In May 2002, Mark Jaccard and I completed a study comparing BC Hydro’s natural gas based electricity supply strategy with a low emission alternative portfolio. A postscript to the original report was released in July 2002, as new information came to light. We conducted this analysis because we believed that Hydro’s Integrated Electricity Plan for 2000 was not the result of a decision-making process that took into account financial, environmental and social attributes. We feared the chosen strategy was not the best option for British Columbia.

The Integrated Electricity Plan was dominated by a combined cycle gas turbine plant on Vancouver Island, fed by a new natural gas pipeline called the Georgia Strait Crossing. We developed an alternative to this approach that involved replacing and increasing undersea electricity transmission capacity to Vancouver Island, and encouraging Independent Power Producers to develop low emission resources such as retrofit cogeneration, wood waste and small-medium hydro throughout the province.

Our analysis found that electricity costs were slightly lower under the natural gas strategy in the base case. The analysis further showed that a typical residential customer in BC would pay less than $3 extra per year if the low emission portfolio were to be implemented (more recent numbers released by BC Hydro suggest that even this estimate may be too high). However, when we incorporated uncertainty around key assumptions, we found that there was a substantial possibility that the low emission option would be as cheap or cheaper. With respect to air emissions – our indicators of environmental performance – our option performed much better than the gas turbine generation option of BC Hydro. It caused virtually no increases in provincial GHG emissions or NOx emissions in the Georgia Basin.

When BC’s new energy policy Energy for our Future: A Plan for BC was released in November 2002, we were pleased to see that the proposed gas turbine plant – referred to as the Vancouver Island Generation Project – would require approval of the BC Utilities Commission before proceeding. We believed that given due consideration of the other opportunities for providing electricity to customers on Vancouver Island the project would not be justified.

(Continued on page 2)
Almost a year later, on September 8, 2003, the Utilities Commission released its decision on the Vancouver Island Generation Project. The Commission denied the application for a Certificate of Public Convenience and Necessity for the generation plant, finding that it had not been established as “the most cost-effective means to reliably meet Vancouver Island power needs.”

We are excited about this decision because it supports our analysis of the issue. Our work in this area was conducted as an unfunded public service at the behest of several concerned citizens in environmental groups, independent electricity producers and even individuals within BC Hydro, and we took some criticism for our efforts and analysis. It is also encouraging to see BC Hydro more aggressively pursuing green power, since our research has shown its economics to be favourable today in BC.

We are still concerned, however, that BC Hydro and the Utilities Commission are mistakenly focused on a “deterministic assessment of financial cost”. There is a great deal of uncertainty about the financial liability risks associated with greenhouse gas and other emissions and the risks of higher natural gas prices. BC Hydro has said publicly that it will simply look at projects in terms of cost, perhaps using the Utilities Commission’s ruling that GHG emissions be monetized at $10/tonne CO2 equivalent. Instead, the proper incorporation of risk into this type of decision should include an understanding of the range and probabilities of possible outcomes. If risk is taken into account in this way, any independent analysis will show a very small cost to BC ratepayers to avoid substantial risks in terms of higher energy prices and higher emission liabilities.

Look on the EMRG website (www.emrg.sfu.ca) for the report and postscript by Jaccard and Murphy referred to above, as well as a related paper recently published in Energy Studies Review.

### Getting Real—Discrete Choice Modeling and CIMS

By Nic Rivers

For the past 15 years, much of our research has focused on developing the CIMS model of the Canadian energy-economy. A primary goal of this research has been to give CIMS the ability to provide useful information to decision-makers. Doing this involves developing the model along two (sometimes competing) directions: first, we need the model to provide answers to policy-makers’ questions. In particular, that means making CIMS capable of simulating the effects of policies like information campaigns, vehicle emission standards, and cap and tradable permit schemes – essentially the type of policies that are being considered by policy makers in their drive to produce a more sustainable energy-economy. Second, we need to make CIMS realistic. That involves making the output from the model reflect the actual interplay of producers and consumers in the real world. In a nutshell, we are constantly improving our model so that it can (1) ask relevant questions, and (2) provide realistic answers.

Those unfamiliar with this particular field of modeling might be surprised that most energy-economy models in existence are not able to provide realistic answers to relevant questions. Traditional models,

### International Visitor

We are pleased to welcome Frank Sensfuss from the Institute for Systems and Innovation Research (ISIR) in Germany.

Frank will grace our offices until November 11th, 2003 while he works to develop a model of the German electricity model using CIMS.
of which there are two main families – top-down models and bottom-up models – concentrate only on one part of the equation. Top-down models, which are aggregate models of the economy based on observations of the market in action, provide more realistic answers to policy makers, but cannot answer the most relevant questions (i.e., they provide the right answers to the wrong questions). Bottom-up models, which are disaggregate models of the economy based on the theory that consumers always chose the cheapest technology available, can answer relevant questions, but do not provide realistic answers (i.e., they provide the wrong answers to the right questions).

