuclear issue in our **G-8 Action Plan on Nonproliferation**. We support the Six-Party Talks as well as efforts by all concerned parties to achieve a comprehensive solution by diplomatic means to the **DPRK nuclear issue** and to other security and humanitarian issues, such as the abductions.

2005: …We were joined for our discussion on climate change and the global economy by the leaders of Brazil, China, India, Mexico, and South Africa and by the heads of the **International Energy Agency**, International Monetary Fund, United Nations, World Bank, and the World Trade Organisation.

We have issued a statement setting out our common purpose in tackling climate change, **promoting clean energy** and achieving sustainable development.

We know that, globally, **emissions** must slow, peak and then decline, moving us towards a **low-carbon** economy. This will require leadership from the developed world.

We resolved to take urgent action to meet the challenges we face. The Gleneagles Plan of Action which we have agreed demonstrates our commitment. We will take measures to **develop markets for clean energy technologies**, to increase their availability in developing countries, and to help vulnerable communities adapt to the impact of climate change.

We warmly welcomed the involvement of the leaders of the emerging economy countries in our discussions, and their ideas for new approaches to international co-operation on **clean energy technologies** between the developed and developing world.

Our discussions mark the beginning of a new Dialogue between the G8 nations and other countries with significant **energy needs**, consistent with the aims and principles of the UN Framework Convention on Climate Change. This will explore how best to exchange **technology, reduce emissions, and meet our energy needs in a sustainable way**, as we implement and build on the Plan of Action.

Higher and more volatile **oil prices** are an issue of particular concern both to us and to vulnerable developing countries. We emphasise the need for concrete actions to reduce market volatility through more comprehensive transparent and timely data.

We issued statements on the **global economy and oil**, trade, and on action to reduce Intellectual Property Right piracy and counterfeiting.

We reaffirmed that the **proliferation of weapons of mass destruction** and their delivery systems, together with international terrorism, remain the pre-eminent threats to international peace and security. We reaffirmed our commitments and called on all States to uphold in full international norms on **non-proliferation** and to meet their arms control and disarmament obligations. We emphasised our determination to meet **proliferation challenges** decisively, through both national and multilateral efforts. We expressed particular concern about the **threat of proliferation in North Korea and Iran**.

On North Korea, we support the Six Party Talks and urged North Korea to return promptly to them. We call on North Korea to abandon its **nuclear weapons-related programmes**.

Note: After 2002, the Chair's Statement was introduced.

Appendix D: G8 Energy Commitments, 1975-2005

	Total	EP	ES	EM	EC	NE	DS	NP/S	O	RDI	C	U	RE	DE	NT
1975	3	1	1	1	-	-	-	-	-	-	-	-	-	-	-
1976	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
1977	5	-	-	-	1	2	1	1	-	-	-	-	-	-	-
1978	17	3	-	-	-	2	-	-	7	1	1	2	1	-	-
1979	23	1	-	-	-	1	-	-	10	6	2	-	1	1	1
1980	25	3	-	-	3	3	2	1	5	-	7	-	-	-	1
1981	9	-	-	-	-	1	2	1	1	-	1	-	2	1	-
1982	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1983	2	1	-	-	1	-	-	-	-	-	-	-	-	-	-
1984	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1986	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
1987	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1988	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
1990	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1991	12	-	2	-	1	-	-	9	-	-	-	-	-	-	-
1992	16	-	-	-	-	1	1	13	-	-	-	-	-	-	1
1993	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
1994	10	-	-	-	1	-	-	9	-	-	-	-	-	-	-
1995	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-
1996	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-
1997	12	1	-	-	-	-	-	11	-	-	-	-	-	-	-
1998	8	-	-	2	-	-	-	6	-	-	-	-	-	-	-
1999	4	1	-	-	-	-	-	3	-	-	-	-	-	-	-
2000	7	-	-	-	-	-	-	6	-	-	-	-	1	-	-
2001	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
2002	25	-	-	-	-	-	-	24	-	-	-	-	-	1	-
2003	40	-	-	3	3	-	5	21	3	-	-	-	5	-	-
2004	15	-	-	-	-	1	-	13	-	-	-	1	-	-	-
2005	77	4	-	18	21	-	6	10	1	-	3	1	6	3	4

