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IN THIS ISSUE OF REALITY CHECK:

RealityCheck

The Canadian Review of Wellbeing

Previous issues of *Reality Check* have focused on single components of proposed new measures of wellbeing—such as population health, volunteer work, or valuing our forests—that are not captured in our conventional measures of progress. This issue for the first time focuses on one of the major values and benefits of more comprehensive measures of progress: their capacity to demonstrate connections among a wide range of economic, social, and environmental variables.

In this issue, we step back to look briefly at the fishery, and at our industrial food and transportation systems. Comprehensive measures can point to the common links among these systems, which are all driven by technological innovation based on the imperatives of growth and efficiency. But are growth and efficiency what they appear to be? And how would we go about fully evaluating these systems? *Reality Check* proposes that more inclusive measures of progress—which weigh full costs along with benefits—can point to hidden costs in some familiar technologies.

It's easy to see the benefits of such technologies, from ease of travel by car to a food system that brings us exotic fruits all year round. We regularly count these benefits in the statistics we use to measure prosperity. But many technologies also impose social, economic, and environmental costs that are hidden in our conventional measures of progress.

When we evaluate these technologies using more comprehensive measuring tools, we can better assess their full benefits and costs. We can then identify those technologies that will contribute toward present and future wellbeing. ✓

The Boon And Bust Of Technology

Harry Houdini, the great magician and escape artist, used to wave a wand and make an elephant disappear. The beast would enter a huge cabinet, Houdini would close the doors, and presto! When the magician reopened the cabinet, the elephant had melted into thin air.

Let's imagine for a minute that the elephant represents technology. As physicist Ursula Franklin says in her book *The Real World of Technology*, "Technology has built the house in which we all live." That house—or elephant—is so huge that it's difficult to take in at a glance. Instead, we tend to make it "disappear" by focusing on its individual components—that impressive array of tools and contraptions that dazzle us with their speed and efficiency.

But technological innovation is more than the sum of its parts. It is a system and a practice—a way of doing things, says Franklin, who likens it to a tight weave, in which every string pulled affects another string, for good or ill. One need only look at the August blackout in Ontario and the U.S. to see how one technology—electricity—is intertwined with many others, from transportation to our industrial food system. The blackout snarled traffic, halted trade, spoiled food, and stopped work in many places.

In this issue of *Reality Check*, we examine how better measures of progress can focus policy attention on more accurate and comprehensive analyses of our current system of technological efficiency. We also note that counting full costs as well as benefits can help us choose technologies that improve the wellbeing of Canadians.

The narrow range of economic growth statistics conventionally used to measure progress implicitly values "more" as "better." More production and more consumption are assumed to contribute to prosperity and wellbeing. These measures therefore accept technological innovation—based on efficiency and productivity—as an unqualified benefit. Increased production leads to greater efficiency, speed, and comfort. The more trees we cut and fish we catch, for example—using ever-larger, faster, more highly mechanized and efficient logging or trawling equipment—the bigger the economy grows, and the better off we are assumed to be.

But, as the collapse of the Atlantic fish stocks so clearly demonstrates, it can be a mistake to interpret such growth as progress. How might we evaluate these harvesting technologies if we subjected efficiency—a hallmark of most current technology—to an accounting system that measures full costs as well as benefits?

> ...counting full costs as well as benefits can help us choose technologies that improve the wellbeing of Canadians.

Technological efficiency is central to our transportation and industrial food systems, to the forestry and fishing industries, and to our communications system. But we seldom think of these components as being interdependent. How, for example, do we cut greenhouse gas emissions from cars and transport trucks when our food system relies so heavily on long-distance trucking, and our communications system depends on more than a billion dollars worth of annual car advertising—the single largest category of advertising in Canada's $6 billion media advertising market? Pull one thread, and another twitches.

In a past issue of *Reality Check*, we showed the uncounted economic and environmental benefits of a healthy, selectively logged forest, compared with the hidden costs of our predominant clearcutting methods. But we can gain additional insight by examining these components as part of a larger system of industrial efficiency, and subjecting that system to the same type of cost-benefit analysis. Such an analysis could help us choose more intelligently among varying technology and policy options.

