



ANNUAL REPORT 2012/13





The Pacific Institute for Climate Solutions gratefully acknowledges the generous endowment provided by the Province of British Columbia through the Ministry of Environment in 2008. This funding is enabling ongoing independent research aimed at developing innovative climate change solutions, opportunities for adaptation, and steps toward achieving a vibrant low carbon economy.

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MESSAGE FROM THE EXECUTIVE DIRECTOR



The top international climate issues of 2013 serve as a reminder for the need to continue to be creative in our quest to establish practical solutions to global warming. On May 9 a symbolic threshold was

exceeded: the concentration of carbon dioxide (CO₂) in the atmosphere rose above 400 parts per million (ppm), the highest it has been for at least three million years according to our best geological records. Sea level three million years ago was dozens of metres above where it is today, a direct reflection of less ice on the continents and a warmer, and thus thermally expanded, ocean. We are now heading in the same direction as ongoing emissions of carbon dioxide drive global temperature inexorably higher. The potential consequences of this pathway were well described at the end of September 2013 with the release of the Fifth Assessment Report of Working Group 1 (the Physical Science Basis) of the UN's Intergovernmental Panel on Climate Change. That assessment, compiled by 259 of the world's best climate scientists from 39 countries and formally approved by nearly two hundred nations, affirmed that warming in the climate system since the mid 20th Century is unequivocal, and

it is extremely likely that human influence has been its dominant cause. Renowned Swiss climatologist Thomas Stocker, co-chair of Working Group 1, noted at the release that, "Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions."

Stocker's statement captures well the challenge facing PICS. Our mandate is to focus on the "S" in our acronym: "Solutions", which must address simultaneously two imperatives: mitigation, via greenhouse-gas emissions reductions, and adaptation: establishing approaches that will allow us to adjust to the climate changes ahead. Toward those ends, we made big changes at PICS in 2013. We have restructured our research programme to focus rigorously on five areas where British Columbia has major opportunities to act on the mitigation and adaptation challenges. PICS research over the next several years will focus on prospects for integration of the electrical grid in western Canada, on improving stewardship of forests to optimize uptake of CO₂, on yielding the maximum environmental, economic and social value of our emerging liquefied natural gas industry, and on the steps required to establish energy-efficient transportation systems and a built environment that emit far fewer



greenhouse gases. The new structure will see fully interdisciplinary and inter-institutional teams conducting research on these critically important areas as of early-mid 2014. The themes that defined our first major phase of research--the low carbon-emissions economy, resilient ecosystems, social mobilization, sustainable communities, and carbon management in BC forests--will be retired as of March 31, 2014.

As you will note as you read through this report, PICS has many other irons in the fire. We made good progress in 2013 on the communications front, amongst other things bringing to completion our second free, animated, online short course, on Mitigation, in our Climate Insights 101 series. The course was released to the public on January 23, 2014. We had great success in 2013 with our public lectures series: PICS hosted or co-sponsored 41 separate seminar or lecture events, almost all of which were live webcast and can be viewed in the events archive on our website. Our graduate fellows and post-docs continue to impress, conducting quality research across a remarkably broad array of disciplines, including engineering, political science, economics, sociology, geography, atmospheric science, hydrology and ecology. Our research output continues to grow via multiple channels including academic journal publications, and our increasingly popular White Papers. Those have now been downloaded thousands of times and as detailed in this report, have attracted much media attention.

But whatever successes we might have realized in 2013, we still have a long way go. The challenge to find mitigation solutions while simultaneously adapting isn't just a concern of engineering or science. It is at least equally a human behavioural and political issue wrapped in an environmental and economic tapestry of immense complexity. We will continue to work across many fronts to produce appropriate policy responses to the challenges society faces.

Readers with sharp eyes might notice that this 'annual' report actually spans 16 months of activities. This is because we've altered our reporting year; instead of September though August as in the past, annual reports in future will describe progress in each subsequent calendar year, January 1 through December 31. This issue of the report marks the adjustment year.