With CIMS we are attempting to break the old paradigms and in so doing produce a model that is more useful to policy makers. Thus, CIMS contains a database of the many energy-consuming technologies available in the economy, and simulates the manner in which consumers choose between those technologies in a realistic way. Our understanding of the way consumers choose between technologies that consume energy (for example choosing whether to buy a hybrid car or a standard gasoline car or to take the bus) has been refined from many studies and meta-analyses conducted by leading economists, psychologists, and engineers. However, there is a limit to the amount that can be learned from other studies, and for the past two years, EMRG has been conducting research tailored to improving CIMS’ ability to realistically simulate consumer decisions.

This research involves gathering empirical data on how consumers choose between alternative technologies, and analyzing that data using a methodology called discrete choice modeling. We have gathered empirical data on some of the most vital technology choices in the Canadian energy-economy: personal transportation choices (i.e., what mode to travel by, and what type of vehicle to purchase), industrial choices (i.e., what type of steam generating equipment to purchase), and residential choices (i.e., what type of heating system to use). These data have been collected through extensive national-level surveys of the appropriate populations. The decision models stemming from this research were subsequently embedded into CIMS. This enables us to (1) have more confidence in our modeling results, and (2) simulate a wider range of policies. In other words, it makes the CIMS model more useful on two separate fronts.

The boxes below provide a brief summary of some of the key results in each sector analyzed, and show a simple policy analysis conducted using CIMS. A full discussion of survey results and a more detailed analysis of policy options in each of the sectors can be obtained through three new reports on the EMRG website: www.emrg.sfu.ca.

<table>
<thead>
<tr>
<th>Transportation</th>
<th>Industry</th>
<th>Residential</th>
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<tbody>
<tr>
<td>Consumers are attracted to “environmental” technologies like hybrid and fuel cell cars</td>
<td>Over 60% of survey respondents were unfamiliar with cogeneration</td>
<td>Subsidies on high efficiency heating equipment have only moderate effect and are expensive</td>
</tr>
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<td>Price is not the most effective policy instrument for affecting technological change</td>
<td>In absence of price differences, many respondents indicated a preference for environmentally superior technologies</td>
<td>Information campaigns are cheap and offer modest reductions</td>
</tr>
<tr>
<td>Significant emissions reductions in a short timeframe will impose high costs on consumers</td>
<td>Capital cost and electricity cost were the major drivers for technology choice</td>
<td>Consumers are attracted to “green” alternatives like heat pumps and triple-paned windows</td>
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Comings and Goings

New Recruits!

EMRG is pleased to welcome two new student members, Jotham Peters and Jacqueline Sharp.

Jotham is from Winnipeg, where he graduated with a major in Economics and a minor in Environmental Science from the University of Manitoba. What little free time he has is spent rock climbing.

Jacqueline joins our group from Toronto, where she received her Bachelor of Commerce degree from Queen's University. Her diverse background includes fair-trade marketing and community economic development work in Bolivia and Ecuador, business strategy consulting with Mercer Management Consulting in Toronto and Boston, and air pollution campaign work and research with the Sierra Club Eastern Canada Chapter.

Graduating Students on the Move...

Congratulations to Margo Dennis, Nic Rivers, and Matt Horne who all successfully completed their Masters degrees this fall! Now they are off to apply their hard earned knowledge...

Nic Rivers is staying on as a research associate with EMRG and is busily researching a number of exciting topics, including alternative policy instruments that Canada could use to meet emissions reductions committed to under Kyoto.

Margo Dennis is now working at BC Hydro where she splits her time as a Manager in Audit Services between audit issues and environmental governance issues. Her responsibilities include quarterly environmental reporting to the board, environmental policy review and environmental control assessments.

Matt Horne has accepted a position with the Pembina Institute as a Community Project Analyst where he will work on community energy planning.

Getting the Word Out

By Nic Rivers

This summer, I had the opportunity to attend two conferences where I shared research and policy ideas with academics and government analysts from across the world. In June, I spoke at the Canadian Pollution Prevention Roundtable (CPPR) in Calgary, where I outlined EMRG research and compared our approach to economic modeling with that of other models. In July, I presented at the American Council for an Energy Efficient Economy (ACEEE) conference on Energy Efficiency in Industry. This presentation focused on the applicability of discrete choice modeling research to energy economy models and summarized the results of the study that I conducted over the past two years on the adoption of cogeneration in Canadian industry.

Both conferences offered me great opportunities to meet and interact with prominent researchers in the environmental policy and energy fields. Particularly encouraging was the interest in the type of work that we conduct at EMRG by other conference attendees.

Contact Us

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EMRG News

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