Reality Check
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IN THIS ISSUE OF REALITY CHECK

LESS MAY BE MORE

In 1989, the Exxon Valdez spilled 11 million gallons of oil into the pristine waters of Prince William Sound. Because of all the money spent on the cleanup, the spill contributed far more to the Alaskan economy than if the ship had safely delivered its oil to port. The true costs of pollution to forests, lakes, and human health remain invisible in the standard economic accounts. So do the damage costs associated with climate change.

The December 2003 issue of *Nature*, for example, reported that climate change—intensified by greenhouse gas emissions—is causing ocean water to evaporate and making tropical oceans dramatically saltier. The U.S. National Science Foundation says: "Recent climate changes, including global warming, may be altering the fundamental planetary system that regulates evaporation and precipitation and cycles fresh water around the globe." This change in turn can affect the frequency, severity, and distribution of droughts, floods and storms.

Scientists confirm that such ocean changes could precipitate more storms like Hurricane Juan, which recently tore through Halifax, downing power lines to some 300,000 homes, felling over 10 thousand trees, and killing two people. Clean-up costs are projected to be $24.7 million by next year.

So long as we count the depletion or degradation of natural capital like the atmosphere and oceans as a gain rather than cost rather to the economy, it will be difficult to initiate policy changes that address climate change and pollution. In fact, human consumption patterns and practices that draw heavily on 'free' natural capital and ecosystem services can appear benign or cost-efficient, even while they deplete the natural resources on which they depend.

Take industrial farming, for example, which relies heavily on chemical inputs such as fertilizer to restore nutrient-depleted and eroded soil. Industrial farming produces cheap food. But as author Richard Manning points out, it takes an average of 5.5 gallons of fossil fuel energy—burned in the production of fertilizers—to restore a year's worth of fertility to an acre of eroded land. Those costly inputs, which could have been avoided through preventive measures, are counted as contributions to prosperity, when the economic growth statistics are mistakenly used to measure progress.

In newer and more accurate measures of progress, less is more when it comes to toxic pollution, waste generation, and greenhouse gas emissions.

Less pollution means a healthier environment, population, and economy. Yet Canada's per capita greenhouse gas emissions are among the highest in the world. According to OECD statistics, Canada is—on a per capita basis—the worst emitter of air pollutants among industrialized countries. And while the OECD countries represent just 18 per cent of the world's population, they also produce about 80 per cent of the world's garbage. Every year, Canadians generate an average of 490 kilograms of garbage per person—11 per cent above the OECD average.

Prosperity without pollution

But it doesn't have to be that way. Innovative measurement tools like the Ecological Footprint can point to policy options that would help households or nations cut excess consumption and preserve the natural capital that sustains them, without reducing quality of life. Investing in public transit and renewable energy, enacting stricter pollution controls, and diverting waste from landfills can all be effective.

Prince Edward Island, for example, banned most non-refillable beverage containers in 1977, resulting in 40 million bottles or jugs being re-used every year—some as many as 40 times before being crushed and recycled. And Nova Scotia's recycling and composting program diverts half the waste generated in that province from landfills. Composting in Nova Scotia alone diverted 72,000 tonnes of solid waste from landfill sites in 2001. This diversion represents a considerable savings in greenhouse gas emissions, since every tonne of solid waste deposited in landfills generates about 62 kilograms of methane—a greenhouse gas 21 times more potent than carbon dioxide.

To accurately assess the impact Canadians have on the environment, we require both natural resource accounts that track the supply of nature's goods and services, and measures that evaluate our demands on natural capital. By focusing on supply, natural resource accounts implicitly put the onus of sustainability on producers—to farm, fish, log and harvest in more sustainable ways. That assumption lets most of us off the hook. But demand-based measures show that it's our consumption habits that are driving the depreciation of our natural capital.

And while Canadian resource accounts assess the health of Canada's forests, fisheries, soils, and other resources, the Ecological Footprint measures the global impact of our consumption habits. Canadian greenhouse gas emissions, for example, may contribute to flooding in Bangladesh.

