

C3 VIEWS

A Climate Change Central Newsletter

TOOLS FOR CHANGE

AN INTERVIEW WITH DR. JOHN NYBOER OF SIMON FRASER UNIVERSITY

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Dr. John Nyboer is a research associate and adjunct professor in the School of Resource and Environmental Management at Simon Fraser University (SFU). He has 17 years of experience in energy modeling, policy and analysis and issues related to greenhouse gas emissions, and he's played an integral role in developing end-use models of energy demand in all sectors across Canada. John has undergraduate degrees in biology from the University of Alberta and education from the University of Toronto and has Masters and PhD degrees in natural resource management from Simon Fraser University.

Simon - John, what do we need to do in Canada to motivate large-scale societal change on the issue of climate change and greenhouse gas emissions?

John - I think primarily what one has to do is to associate some sort of a value to the carbon that we're emitting, and that value then gives it an impetus to do something. By using the word value, I'm suggesting there be a price associated with the carbon emissions or at least greenhouse gas emissions. So that would be the primary approach. There are other approaches, but they tend to be less compulsory in their response from consumers. And if you really believe that climate change is an issue that needs to be addressed, we can't just wait for the consumer to respond voluntarily. We have to push them in a direction that would require a much stronger response.

Simon - Could you provide some examples of how you would put value to carbon?

John - The easiest way is to simply say there is going to be a charge for emitting into the atmosphere. Currently, we see the atmosphere as a free waste receptacle for our carbon or GHG emissions. There is no charge for emitting into the atmosphere, even though there is very likely a cost associated with it. To have people actually represent that cost in their calculations of how they would use carbon fuels, for example, or use a process that emits other greenhouse gases (GHG), you would fix a price to it that would focus people on ways to not emit that GHG.



DR. JOHN NYBOER
SIMON FRASER UNIVERSITY

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Simon - What would these tools look like?

John - The simplest one, in terms of efficiency and effectiveness, would be to affix a price, or a tax, to carbon. An alternative would be to set up a market that recognizes there's only so much carbon we're allowed to emit and then you have to buy the right to emit that amount of carbon. That would be a cap-and-trade approach, where there would be a cap on the amount of carbon you could release and trading, at a cost, to release more than that amount.

Simon - Can you give some examples of where this has been successfully used in Canada or around the world?

John - There are a number of European countries like Norway, Sweden, Germany and Denmark where carbon taxes have been imposed, and there have been some positive impacts in terms of emissions levels. Now, one cannot always associate a particular tax with how it affects the economics of a country, and the taxes tend to be relatively small. In Germany, one gentleman suggested it was more like a wart on the butt of the economic system and so it may not have a huge impact. But unless there is a price associated with carbon emissions, there could be no response to its reductions. So in these countries, we actually do see significant reductions in carbon-based GHG emissions.

Simon - Would associating these costs with carbon be the same for individuals, companies and communities?

John - In different situations, you might find different tools working. In building construction, for example, regulations – such as a requirement for zero-emission buildings – might be more effective than a price on carbon. At the same time, the higher operating costs of an (energy-inefficient) building would be less attractive to buyers, and so the contractor would be very inspired to build emissions-free buildings in the first place.

Simon - If the government was unwilling to regulate, what other tools would be available to create change?

John - There are a number of tools one can use besides regulation, though some might consider the imposition of a carbon price to be regulation. For example, you could say to the people of Alberta that if you don't reduce your emissions a year, or five years, from now, we're going to start charging you for it. If you give them enough time to reduce their emissions, there could be little impact on their bottom line and still meet the criteria that by, say, 2050, we have to be down by 75 per cent of what we emit today.

Simon - What do you think is the relative importance of energy efficiency within carbon reduction efforts?

John - I'm a firm believer in there being a huge potential to reduce emissions because we become more efficient with our processes. But it's always difficult to use a goal of energy efficiency to help solve a goal of reducing emissions. While there is a strong relationship between energy consumption and CO₂ emissions, it is also quite possible to need more, rather than less, energy to reduce greenhouse emissions. I'm thinking here of things like carbon sequestration. So while energy efficiency plays a significant role, it is not going to be a sufficient role.