Let me end on a personal note. That PICS is doing well is very largely a reflection of the exceptional colleagues with whom I have the honour to work at the PICS UVic office. The Institute is similarly extremely well served by our campus coordinators at UNBC, SFU, and UBC. All work very hard on behalf of the Institute and for all of their efforts, I remain very grateful.



Dr. Tom Pedersen



ABOUT PICS

The Pacific Institute for Climate Solutions (PICS) is a dynamic knowledge network that brings together leading researchers from British Columbia (BC) and around the world to study the impacts of climate change and to develop positive approaches to mitigation and adaptation.

Created in 2008 with a major endowment from the BC Ministry of the Environment, PICS is hosted and led by the University of Victoria (UVic) in collaboration with BC's three other research-intensive universities – Simon Fraser University (SFU), the University of British Columbia (UBC) and the University of Northern British Columbia (UNBC).

PICS pulls together the intellectual capital of the province in applying a multi-disciplinary approach to climate change research. In partnership with all levels of government, the private and the non-profit sector, the Institute strives to develop innovative climate change solutions that will help lead the way to a vibrant, low-carbon economy.

The Institute's main objectives are:

- understanding the magnitude and patterns of climate change and its impacts;
- evaluating the physical, economic and social implications;
- assessing mitigation and adaptation options and developing policy and business solutions;
- evaluating and strengthening educational and capacity-building

strategies to address climate change;
and

- communicating climate change issues to government, industry and the general public.

Mission Statement

To partner with governments, the private sector, other researchers and civil society, in order to undertake research on, monitor, and assess the potential impacts of climate change and to assess, develop and promote viable mitigation and adaptation options to better inform climate change policies and actions.

Governance

PICS is governed by a Program Committee consisting of researchers from the four partner universities as well as representatives from the provincial Climate Action Secretariat (CAS) and Environment Canada's Canadian Centre for Climate Modelling and Analysis (CCCMA); an Executive Committee appointed by the University of Victoria; and an external Advisory Board comprising representatives from across the public, private and non-profit sector.

More information about the PICS governance structure is included as Appendix 1.

RESEARCH

Research Themes

Collaborative and interdisciplinary research dedicated to meeting the multi-faceted climate-change challenge is at the core of the PICS mandate. Within this framework, PICS supports a wide range of solutions-focused research relevant to BC under five themes:

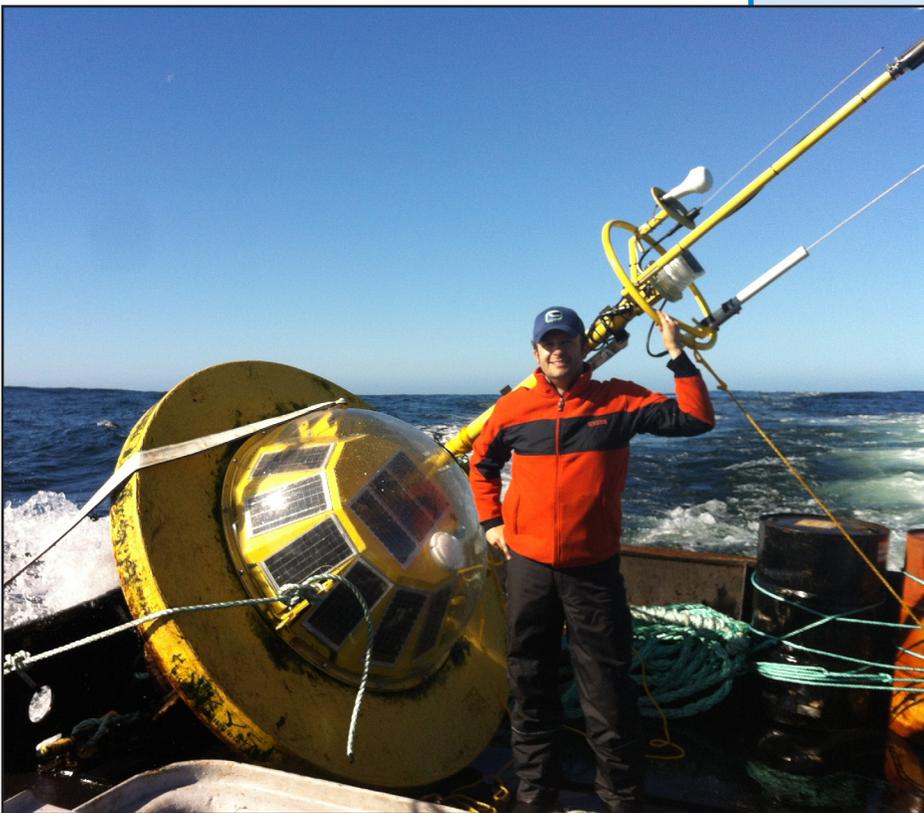
- The low carbon emissions economy
- Social mobilization
- Sustainable communities
- Resilient ecosystems
- Carbon management in BC forests