Demand-based measures like the Footprint also show we aren't all placing equal demands on nature. The rich consume more energy and resources and produce more wastes and greenhouse gases than the poor, with just 30% of people responsible for 70% of global consumption and waste. The richest 20% consume 84% of the world's paper, the poorest 20% consume just 1%. The richest 20% use 58% of total energy, the poorest use less than 4%. The richest 20% eat 45% of all meat and fish, the poorest eat just 5%. The richest 20% own 87% of the world's vehicles, the poorest own less than 1%.

While more production and more consumption always signify progress in our conventional measures, the new measures we profile in this issue of *Reality Check* recognize less pollution, fewer greenhouse gas emissions, less waste generation, and a smaller ecological footprint as signs of genuine progress. ✓

EVERY DAY, we use vital services that the earth provides us for 'free.' We eat food grown in soil made rich by centuries of decaying organic matter. We breathe air that is filtered by plants and trees. And we drink water, which, in the words of poet Gwendolyn MacEwen, "is everything."

Previous issues of *Reality Check* have looked at ways we can effectively track the supply of this 'natural capital,' which contributes to our economy, health, and quality of life. In this issue, we examine measures that track people's demands on natural capital.

The more demands we make on nature—the more food, energy, timber and other resources we consume—the more the economy grows. And when we exceed nature's capacity to absorb our wastes, we grow the economy again by spending money cleaning up the mess. Yet our standard measures of progress misleadingly assume that a growing economy makes us better off and more prosperous.

This issue of *Reality Check* looks at better ways to measures those demands on nature—ways that count the true costs of pollution and over-consumption, and that count a reduction in our impact on the environment, rather than an increase, as a sign of genuine progress.

GDP & The *Reality Check* Mission

This is not a criticism of the Gross Domestic Product (GDP) that we use to measure economic growth, but of the frequent misuse of GDP to assess wellbeing and prosperity—a purpose its architects never intended.

GDP is simply a measure of output produced, some parts of which improve wellbeing and other parts of which may be labelled as 'regrettable' or 'unfortunate' requirements. GDP measures the size of the economy, regardless of the contribution of its output to wellbeing and prosperity.

Nor does the accompanying discussion imply that we would be better off if we did not clean up after disasters such as the Exxon Valdez. On the contrary, when disasters, pollution, and other problems occur, restorative action is essential. However, our critique points to the common misuse of GDP statistics to imply that anything that grows the economy necessarily makes us 'better off,' a message that sends highly misleading signals to both policy makers and the general public.

Nevertheless, GDP is a useful concept, defining what we can produce for many purposes with the labour, capital, and other resources we have. No one wants to waste these resources, especially if there is a way to avoid problems at less cost. Hence qualitative distinctions among different types of output, and preventive investments that may avoid potential liabilities, are essential.

To this end, the mission of *Reality Check* is to promote the development of a new measure of wellbeing and prosperity, which assigns explicit value to assets like population health, educational attainment, environmental quality, equity, and volunteer work, and which counts pollution, crime, sickness, disasters and other liabilities as costs. ✓

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Walk Softly... And Carry A Measuring Tape

Measuring Our Ecological Footprints

Anyone who has been to a Grateful Dead concert is likely familiar with the deadhead motto, "take nothing but memories... leave nothing but footprints." The axiom has been made into T-shirts and bumper stickers. It's the eco-motto of an enlightened subculture. But anyone who has seen the aftermath of a Grateful Dead concert—or any rock concert, for that matter—knows that leaving nothing but footprints is easier said than done. The place looks like a wasteland, with litter and lost items everywhere. Maybe the motto should be amended: Leave nothing but small, clean footprints.

It's this evocative idea of footprints that makes the 'Ecological Footprint' such a powerful, popular idea. Developed by two regional planners at the University of British Columbia, the Ecological Footprint concept is a way to measure and monitor people's impact on nature. It does this by calculating how much land is needed to produce the resources we consume, and absorb the waste we generate.

"It helps to visualize the idea of area being used for our life support," says Mathis Wackernagel, who along with UBC regional planning professor William Rees published the pioneering book Our Ecological Footprint in 1996. "We thought, there needs to be a new measure that links resource consumption of individuals, cities or nations to the globe's ecological limits worldwide."