Notes:
EP = energy problems, generally
ES = energy sources
EM = energy market; growth, development & research
EC = energy conservation, energy efficiency
NE = nuclear energy
DS = diversify energy sources, develop clean energy
NP/S = non-proliferation, nuclear waste disposal, nuclear safety
O = oil
RDI = reduce demand of imports
C = coal
U = uranium
RE = renewable energy
DE = developing countries & energy development
NT = new technologies

Appendix E: Compliance with G8 Energy Commitments, 1996-2005

Issue Area	Lyon 96-97	Denver 97-98	Birming-ham 98-99	Cologne 99-00	Okinawa 00-01	Genoa 01-02	Kanana-skis (interim) 02-03	Kanana-skis (final) 02-03	Evian (interim) 03-04	Evian (final) 03-04	Sea Island (interim) 04-05	Sea Island (final) 04-05	Glen-eagles (interim) 05-06
TOTAL (average *n*)	+29% (1)	-	-	-	-	-	-	-	+50% (2)	+88% (2)	+84% (2)	+78% (2)	+100% (1)
Global Transnational Issues													
Energy	-	-	-	-	-	-	-	-	0.00	+0.75	+0.89	+0.78	+1.00
Nuclear Safety	+0.29	-	-	-	-	-	-	-	-	-	-	-	-
Political/Security Issues													
WMD	-	-	-	-	-	-	-	-	+1.00	+1.00	+0.78	+0.78	-

Nuclear Safety

1996-S130: We stress the necessity of further progress in the establishment of relevant domestic legislation and in the enhancement of the international regime of nuclear liability as well as in the preparation of an international convention on the safety of radioactive waste management. (+0.29)

Energy

2003-75: We commit to participating in the International Conference on Renewable Energies, spring 2004 in Bonn. (+0.75)

2004(S)-2: We recognized the need for balanced energy policies, which increase energy supplies and encourage more efficient energy use and conservation, including through new technologies. (+0.78)

2005-1: We resolved to take urgent action to meet the challenges we face. The Gleneagles Plan of Action which we have agreed demonstrates our commitment. We will take measures to develop markets for clean energy technologies, to increase their availability in developing countries, and to help vulnerable communities adapt to the impact of climate change.

WMD

2003-186: We reaffirm our support for the IAEA (International Atomic Energy Agency), which should be granted the necessary means to implement its monitoring tasks. (+1.00)

2004(S)-4: …for the intervening year [between Sea Island and Gleneagles Summits], we agree that it would be prudent not to inaugurate new initiatives involving transfer of enrichment and reprocessing equipment and technologies to additional states. We call on all states to adopt this strategy with prudence. (+0.78)

Appendix F: G7/8 Official Level Bodies

First Cycle (8)

1975 London Nuclear Suppliers Group
1977 International Nuclear Fuel Cycle Evaluation Group
1979 High Level Group on Energy Conservation and Alternative Energy
1979 International Energy Technology Group
1979 High Level Group to Review Oil Import Reduction Progress
1980 International Team to Promote Collaboration on Specific Projects on Energy Technology
1980 High Level Group to Review Result on Energy
1981 Missile Technology Control Regime (MTCR)

Second Cycle (9)

1982 Working Group on Technology, Growth and Employment
1982 Consultations and Coordination on East-West Relations
1982 Representatives to control exports of strategic goods
1982 Procedures for multilateral surveillance of economic performance
1985 Expert Group for Foreign Ministers
1985 Expert Group on Desertification and Dry Zone Grains
1985 Expert Group on Environmental Measurement
1986 Group of Experts on Terrorism
1987 International Ethics Committee on AIDS.

Third Cycle (14)

1989 Financial Action Task Force (FATF) (with others, secretariat from OECD)
1989 International Ethics Committee on AIDS
1990 Chemical Action Task Force, 1990-1992 (with others)
1990 Task Force to Study the State of the Soviet Economy
(1990 Permanent Working Group on Assistance to Russia)
1990 Gulf Crisis Financial Coordination Group
1992 Nuclear Safety Working Group
1992 Group of Experts on the Prevention and Treatment of AIDS
1993 Support Implementation Group (SIG)
1993 G8 Non-Proliferation Experts Group
1995 Counterterrorism Experts Group
1995 G7/P8 Senior Experts Group on Transnational Organized Crime (Lyon Group)
1995 GIP National Co-ordinators
1995 Development Committee Task Force on MDB's

