

Sustainable Development & the Knowledge Economy: Public Policy and Product Innovation

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My title is Perspectives on Future Environmental Policy. Concerns about environmental issues aren't confined to environmentalists, academic economists and policy makers, particularly in terms of future issues. Only one thing in this area is certain and that is prediction is difficult, particularly if you're predicting the future. It's well known that Marxists once predicted the inevitable collapse of Capitalism. Like many of Marx's predictions commentators have noted that this one has been late in coming true. And supposedly an admirer of Marx once said, proof of Marx's farsightedness is that none of his predictions have come true yet. Well, if it isn't clear yet where I'm going with this it is that proper humility is required whenever we get into the predicting business and we are supposed to be looking through an entire century.

Possibly more to the point there is a website that is titled Famous Bad Predictions. In 1873 for example the British Surgeon General said that the abdomen, the chest and the brain will forever be shut from the intrusion of the wise and humane surgeon. In 1899 the U.S. Commissioner of Patents said everything that can be invented has been invented. Possibly the best one is from 1981, Bill Gates said that 640K ought to be enough for anybody. Well know MIT economist, Paul Krugman, contributed a piece to the New York Times magazine in which he was hypothetically looking back on what had happened to the U.S. economy from the perspective of the year 2100. Environmental and resource issues play an important role in his interesting assessment and if you haven't looked at it and you're interested in this kind of thing Krugman's website is certainly one of the best going for economists. Well our own topic of sustaining a quality environment for Canadians is only slightly less daunting.

In terms of what I want to look at in the time that I have available I want to talk a little bit about trends and second at targets. There continues to be substantial imprecision under the general heading of environmental targets or how to integrate economic and environmental considerations. I will already predict that this imprecision will continue well into the 2000's. As well, I want to look at 3 specific issues. I want to look at costing issues related to environmental externalities. I want to talk just a little about resource prices and resource use. And I want to talk as well about reform of environmental regulation.

In terms of trends in environmental quality this issue probably should be easier than it is. It is regrettably true that you can pretty much find any trend you want in environmental quality depending on how you select your area. There often appears to be a reluctance to describe areas of environmental quality as improving. Certainly from listening to what my kids learn about the environment in school there often appears to be a dark lining in every silver cloud. Possibly there's good strategic logic here if people think that acknowledging gains will promote backsliding. However, I think it's important to

recognize gains because this may help us to understand why gains have occurred in some areas and not in others, why our policies have been better for some problems than for others. And this may allow us to pick up some of the laggards. Well, in terms of trends I think there is a set of environmental indicators that have improved in virtually all developed countries leading some analysts to refer to a U-shaped relationship between some measures of environmental quality and GDP. At low income levels GDP growth increases many pollutants, but at a level somewhere around \$8,000 per capita this turns around with environmental quality and GDP increasing together. Among other things this reflects a positive income elasticity and there are obvious areas where this has happened. Sewers, sanitation systems together with air and water quality controls have led to many improvements and again, Brian Copeland's paper has some data in this area. If we look at air indicators like sulfur dioxide and nitrogen oxides and carbon monoxide we have had improvements, in some cases extremely striking improvements. There have been reductions in other air measures like total suspended particulates. Threshold problems for particulates are at least uncertain so that this will continue to be an important policy issue, particularly for people living in the Montreal-Windsor corridor where urban air pollution is a problem. Maybe a clearer area in terms of trends deals with ozone depleting substances. It is easier to know about success in this area because the Office of the Auditor General in fact did a detailed audit report on Environment Canada's ozone layer protection program and I would characterize the report as extremely positive. And this reflects worldwide efforts in which Canada has played an important part. The concentration of ozone in the stratosphere should reach a low point somewhere at the end of this year and then the impact of the Montreal Protocol on substances that deplete the ozone layer will mean a recovery of the ozone layer to pre-destruction levels over a 50 year time period. So things will get better, but not really quickly. These are long lived pollutants in the upper atmosphere and it will take time, but starting soon we will be moving in the right direction instead of the downward direction in terms of ozone concentration that we had been moving in. At the same time it's important to acknowledge how potentially serious this problem was. In assessing the benefits and costs of the Montreal Protocol controls on ozone depleters, there have been simulation results that I've worked on that show that even a 10 year delay (the Protocol came into effect in 1989)... a 10 year delay in those dates would have, almost certainly have led to irreversible ozone layer destruction and extraordinarily large costs. In terms of other issues, global warming is next or upon us already as an issue. And a question for the future, it would be certainly nice to know is this going to end up looking like the Montreal Protocol, more or less smelling like roses, at least eventually or will it drag like acid rain and a number of other problems have? If you're looking for an interesting perspective on global warming I would recommend the website of Resources for the Future (RFF), an environmental organization in the United States. RFF has a very sensible proposal to start controls almost immediately on greenhouse gases, but at levels dramatically less stringent than in the Kyoto Protocol, which doesn't start a control period until the time period between 2008 and 2012. The RFF proposal is for less stringent but immediate controls including a cap on abatement expenditures. And certainly to economists and policy makers a program like this would be worth its weight in gold in terms of generating information about abatement cost functions immediately.