Reality Check recognizes that there are no simple answers to the controversial issues we discuss in this issue. But the key purpose of more comprehensive measures of progress is to shine the spotlight on hidden values, benefits, and costs. We thereby hope to stimulate debate on vital matters, where such debate has been stifled by an overly narrow focus on economic growth alone. Put more poetically, in this issue we seek to reverse Houdini's magic and make the technological elephant reappear. ✓

90% of World's Large Fish Are Gone: *Nature* Study

Industrial Fishing Cited As Cause

Industrial fisheries are so efficient that within 10 to 15 years of encountering a new fish stock, they destroy 90 per cent of its population, according to a study published in the scientific journal *Nature* this spring.

"Industrial fishing has scoured the global ocean. There is no blue frontier left," says lead author and Dalhousie University fisheries biologist Ransom Myers.

Just 10 per cent of the world's largest fish—including tuna, cod, halibut, and swordfish—are left in the sea, says the decade-long study, which looked at international fish populations from 1950 to the present.

The study's authors recommend reducing fish harvests by half, cutting subsidies to the fishing industry, reducing bycatch, and creating marine reserves.

The study also points to the need for good measurements. Experts may over-estimate the health of some fish stocks by relying on only the most recent survey data, say the authors. Surveys of fish stocks are often not undertaken until the species has been fished for about 20 years, which may be too late to create a reliable baseline.

In addition, Myers points out that the health of fish stocks can easily be overestimated by relying on landings data—or looking at fish caught—to determine the health of fish populations.

More comprehensive measurements of progress can provide a more accurate assessment of the state of the oceans that accounts for the depletion and depreciation of "natural capital" such as fish stocks and habitat on the ocean floor.

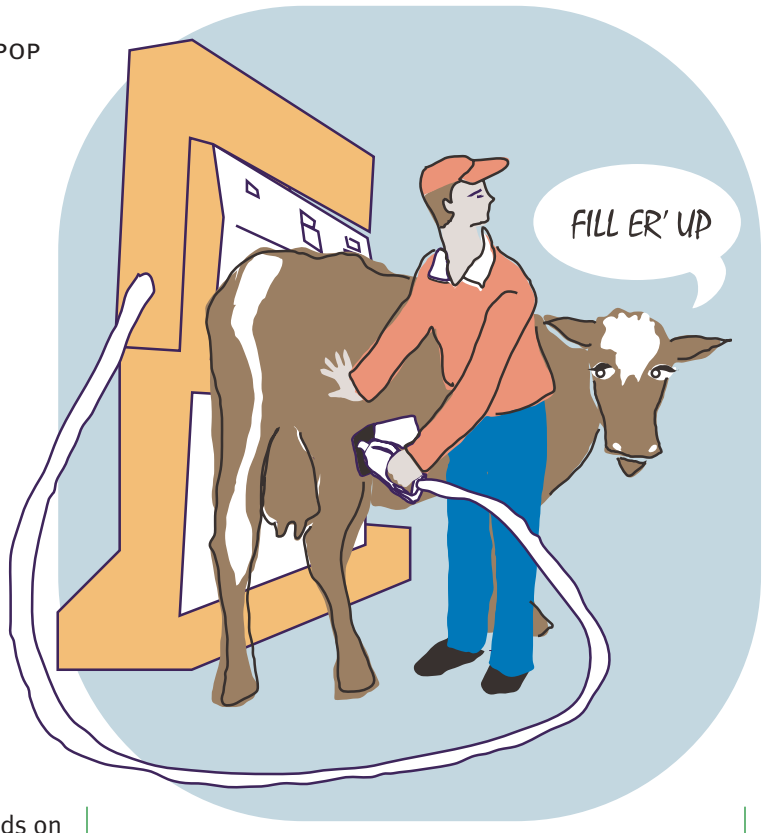
Such measures would weigh the full costs and benefits of industrial fishing technology such as draggers, factory freezer trawlers, and sensors that pinpoint fish populations with digital accuracy.

Industrial fishing applies an economic growth model to the ocean—a natural system that thrives on balance and equilibrium. Even the most productive natural system cannot withstand the logic of limitless growth—the economic imperative to keep increasing production levels to ever-higher levels.