Wave Energy

Wave energy is often cited as an important entry in Canada's future clean energy portfolio, yet much is unknown about the feasibility of this resource, the conversion technologies required or its impacts. Dr. Brad Buckham, who heads the PICS-supported West Coast Wave Initiative (WCWI) research team, is seeking to find these answers.

The WCWI has developed leading edge simulation software to design and study both moored Wave Energy Converters (WEC) and the remotely operated vehicles (ROVs) used in deep-sea exploration as well as their accompanying cable systems. Tools

being used include wave monitoring buoys, coastal wave propagation models, and community, regional and provincial electrical grid models to evaluate how, when and where WEC can benefit Canadians. The WCWI's predominantly computational methodology compares to the development model being used in other wave energy development programs around the world. The \$2.5 M WCWI project's other funding partners include Natural Resources Canada and the Natural Sciences and Engineering Research Council.



Brad Buckham offshore from Ucluelet with wave monitoring buoy from the WCWI project



The Low Carbon Emissions Economy

This theme engages research that capitalizes on the opportunities and policy initiatives required to build such a vibrant and diverse low-carbon economy.

Research priorities include:

- improving and sustaining BC's carbon pricing initiative
- ensuring environmentally sound development of renewable electricity generation
- reducing greenhouse gas (GHG) emissions from BC's transportation system
- reducing GHG emissions from BC's buildings
- managing BC's solid wastes in ways that reduce GHG emissions
- accelerating the energy efficiency trend in BC

Social Mobilization

Lasting changes in the ways we live, work and think are a crucial part of mitigating and adapting to climate change. This theme focuses on finding ways to mobilize British Columbians to think about and act on climate solutions.

Research priorities include:

- engaging British Columbians in developing and implementing climate change solutions, including mitigation and adaptation planning
- changing collective behaviour toward a reduced carbon footprint
- building public demand for policies/ actions that support a green economy, ecological resilience, and sustainable communities, and meet GHG reduction targets

Sustainable Communities

This theme promotes research designed to foster sustainable communities in BC -- from the way we structure our built environment and organisations, through to how the beliefs and behaviors of leaders and citizens influence the collective use of energy and materials.

Research priorities include:

- exploring the elements of a sustainable community, including densification, mixed land use, a net-zero energy system and a diverse local economy, and determining how to get there through planning and policy development
- addressing the underlying drivers of unsustainable practices in our communities

Resilient Ecosystems

Research under this theme seeks to understand the scale, pace and range of climate change impacts on BC's ecosystems and to develop management solutions to maintain their viability. The emphasis is on risk and adaptive management.

Research priorities include:

- understanding existing rates of change to BC ecosystems
- predicting future ecosystem change and the vulnerability of ecosystem services
- promoting adaptive management and governance in the stewardship of natural resources

Carbon Management in BC Forests

Forest-based carbon stocks will be affected by pests, fire, drought and other climate change factors, as well as by human activities such as land use changes and harvesting. This theme seeks to understand and address these impacts on BC's forest ecosystems as well as the related socio-economic implications.