Simon - Could you expand on what you mean that energy efficiency is not sufficient to help meet emission-reduction goals?

John - We are consuming ever increasing amounts of energy for things like heating, lighting, cooking and refrigeration. That demand for energy is happening around the world because huge portions of the population do not yet have what we have. So that, in spite of a significant increase in the efficiency of producing goods, overall energy demand

will continue to increase. Therefore, we have to find some alternatives that will help us reduce the amount of emissions generated from the production and consumption of that energy. So, for of emissions generated from the production and consumption of that energy. So, for example, we need a strong focus on renewable energy of all sorts that is not GHG intense – such as wind and wave power, biomass, geothermal and even nuclear, if you're inclined in that direction. Another route would be to significantly change processes to those that are the least energy-intensive methods of producing goods. With most companies today, the focus is on the bottom line, even if it means consuming more energy to produce the good because they're saving more on labour or the cost of materials.

Simon - We've talked a lot about what we can do on a large scale, but what can the average Albertan do?

John - There are lots of opportunities for the average Albertan to reduce GHG emissions in his or her lifestyle – anything from better insulating their homes to buying smaller vehicles to traveling less. The biggest issue for most people, I think is to realize these things do not come for free. The motivation that has a person buy an efficient fridge may not be the same motivation that prevents him from using energy in other forms. It's very difficult to reduce energy consumption on an item by item basis. So perhaps the biggest thing average Albertans could do is to insist the government place a value on carbon emissions. This way, they would be constantly reminded that they have to be carbon sensitive in their daily choices because they would have to pay every time they weren't.

Simon - What do you think about using incentives as opposed to imposing taxes or setting levies?

John - Incentives are hard to analyze, because it is very difficult to determine the degree to which the incentive actually bore fruit or not. We've done reviews where incentives have been given for such things as (compact fluorescent) light bulbs. We found that some people would purchase light bulbs once they were offered an incentive, but there were huge numbers that would have purchased these bulbs whether you provided an incentive or not. We call these people free riders, because they in essence receive money for doing something they would have done without the incentive. So in a sense, the incentive you give to these people is lost money and not effective in reducing emissions or improving energy efficiencies. It's very difficult to ascertain how much that free ridership might be, but we tend to find those programs and policies poor in terms of their net gain in emissions reductions or efficiency improvements.

Simon - How big a role does educating the public, business leaders and communities play?

John - Education is important to the extent that people at least know what the issues are. Their response to those issues, though, still often depends on how they act at the moment when they are making a decision to buy a new appliance, automobile or home. For example, we all know that we should drive slowly in school zones. If it was simply a matter of information, all we'd need to do is post a sign that you are approaching a school zone and you'd automatically slow down. Yet we find that's inadequate, and we need to institute laws and fines and court appearances to enforce this thing, which we all should know because we're educated. The same thing goes for cigarette smoking. So, while education is important in informing people, unless it is supported by policies that invoke some sort of cost or value, they tend to wind up not being very effective. ■

CAMPAIGNS STIMULATE BEHAVIOUR CHANGE TO CONSERVE ENERGY

It's one thing to believe it's a good idea to buy high-efficiency furnaces, commute by public transit and get rid of beer fridges. It's quite another to convince large numbers of people to take those actions.

The trick – for municipalities, government agencies and advocacy groups – is to organize environmental campaigns that will persuade many people to change ingrained habits. What these organizations are discovering is it's not enough to just post educational information on websites, offer the odd rebate and hope for the best.

The new world of green campaigning is increasingly complex, embracing such techniques as behavioural psychology, once used for, say, getting people to quit smoking. An added challenge is that campaigns are often issue and site specific and must thus be targeted to each situation. In other words, what works to reduce idling probably won't work to increase composting, and what's successful in Calgary may well flop in Strathmore. The good news, these days, is that if your message is on target, the public is increasingly willing to listen – and act.

Obviously, education remains a vital component of any public program to reduce such things as energy use, waste and greenhouse gas emissions. At one end of the educational spectrum are people who may not realize their actions contribute to a problem and who may be ill inclined to voluntarily change that behaviour. At the other end are highly-motivated people seeking detailed information on, say, what needs to be done to install a high-efficiency furnace in their house.