Fourth Cycle (16)

1996 Nuclear Safety Working Group
1996 Lyon Group
1997 Expert Group on Financial Crime
1997 Subgroup on High Tech Crime (of the Lyon Group)
1997 Officials Group on Forests
2000 Conflict Prevention Officials Meeting (CPOM)
2000 Renewable Energy Task Force
2000 Digital Opportunities Task Force (Dot-Force)
2000 Global Fund to Fight AIDS, Malaria and Tuberculosis

2001 G8 Task Force on Education
2001 Personal Representatives for Africa (APR)
2002 Energy Officials Follow-up Process
2002 G8 Global Partnership Review Mechanism
2002 G8 Nuclear Safety and Security Group
2002 G8 Experts on Transport Security
2002 Global Health Security Laboratory Network

Fifth Cycle
2003 High Level Working Group on Biometrics
2003 Counter-Terrorism Action Group
2003 RadioActive Sources Working Group
2003 Senior Officials for Science and Technology for Sustainable Development
2003 G8 Enlarged Dialogue Meeting
2003 Forum for the Partnership with Africa, November 10, 2003
2003 Global Health Security Action Group (GHSAG) Laboratory Network
2003 Technical Working Group on Pandemic Influenza Preparedness
2004 Global Partnership Senior Officials Group (GPSOG), January 2004
2004 Global Partnership Working Group (GPWG)
2004 Global HIV Vaccine Enterprise
2004 Microfinance Consultative Group
2004 Best Practises Microfinance Training Centre
2004 Democracy Assistance Dialogue
2004 Task Force on Investment
2004 G8 Expert-Level Meetings on Peace Support in Africa
2004 Friends of the Convention on Corruption
2004 G8 Accelerated Response Teams on Corruption
2004 International Partnership for a Hydrogen Economy (IPHE)
2004 IPHE Implementation-Liaison Committee
2004 Carbon Sequestration Leadership Forum (CSLF)
2004 Renewable Energy and Energy Efficiency Partnership ((REEEP)
2004 Generation IV International Forum (GIF)
2004 Global Earth Observation System of Systems (GEOSS)

Note: Excludes one-off meeting or conferences

Appendix G: World Energy Prices

Date	Crude Nominal US$ NYME
74-00-00	09.07 (annual average)
81-00-00	35.24 (annual average used)
90-10-12	41.15 intraday (record)
91-01-16	32.00c
99-12-31	12.00c
00-06-30	35.00+
02-12-00	under 30.00
03-03-10	38.00c
04-05-04	38.98 June
04-05-05	39.57
04-05-07	40.00+ intraday
04-05-13	41.10 June
04-05-15	41.38
04-05-17	41.55 Jun
04-05-25	41.72 July
04-05-31	40.50 (Asian trading)
04-06-01	42.33
04-06-02	39.86 (42.45 intraday high)
04-08-02	43.83
04-09-01	43.89
04-10-01	50.16
04-11-01	50.10
05-04-01	57.26
05-07-01	59.11
05-08-01	61.51
05-09-01	69.50
05-10-03	65.36
05-11-01	59.85
05-12-01	58.46
06-01-03	63.11
06-02-01	66.61

Note:
Daily closing price for near month settlement price for light sweet crude oil on the New York Mercantile Exchange, closing price, in US$.

2005 data: The WTI and Brent numbers are published on the United States' Department of Energy's Energy Administration's website. They are the closing prices reported by West Texas Intermediate (WTI) in Cushing, Oklahoma. Brent Crude is a type of oil sourced from the North Sea. It forms a benchmark for the price of other crude oils from Europe, Africa and the Middle East. Brent Crude is a type of sweet crude oil that consists of Brent Crude, Brent Sweet Light Crude, Oseberg and Forties.

Source: EIA Historical Petroleum Data
<http://www.eia.doe.gov/neic/historic/hpetroleum2.htm#Crude Oil>.