Research priorities include:

- developing quantitative carbon and carbon-offsets accounting methods
- exploring the bio-energy potential of BC's forests, and the associated environmental concerns
- understanding the soil carbon pool and its future behaviour
- developing sustainable forest management policies in the face of a changing climate

Affiliated Projects

PICS supports climate-related research projects apart from the five major themes. Projects supported over the past year include:

- the BC Agriculture & Climate Change Regional Adaptation Strategies series for Cowichan, Delta and the Peace Region – this follows the BC Agriculture Climate Change Risk and Opportunity Assessment supported in 2011/2012
- the province-wide Climate Analysis and Monitoring (CAM) project led by the Pacific Climate Impacts Consortium (PCIC) in partnership with PICS and the BC Ministry of Environment. CAM achieved a major milestone with the release of the Provincial Climate Data Set available through a new [data portal](#).
- an energy systems analysis of energy grids in BC and beyond (through a project involving PICS, IESVic, and BCIT, with input from BC Hydro). This collaboration has produced a number of peer reviewed papers (see PICS website journals section) and helped shape the new PICS research direction. See page 13.

Research in 2012-13

The table on the following pages lists PICS-supported research projects funded during the five theme Phase 1 research program of the Institute. Almost all of these will be completed by March 31, 2014.

The Low Carbon Emissions Economy		
Project Title	Grant Holder, Organization	Project Partners
Accelerating GHG reductions in BC's economy	Hadi Dowlatabadi, University of British Columbia	BC Climate Action Secretariat
Development of novel nano-structured photo catalysts for highly efficient solar reduction of carbon dioxide to clean energy fuels	David Wilkinson, University of British Columbia	
Experimental validation of the performance of wave energy converters of the point-absorber class	Brad Buckham, University of Victoria	
Flogging a dead policy: estimating the environmental impact of the luxury vehicle surtax in BC	Sumeet Gulati, University of British Columbia	
Just transition in BC: a framework for dealing with the employment impacts of the shift to a low-carbon economy	Kenneth Carlaw, University of British Columbia – Okanagan	CCPA; Communication, Energy and Paperworkers Union
Wind turbine design and siting for unsteady conditions	Curran Crawford, University of Victoria	
Social Mobilization		
A day in my carbon neutral life: imagining transformative change, overcoming barriers	Shannon Daub, Canadian Centre for Policy Alternatives	SFU; CCPA; David Suzuki Foundation; Pembina Institute; SAP Canada; BC Healthy Communities; VanCity
From communities of interest to communities of practice: digital media as catalysts for climate action campaigns	Maged Senbel, University of British Columbia	goBEYOND Campus Climate Network
Greenest City Conversations	John Robinson, University of British Columbia	SFU; City of Vancouver
Measured visualizations as catalysts for mobilization: a prototype for public engagement in municipal planning for climate change	Ronald Kellett, University of British Columbia	City of Revelstoke
Understanding the public uptake and acceptance of a municipal green energy incentive program	Chris Ling, Royal Roads University	City of Colwood

Sustainable Communities		
A community energy and emissions simulation model	Michael Wolinetz, Simon Fraser University	Nanaimo and Sunshine Coast Regional Districts
Integrated community sustainability planning: implications for rural BC	Maureen Lebourdais, Fraser Basin Council	Regional District of Fraser Fort George
Meeting the climate change challenge: community responses to BC climate policy	Ann Dale, Royal Roads University	UBC; SFU
Pando Sustainable Communities	Mark Roseland, Simon Fraser University	BC Climate Action Secretariat
Resilient Ecosystems		
Assessing the potential aquatic habitat value of streams responding to a changing climate	Brett Eaton, University of British Columbia	SFU; Fisheries and Oceans Canada; BC Ministry of Forests
Climate and ecosystem dynamics on southern Vancouver Island and the Gulf Islands: a historical perspective on strategies for restoration, management, and population recovery	Marlow Pellat, Simon Fraser University	UVic; UBC; University of Guelph; University of Sherbrooke; Parks Canada
Climate change and the decline of yellow cedar along the north coast of BC	Lori Daniels, University of British Columbia	University of Guelph; BC Ministry of Forests
Combining historical datasets, ecological modeling & sampling, and cutting-edge visualization techniques for adaptive management of mountain biodiversity	Brian Starzomski, University of Victoria	BC Parks; Alberta Parks; Alberta Innovates
Evaluating the resilience of northern interior cedar-hemlock forests to western hemlock looper outbreaks	Philip Burton, University of Northern British Columbia	Canadian Forest Service (CFS)
Impacts of climate change on natural disturbance regimes in BC: planning for adaptive forest management solutions	Dan Smith, University of Victoria	CFS; BC Ministry of Forests
Operationalizing resilience over the long-term: learning from ecosystem baselines	Sara Gergel, University of British Columbia	University of Toronto; BC Ministry of Forests