"We are in massive denial and continue to bicker over the last shrinking numbers of survivors, employing satellites and sensors to catch the last fish left," says Myers.

Measuring Food From Land To Mouth

Type "Yes, we have no bananas" into the Internet's Google search engine, and up pop several Web sites with the lyrics to the comical 1923 ditty about a Greek fruit vendor who can never say no. For members of the post-war baby-boom generation, "Yes, we have no bananas" is a quaint relic of long-ago times when Depression and war brought scarcity and privation. For the last half century, there have always been bananas—and myriad other fruits and vegetables—on supermarket shelves even in the middle of winter.



The astonishing abundance and variety of food in Canada result from a revolution in agricultural production over the past 60 years. Food is plentiful, and for the most part, cheap. But does it have hidden costs that we don't count in our conventional growth statistics and measures of progress? What if we examine food production as part of a complex, costly technological system that depends on intensive inputs of energy, fertilizers, pesticides, and drugs, as well as processing, packaging and long-distance transportation? Looked at one way, this system is a boon to the economy, because each step required to bring food from farms to people's tables means more economic production and more spending. Industrial agriculture and food processing also seem to be a model of efficiency, as they produce cheap food in great abundance. From the point of view of a system that measures economic growth as progress, high-tech, industrial farming shines.

But if we evaluate our food system through another lens, and count the benefits and costs more comprehensively and accurately, it begins to look topsy-turvy. What if our seemingly efficient technological inputs actually reduce nutritional value and compromise the "natural capital"—soil, water, beneficial insects and plants—on which food production depends? By examining the food industry as part of a system that has social, environmental, and economic effects, we can more accurately measure and assess its true benefits and costs.

Farming is highly technological—and becoming more so

Mechanization of farming—to produce food more efficiently and abundantly—surged in the 1940s, hastened by labour shortages during the Second World War. The postwar use of chemical fertilizers and pesticides, as well as genetic improvements in animal breeds and plant varieties, reduced the costs of food production. Faster transportation systems, improved refrigeration, and closer trade links now enable most Canadians to enjoy a rich variety of relatively inexpensive foods all year round. On average, Canadians spend just 11 per cent of their total household budgets on food—compared to 13 per cent on transportation and 19 per cent on shelter.

The "Green Revolution" that produced cheap, abundant food continues apace. A 1995 cover story in *Maclean's* magazine, for example, reported on North America's growing biotechnology industry, citing companies "that use micro-organisms to enhance fertilizer use" or genetically engineer vaccines to "turn bulls into steers without mechanical castration." The article goes on to describe genetically modified plants that can grow pharmaceutical products, such as certain cancer drugs, in greater volumes and more cheaply than conventional laboratory methods.

When we view our food system as a producer of commodities and contributor to economic growth, it is an obvious success. But critics argue there is a hidden price to pay for the cheap and plentiful food made possible by rapid advances in technology. Farming communities and surrounding rural areas lose the age-old social and economic anchor of local farms, which cannot compete with seemingly more efficient, more profitable factory farms. And large-scale farms do not necessarily create strong local economies. For example, a preliminary University of Illinois study of 1,106 towns found a "negative relationship between large swine farms and economic growth in rural communities."

Other costs are more subtle and indirect. For example, a *Globe and Mail*/CTV analysis published in July 2002 found that fruits and vegetables today have far fewer nutrients than they did 50 years ago. "Vital vitamins and minerals have dramatically declined in some of our most popular foods, including potatoes, tomatoes, bananas and apples," says the Globe analysis, which looked at government data on food nutrients from 1951, 1972, and 1999. For example, the data show that potatoes have lost all of their Vitamin A; half of their Vitamin C and iron; 28 per cent of their calcium; half of their riboflavin; and 18 per cent of their thiamine.

> "We have succeeded in industrializing the beef calf," Pollan writes, "transforming what was once a solar-powered ruminant into the very last thing we need: another fossil-fuel machine."

The analysis—which found similar declines in nutritional value in 24 other fruits and vegetables examined—blames modern farming methods, long-distance transportation, and crop-breeding practices for contributing to the decline. The article quotes Phil Warman, a Nova Scotia professor of agricultural sciences: "The emphasis is on appearance, storability and transportability, and there has been much less emphasis on the nutritional value of fruits and vegetables." The analysis did not examine whether Canadians get sufficient vitamins and minerals from other sources, or whether they can effectively compensate for the loss through supplements.

