

**Ralph Pentland's Speaking Notes – May 30, 2008
National Council of Women of Canada
21st Century Energy and Water Policies**

I would like to thank you for inviting me to meet with you today. I was pleased when I learned that the National Council of Women of Canada was embarking on an energy-water connections project. I can't think of a subject that is timelier, and which touches more directly on virtually every aspect of the lives of Canadian families. What I will be doing today is exploring several specific policy areas related to energy and water, as well as a few related governance matters. But, before getting into the details, I would like to spend just a few minutes situating energy and water futures in a global and conceptual context.

Western societies seem to be governed by a belief that everyone in the world will eventually adopt our values, and as everyone becomes alike and modern, advancing science and technology will engender a universal morality in which the aim of the global society will be to be as productive as possible. Under that scenario, humanity will extend its power over the world's resources, and thereby overcome the worst forms of natural scarcity.

While few would disagree that scientific and technological advances are on balance beneficial, the way those advances interrelate with generally slower evolving political, legal and economic systems is very troubling. Far from resource scarcity fading away with economic development, it is in fact becoming a pivotal source of conflict. Early in the 21st century, the pattern of human conflict is being fundamentally reshaped by uneven population growth and consequent migration pressures, geopolitical tensions linked to energy insecurity, widespread regional freshwater shortages, and irreversible climate change.

That should not be surprising. Just think about where we have come from over the 20th century – world energy increased by a factor of 12.5, and world water use increased by a factor of nine. Most of that increase occurred in the latter half of the century after planned obsolescence was adopted as a core economic strategy in the western world. And most of the energy increase can be attributed to about 10% of the world's population.

If everyone in the world started to consume at the same rate as North Americans do, and if exponential increases in consumption were to continue, water and energy use would, for all practical purposes be approaching infinity well before the middle of this century. The notion of infinite resource exploitation on a finite planet is obviously absurd.

Some of you may have seen the very fascinating video on the internet at storyofstuff.com. It explains in very simple layman's language just why we are on unsustainable resource exploitation and consumption paths. It also offers some thought-provoking statistics. For example, did you know that for every bag of garbage you put out on your curb every week, about 70 equivalent bags of waste were created in producing the things that are in your one bag of garbage? Or, did you know that, of all the "stuff" that is in the production cycle today, only 1% will still be in use six months from now?

Over the past year or two, there have been several interesting books published on water, energy and related futures. One particularly intriguing book by Richard Heinberg is entitled "Peak Everything". The author of that book makes a relatively convincing case that the use of most resources and the production of most material goods will necessarily peak relatively soon, and begin to decline.

Surprisingly, he doesn't view that as an impending tragedy. In fact he argues that our quality of life could actually improve as resource use and the production of "stuff" declines, but only if we accept the inevitable and manage the transition appropriately. On that point, he suggests provocatively that "the only real question is whether societies will contract and simplify intelligently or in an uncontrolled, chaotic fashion."

One could of course argue about the timing of the global energy and water use peaks, but I would guess they would nearly coincide. Some parts of the world are already consuming virtually all of their renewable water supplies. Lots of examples are documented in Fred Pease's very good book "When the Rivers Run Dry".

For example, as many rivers and lakes are drying up in India and China, irrigators are increasingly turning to groundwater. But, those aquifers are becoming depleted and polluted. It has been estimated that in China, as many of 100 million people now depend on food grown with underground water that the rains are not replacing. Probably another 200 million are doing the same thing in India. Half of all hand-dug wells and millions of tubewells have dried up across western India. Whole districts in arid Indian states are emptying of people. In fact, I have heard claims that the world now had more water refugees than war refugees.

At least theoretically, water scarcity can always be overcome by some combination of desalinization, cleaning water up to a very high standard, and moving water over long distances. But, those options are all huge energy destroyers. The further we move down any of those paths, the sooner we will arrive at the inevitable global energy crunch, if we haven't already. Of course the opposite is also true. The faster we squander energy resources, the sooner we will hit water limits. A good example of that is the impact of tar sands development on the Athabasca River.