Resilient Ecosystems Cont'd		
Project Title	Grant Holder, University	Project Partners
Place-based policy-making and community resilience-building for climate change	Michael Howlett, Simon Fraser University	University of Saskatchewan; Carleton University; Natural Resources Canada
The Alouette River Basin: the developing urban fringe at the interface with protected landscapes in coastal BC and consequences for ecosystem resilience	John Richardson, University of British Columbia	SFU
Understanding ecosystem responses to climate change in southwestern BC forests: a paleoecological perspective on resilient ecosystems	Terry Lacourse, University of Victoria	Parks Canada
Carbon Management in BC Forests		
Community fire-interface biomass utilization for heating fuel	Juan Blanco, University of British Columbia	Community Energy Association; Green Heat Initiative
Developing environmental-response functions of growth and mortality to forecast forest carbon stocks in BC	Nicholas Coops, University of British Columbia	CFS
Estimating the carbon storage and emissions from harvested wood products from BC	Paul McFarlane, University of British Columbia	BC Ministry of Forests
Predicting carbon storage for BC on seasonal to decadal timescales	Vivek Arora, University of Victoria	CFS; Environment Canada; Pacific Climate Impacts Consortium (PCIC)
Striking the right bioenergy balance: promoting healthier carbon stores in our forests and forest product streams	Art Fredeen, University of Northern British Columbia	UBC; CCPA



Fellowship Programs

PICS fellowships support postdoctoral and graduate students from the four partner universities as well as established visiting scholars from around the world. Drawing on a continuous flow of talent and expertise from BC and beyond, the fellowship program produces a diverse array of outcomes related to climate change issues that are closely aligned with the Institute's research agenda.

PICS fellowships are valued at \$12,000/year over two years for Masters, \$18,000/year over three years for PhD students and \$50,000/year over two years for postdoctoral fellows. Visiting fellowships are awarded on a periodic, short-term basis throughout the year. To date, PICS has awarded more than 80 fellowships totaling nearly \$3 million, and over the past 12 months, has supported a total of 78 graduate students and 2 post-doctoral fellows at its collaborating universities.

For a complete list of 2012/13 fellowship holders, see Appendix 2.

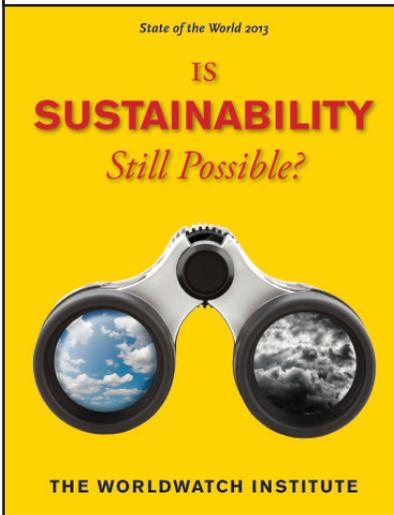
Jennie Moore

The research of PICS fellow Jennie Moore has been gaining international attention. She is a contributing author, along with her thesis supervisor, UBC Professor Emeritus William E. Rees, to the Worldwatch Institute's State of the World 2013 report that was launched in Washington DC in April. Their chapter, "Getting to One Planet Living"

examines the sustainability gap between how much the average Vancouverite consumes today and what would be needed to stay within global ecological carrying capacity. Jennie, who is also director of Sustainable Development and Environmental Stewardship at the BC Institute of Technology, has published a wide range of articles, some of which are featured on the PICS website. Her dissertation research, which she successfully defended in July 2013, is being used by the City of Vancouver to inform its Greenest City 2020 Action Plan. September 2013 saw her presenting at the Ecocity World Summit in Nantes France, where she is helping to develop the International Ecocity Framework and Standards.