Once people and governments know the breadth of their Ecological Footprints—and the implications for nature, people and the economy—they can make more informed decisions about how they want to use their ecological resources, says Wackernagel, who now heads the Global Footprint Network, a non-profit public policy group in Oakland, California. "They may actually realize that it is in their interest to reduce their Footprint."

Measuring local, global demands

A Footprint calculation follows a supply-and-demand type of logic. It measures demand by counting the resources that people consume in a year, from water and fossil fuel to food, wood and land used for roads and houses. It also measures their yearly waste production, such as greenhouse gas emissions from fossil fuel use. Next, it determines the biologically productive area necessary—be it fields, fishing grounds, or forests—to meet these demands in a given year, and absorb the waste.

Since people consume resources from all over the world, the Footprint clusters its measurement of biologically productive area into standardized 'global hectares.' This 'Footprint,' expressed in global hectares, can then be compared to the supply of biologically productive area worldwide. In 2002, for example, the biosphere had 11.4 billion hectares of biologically productive space, which included two billion hectares of ocean and roughly 9 billion hectares of land. (The land measure includes inland waters.)

The Ecological Footprint analysis provides easy-to-read charts that allow readers to compare a nation's Forest Footprint (the area needed to produce the wood a nation consumes) or Fishing Ground Footprint (the area needed to produce the fish and seafood a country consumes) with available forest or ocean biocapacity. The analysis also includes a fossil fuel combustion footprint, which is calculated by the area of forest that would be needed to absorb the carbon dioxide emissions resulting from a nation's fossil fuel use (excluding the proportion absorbed by the oceans).

Canada's Ecological Footprint is 8.8 hectares per person – the world's third largest, just behind the U.S. and the United Arab Emirates.

Global comparisons are mainly based on data from the United Nations, the International Energy Agency, and the Intergovernmental Panel on Climate Change, although recent provincial-level analyses in Nova Scotia, PEI, and Alberta have used Statistics Canada's household consumption and expenditure survey data. The Footprint calculation excludes any resources or wastes that can't be measured, and thus underestimates people's demand on nature and overestimates nature's available resources. In other words, it is a conservative measure.

Americans have world's biggest footprint—Canadians not far behind

Wackernagel and Rees first tested their Footprint analysis on Vancouver, and were shocked by the results. The city needed an area 50 times the size of the Lower Fraser Valley—a vast, ecologically rich area stretching from Vancouver to Hope—to sustain its consumption of natural resources.

Since then, Ecological Footprint calculations have been done for cities, provinces, countries, and the world as a whole. Individuals can even roughly determine their own Footprint with an easy step-by-step quiz at **www.MyFootprint.org**. The most recent global Footprint results show that in 1999, Canada's Ecological Footprint was 8.8 hectares per person—the world's third largest, just behind the U.S. and the United Arab Emirates. By comparison, the per capita Footprint of the world's 31 poorest countries, including India and Haiti, is lower than one hectare. On average, high income countries have a Footprint six times greater than low income countries, according to Footprint data in the World Wildlife Federation's *Living Planet Report 2002*.

On its own, the size of a nation's Footprint may not mean much. But when you compare it to the natural resources available, it begins to read a bit like a bankbook, with debits and credits. For example, the United States has 5.3 global hectares available per person to provide resources for its people and to absorb their waste. But it has an Ecological Footprint of 9.7 hectares per person—equal in size to 24 football fields. In other words, in order to support the eating, shopping, energy-use and travelling habits of Americans, the U.S. is operating on an ecological deficit of 4.4 global hectares per person.

Place that in a world-wide context, and the picture becomes more dire. The planet only has 1.9 global hectares of biologically productive space available for each person on earth. But the world's average Footprint per person is about 2.3 global hectares—20 per cent above what the earth can sustain. If everybody consumed at American or Canadian levels, we would need five additional planets to provide the needed resources and absorb the wastes produced.

But the Ecological Footprint offers more than what to some may look like a doomsday prophecy: It offers a method to manage ecological resources and demonstrate the benefits of shrinking our Footprints.

Government policies could reduce our current global Footprint by addressing four key areas:

- *Production:* producing goods and services using fewer resources. For example, switching to renewable energy sources would sharply reduce Footprint size.
- *Consumption:* using resources more efficiently by, for example, promoting markets for sustainably produced goods.
- *Population:* slowing world population growth by promoting equity through improved health care, livelihood security, and education in low-income countries—all of which lead to smaller families.
- *Environment:* making nature more productive for people without degrading it, by, for example, protecting against soil erosion and eliminating toxic chemicals.