The second area that I want to talk about today has to do with targets. Well this is an area that is sometimes contentious. The sustainable development literature has one perspective on this while the literature on environmental policy and competitiveness frequently has another. I would assert that an environmental policy initiative that passes an economic benefit cost test must also contribute both to sustainable development and national competitiveness if we are defining all of our variables correctly. The converse of that is a little different. An initiative that fails a cost benefit test would diminish national competitiveness if it were implemented, but it would not necessarily be unsustainable. That is sustainability by itself is not a great target since lots of non-optimal things can be sustained. Well many critics of the environmental perspective ask, well won't protecting the environment reduce GDP? Well, not necessarily, particularly if measurement improves. But it's the case that all economists know that GDP is not what we're trying to, to maximize that we're trying to maximize utility and the positive elements of GDP contribute to that. But maximizing utility that is our overall economic and related well being and maximizing GDP are separate problems. And with accounting this may be straightened out in the next hundred years as we measure things better, but it'll probably take a good chunk of that hundred years to get it sorted out. So the central point about GDP and productivity is a simple one. There are a number of economists who have argued that our basic productivity measures are flawed. If an environmental regulation passes a properly conducted benefit cost test it promotes economic welfare, even if it reduces the growth of measured productivity. And the reason for this is that input resources are being diverted from the production of output to the production of environmental quality. If it passes the benefit cost test, the gain in environmental quality makes us better off even if there is a reduction in output. Part of this is misuse by people who don't know better or should know better of the conventional studies that have been done in this area. It's reasonable in a study to look at the costs of promoting environmental quality in terms of reduced productivity, but the fact that you find a cost doesn't mean that any of the decisions relating to those costs were bad ones. What about future issues? Well, first of all prices and costs. Building on the work of Ronald Coase on externalities, economists see environmental policy issues in a property rights perspective. Common property or open access resources are the source of environmental externalities and increasingly we will incorporate external costs in the price of commodities. Krugman in his view from the year 2100 looks back on the increasing importance of environmental costs in the prices of many products. Brian Copeland in his survey article discusses the same thing. He refers to a double dividend in which welfare improving and revenue neutral environmental taxes replace distorting taxes in other dimensions. Krugman foresees an era in which environmental taxes and permits as well as related licenses are such a large revenue source that the income tax is abolished. His written prediction, (you can look it up on his website), is that this will occur in the year 2043. So you'll have to wait to see if getting rid of the income tax because of all the environmental revenues is a farsighted prediction or not. Although not widely recognized, economists are usually serious environmentalists. There are a number of reasons for this. Economists now learn about externalities in the first economics course that they take and markets are great, but externalities happen. This does not support all forms of regulation.

I've referred to the benefit cost test, but it often predisposes economists to the view that charges, permits and other incentive based mechanisms have the potential to improve outcomes in this area.

What about resource price pressures versus running out. There seems to be a debate about whether we should expect price spikes for some natural resources or whether we should have gradual price increases over time. Economists kind of expect the gradual price increases, going back to the path breaking work of Hotelling in this area. Unfortunately the Hotelling model doesn't fit the real world problem of resource use because the known stock that Hotelling assumes does not really exist. We're always drawing on some kind of unknown resource. Many resource specialists have lost lots of money betting on an increase in resource prices over time. This may well happen, but gradual price increases appear more likely than, than price spikes.

Regulatory reform is necessary in terms of moving to more incentive-based systems. Although local controls may often be effective, there should be a differentiation in terms of more global issues like the ozone layer. The Montreal Protocol dealing with the ozone layer and global warming are areas where most of the responsibility should continue to lie with Environment Canada. Local air, water and other problems can be dealt with at a provincial level.

It's hard to sum up something that has covered as many areas as this presentation has. I will say though that my fearless and self-interested closing prediction is that measuring benefits and costs of environmental improvement will be a growth industry over the next several decades. Thank you.

APPLAUSE