What I would conclude from this brief glance at the global energy and water situations is that current trends and current mindsets simply cannot, and almost certainly will not continue much longer. We will very quickly have to seek out some new form of dynamic equilibrium.

Back about 25 years ago, I participated in something called the World Futures Conference in Washington. Thinking back, I guess most of the presentations, including one I made on water were pretty naïve. But, there was one theme running through several of the presentations that I have often come back to. That theme related to certain things that were inevitable but not necessarily obvious at the beginning of the information age. The first was the inevitable “flattening” of the world that would happen as everyone became interconnected. That phenomenon is definitely well underway, and is described well in Thomas Freidman’s book “The World is Flat”.

But, a more disturbing prediction was that the information age would also lead to the accumulation of wealth and power in only a few hands. That has also come to pass. The poorest 20% of the world’s population now receive less than 1% of the world’s income. And of the hundred largest financial entities in the world, less than half are now countries, and more than half are corporations.

The predictions 25 years ago went even further to suggest that by now, even democracies would effectively be governed by non-democratic entities. That is only partly the case. As pointed out by Nobel Prize winner Joseph Stiglitz in his book “Making Globalization Work”, a lot of the world’s most important decisions are now being made by undemocratic entities like the World Bank, the IMF and the World Trade Organization. And North American policy, including Canada’s, is being shaped to a large extent by Washington-based think tanks and industry-dominated processes like the Security and Prosperity Partnership. Those bodies and processes are all driven by the same single-minded focus on immediate competitiveness, with little attention to the broader public good, or the well-being of future generations.

In his book “The Collapse of Globalism”, John Ralston Saul argues that globalism is now petering out as nation states begin to reassert their independence. He contends that we have just lived through a period in which elites have been obsessed by abstract theories of how economies must work at the global level. With everything viewed through the lens of international economics, and the influence of domestic voters on the decline, public good issues like health, education and the environment were effectively demoted. Saul goes on to suggest that what we are now witnessing is the emergence of a more assertive sub-national democracy in cities and semi-autonomous regions, and large concentrations of people and political power in urban areas. As these trends accelerate, citizens will insist on organizing their lives around the realities of the local environment in which they live.

Earlier this week, even a major Canadian financial institution, CIBC World Markets predicted that globalism as we know it will wind down over the next few years, because energy costs will make it prohibitively expensive to ship resources and finished products between continents.

I don't know whether these futurists are right or wrong. But, for the sake of speculating on 21st century energy and water policies, I am going to make four optimistic assumptions about governance in the coming decades.

First I am going to assume that we will continue to take advantage of the efficiencies offered by the free market system. Second, I am going to assume that the public good will make a comeback, which will be reflected in more citizen-sensitive constraints on the functioning of the free market system. Third, I will assume that the global society will be forced to recognize that the production and consumption of stuff cannot increase exponentially to infinity on a finite planet. And fourth, I am going to assume that the relative roles of international organizations, various levels of government, the private sector and civil society will evolve in constructive ways.

As pointed out by Stiglitz, international agencies will necessarily have to become more democratic in some way – I am not quite sure how. Governance will become very distributed, with senior governments doing more “steering” and more local governments doing more “rowing”. The private sector will continue to be creative, but it will do that at a more local level, and the policy space within which it innovates will be somewhat more constrained. And civil society will lubricate the evolution, by doing the kind of project the NCWC has just initiated, and following through on their findings by influencing voters and consumers.

Taking those assumptions into account, I am going to suggest an even dozen topics and potential policy shifts that the NCWC may wish to consider during its energy-water connections project. Other advisors will no doubt suggest others, some of which may be more pertinent. Not surprisingly, you will find that many of my suggestions are already on your radar screen, as demonstrated by previous Council resolutions.