"We can choose among the four," says Wackernagel. "Say we don't want to look at one of them—let's say consumption—then we have to work harder on the other three. Basically as with money, the Footprint accounts help you compare your demand with nature's budget. You then have to decide for yourself how to use the budget best to serve your interests."

Footprint to make better policies

So far, several municipal, regional and national governments have adopted various Footprint policies. For example, California's Sonoma County region used the Ecological Footprint analysis to mount a successful campaign in which all cities in the County committed to reduce their carbon dioxide emissions by 20 per cent.

The next step for the Ecological Footprint is the Global Footprint Network's effort to standardize and promote the Footprint worldwide. That means developing common standards, in much the same way the GDP is standardized and comparable across countries, says Wackernagel. "As governments use the Footprint, they will be assured that their results are scientifically robust and comparable, so it's not so much of a political risk."

For a fuller explanation of the methodology and policy choices suggested by the Ecological Footprint, see the WWF Living Planet Report 2002 *at* ***www.panda.org****. For an example of Ecological Footprint analysis at the Canadian provincial level, see* ***http://www.gpiatlantic.org/publications/environmental.shtml#ecologicalfootprint****.* ✓

Michael DeAdder

AIR POLLUTION LINKED TO LUNG CANCER, HEART DISEASE, SARS DEATHS

Exposure to air pollution may significantly increase a person's risk of dying from diseases such as lung cancer, heart disease, and Severe Acute Respiratory Syndrome (SARS), according to studies by Canadian, U.S., and Chinese researchers.

- A study published in the January, 2004, edition of the American Heart Association journal, *Circulation*, found that people with long-term exposure to polluted air have an eight to 18 per cent increased risk of dying from heart disease.
- A 2002 study done by the same medical team—including two University of Ottawa researchers—showed that each 10-microgram increase in concentrations of air pollution went hand-in-hand with an eight per cent increase in deaths from lung cancer.
- And a 2003 UCLA-led study suggests that exposure to air pollution may double a person's risk of dying from the SARS virus.

Dr. Mathis Wackernagel

What's Your Shoe Size?

An interview with **Dr. Mathis Wackernagel**, who along with University of British Columbia professor William Rees, pioneered the Ecological Footprint.

Q: *Why should we think about our 'Ecological Footprint'?*

A: In order to manage we need to be able to measure. That's why economists developed the GDP or Gross Domestic Product as a way to know how much money is changing hands. It's an essential tool to run the economy. We need similar kinds of information to protect and manage our ecological assets. The Ecological Footprint is an aggregate overall account of our ecological assets. It helps us to see how much 'nature' we have and how much we use, and by doing so we can make wiser decisions.

Q: *Many of us consider ourselves fairly 'green.' Yet when we calculate our Ecological Footprint, we're surprised to discover it is huge. How easy is it to reduce our Footprint?*

A: Let me tell you a story about that. The San Francisco Bay Area of Marin County, which is fairly environmentally oriented, has an Ecological Footprint larger than the U.S. average—about 11 hectares per person.

On the other hand, what they really like to do on their holidays is to go to Italy, because they love the Italian way of life. That's also what they try to imitate in Marin County—having pleasant cities with a central piazza, etc. But if you actually look at the Italian Ecological Footprint, it's only about a third of the size per person. The Italians are able to produce the lifestyle that these wealthy Americans aspire to on one third of the Footprint.

What's the secret? Well, Italians live in more compact cities, so they are much less dependent on cars. It is not nuclear power or hydro power—it is 'proximity power' as Richard Register calls it. Kids can walk to school, houses are closer to each other. This U.S.-Italian difference gives us a sense of what is possible without even applying available green technology yet.

Q: *What could our governments do to try to reduce our Ecological Footprints, bringing them alongside Italy's, while also improving quality of life?*

A: The question is why would they like to do that. The first step is to recognize that by overusing our ecological resources, we may put our economic performance at risk. The more we depend on importing ecological resources, the more it becomes a liability for our economic performance.