PICS fellow Jennie Moore (above), contributing author to *Is Sustainability Still Possible* (below)



Internship Program

PICS awarded 10 new internships in 2013 to students who attend one of the four PICS universities. Interns were hosted during summer and fall by organizations around the province including Ministry of Energy, Mines and Natural Gas, West Coast Environmental Law, the Regional District of Wells, the Pembina Institute, and the World Wildlife Fund. Internship topics in 2013 ranged from investigating the bio-energy economy in the Kootenays to planning for district energy in the North. To date 44 students have completed work terms under this program.

For a list of projects supported in 2012/13 see Appendix 3.



PICS intern Juila Berry

PICS Interns

Julia Berry, a UVic fourth year student, was hired by the Capital Regional District (CRD) to support its Climate Action Program. Her tasks included synthesizing data on regional greenhouse gas emissions and energy use, researching carbon offset purchasing opportunities and drafting education materials on climate change adaptation. She also coordinated a contest where university students worked on solutions to municipal climate-related issues such as rainwater management, reducing

waste, creating local food production policies, mapping ecologically sensitive lands and investigating sustainable transport options. Julia now works in the sustainability field for the City of Calgary.

PICS intern at Pembina, **Natalie Alteen** from UNBC, won a poster competition at Generate 2013 (the Clean Energy Association of BC's annual

conference) with her presentation of the feasibility of bioenergy in the Kootenays.

Food wastage was the focus of SFU student **Katie Schilt's** internship with the Society Promoting Environmental Conservation (SPEC) through exploring policy solutions towards food waste prevention, food waste recovery/donation and small-scale neighbourhood composting. The resulting Food Waste Policy Research Report was presented by Katie at the Vancouver Food Policy Council meeting, and at Metro Vancouver's Zero Waste conference.



Natalie Alteen with her winning poster.

New Research Direction 2014

In April 2014 PICS will embark on a restructured research program that will see the “retiring” of the existing five-themes (the low carbon-emissions economy; resilient ecosystems; social mobilization: sustainable communities; and carbon management in BC forests), in favour of a more focused policy relevant set of questions.

While the historical structure has yielded an array of discrete research results, it has not influenced the policy domain as directly as the PICS mandate was intended to accomplish. In response, the executive director proposed at the Institute’s 2012 annual forum that PICS adopt a refocused research program. The subsequent restructuring was the product of extensive consultation over a full year with the PICS community and beyond, including the PICS external Advisory Board. The new program was endorsed by the Program Committee in July, 2013.

The new structure will see interdisciplinary and inter-institutional teams conduct research on five issues of critical importance to BC in the context of the climate-change challenge. These five are, in simplest terms, LNG (and later, coal), grid integration, energy efficiency in the built environment, transportation policy and carbon stewardship in BC’s forests. The structure allows allocation of substantial funding for up to five years for each issue, including support for graduate students, post-doctoral fellows, and face-to-face team meetings. The research effort attached to each question

is to be overseen by an “Advisory Panel” that will include senior PICS membership (e.g. the Executive Director or his/her designate), a member of the Climate Action Secretariat (CAS), a member of the business community where appropriate, and at least one external academic researcher. The LNG project oversight team will also include First Nations representation. Once assembled, the research teams will incorporate the best researchers in BC who have a keen interest in the five areas. Not all will be academics: top scientists within the provincial or federal research ranks will be participating.

The new structure was strongly supported in concept by the External Review of PICS that was received in final-report form in April 2013, and it has also received an enthusiastic (and unanimous) endorsement by the PICS external Advisory Board.