Appendix H: Oil Tanker, Rigs and Related Accidents

Year	Spills >700 tonnes
1975	22
1976	16
1977	17
1978	23
1979	34
1980	13
1981	7
1982	4
1983	13
1984	8
1985	8
1986	7
1987	10
1988	10
1989	13
1990	14
1991	7
1992	10
1993	11
1994	9
1995	3
1996	3
1997	10
1998	5
1999	6
2000	4
2001	3
2002	3
2003	4
2004	5
2005	3

Note: This table documents the number of oil spills over 700 tonnes.
Source: International Tanker Owners Pollution Federation Limited <www.itopf.com/stats.html>

Appendix I: G8 Oil and Gas Capability

Average Oil Production: Thousands of Barrels per Day

	Russia	USA	Canada	UK	Total OPEC	Total World
1975	9,523	8,375	1,430	12	26,771	52,828
1976	10,060	8,132	1,314	245	30,327	57,344
1977	10,603	8,245	1,321	768	30,893	59,707
1978	11,105	8,707	1,316	1,082	29,464	60,158
1979	11,384	8,552	1,500	1,568	30,581	62,674
1980	11,706	8,597	1,435	1,622	26,606	59,600
1981	11,850	8,572	1,285	1,811	22,481	56,076
1982	11,912	8,649	1,271	2,065	18,778	53,481
1983	11,972	8,688	1,356	2,291	17,497	53,256
1984	11,861	8,879	1,438	2,480	17,442	54,489
1985	11,585	8,971	1,471	2,530	16,181	53,982
1986	11,895	8,680	1,474	2,539	18,275	56,227
1987	12,050	8,349	1,535	2,406	18,517	56,666
1988	12,053	8,140	1,616	2,232	20,324	58,737
1989	11,715	7,613	1,560	1,802	22,071	59,863
1990	10,975	7,355	1,553	1,820	23,195	60,566
1991	9,992	7,417	1,548	1,797	23,275	60,207
1992	7,632	7,171	1,605	1,825	24,398	60,213
1993	6,730	6,847	1,679	1,915	25,119	60,236
1994	6,135	6,662	1,746	2,375	25,510	60,991
1995	5,995	6,560	1,805	2,489	26,004	62,335
1996	5,850	6,465	1,837	2,568	26,461	63,711
1997	5,920	6,452	1,922	2,518	27,710	65,690
1998	5,854	6,252	1,981	2,616	28,774	66,921
1999	6,079	5,881	1,907	2,684	27,579	65,848
2000	6,479	5,822	1,977	2,275	29,267	68,344
2001	6,917	5,801	2,029	2,282	28,344	67,875
2002	7,408	5,746	2,171	2,292	26,352	66,784
2003	8,132	5,681	2,306	2,093	27,981	69,154
2004	8,805	5,419	2,398	1,845	30,138	72,488

Source: Energy Information Administration, US Department of Energy <www.eia.doe.gov/emeu/ipsr/supply.html>

Average Natural Gas Plant Liquids Production: Thousand Barrels per Day

	USA	Canada	Russia	Total OPEC	Total World
1975	1,633	309	205	372	2,790
1976	1,603	289	220	442	2,865
1977	1,618	290	235	482	2,982
1978	1,567	281	255	566	3,078
1979	1,584	331	270	637	3,285
1980	1,573	331	285	732	3,444
1981	1,609	330	300	825	3,625
1982	1,550	318	315	842	3,626
1983	1,559	309	330	780	3,635
1984	1,630	336	340	869	3,869
1985	1,609	337	350	892	3,938
1986	1,551	328	440	969	4,150
1987	1,595	367	430	1,006	4,279
1988	1,625	381	450	1,077	4,481
1989	1,546	410	425	1,188	4,502
1990	1,559	426	425	1,281	4,632
1991	1,659	431	420	1,299	4,827
1992	1,697	460	230	1,364	4,974
1993	1,736	506	220	1,435	5,186
1994	1,727	529	200	1,718	5,552
1995	1,762	581	180	1,766	5,756
1996	1,830	596	185	1,772	5,871
1997	1,817	636	195	1,859	6,012
1998	1,759	651	220	1,927	6,163
1999	1,850	653	231	1,993	6,356
2000	1,911	699	232	2,101	6,616
2001	1,868	709	237	2,304	7,016
2002	1,880	698	246	2,403	7,190
2003	1,719	724	390	2,554	7,530
2004	1,809	658	456	2,560	7,465

Source: Energy Information Administration, US Department of Energy
<www.eia.doe.gov/emeu/ipsr/supply.html>