Once countries recognize that it's in their interest to limit their Ecological Footprint, there are various intervention possibilities. One large factor of resource consumption is our huge dependency on fossil fuel.

Q: *Sometimes improvements in technology—from fuel-efficient cars to energy-efficient homes—are regarded as a panacea. How do you assess the notion of technology as the solution to reducing our Ecological Footprint?*

A: Technology has its role to play. Still it's important to recognize how we apply these ecological efficiency gains. If we apply them without reaping the benefits for society, it may end up just stimulating demand for these goods, and may lead to higher consumption.

We need to combine efficiency gains with tax reforms to capture the benefits of these gains for society, and invest them into sustainable alternatives. And you can also do it in a socially equitable way. Tax reforms actually address social and ecological issues at the same time—reducing consumption without putting an undue burden on people, particularly not the already disenfranchised.

Q: *How can we ensure that our new 'green' technologies don't just stimulate greater consumption?*

A: Typically, there's no inherent limit to human wants. Technological wizardry alone cannot outwit human wants. One possible solution is to raise taxes on energy sources as more efficient energy technologies become available. The effect would be that people who adopt efficiency gains would benefit most, because energy would be more expensive. That's an incentive for adopting technological innovations that are more resource efficient.

Q: *Does the private sector have a responsibility to help reduce a nation's Ecological Footprint?*

A: Obviously there are lots of opportunities to reduce the Footprint on the production end. We can generate or produce cars that consume less energy, or produce furniture that is more long-lasting and repairable.

Governments talk about sustainability, yet 99 per cent of their incentives encourage corporations to use more resources. As long as we're not really serious about bringing the incentive systems in line with what is necessary for sustainability, it's hard for corporations to live within the means of nature.

Q: *Lately, nuclear energy has been talked about as a solution for reducing greenhouse gas emissions. What do you think of this solution?*

A: Overall, the efficiency of nuclear production is not that different from fossil fuel, from a Footprint perspective. Once we add potential risks, and costs to store wastes for generations to come, nuclear energy looks even less favourable. Certainly, nuclear power is so much less competitive than many other renewable resources. Hence it should probably be phased out for economic reasons alone.

The electricity bill does not show us the full price that we pay for nuclear power. But there are lots of hidden subsidies that, once taken into account, make this fuel source rather unattractive.

Q: *How can a society that is so driven by growth and consuming more adopt a plan to consume less?*

A: It is a large challenge, and I think we still live with the illusion that we can solve all our problems by producing more. We're not seeing to what extent our economic expansion is costing us more than it produces. During the time of expansion, things may be easier in the moment—but eventually we will have to pay the bill for ecological overuse.

Living in an economy that doesn't depend on continuous economic expansion requires some serious rethinking. I think one of the big tragedies is that as a society, we have refused to think about what such an economy would actually have to look like.

Q: *How can we ensure equity comes to the poorer countries, while also attempting to reduce the world's Ecological Footprint, when we know that 'development' and wealth bring an expanding Ecological Footprint?*

A: Any common resource problem has to struggle with two questions. The first is how big is the 'chocolate cake'—the common assets we are looking at. The next is who gets what. We have to get together and find enough common support for new social contracts we're actually willing to live up to, or we can invest more in our armies and just defend taking a bigger piece. The Footprint makes conflicts of resource distribution more visible so we can have more rational conversations about how to use our ecological assets. But it's obviously not in everybody's direct interest to share. I think it's in the majority's best interest—but those that have the biggest hands to grab from the chocolate cake may have a harder time recognizing the benefits of taking less.

Q: *What is the most effective way to reduce our Footprint?*

A: I would say it's to increase your quality of life. *Your Money or Your Life*, a book by Joe Dominguez and Vicki Robin, is a great resource on how you can become financially independent. Basically they say the limitation to your wellbeing is not how much money you earn, but how many hours you have in your life. On average we get this incredible gift of 75 years of life (at 8,760 hours a year). So how do you want to use your budget of limited hours best? How many of your hours do you want to invest in which activities? How many hours of work do you trade? What people typically come up with is that reducing their overall consumption increases their wellbeing.