Separate to the new research structure will be the continuation of the existing PICS Fellows and Internship programs.

Publications

PICS research generates a growing body of knowledge related to climate change mitigation and adaptation. All publications are solutions-focused, and can be used to inform and guide policy-makers, educators and the interested public.

White Papers

The PICS white paper series consists of independent, peer-reviewed reports authored by leading researchers and policy experts commissioned by the Institute.

White papers contain in-depth analysis and recommendations on a range of climate-related topics of key relevance to British Columbia. Over the past year, the following white papers have been published:

- “Are Small-to-Mid Sized Businesses the Catalyst to a Low Carbon Economy in BC?” by Climate Smart Businesses Inc, April 2013.
- “Strengthening BC’s Agriculture Sector in the Face of Climate Change” by Erica Crawford and Rachelle Beveridge, May 2013
- “Fire in the Woods or Fire in the Boiler?” by Juan Blanco, Dale Littlejohn, Dave Flanders, David Dubois, and Peter Robinson, August 2013

The white papers from 2013 have been downloaded over 3200 times.

Briefing Notes and Issues Briefs

PICS Briefing Notes offer succinct analysis and solutions-orientated policy recommendations based on a range of climate-change related topics. They are a useful tool for policy and decision-makers, the media industry leaders and the interested public. Formerly initiated and produced by ISIS at the Sauder School of Business, UBC, the briefing note service is now managed by PICS central.

In late 2013, PICS began offering a new product, Issues Briefs, which summarize and clarify current climate-related issues, trends and research findings. They are tailored toward British Columbians, and aim to provide relevant and timely independent information to policy-makers, media and the interested public.

Briefing notes and issues briefs published in 2012/13 include:

- “Greening” the Fleet: Using a Lifecycle Modeling Tool for Procurement Decisions
- Moving toward greater adoption of integrated resource recovery in BC
- Using climate models to inform community adaptation in BC
- Climate change and the conservation of BC’s leading-edge species at risk
- Clarity over the Global Warming “Hiatus”

Other Publications

Additional resources include journal articles, book chapters, conference proceedings and theses produced by the Institute’s fellowship holders, as well as special reports commissioned or supported by PICS.

Over the past year, these have included the examples, selected from a long list:

- Learning with practitioners: climate change adaptation priorities in a Canadian community (Prince George) by PICS Fellow from UNBC, Ian Picketts
- Climate and atmospheric drivers of historical terrestrial carbon uptake in the province of British Columbia, Canada. *Biogeosciences*, by Peng, Y., Arora, V. K., Kurz, W. A., Hember, R. A., Hawkins, B., Fyfe, J. C., and Werner, A. T. (2013)
- Variable Energy Resources: Interesting Implications for the Western Interconnect. *The Electricity Journal*, 26(5) by A. Sopinka. and L. Pitt (2013)

All such publications are available on the [PICS website](#).

OUTREACH & EDUCATION

Raising public awareness and understanding of climate change is an essential foundation for effective action on global warming. Drawing on its extensive knowledge network, PICS outreach efforts include hosting public events, briefings and expert lectures, and creating a range of free educational online products and publications. The past year has seen an increase in co-hosted events with PICS' sister organization, the Pacific Climate Impacts Consortium (PCIC), resulting in a greater sharing of expertise across a wider range of disciplines. The vast majority of public lectures and panel events are live webcast and archived on the [PICS website](#).



Taking audience questions: IPCC Fifth Assessment briefing panel in Victoria, (LtoR), Greg Flato, Francis Zwiers and head of CAS, James Mack.

Lectures & Seminars

Special briefings on IPCC 5th Assessment

The release of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report from Working Group I (WG I), which assesses the physical scientific basis of climate change, generated substantial public attention and made headlines around the globe in September 2013.

PICS and PCIC sought to add value for British Columbians by hosting public briefings in Vancouver and Victoria on the report's key findings and what it means for this province, shortly after the official release.