Besides deciding how to tailor these messages to divergent audiences, organizations must determine how they're going to deliver the information. Options here include website postings, brochures and newsletters, phone lines and public talks, workshops and trade shows. But studies have shown that providing information, on its own, is usually insufficient to prompt changes in behaviour.

One thing that seems to consistently work well in regards to changing behaviour is face-to-face interactions. For example, ATCO EnergySense (a service offered by ATCO Gas and ATCO Electric) found that when its technical experts carried out federal government-subsidized home energy assessments, homeowners were enthusiastic for information on retrofits and the purchase of energy-saving furnaces and appliances. "The ability to go into the house and educate customers via the evaluators is very important," says Mark Antonuk, program manager for ATCO EnergySense.

Combining face-to-face energy assessments with financial incentives can be an even more powerful motivational tool. When ATCO EnergySense delivered Natural Resources Canada's subsidized EnerGuide for Houses service for \$150 more than 40,000 initial and follow-up assessments in Alberta were completed over five years. Those assessments led to energy-saving improvements that produced average greenhouse gas reductions of 3.2 tonnes for houses where follow-up assessments were completed. Without that subsidy (it now costs \$400 for an initial and a follow-up assessment), the number of inspections has fallen to approximately 150 per month, even though federal grants are still available for undertaking energy-saving home improvements following the initial assessment.

BC Hydro discovered the power of combining incentives with direct interaction when it ran a compact fluorescent light (CFL) give-away campaign five years ago. At the time, CFLs were expensive, hard to find and didn't always work well. So, through its Power Smart program, BC Hydro offered customers coupons for two free CFL bulbs, redeemable at participating retail outlets, where Power Smart staff were on hand to provide information and answer

questions. Additional free and discounted bulbs were available through a follow-up program involving manufacturers and retailers. As a result, some 73 per cent of BC Hydro customers now have CFLs – averaging nine bulbs per household – and lighting shelf space devoted to CFLs in major outlets has increased from less than two to nearly 20 per cent.

“Incentives do two things,” says Pat Mathot, BC Hydro’s manager of residential marketing. “One, they address the capital barrier if there is one – in this case, the \$8 or \$9 cost, at the time, of a CFL bulb, compared with 75 cents for an incandescent bulb. Two, they draw people’s attention better than a general awareness campaign.

“Giving away free light bulbs was a good way to kick-start the market, especially for something that was relatively expensive,” says Mathot. “But I think you can’t offer incentives for too long. One risk is that as soon as you end them, the market collapses. Incentives should be used to stimulate the market (and people’s actions) to be self sustaining.” In the case of the CFL program, the incentives could be safely removed once prices had come down, bulbs were widely available and people were accustomed to using them and could see the benefits on their electricity bills.

These days, environmental campaigns are becoming increasingly sophisticated, going far beyond standard information-only programs. One of the most popular and comprehensive approaches is community-based social marketing. Its proponents believe behaviour change is best achieved through community programs that focus on removing barriers to an activity while enhancing its benefits.

One example of this approach is a Sudbury, Ontario program that gave free low-flow showerheads to low-income households. People went door to door, explaining the energy-saving benefits (without a reduction in performance) of the showerheads. If the residents expressed interest, a plumber would arrive within 30 minutes to install the showerhead. In this case, the program removed all the barriers – lack of information and motivation, cost, a trip to a hardware store and installation.

For each campaign, the social marketing approach follows four detailed steps:

1. Identify the barriers and benefits to an activity
2. Develop a strategy, using tools shown to be effective in changing behaviour
3. Pilot the strategy
4. Evaluate the strategy once it’s been implemented throughout a community.

Each step involves several actions. Identifying barriers and benefits, for example, requires a literature review, focus groups and a survey of a random sample of residents.

“It’s a rigorous process, which makes it much more likely that a program is going to work,” says Fredericton-based environmental psychologist Doug McKenzie-Mohr, who has helped pioneer this approach in Canada. “It identifies which behaviours to go after and it helps systematically remove as many barriers as possible.”

