Mark Jaccard and Michael Wolinetz

Mark Jaccard traveled twice to Washington DC in May for invited speaking engagements. On May 10th, he joined Hill Huntington of Stanford to speak at the US Department of Energy on the 2-year project, Energy Modeling Forum 25. Mark explained the analysis of Rose Murphy (Ph.D. candidate) with our CIMS-US model showing how the behavioural parameters of a hybrid model (discount rates, intangible costs) can be adjusted to replicate the cost estimates (especially for energy efficiency) of a bottom up analysis like the well-known recent work of the McKinsey consulting firm. As Hill noted in follow-up communications, there is great interest in the work that we at EMRG are doing, especially in how it shows why the simple analysis of the type done by McKinsey may mislead policy-makers of the full cost of energy efficiency and the effectiveness of non-price policies in achieving it. Rose's work will appear in a special issue of The Energy Journal and she has submitted another paper to Energy Policy.

On May 11th, Mark gave a similar talk at the 2-day meeting of Energy Modeling Forum 24, where Suzanne Goldberg and Michael Wolinetz also presented results from CIMS. The CIMS results focused on the effects of technology assumptions in scenarios where the United States caps annual greenhouse gas emissions at 50% relative to 2005 values. Specifically, Michael and Suzanne discussed how optimistic and pessimistic assumptions for energy end-use technologies affect the changes in capital stock and relative abatement from energy supply and energy demand sectors. Using a technologically detailed model such as CIMS shows that pessimistic assumptions for future costs of key end-use technologies (heat pumps, plug-in hybrid cars etc.) does not necessarily result in less adoption of these technologies. The market penetration of these technologies is a result of the interplay between all scenario assumptions and the resulting carbon price required to meet the 50% emissions cap.

Finally, Mark returned to Washington on May 25th to talk about CIMS results for the US on energy efficiency and fuel switching to the annual conference of the Electric Power Research Institute. Mark was one of 10 invited speakers at the high-profile conference.
Stephen Healey and Karen Mascarenhas

Stephen Healey, Kristin Lutes, and Karen Mascarenhas work together on a comprehensive Carbon Capture and Storage (CCS) project sponsored by a nationwide research network, Carbon Management Canada Inc. (CMC-NCE). Their project aims to assess technical, economic, and social institutional/policy potential for CCS deployment in Canada using analytical tools. Data pertaining to a) the location of large single point emission sources within Canada b) the location of potentially promising carbon storage sites, and c) the economic/engineering characteristics of the capture and storage technologies will be compiled in the EMRGCAP, EMRGSTOR, and EMRGTECH databases respectively. Sources and sinks will then be geographically matched to estimate the integrated cost of various potential projects, and will be translated into regional specific CCS supply curves. These curves will then be incorporated into energy economy models.

The incorporation of social/political/institutional aspects into the analysis involves a) ground-level, public opinion and perception forecasting based on multiple demographic/political parameters and b) policy network analysis surrounding CCS in order to inform scenarios about how policy and regulation concerning CCS might play out into the future.

After creating the aforementioned cost curves and incorporating them into energy-economy models, a variety of GHG mitigation policies will be simulated where CCS competes against other mitigation technologies. This will provide an estimate of the projected uptake of CCS, by region, under these policy scenarios. Incorporating socio-institutional parameters into our analysis enables us to quantify the sensitivity of our modelling results to these factors and identifies areas where policymakers should focus their efforts if they are interested in promoting the uptake of CCS in Canada.

Kristin Lutes’ focus is on integrating, both regionally and nationally, economic information for CCS into the CIMS energy-economy model. In particular, she will be answering the questions: What is the potential for large-scale deployment of Carbon Capture and Storage (CCS) in Canada? What are the costs associated with CCS, both national and regional? What are the potential national and regional economic impacts of policies that promote CCS deployment?

Stephen Healey’s focus is on answering some of the above questions, i.e. the potential for large-scale deployment of CCS in Canada, the costs of CCS—except with a Computable General Equilibrium (CGE) model. He also plans to discern the impacts of Canadian climate policy on the international competitiveness of Canadian firms, and how the specification of CCS in CGE models might impact these results.

Karen Mascarenhas intends to work with James Gaede of Carleton University on incorporating social/political/institutional parameters into energy-economy models. She intends to analyze how these considerations might impact the deployment of CCS over time relative to their absence in energy-economy models.

On May 16-20th, the EMRG team participated in Carbon Management Canada’s first annual conference at the Westin Hotel in Calgary. This conference provided an invaluable opportunity to connect with and exchange information among participants in academia, industry, and government. A variety of seminars, brainstorming sessions, team meetings, and collaborative workshops were held to achieve this goal. The EMRG team presented a poster of their research and learned about the exciting research conducted by other groups from all over Canada.


For decades, most environmentalists and advocates of renewable energy have argued that these sources of energy are benign in comparison to fossil fuels and that humanity should rapidly shift toward them in order to reduce environmental impacts. At a global level, the
advantages of renewable energy are largely undisputed – renewable sources of energy emit little or no greenhouse gas emissions and thus represent a key mitigation action for combating climate change. However, at a local level, the environmental attractions of renewable energy are less clear due to a range of impacts including visual intrusion, noise, land and water alienation, ecosystem disturbance and in some cases local pollution of air, water and land.