To line up my suggestions with my assumptions, I am going to place the 12 suggestions in three categories: the first at the level of national vision; the second at the level of appropriate constraints on the functioning of the free market; and the third at the level of providing incentives and opportunities for individuals and local level entities to act on their own behalf in ways that are meaningful and beneficial

1. National Vision

1.1 Look to Europe for Inspiration

My first suggestion on vision is to look to Europe for your inspiration. Europeans are already living the energy and water future we should be striving for. It's obviously difficult to compare quality of life in different countries. But, as I travel around Europe and North America, I don't perceive any perceptible difference in quality of life; except Europeans seem to enjoy life a bit more than North Americans.

The average European supports his or her very good lifestyle with less than half as much water use and less than half as much energy use as the average North American. He or she also produces less than half the quantity of greenhouse gas emissions. It would take very little for us to match their performance – just a few very minor lifestyle changes.

An equally impressive contrast is in the way Europeans deal with regulations and other measures to protect health, safety and the environment. Here in North America, we are frantically engaged in a race to the bottom under NAFTA and the Security and Prosperity Partnership, by searching out and moving to lowest common denominator regulatory regimes in the interest of theoretical competitiveness. But, the Europeans are doing just fine, and at the same time adopting very strong Union-wide standards. And many member states are moving to even more stringent requirements.

Our race to the bottom will inevitably lead to spectacular market failures. A non-environmental example is the sub-prime mortgage meltdown in the U.S., which is typical of what we will see in the future if we keep putting theoretical competitiveness ahead of the public good. Climate change will soon become a much more spectacular example of a market failure. That one is being caused by a failure to include environmental and social costs in energy decisions.

1.2 Climate Change

That brings me to my second topic under the heading of national vision. Climate change is a key integrator between water and energy issues. Canada has over 600 large dams and 54 interbasin diversions created mainly to produce hydroelectric energy. Two-thirds of all the water withdrawn in our country is for thermal power generation. And we are now witnessing devastating impacts on water caused by tar sands development. But, in the very long run, all the direct impacts of energy development on water may pale in comparison with the indirect impacts by way of climate change.

In a report last month on climate change and water, the Intergovernmental Panel on Climate Change predicted, with a high level of confidence, that by the 2050s, the area of land subject to increasing water stress due to climate change will be more than double that with decreasing water stress. Unfortunately, two of the areas most likely to be severely stressed are our already water-short prairie region, and our critically important Great Lakes Region.

On most major environmental issues over the past half century, from acid rain to eutrophication of the Great Lakes, the U.S. has initially dragged its feet while Canada exercised leadership. Eventually, the U.S. has always come on board, and has become a world leader. The climate change issue is the first major exception to that pattern.

I think there is a pretty broad perception both at home and abroad that both Canada and the U.S. have dragged their feet on this one. Our policies and targets are of course somewhat different, but on the most important strategies like intensity-based targets, our national government appears to be in lock-step with the current U.S. administration. Fortunately, we are seeing more leadership at a sub-national level, for example in California, British Columbia and Manitoba.

In Jeffrey Simpson's recent book, he predicts that very soon the U.S. will begin to aggressively reduce greenhouse gas emissions. He is probably right. Even the Republican candidate has called for the U.S. to stop resisting a global cap and trade regime. And with Europe already demonstrating leadership, we could soon become the only laggard among industrialized nations.

I am not an expert on climate change. But, Jim Bruce, who is one of Canada's leading experts, tells me that Canada should be moving forward much more aggressively in several areas, including: a cap and trade strategy for large industries; a revenue neutral carbon tax; quotas on the proportion of electricity provided from renewable sources; and subsidies for green energy.

1.3 Energy Security

If our national government were to aggressively tackle the climate issue, it could also pay huge dividends with respect to our national energy security. So, my third topic at the level of vision is energy security.

Earlier this month, Canada's Industry Minister was speaking to the Council of the Americas in Washington. According to his speaking notes he said: "World energy demand will not decrease anytime soon. It will continue to grow". He went on to say "We also have the infrastructure, the technology and the will to find innovative ways to use energy to build competitive strength". Both statements are obviously correct. Energy demand will continue to grow, and if we try real hard we can obviously find innovative ways to squander more energy. But, is that a defensible mindset in the 21st century?