But in an accounting system that looked at full economic, environmental and social benefits and costs, this loss of nutrition would still be considered a hidden cost of our industrial farming system, and the cost of supplements to compensate for the losses would be considered a "defensive expenditure." A more comprehensive accounting system would enable governments to use such measures to tailor policies that more accurately reflect the overall benefits and costs of the system.

Energy inputs are huge, hidden cost: the story of a beef calf

Cornell University food experts David and Marcia Pimentel argue that our complex, technological food system consumes many times more energy than it produces, and more resources than it yields. For example, they calculate that it requires nine times more energy to produce, process, package, and transport a 455-gram can of corn than the corn itself contains. But that's a fairly modest ratio compared to the energy needed to bring a quarter pound hamburger to the lunch plate. The beef consumes 35 times more energy than it contains, because industrial beef production requires a wide array of expensive "inputs" such as fertilizers, pesticides, hormones, antibiotics, electricity, and fossil fuels.

While most products are not valued on the basis of net energy contribution, food *is* produced largely for energy and to fuel human activity. An appropriate analogy to the Pimentel analysis might be fossil fuel production itself, which would be viewed as unproductive if it took many times more energy to extract and bring to market than it provided.

New York Times writer Michael Pollan quickly learned about the logic of industrial cattle farming when he purchased "No. 534," an eight-month-old calf in 2001. Pollan paid $598 for the calf and dished out an additional $319 for drugs and living expenses. In the past, calves took two or three years to mature. Today's beef calves grow from 80 to 1,200 pounds in just 14 months, thanks to vast amounts of corn, protein supplements, growth hormones, and antibiotics. "These 'efficiencies,' all of which come at a price, have transformed raising cattle into a high-volume, low-margin business. Not everybody is convinced that this is progress," writes Pollan, who ended up earning a profit of just $27 when he sold his grown animal, with his own labour time counting for nothing.

An expert helped Pollan calculate that in its brief lifetime, No. 534 would consume the equivalent of 1,076 litres of oil. "We have succeeded in industrializing the beef calf," Pollan writes, "transforming what was once a solar-powered ruminant into the very last thing we need: another fossil-fuel machine."

He concludes by weighing the costs and benefits of industrial beef production, and asking how "cheap" feedlot beef really is: "Not cheap at all, when you add in the invisible costs: of antibiotic resistance, environmental degradation, heart disease, E. coli poisoning, corn subsidies, imported oil and so on."

Natural capital and resource depletion are invisible

The large quantities of fossil fuels burned to produce industrial food also contribute to other hidden costs, such as environmental degradation and climate change, that are invisible in our standard accounting mechanisms. For example, lawyer and environmental author Steven Shrybman argues that energy-intensive food production and global systems of agricultural production and trade are the world's single largest source of greenhouse gas emissions. He advocates a comprehensive analysis of agricultural energy costs that includes energy required to manufacture and distribute everything from processed food and beverages to fertilizers. "When information about agriculture and climate change is presented, the most important relationships—those that reveal the food system's true energy demands when processing, packaging, and distribution are added to production—are ignored," writes Shrybman.

Soil erosion, heavily compacted soil, and nutrient-depleted soil—all associated with large-scale, industrial farming—are also currently not measured as costs. In fact, the inputs required for short-term fixes to these problems—fertilizers and fuel that are costly to the farmer—are counted as further contributions to economic growth. This presents a skewed picture of the productivity of industrial farming.

By contrast, "free" natural services from predatory insects, pollinators, and soil-enriching earthworms that enhance productivity are not counted as benefits in conventional accounting mechanisms, and when pesticides kill such beneficial organisms, their loss remains invisible.

Soil is also a rich source of carbon, built up over centuries, and acts as a greenhouse gas "sink" or absorber. However, decades of industrial farming are depleting the soil, and reducing its ability to absorb greenhouse gases.

Continued on next page.

"Measuring Food..." continued from previous page.