Of course, this method requires considerable expertise, resources, and time. McKenzie-Mohr believes major cities like Edmonton and Calgary should be able to afford to hire qualified social marketers to help run their public environmental programs. Smaller municipalities and non-government organizations, he says, would likely require provincial assistance to properly conduct social marketing campaigns.

The good news is the public is increasingly receptive to the message that green campaigners are trying to get across. The success of anti-idling campaigns, for example, shows that people are willing to do something about air quality and will respond to peer pressure when attitudes start to change.

“I think the marketplace is ready for these types of messages,” says Antonuk. “It’s not just high energy costs that people are responding to now. More and more, it’s the social good and environmental benefits that motivate them.” ■

RESOURCES

Doug McKenzie-Mohr’s Fostering Sustainable Behavior
www.cbsm.com

Tools of Change
www.toolsofchange.com

BC Hydro Power Smart
www.bchydro.com/powersmart/

ATCO EnergySense
<http://www.atcoenergysense.com/>

SOCIAL MARKETING CAMPAIGN IN DURHAM, ONTARIO

In the mid-1990s, the Region of Durham's (Ontario) residential water use was increasing three times faster than its population growth. It got to the point where an expensive new water treatment facility would soon be needed, unless water use could be decreased.

After an extensive public consultation process, the region launched a widespread water efficiency program. It included providing subsidies for low-flow toilets, publishing a free, 60-page Householder Guide to Water Efficiency and introducing a bylaw whereby homeowners with addresses ending in odd numbers watered their lawns on odd-numbered calendar days, and those with even numbers watered on even days.

The region employed a non-coercive, social marketing approach, which relies heavily on personal communication to change behaviour. This approach was emphasized in one program that sought to reduce residential outdoor water use in the summer. Trained summer students, dressed in t-shirts and hats with water-efficient logos, went door to door talking to some 1,000 homeowners about their outdoor water use, while providing information on how to decrease consumption. To help residents measure the amount of water their lawns received from watering and rainfall, the region distributed 20,000 free rain gauges each summer. It also

provided homeowners with a "prompt," a sticker applied next to their outdoor tap as a reminder of when to water. Finally, homeowners were asked to make a written commitment to reducing their outdoor water use.

"As a result of the program, summer water use dropped by 215 litres per household per day, or 32 per cent, and they've been able to maintain a 25-26 per cent reduction going forward for five to six years," says environmental psychologist Doug McKenzie-Mohr, a consultant to the Region of Durham on its water efficiency initiative.

"The broad acceptance of rain gauges shows that people recognize the connection between improved lawn health and moderated lawn watering, which is especially important when summers are hotter and drier than average," says the region's website.

RESOURCES

Doug McKenzie-Mohr's Fostering Sustainable Behavior
www.cbsm.com

Water Efficiency Durham Program
www.cbsm.com/CasesDatabase/detail.lasso?ID=165

VOLUNTARY REPORTING A FIRST STEP TO A REGULATORY REGIME

Through early voluntary action on reporting and reducing greenhouse gas (GHG) emissions, some of Canada's large final emitters find themselves well-positioned to compete in Alberta's new compliance system which includes an offset credit scheme and in an evolving federal regulatory climate change regime.

Suncor Energy, for example, has since the early 1990s blazed a trail in its voluntary reporting of GHGs through the Voluntary Challenge and Reduction Program, which evolved in the late 1990s into a non-profit government-industry organization known as the VCR. The VCR challenged large final emitters to measure and report on annual emissions. It was the impetus for many companies, including Suncor, to find ways to reduce emissions and invest in clean energy projects.

"We're much more prepared for where we are today because of our commitment to the VCR," says Suncor's Dianne Zimmerman. "We spent a lot of time and effort to meet the highest standard of reporting."

According to the University of Calgary's Institute for Sustainable Energy, Environment and Economy voluntary action, including the VCR, "was a beginning – a first stage," in addressing climate change in the context of large industrial emitters. "It served as an educative purpose and was essentially exploratory," the institute states in a report.