The world has already entered a period of energy supply-demand imbalance, which will only intensify over time as the four BRIC countries industrialize. The kind of energy price shock that you are experiencing every time you fill up your gas tank or pay your home heating bill will inevitably happen more frequently in the coming decades, and become much more severe.

Canada is not an island, and can't insulate itself from the vagaries of the international marketplace. We are still a net exporter of oil, but many millions of Canadians are dependent on imports from potentially unstable regions of the world. We are still a net exporter of natural gas, but the National Energy Board suggests that we may become a net importer within two decades.

I guess North America is sort of an island, but contrary to political spin, it cannot achieve energy self-sufficiency without both major policy shifts, and the passage of a lot of time. The sooner both Canada and the United States get on with those policy shifts, the less vulnerable we will be to circumstances beyond our control.

The necessary policy shifts are relatively self-evident. We need to modernize regulations, incentives and disincentives in ways that will achieve three things – the first is to move us to a “softer” energy path; the second is to diversify away from non-renewable sources; and the third is to take advantage of potentially important synergies between energy and water policy. I will come back to these points in a few moments. I am sure you will have noticed a certain parallel between my energy and climate suggestions. Clearly, solving either of these problems would go a very long way towards solving the other.

1.4 Water Policy

My fourth topic in the vision category is water policy. I think you have already called for a new water strategy, and the current government has even promised to do one.

Canada’s last formal federal water policy was one I worked on way back in 1987. Ironically, since that time, the number and severity of freshwater issues has rapidly escalated, while our capacity to deal with them has steadily declined.

We have always assumed that the vast area of Canada and our generous endowment of water would shelter us from the fate of more densely populated nations. But, our perception of overabundance is rapidly fading due to competing consumptive and in situ uses, the contamination of existing supplies, and gradual climate change. And as we are learning with western Canadian energy developments, a combination of even small policy errors and very powerful modern technologies can change a healthy water situation into a potentially tragic one quickly and without warning.

There is still no effective centre of water policy leadership at the federal level. There is very little science anywhere in Canada that is both independent of the political process and independent of the primary abusers of water resources. Data and other water science programs have been severely downsized and degraded over the past two decades.

Clearly, there is an urgent need to rebuild and reinvigorate a national water management capacity, beginning with federal leadership. Last fall, I worked with a number of concerned scientists and citizens under the name Gordon Water Group which developed 25 specific suggestions on how that could be done.

We also have to get beyond federal-provincial turf wars, and move towards a pan-Canadian consensus on water policy. Once again I would look to Europe for inspiration. In 2000, member states of the European Union passed the Water Framework Directive, a legally-binding policy for water management and protection for all of Europe. That framework sets out a comprehensive water management strategy based on integrated watershed management, including transboundary watersheds.

2. Constraints

1.1 Smart Regulation

On public interest constraints, the first topic I would like to touch on is so-called smart regulation, which has major implications for both energy and water. Since about 1990, as an inevitable outcome of declining voter influence, North America has gone through a process of deregulation and the eroding of public interest regulations in an attempt to become more competitive. One of the ways of doing that has been to move in the direction of so-called smart regulation.

That's a complicated concept, but what it essentially means is that we have moved away from the precautionary principle to a risk assessment approach. And because, whether by accident or design, governmental scientific capacity has been seriously compromised at the same time, the task of risk assessment has fallen mostly to those being regulated.

In North America, that process seems to be accelerating under the Security and Prosperity Partnership. Under that process, governments are taking their direction primarily from a group of corporate executives. Citizens are not being significantly included or consulted. There is always a great deal of secrecy surrounding decisions until they are a fait accompli, and many close observers contend that the regulatory shift is generally in the direction of the lowest common denominator.

Aside from the regulatory process losing its rigor, enforcement has virtually evaporated. For example, in a recent year, the Ontario Ministry of the Environment recorded 1900 water pollution violations and laid only 4 charges. In the same year, Environment Canada noted 3000 violations of pulp and paper mill regulations, and only proceeded with 7 prosecutions.