The logic of distance creates price distortions

In his book *From Land to Mouth*, Brewster Kneen contends that the industrial food system is based on the logic of distance. Indeed, the average Canadian food item travels about 2,000 kilometres to reach the dinner table. Tomatoes grown in faraway California and hauled to Canadian consumers yield profits for big growers, long-distance truckers, huge wholesalers, and supermarket chains. But if we were to count the full costs of this system, we would see its possible social, environmental, and economic repercussions more clearly, and likely find more value in local production.

A full-cost analysis would ask why a head of commercial California lettuce is cheaper than its locally grown counterpart? Would it be possible to sell vegetables from California cheaply in Canada without the government subsidies that support large-scale farming and long-distance transportation? And what are the local and global effects of such subsidies? A *New York Times* commentary in March reported that American corn sells in Mexico for 25 per cent less than its U.S. cost of production, because it is so heavily subsidized by the U.S. government. Mexican farmers receive such low prices for *their* corn that they lose money with each hectare they plant, and are increasingly forced out of business.

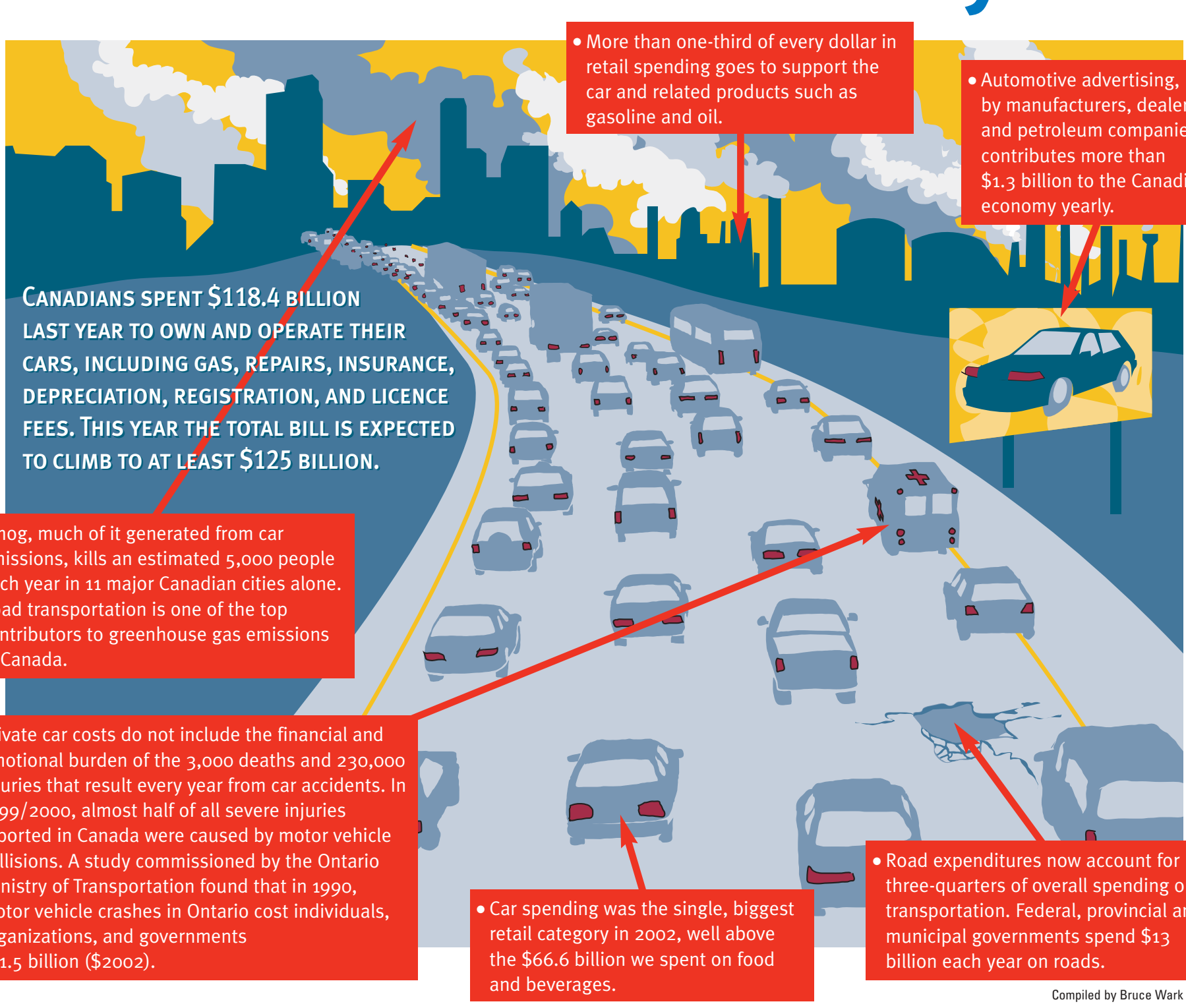
It is estimated that government subsidies to agriculture in all the rich countries amount to $1 billion a day—about six times what those countries contribute in development aid to the world's poor. Nicholas Stern, the chief economist at the World Bank has pointed out that each day, the average European cow receives $2.50 in subsidies, while three-quarters of Africa's population tries to survive on less than $2 a day.