Dr. Mathis Wackernagel is Executive Director of the Global Footprint Network, a non-profit organization that is advancing sustainability.
www.FootprintNetwork.org. ✓

"I think that what we're going to find over time is that air pollution is playing a wider role than people had thought likely 30 years ago," says Dr. John Froines, director of a major air pollution research centre at UCLA, and one of the authors of the SARS study. And with every health problem attributed to air pollution comes hidden costs, from the social cost of loved ones becoming ill, to the economic cost of paying to treat their illnesses.

Researchers have known for a long time that air pollution is linked to many health ailments, says Dr. Froines. But they are now zeroing in on 'fine particulate matter'—microscopic particles of soot generated by cars, factories, and coal-fired power plants—as particularly grave health risks.

The particles, which can also be carcinogenic, can penetrate deeply into lungs and brains, killing or inflaming cells, and causing many health problems not normally associated with air pollution. For example, Dr. Froines has found that pregnant women who live close to major highways are more likely to have low-birth-weight babies and premature births.

Both the heart disease and lung cancer studies focused on the health impacts of particulate matter. The lung cancer study, published in the *Journal of the American Medical Association*, tracked 500,000 people for 16 years. It determined that the lung cancer risk from living in a polluted American city was similar to the risk of long-term exposure to second-hand cigarette smoke. The SARS study, published in the November, 2003, online journal *Environmental Health: A Global Access Science Source*, provided only a cursory look at the possible link between air quality and deaths from the virus. Researchers looked at 5,327 probable cases of SARS in China, and 329 deaths from the virus. They discovered that the death rate in areas with low air pollution was roughly four per cent. In areas with high air pollution, it was nine per cent.

"All it suggests is that at a first blush, we've found something," says Dr. Froines. "What we found suggested that one ought to look at it more closely." ✓

What Goes Up Must Come Down

New Measures Show that Spending Money On Clean Air Pays

The rolling farmland and sparkling water of Ontario's Haldimand and Norfolk Counties is one of the prettiest places in Canada. The area is a fisherman's playground, a birder's paradise, and a botanist's dream. It is home to a large portion of the only Carolinian forest in Canada, and harbours several rare plants, grasses, and species of wildlife. It is also home to Canada's single greatest source of air pollution—Ontario Power Generation's Nanticoke station, North America's largest coal-fired power plant, which sits nestled on the shores of Lake Erie. Its trademark smokestacks can be seen from kilometres away. Tourists at dusk have been known to mistake the yellow, smog-streak across the sky for a new hue of sunset.

The arguments for and against the power plant are always the same. Environmentalists and concerned citizens point out that according to the Commission for Environmental Cooperation (CEC), the plant is the top polluter in Canada and the 15th worst in North America, its stacks belching a toxic mixture that includes nitrogen oxides, sulphuric acid, and mercury. They point to the fish, which have mercury levels high enough that the Ontario government recommends children and women of childbearing age should not eat most species more than four times a month. And they note that between 1995 and 2000, Nanticoke's pollutant emissions increased 175 per cent.

Advocates of economic growth and other concerned citizens in turn point out that the power plant pumps $5.7 million into the local economy and brings some 600 jobs to family, friends and neighbours. They argue that we all need electricity. Toby Barrett, the area's representative in the provincial legislature, says that converting the plant to cleaner natural gas—which the newly elected Ontario Liberal government plans to do by 2007—is short-sighted, since gas supplies are limited, while coal is plentiful and cheap. Besides, plant supporters say, Nanticoke just received new pollution-controlling filters, which will partly eliminate one of the plant's 30-some pollutants, nitrogen oxides.

It's not clear whether anyone is 'winning' the argument, which appears to pit the needs of the environment against the needs of people and the economy. But what if that were a false dichotomy? What if we looked at the clean air issue through a new lens, which counted the full costs and benefits of a coal-fired power plant such as Nanticoke? Such an analysis would not simply pit the need for clean air and water against the need for jobs and warm houses. Instead, it would recognize the uncounted value of our natural capital, such as water, air, or plant species that produce valuable ecosystem services and contribute to the economy and to people's health and wellbeing. And it would count the full costs of air pollution, from emissions generated by factories and power plants to emissions from private automobiles.