As a result of the voluntary reporting program, which has wound down under the federally legislative framework, Suncor was able to establish a baseline for its GHG emissions and measure its total inventory. In turn, that provided the company with a benchmark, and opportunity to find efficiencies leading to measurable emissions reductions which at the same time resulted in cost-savings for the company.

“The VCR began as a voluntary approach and what we’ve found is that we’re now using that as an instrument to not only align with our own understanding of what we’re doing on climate change but also to meet the needs of so many other organizations that have emerged,” says Zimmerman.

Using voluntary measures as an instrument to change the behaviour of large industrial emitters has had its benefits, but there is recognition among some major industry players that a regulatory regime is necessary if Canada is going to make significant gains in emissions reductions.

As the magnitude of the problem has become clear, so has the need for mandatory reporting and reductions.

“Absolutely it’s better if you can take voluntary action but voluntary action is not necessarily sustainable,” says Doug MacLeod, vice-president of corporate environment at Edmonton-based power company EPCOR.

He points out that corporations can “back away” from voluntary initiatives without a legislative backstop.

Adds Zimmerman: “Being regulated is quite important because then it does put us all on the same playing field and from there we can figure out the next step.” ■

RESOURCES

Voluntary Greenhouse Gas Emission Reduction: The Rise and Fall of VCR Inc., November 2006
www.iseee.ca/files/iseee/ABEnergy-Futures-02.pdf

Canadian GHG Challenge Registry™
http://www.ghgregistries.ca/challenge/index_e.cfm

CSA in Climate Change: A Background Report
http://www.csa.ca/climatechange/downloads/pdf/ClimateChange_en_dec_17th_2007.pdf

CUSTOMERS OPT TO OFFSET THEIR CARBON FOOTPRINTS

Whether it’s planning a wedding, jetting to a beach destination or even driving across town, consumers are increasingly concerned about the lasting impacts that daily living has on the environment.

Now a growing offset market is providing ordinary citizens a way to reduce their environmental footprint – whether it’s choosing to e-mail wedding invitations instead of using paper or using a venue that’s gone carbon neutral, paying a fee to offset emissions created through air travel, or purchasing a vehicle from a car manufacturer that invests into green projects aimed at slowing global warming. Those projects range from tree planting to solar installations to wind farms.

For instance, airlines are starting to offer customers the option to offset their flights while many hotels are also providing carbon neutral accommodations.

A traveler on Air Canada making a return trip from Calgary to Toronto can pay \$9.60 to offset the amount equal to the emissions -- 0.6 tonnes of carbon dioxide according to its online calculator. That money is then paid to an aggregator, non-profit Zerofootprint, which will use the money to invest in a clean energy project.

The idea is catching on in the car manufacturing sector, as well. Those with a green conscience can buy a Land Rover, for example, knowing that part of the proceeds for the sale will go toward offsetting the emissions created from driving. The Land Rover’s

CO₂ Offset Program is two-fold: it offsets both greenhouse gas emissions generated by Land Rover's manufacturing operations and the first 45,000 miles of every new vehicle use by its customers. The ultimate goal of the program is to achieve carbon neutrality with investments made in renewable energy projects such as wind and solar, technology change and energy efficiency in Uganda, China, India, Turkey, Dominican Republic and other countries.

In theory, changing consumer behaviour by creating opportunities for individuals to buy into the offset market is well-intentioned. In practice there are challenges, says Aldyen Donnelly, who has for 10 years been helping large industrial emitters gain experience in the offset market.

"There's a wide range of offset offerings in the marketplace and airline travel is one of the most common. However, it is difficult to ascertain whether real net emission reductions are being achieved," adds Donnelly, president of Vancouver-based WDA Consulting Inc. "It's not clear that any offset purchaser or aggregator actually holds a contract that firmly binds the vendor to cut greenhouse gas emissions. This is a market full of credits with little in the way of balancing liabilities."

But, emission offset programs are definitely a promise, says Donnelly, pointing to a potentially successful program in British Columbia.

The province of B.C. recently announced it will track emissions associated with all of the work-related activities of employees of government agencies and Crown corporations.