Counting full costs can guide policymakers

Critics like Brewster Kneen argue that reforming the food system is an urgent priority. But it will not be easy. It means moving food production closer to consumers, reassessing government subsidies for large-scale food producers, establishing fairer international trade rules, and changing our accounting practices to reflect the full benefits and costs of food production. According to Kneen, it also means scaling back the capital-intensive technologies on which Canadians have depended during the last half-century for a steady variety of cheap and plentiful food.

And what about those bananas? After years of selective breeding, the modern banana is a fragile and sterile replica of its once-hardy self, according to Robert Alison, a former senior biologist with Ontario's Ministry of Natural Resources. The plants predominantly grown in the world—which produce our popular "Cavendish" banana—are now genetically uniform, and require fertilizers and chemical sprays to protect them from pests and diseases. But nothing can save them from a new fungus that has caused banana yields to drop by 50 to 70 per cent worldwide, Alison writes in a *Globe and Mail* article that predicts the plant's imminent extinction. Other scientists are suggesting another technological fix: a genetically modified banana. Barring that, says Alison, yes, we'll have no bananas. ✓

How Much Does Your Car Really Cost?



Compiled by Bruce Wark

Total costs: $200 billion per year.

When all costs are tallied, including societal costs such as air pollution, land use impacts, accidents, congestion, road maintenance, and subsidies for parking, the total costs of supporting the private automobile add up to $200 billion a year, of which car owners pay just over half in ownership and operating expenditures and fees.

Few Canadian car owners realize how much they pay to drive. That's because many of the costs of driving remain hidden. It's easy to see the benefits of cars, from convenience, speed, and comfort to leisure and independence. And the car plays a big role in our economy, with auto sales, service and manufacturing employing close to a million people, producing vehicles and parts worth $95 billion per year.

Conventional measures of progress based on economic growth statistics don't account for the full costs of driving. In fact, the more we drive, the more fossil fuels we burn, the more greenhouse gases we emit, the more car accidents and repairs we have, and the more we spend on our cars, the more the economy will grow. More accurate measures of wellbeing would account for the hidden costs as well as the benefits of driving. And they would reflect how the car is imbedded in other facets of our lives, from our industrial food system to urban planning.

Because they are invisible in our conventional economic accounts and measures of progress, the total costs of private car ownership, including its environmental impacts, are not currently recognized as a serious public policy issue. Yet the $200 billion in driving costs far outstrips the $112 billion Canada spent last year on health care. The news media are filled with stories and editorials about "soaring," "unsustainable" health costs, and two major commissions recently reported on how to 'save' Medicare.

Yet every year Canadians spend billions more caring for their cars than for their health. Indeed, without the medical costs of automobile injuries and smog-related illness, even health care would be cheaper. Until we properly account for the full costs of driving, we are not likely to see any serious policy discussion on shifts to mass transit, integrated transportation and land use planning, or other measures that can reduce car costs.

Sources: Canadian Automobile Association; Statistics Canada; Transport Canada; Canadian Institute for Health Information; Environment Canada; Todd Litman, 2002, *Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications*, Victoria Transport Policy Institute; Canadian Auto Workers. ✓

An interview with Richard Gilbert:

Looking At The Car 20 Years Down The Road

We are a car culture. The car is interwoven into our lives, geography, and economy in myriad ways. In fact, most current consumption patterns, from shopping malls to suburban housing to entertainment to vacations, depend on the automobile. The car literally drives the economy.