Nova Scotia study shows coal is a costly power source

A newly released study of air quality in Nova Scotia, for example, shows that in 2002, air pollutant emissions generated within that province caused at least half a billion dollars in damages including poor health, reduced agricultural yields, less productive forests, and acid rain damage to rivers and lakes. The study, by GPI Atlantic, shows that Nova Scotia's coal-burning electric power plants are the main source of air pollution in the province and that these plants emit more acid-rain-producing sulphur oxides than power plants in any other province in the country. The study notes that Nova Scotia's rivers and lakes are recovering more slowly from acidification than lakes in Ontario, Quebec and Newfoundland.

Full cost-benefit accounting sheds light on the hidden pollution costs of seemingly efficient methods of transportation, food production, or electric power generation. For example, through a full cost-benefit accounting lens, coal may still appear abundant, but it no longer looks affordable as a source of electric power.

It's hard to fully quantify damages from air pollution within particular regions, since air knows no provincial or national boundaries, and pollution drifts in and out of provinces and nations. For example, Canada's highest recorded levels of ground-level ozone are in rural Nova Scotia, due largely to trans-boundary pollution from the northeast United States and central Canada. But it *is* possible to observe the overall effects of air pollution—from many sources—and to estimate the human, economic and environmental costs of pollution.

Air pollution costs the Canadian economy billions

For example, the Ontario Medical Association (OMA) conservatively estimates that illnesses from air pollution cost the province just over $1 billion in hospital bills and workplace absenteeism. The OMA reports that in 2000, poor air quality killed 1,900 people in Ontario, and led to 9,800 hospital admissions, 13,000 emergency room visits, and 47 million sick days for employees.

Similarly, the U.S. Clean Air Task Force says 250 people in the Washington D.C. area die every year due to emissions from five power plants located nearby. It holds the fossil-fuel-burning plants responsible for 20,000 asthma attacks, 4,000 emergency room visits, and 300 hospitalizations each year. And it says three quarters of the deaths and health problems could be avoided if the plants used pollution-controlling equipment.

U.S. studies also estimate that air pollution causes $2 – $3 billion in crop damage each year. Environment Canada and Health Canada cite 1980 figures showing air pollution caused approximately $23 million in crop damages in Ontario alone.

In addition, many sources of air pollution, including industries and automobiles, also generate greenhouse gases—such as carbon dioxide and nitrous oxide—which contribute to damaging climate change.

Counting the full costs of air pollution allows policy-makers to weigh a broader spectrum of variables before making decisions on alternative development options that affect air quality differentially. For example, half of the nitrogen oxide emissions in the Toronto area come from automobiles and heavy trucks. Nitrogen oxides contribute to the formation of ground-level ozone and smog, which are created when sunlight interacts with other pollutants. Toronto could significantly cut its pollution levels by cutting traffic. How? Smart-growth policies that cluster residential and business developments into compact areas, with access to green space and public transit, can reduce traffic and its attendant pollutant emissions. Recent studies by the U.S. Environmental Protection Agency, for example, show that infill development and re-development of older suburbs could cut the distance people commute to work by up to one half, compared to the long-distance commuting brought about by urban sprawl development.

The Nanticoke Generating Station located on Lake Erie, Ontario, has been called 'the SUV of power plants.' It is Canada's biggest single source of air pollution.

A report by Ken Ogilvie, executive director of Pollution Probe, suggests other ways to reduce air pollution and cut greenhouse gases:

- Converting coal-fired power plants to cleaner fuel sources such as renewable energy. Currently, only over one per cent of Canada's electricity comes from renewable sources other than large hydro facilities.
- Encouraging public transit use through urban gasoline taxes, or by giving tax deductions to employers who provide transit passes.
- Modernizing and re-investing in public transit systems, so they provide fast, efficient transportation in cities.

For more information on air quality and climate change, visit Pollution Probe at: ***www.pollutionprobe.org*** *or Environment Canada at:* ***http://www.ec.gc.ca/air/introduction_e.html****.*

For information on air quality measures and pollution damage costs, see: ***http://www.gpiatlantic.org/pdf/airquality/airquality.pdf*** ✓

Background photo by Albert Koehl/Ontario Clean Air Alliance. Inset photo by the Ontario Clean Air Alliance.

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