The plan is that the province will periodically issue a tender call so developers of emission reduction projects in B.C. can bid to offset the government's footprint.

"A transparent tender process should result in a contract that imposes penalties on any offset vendor that fails to perform in exchange for the taxpayer-funded investment," says Donnelly. "There's good promise in this approach." ■

ENERGY SERVICE COMPANY HELPS U OF C CUT COSTS AND GHGS

Saving energy means saving money, but how do you convince people to use less when they aren't directly paying the power bills for their office or residence?

The solution many organizations have chosen is to enlist the expertise of a dedicated energy service company (ESCO) to encourage conservation through the use of new technology and by making their clients aware of the value of cutting energy use.

"The energy market has changed dramatically in the last few years because we're really moving towards helping our clients come up with roadmaps for conserving energy and reducing their carbon footprints," says Julie Matthews, a consultant with Direct Energy Consulting, a business unit of Direct Energy. "We look at energy use and try to change behavior and patterns of energy use in the daily lives of our clients by educating and communicating to them in terms that are important to them."

The University of Calgary joined forces with Direct Energy in 2005 with the goal of achieving a 30 per cent reduction in energy use in seven years. As the biggest electricity consumer in Calgary, the university stands to save \$24-million dollars over seven years, reduce ongoing operating costs and cut greenhouse gas emissions by an estimated 29,500 tonnes annually.

RESOURCES

Air Canada's Carbon Offset Program
http://www.aircanada.com/en/travelinfo/traveller/zfp.html?src=hp_q1

Land Rover's CO₂ Offset Program
http://www.landrover.com/int/en/Company/Sustainability/CO2_Offset_Programme.htm

The Greenhouse Emissions Management Consortium
<http://www.gemco.org/index.htm>

"It's part of our larger sustainability plan but it's also about saving money that can be used for other things at the university, such as research or student scholarships," says Murray Sloan, the U of C's chief energy and utilities engineer. "Communicating that value to our students and staff is important so that they recognize there are many benefits to using electricity wisely."

While building audits and retrofits take place behind the scenes, the partnership called Project evolve is also focused on public awareness about energy conservation that involves educating occupants about power consumption, energy efficiency tips and the ecological impacts of the power they consume.

"Translating power use into a carbon footprint is often a very effective tool because people care about their impact on climate change," Matthews says. "We spend time educating them about their habits in ways that can change their behavior at work or at home."

Similarly, the Alberta government used energy service companies to deliver a multi-year plan to reduce energy use in many facilities around the province.

"It was worth doing and we showed it was possible to do it without a budget," says John Gibson, head of Alberta Infrastructure's building science team.

"We've now done well over 200 buildings across the whole province, we've spent \$26-million, realized \$6-million a year in mostly guaranteed savings, and have reduced our greenhouse gas emissions by over 20 per cent below 1990s levels." ■

RESOURCES

Project Evolve, University of Calgary
http://hbcalgary.com/case_studies/CaseStudy_UofC_EvolveR0.pdf

Direct Energy Consulting
<http://www.directenergy.com/EN/Canada/DEBS/Pages/Consulting-Services.aspx>



TOOLS TO COMBAT CLIMATE CHANGE: PROS AND CONS

Regulations and standards

- Pros:** Generally provide some certainty about emission levels.
- Cons:** They may be preferable to other instruments, but they may not induce innovations and more advanced technologies.

Voluntary actions

- Pros:** May limit greenhouse gas emissions, stimulate innovative policies, and encourage the deployment of new technologies.
- Cons:** On their own, they generally have limited impact on a national- or regional-level of greenhouse gas emissions.

Information instruments (e.g. awareness campaigns)

- Pros:** May positively affect environmental quality by promoting informed choices and possibly contributing to behavioural change.
- Cons:** It is hard to measure impact of information instruments.

Financial incentives (subsidies and tax credits)

- Pros:** Often critical to overcome barriers. Certain programs demonstrated that financial incentives coupled with personal interactions can be successful.
- Cons:** Needs to be combined with other tools to ensure long-term change.

Source: Mitigation of Climate Change, IPCC

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