But can we continue to depend on it, and will it improve our wellbeing and quality of life in the longer term? *Reality Check* asked transportation analyst **Richard Gilbert**, an independent consultant specializing in transportation, who also directs the research program at the Centre for Sustainable Transportation in Toronto.

Q: What are the implications of depending on the automobile as the centrepiece of our transportation system?

A: I think there are the dangers we're all familiar with, which are increases in pollution, increases in congestion and increases in cost. But I think none of these is the most important reason. Sometime during the next 20 years, perhaps during the next 10, the fuel on which the automobile depends is going to become expensive, because there will come a point where worldwide the supply of oil won't be able to keep up with the growing demand.

The one thing that we know from economics is that if you have more demand than supply you get high prices. It's not that the oil is running out. It's that production will peak. Some people think that's already happening, but I think it's more likely to happen between about 2012 and 2015. That means we are not going to be able to afford to travel in the way that we've become almost totally dependent on travelling. And very little is being done to prepare us for that radical change in our lives.

Q: What about the development of new fuels?

A: Well, there's a lot of talk about fuel cells and a hydrogen economy, but the prospect of any of that materializing within this time frame is essentially zero. The hydrogen economy is something of a mirage. In North America, over ninety-five per cent of hydrogen is made from natural gas—and on this continent we seem to have already reached our production peak for this important fossil fuel. No matter how much frantic drilling goes on, there isn't more supply. We're still a long way from running out, but the key thing is that the supply doesn't keep up with the demand. So, our dependence on the automobile is something that has an end to it, and we're not preparing for the end. In many, many respects, if we don't prepare, we will end up in chaos.

Q: What do you think could happen?

A: I think large parts of the country where dependence on the automobile is essentially total—chiefly our outer suburban areas—are going to become unattractive places to live. People are not going to want to buy homes there because of the cost of driving. The banks will figure this out and they will be reluctant to grant mortgages for homes that, 10 years down the road, may well be valueless because nobody will want to buy them. Even worse, people who have such homes now and think that they can stay in them and use up or even add to their remaining value will find that they can't get their mortgages renewed. They've got $300,000 locked up in a home. The mortgage becomes due, and the normal thing would be to renew the mortgage—but the bank will only renew it for $50,000, and these owners will be $250,000 in the hole. This is a serious matter that could be the bigger issue—in terms of having a practical effect—than the simple increase in fuel prices, although that will have an effect too.

Q: You call for more investment in public transit. But can we still be as economically productive without cars?

A: I think that cars can, in certain environments, add to productivity. To be more productive in the Greater Toronto Area, it's probably advantageous to have a car, especially if you have the kind of job in which you've got to dip around the suburbs a lot. I'm doing work in the Halton and Peel regions at the moment and it saves me a lot of time if I rent a car to go there. But then I do quite a bit of work in Hong Kong, which, of all affluent cities, has the lowest car ownership in the world. I was in Hong Kong in February, speaking at a meeting, and I noted how efficient business is in Hong Kong, and how many meetings people can fit into a day—if you want to use meetings as a quantitative index of how much you can get accomplished. I told them that in Toronto it's really quite hard, unless everything is confined to the downtown, to have more than two or three meetings a day. But in Hong Kong you can have five or six meetings a day quite easily. Somebody in the audience heckled me and said, "Five or six? How about ten or eleven!" It's so easy to get around in Hong Kong because almost nothing is more than 10 minutes away by streetcar, subway, regional train, or bus.

Q: So, you're saying we may still need the car, but we should lessen our dependence on it?

A: We certainly need to get away from our dependence on it. We should move towards treating the car as a special thing. It should not be part of our everyday existence. A car should become something that you rent to go to the cottage, or you rent because you need to move this particular item.

Q: Would people save money this way?

A: In 1971, my family decided we would not own a car. And we then said, "Well what are we going to do with this extra money?" What we did was invested in something that was probably equally unsustainable: exotic vacations. And so my kids got to go to all sorts of places that most kids, at least then, had never been to, like Peru and Gambia.

Michael DeAdder

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