Your Council may want to take a very close look at how we develop and enforce health, safety and environmental regulations in this country, and if deemed necessary call for a mid-term correction.

1.2 Safe Drinking Water

My second topic under constraints is safe drinking water. I notice that you have already passed an earlier resolution on this topic, which I would like to support and reinforce. In Canada we operate under a system of national guidelines, with provincial regulation. There are few other countries anywhere in the world without enforceable national drinking water standards.

Last month, I was invited to make a presentation to a Senate Committee on this topic. I pointed out that public anxiety is continuing to mount with every new tragedy like those experienced in Walkerton and Kashechewan, and with the thousands of boil water advisories that Canadians face every year.

The Commissioner for the Environment and Sustainable Development has also pointed out a serious backlog in the guideline process itself, which is becoming very troubling when one considers newer forms of pollution like pharmaceuticals and personal care products, and potential human health risks in the vicinity of energy and other major resource extraction projects.

I noted: the fact that only two of the provinces had fully adopted the national guidelines; the fact that requirements for the monitoring of contaminants varied widely from province to province, the fact that few provinces had regulations in place to deal with source water protection; and the fact that a majority of provinces still did not require mandatory reporting on performance.

In calling for enforceable national standards, I pointed out that we expend a lot of time, energy and money on security, and asked what could be more important to the security of Canadians than the dependability and quality of the water they and their families drink every day. We regularly hear about acute medical problems caused by short-term drinking water issues. But, we need to be equally concerned about the chronic effects that may occur if contaminants are ingested at unsafe levels over many years.

This is yet another area where we can look to Europe for inspiration. The Drinking Water Section of the EU Water Framework Directive provides for enforceable union-wide standards for most common substances that can be found in drinking water. While translating the Directive into their own national legislation, the Member States can include additional substances or more stringent requirements, but are not allowed to set lower standards. This ensures a high and consistent level of human health protection throughout the whole of the EU.

1.3 Public Trust

The third area I would like to touch on under the heading of constraints is public trust law, and its relationship with free market mechanisms. Earlier this month, I reviewed a draft report which explored the potential for the marketing of water rights. I have no problem with the concept in principle – international experience has suggested that it could be useful in reallocating water to higher value uses, and introducing water use efficiencies.

But, I do have a problem with it in the Canadian context where we don't generally have sufficient safeguards in place to protect the public interest. Water would indeed flow to higher value uses, but the more general public good would take a beating.

I think, before we move very far on water rights marketing, that should be preceded by something akin to public trust laws. We don't have those kinds of laws in Canada, but they do have them in every U.S. state. They are based on the assumption that certain natural resources - like air, freshwater, oceans and the living things dependent on those resources - are so critical to human survival, that governments have a fiduciary duty to preserve their essence for the use and enjoyment of the entire populace, not just the privileged.

Some suggest we don't have that kind of protection in Canada simply because one judge in Ontario made a mistake a few decades ago. But, the Supreme Court of Canada, in a judgment a couple of years ago, hinted that it would now be open to those kinds of argument if they were presented to them.

I think public trust law, or something akin to it, is a topic that could be fertile ground for research under your water-energy connections project. To what extent should we allow energy and other financially overpowering industries to "buy" the right to use water, without first providing adequate public protection? If you do decide to pursue that topic, I have a detailed paper that I wrote for a Commons Group awhile back that you could use as a starting point.

1.4 Model Act

My final topic under constraints is living within nature's limits. On energy it is clear that we cannot depend on non-renewable sources indefinitely. More and more of our energy sources will necessarily have to be renewable, and will be finite unless we find ways to exploit energy from beyond our own planet.

And as more of our energy sources become renewable, those sources will also be closer to home, and their control will shift to more local entities. At the same time, the energy- water linkages will also become clearer, and the need to keep water within its natural watersheds and deal with its many uses in an integrated fashion will also become obvious.

At that point in time, we will hopefully escape the inevitable 20 year cycle when people trot out wild schemes for moving large amounts of water around the continent or the world. That cycle started in the 1960s, repeated itself in the 1980s, and is now showing up again. Last year a Washington-based think tank tried to sell the idea of continental replumbing, using the argument that it's better to move water to people than to move people to water. Of course, you don't have to move people to water - they naturally gravitate there. But, you would have to move people if you took their water away from them.