Appendix J: G8 Civilian Nuclear Reactor Capability

	USA	Japan	France	Britain	Germany	Italy	Canada	Russia
1975	6	2	-	1	-	-	-	2
1976	7	1	-	3	3	-	1	2
1977	3	3	2	1	2	-	2	-
1978	5	5	2	-	2	1	1	-
1979	-	1	2	-	2	-	-	2
Subtotal	**21**	**12**	**6**	**5**	**9**	**1**	**4**	**6**
1980	2	1	7	-	-	-	-	2
1981	4	2	8	-	1	-	-	2
1982	4	-	2	-	-	-	3	1
1983	3	3	4	3	1	-	1	1
1984	6	3	6	2	4	-	3	2
1985	7	2	4	1	1	-	-	3
1986	7	2	6	-	2	-	2	1
1987	8	1	4	-	-	-	1	1
1988	2	2	2	3	2	-	-	1
1989	3	1	-	1	2	-	-	-
Subtotal	**48**	**16**	**43**	**10**	**13**	**0**	**10**	**14**
1990	2	2	3	-	-	-	2	1
1991	-	1	1	-	-	-	-	-
1992	-	2	1	-	-	-	1	-
1993	1	4	1	-	-	-	1	1
1994	-	2	-	-	-	-	-	-
1995	-	1	-	1	-	-	-	-
1996	1	3	1	-	-	-	-	-
1997	-	-	2	-	-	-	-	-
1998	-	-	-	-	-	-	-	-
1999	-	-	1	-	-	-	-	-
Subtotal	**4**	**15**	**10**	**1**	**0**	**0**	**4**	**2**
2000	-	-	-	-	-	-	-	-
2001	-	1	-	-	-	-	-	1
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	1	-	-	-	-	-	1
2005	-	2	-	-	-	-	-	-
Subtotal	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**2**
TOTAL	**73**	**47**	**59**	**16**	**22**	**1**	**18**	**24**

Note: Number of new nuclear power plants connected per country, per year.
Source: IAEA Power Reactor Information System <www.iaea.org/programmes/a2/index.html>

	US	RO7	TOTAL	US%
1975-79	21	42	63	33.3%
1980-89	48	107	155	30.9%
1990-99	04	32	36	11.1%
2000-05	0	6	6	0
TOTAL	**73**	**187**	**260**	**28.0%**

Appendix K: World Uranium Production 1998-2004

	1998	1999	2000	2001	2002	2003	2004
Canada	**10,922**	**8,214**	**10,683**	**12,520**	**11,604**	**10,457**	**11,597**
Australia	4,910	5,984	7,579	7,756	6,854	7,572	8,982
Kazakhstan	1,270	1,560	1,870	2,050	2,800	3,300	3,719
Niger	3,714	2,907	2,911	2,920	3,075	3,143	3,282
Russia	-	**2,610**	**2,760**	**2,500**	**2,900**	**3,150**	**3,200**
Namibia	2,780	2,690	2,715	2,239	2,333	2,036	3,038
Uzbekistan	1,926	2,159	2,028	1,962	1,860	1,589	2,016
USA	**1,810**	**1,773**	**1,522**	**1,011**	**883**	**779**	**878**
Ukraine	1,000	1,000	1,000	750	800	800	800
S. Africa	994	927	838	873	824	758	755
China	590	700	700	655	730	750	750
Czech Rep.	610	612	507	456	465	452	412
Brazil	-	-	80	58	270	310	300
India	207	207	207	230	230	230	230
Germany	**30**	**29**	**28**	**27**	**212**	**150**	**150**
Romania	132	89	86	85	90	90	90
Pakistan	23	23	23	46	38	45	45
France	**507**	**416**	**296**	**195**	**18**	**9**	**7**
Gabon	725	-	-	-	-	-	-
Spain	255	255	255	30	37	-	-
Portugal	19	10	14	3	2	-	-
Belgium	15	-	-	-	-	-	-
Hungary	10	10	10	-	-	-	-
Argentina	7	4	-	-	-	-	-
World TTL	**34986**	**32179**	**36112**	**36366**	**36025**	**35620**	**40251**

Note: Annual uranium production, by year (tU).

Source: WISE Uranium Project <www.wise-uranium.org/umaps.html>

G8 members in bold