Given the potential for these negative impacts, it is not surprising that renewable energy deployment has found more resistance in many jurisdictions than advocates had originally anticipated. One lesson from recent experiences is that policy makers and regulators need to be more effective at balancing the range of goals and interests, from global to local, associated with renewable energy. This task is particularly important because the demand for renewable energy is likely to accelerate dramatically over the next few decades even if substantial deployment of nuclear power, the capture and storage of carbon from fossil fuel conversion, and great gains in energy efficiency are all achieved.

In this paper, Jaccard, Melton, and Nyboer (2011) explored institution and process designs – including those related to energy and climate policy, energy system planning, land use planning, and environmental/strategic assessment – and their influence on the expansion of renewable energy production. To this end, the authors developed a set of criteria with which to evaluate these processes and assess challenges related to the development of renewable energy. The authors then used the experience of British Columbia as a case study for describing these challenges and the responses of policy makers seeking to rapidly scale-up renewables, and run-of-river hydropower in particular.

In BC, run-of-river hydropower has generated concern among some British Columbians due to the possible cumulative effects associated with developing a large number of projects scattered across the province. In this paper’s case study, Jaccard et al. (2011) assessed the possibility for a more strategic and inclusive approach to renewable energy planning to reconcile global and local concerns, and generate support for renewable deployment.

The analysis highlighted the trade-off between the need to quickly increase renewable generation capacity to protect the environment from climate change, and the need to protect the local environment from poorly implemented renewable projects. The authors found that the current system of project-based approvals risks larger than necessary local environmental effects and dissatisfaction among the public, but a broader and more inclusive process that balances global and local effects risks a delay to renewable development and climate change mitigation. This trade-off should be of concern to all jurisdictions aiming to rapidly increase their renewable energy supply.


The Pacific Institute for Climate Solution provided funds for two EMRG projects: “Next Steps on B.C.’s Carbon Tax: Assessing Alternatives and Searching for Common Ground” led by Katya Petropavlova (Doctoral student) and the Pembina Institute, and “Development of a Modeling Tool to Help BC Communities Achieve Greenhouse Gas (GHG) Reductions” led by Anusha Baji (Master’s student) and MKJA.

Katya Petropavlova works with Matt Horne (the Pembina Institute) on British Columbia’s carbon tax project. Her research focuses on the design of alternative carbon tax policies in British Columbia after 2012, when the current schedule of carbon tax increases, low-income tax credits, and personal and corporate income tax reductions come to an end. Katya’s project will be conducted through a mix of interviews, public polling, and economic modelling. The project will engage with different constituencies in B.C. to gather a range of perspectives on the current and future design of the carbon tax policy. Ultimately, this research will help decision-makers to determine the tradeoffs between different policy design issues and prepare a post-2012 carbon tax policy schedule that will effectively balance environmental, economic, and social goals.

The Pacific Institute for Climate Solution funds two EMRG projects cont. on pg. 4
Anusha works on a PICS-MKJA project to develop a user-friendly and adaptable spreadsheet model that can be used by B.C. local governments to forecast energy consumption and GHG emissions at the community level. The model will improve the scope and accuracy of community energy and emissions forecasting under business-as-usual and policy scenarios, thereby enabling communities to explore the impacts of GHG-related climate policies and aiding in: (1) the design of new and effective community energy and emissions plans (CEEPs); (2) the analysis of existing CEEP; and (3) the creation or modification of Official Community Plans and Regional Growth Strategies, both of which must include targets, policies and actions to reduce GHG emissions under the new ‘Green Communities’ legislation (Bill 27).

(3) Distributional incidence of climate change policies in Canada; (4) Electric utility demand side management in Canada. Nic has been the recipient of numerous awards, including the prestigious Trudeau Foundation Doctoral Scholarship, and the Canada Graduate Scholarship (Doctorate and Master), Natural Sciences and Engineering Research Council of Canada. In September, Nic will take up an Assistant Professor position at the Graduate School of Public and International Affairs and the Institute of the Environment, at the University of Ottawa.

New Energy Professor: Jonn Axsen

After a series of interviews, the REM Executive Committee made an offer to Jonn Axsen to take a tenure-track faculty position in Energy and Materials Modeling and Policy at the Assistant Professor rank. Jonn Axsen will join the Energy and Materials Research Group in September and will teach the new undergraduate ecological economics course (REM 363) and the graduate energy and materials modeling course (REM 658). Jonn is currently a postdoctoral scholar at the Institute of Transportation Studies in the University of California, Davis (UC Davis), researching market, energy, and environmental aspects of alternative-fuel vehicles. Jonn possesses advanced quantitative skills in energy policy modeling and is particularly interested in continued exploration of the intersection between technological change, environmental policy, and consumer behaviour.

Nic Rivers Achieves PhD in March

On March 10th, 2010 Nic Rivers successfully defended his doctoral thesis “Modeling Climate Policy: Addressing the challenges of Policy Effectiveness and Political Acceptability” and obtained his Ph.D. in Resource and Environmental Management. Nic’s thesis consisted of four papers: (1) Intensity-based climate change policies in Canada; (2) Impacts of climate policy on the competitiveness of Canadian industry: How big and how to mitigate?;