Recently, the oil patch has also seemed to develop an interest in piping water all over the place. And last month, I noticed that even the whacky old Grand Canal scheme had resurfaced with a different proponent and a different name. Fortunately, Canadians have always been way ahead of their leaders on this one, and have always rejected the notion of pumping water over continental divides or shipping it across oceans.

There is pretty broad consensus among serious water experts that water should generally be kept within its major natural water basins and used more efficiently. For example, that notion is reflected in Alberta's Water for Life Strategy, which calls for a 30% gain in water conservation, and managing within the natural capacity of each basin. And it is reflected in proposed state-provincial agreements to prohibit diversions of water from the Great Lakes Basin. Last fall, I was a panelist along with two other Canadians and two Americans that reached a similar consensus, leading to a recommendation for federal safety net legislation to ensure it happens. The Canadian Water Issues Council and the Munk Centre at the University of Toronto subsequently developed a Model Act along those lines for the consideration of legislators. I hope you will be able to support the passage of that proposal or something like it during your project.

2. Incentives and Opportunities

1.1 Soft Paths

My first topic under incentives and opportunities is energy and water soft paths, which relates back to my previous discussion under energy security. What society generally does is forecast future energy and water demands based on almost arbitrary exponential increases over time, and then tries to meet them. Without getting into the detail, with soft paths you do the opposite. You decide ahead of time where you want to end up, and by backcasting devise demand management strategies to get you there.

There has been some very good conceptual work done on these ideas at Friends of the Earth and the Polis Project at the University of Victoria. There has also been some limited uptake on a local scale in places like Toronto, Calgary and in the Okanagan Basin. And there have been some broader success stories, for example, water use in the entire United States essentially leveled off around 1985.

But, no senior level of government in Canada has ever taken on soft energy or water paths as a core policy. And it is easy to understand why. They live or die mainly on the basis of outdated measures of economic performance over their 4 year mandate. And a lot of their advice comes from corporate executives who are focused almost exclusively on profits in the next quarter. But, energy and water uses simply can't keep growing indefinitely, and this kind of short-term thinking is getting in the way of moving to longer-term sustainable solutions.

David Brooks, who has worked a lot on soft path approaches for both energy and water, assures me we have no shortage of opportunities to reduce demand, not only by marginal amounts, but by factors of three or four. Let's assume for the sake of argument that we can match the Europeans and reduce both energy and water use by a modest half and at the same time preserve our overall quality of life. That seems to me to be quite a reasonable assumption.

Just think of the synergies that would produce. If we reduced energy use by 50%, we would save enormous amounts of water and very significantly improve our aquatic ecosystems, as well as move towards a more responsible climate policy. And if we reduced water use by 50%, we would save enormous amounts of energy which are now used to extract, store, pump, transport, heat and treat that water.

It obviously won't happen overnight. First, groups like yours need to convince enough voters and consumers that it is in their best interest to force governments and corporations to adopt a longer-term perspective. Then senior governments need to enable the rest of society with the knowledge, policies, incentives and opportunities that they need to make it happen from the bottom up.

1.2 Incentives and Disincentives

My next topic is incentives and disincentives. A few months ago, Alberta raised royalties on tar sands output. There were a few muted complaints from the energy industry. But, I suspect that in corporate boardrooms, there was a lot of loud celebrating going on.

What if federal and provincial governments ever did what pure economic theory suggests they should do – which is to include all environmental costs in royalty and taxation regimes? Actually what would happen is that tar sand development would slow to a much more reasonable pace, and both Canada and the U.S. would be forced to move more quickly to more sensible and more sustainable energy futures? Would that really be so bad?

Of course it is impossible to calculate all the environmental costs. What governments tend to do instead is to use various economic incentives and disincentives as proxies. Unfortunately, Canada has been very slow to do even that, and as a result we are missing out on a lot of green industry opportunities. I will just mention a couple of success stories from Europe.

The Danish government has been taxing CO2 emissions since 1991, and it has offered tax incentives to the wind industry since the 1970s. The results range from Denmark's global leadership in renewable power generation and wind turbine manufacturing, to a majority of its chilly climate's heat being produced by hyper-efficient combined heat and power schemes, to substantial CO2 emissions reductions during a period of robust economic growth.

In Germany, an approach dubbed a feed-in-tariff has almost single-handedly vaulted Germany to the global forefront in renewable energy. Feed-in-tariffs are a kind of price subsidy which inflates the price of green energy to the “avoided cost” rate – the total cost to society if the same power had been produced by fossil fuels. The outcome of this strategy has been a near spectacular boom in German solar energy production.

For more detail on these and many similar successes, I would refer you to a very informative book entitled “The Geography of Hope – A Tour of the World We Need” by Chris Turner.

1.3 Science

I would now like to turn to one of the most important enablers, namely science and knowledge. In the more global, industry dominated economy, strong independent science tends to be viewed in the same way as strong regulation – as an impediment to moving along the trajectory towards infinite consumption. I sometimes watch parliamentary committee hearings, and sympathize with credible government scientists who at times appear to be trying to defend the indefensible. Their testimony is of course counterbalanced to some extent by the views of non-governmental experts, but those experts generally don’t have the resources necessary to do sound science. I think we do need strong independent science somewhere if the public good is to be protected. I was pleased to see that science was highlighted in one of your previous resolutions.

Last year the Gordon Water Group looked at some trends in environmental science. Personnel working on environmental science in Environment Canada were cut by 26% between 1992 and 2007, and by 21% in Fisheries and Oceans. At the same time as the demands for information are increasing, we are creating huge gaps in our water quantity and quality knowledge base. For example, we used to monitor water quantity at 4000 sites; now we monitor at only about 2500 sites.

Looking beyond just government, Canada’s scientific performance is very disappointing. According to Mel Hurtig’s new book, out of 30 countries, Canada ranks 25th in research and development, and 30th, or dead last, in patents. There is an urgent need to both rebuild our national science capacity, and to find institutional models that allow publicly funded scientists to speak out honestly and without fear of reprisal. One possible model you might want to take another look at is something akin to the former Fisheries Research Board. It did outstanding, world class research, and its independence was never in doubt.

1.4 International Assistance

The final topic that I would like to touch on very briefly is the situation in many less developed countries. I will use two countries in the Upper Nile Basin as an example, although I could have chosen any number of others.

Sudan has a population of over 30 million which is growing at a rate of 2.7% per year. A combination of failing rains and civil strife has at times led to starvation or malnutrition for millions of people in the south. Ethiopia's population of 60 million is growing at a rate of 3% a year. Forests, which once covered 40% of that country, now cover less than 3%. If no other energy source is developed, further cutting of wood for burning will soon annihilate all of the remaining forests. In the semi-arid zone, desertification is capturing significant areas, and land productivity throughout the region is diminishing due to increasing topsoil erosion and the depletion of nutrients. At the peak of the drought in the mid 1980s, many areas in the Upper Nile Basin were hit by famine, affecting more than 15 million inhabitants. What is further alarming is the fact that global climate change is now beginning to exacerbate the problems.

Canada and other industrialized nations are of course providing some aid through a variety of channels. But, we need to recognize that it is in our national interest to place an even higher priority on these kinds of water and low level energy problems. Those investments will not only improve world-wide health, but they will at the same time reduce the risk of political conflict, and contribute to global security and stability.

In summing up, I would just like to congratulate the Council again for tackling the very challenging topic of energy-water connections. It is certainly a daunting, but very timely and relevant undertaking. To deal effectively with the energy and water challenges of the 21st century, we are going to need at least a modest renaissance of democracy. And groups like yours can play an important role in making that happen. You may not overcome all the world's ills in two short years, but even if you succeed in changing the tone of the national conversation in Canada that will be a major accomplishment.

Thank you.