Presentations were introduced by PICS executive director Tom Pedersen and given by PCIC director and vice-chair of WG I, Dr. Francis Zwiers, and by Greg Flato, the coordinating lead author of the chapter "Evaluation of Climate Models", and manager of the CCCMA of Environment Canada. More than 800 people – including academics, NGOs such as the World Wildlife Fund and the David Suzuki Foundation, members of the public and media, staff from a dozen BC government ministries, and representatives from local government and federal departments – gathered to find out how the IPCC assessment process works, the current extent of global climate change and what the future holds.

New PCIC research was presented on past and projected impacts of climate change in the province using the same emissions scenarios used by the IPCC. One interesting projection is that BC stands to

have about 50 fewer frost-free days in 2100 compared to 1900, and it is almost half-way to that target now. A recording of the Vancouver event is on the [PICS website](#).

Expansion of public lecture series

2013 has seen an expansion of the monthly PICS UBC-SFU Public Lecture Series beyond its Vancouver base. Since 2010, September climate change experts from the two universities have held joint public talks in the city on climate change topics ranging from adaptation and community health impacts, through to technology innovations for a carbon-free future.

September 2013 saw the launch of an additional new lecture series that showcases PICS-funded projects across the four consortium universities, as results from those research initiatives come to fruition. These lectures are predominantly held where the principal investigator is based – Vancouver, Victoria or Prince George.

Pacific Climate Seminar Series

2013 has also brought changes to the UVic-hosted Pacific Climate Seminar Series – a joint PICS-PCIC initiative that has been running monthly since 2009. In line with PICS' new flexible research structure, the series is now more opportunity driven as to when local and visiting lead researchers are available, rather than constrained by a fixed time slot. With a focus on climate science,



PICS researcher Erica Crawford talks to Goba TV Top Story host Aaron MacArthur

Erica Crawford

PICS researcher Erica Crawford co-authored a white paper that generated huge interest in BC by demonstrating that climate change is bringing additional stress to the province's already struggling agriculture sector. The report, entitled "Strengthening BC's Agriculture Sector in the face of Climate Change", is the result of interviews with BC agricultural producers and specialists. The white paper's recommendations for policy-makers include: changing current governance structures so policy makers are in touch with what's happening on the ground, improving the resources available to farmers, and supporting climate change innovation and preparedness on farms. Erica was interviewed by CBC Vancouver News, Global News Top Story, BC Almanac, the Globe and Mail, the Vancouver Sun, News 1130, CFAX radio, All Points West, OMNI news, CBC radio news, and the Q radio.

regional impacts and potential solutions, seminars over the past year have covered the following topics: water security in the Canadian prairies; how BC's carbon tax is affecting consumer behaviour and reducing consumption; larval dispersal models of two important BC commercial species, herring and hake, in the Salish Sea; potential land changes due to hydrologic changes under climate change; and progress in harnessing the power of wave energy converters on BC's west coast.

Invited Speakers

In addition to its regular seminar and lecture series, PICS periodically hosts special public event with key climate change authorities from around the world. Invited speakers and topics during the past year have included:

- **Jennifer Francis**, research professor with the Rutgers University Institute of Marine and Coastal Sciences, on how Arctic warming may be affecting the jet stream and the frequency of extreme weather events.
- **Yoram Bauman**, stand-up economist and comedian from Seattle, on how putting a price on carbon is the best way to fight climate change and foster clean tech innovation. This event was co-hosted with UVic's Department of Economics.
- **Bob Inglis**, former Republican congressman for South Carolina and current director of the Energy and Enterprise Initiative at George Mason University in Washington DC, on prospects for conservative support of a revenue-neutral carbon taxes.

- **Stephen Sheppard**, professor of Forest Resources Management and Landscape Architecture at UBC, on how seeing climate change through the use of visual tools can help communities relate and engage in mitigation action.

- **Juan Blanco**, (former UBC Dept. of Forest sciences/now Universidad Pública de Navarra), on using waste-wood from wildfire prevention work to generate energy for nearby rural BC communities.

- **Andy Hoffman**, Professor of Sustainable Enterprise at the University of Michigan, on how culture and ideology affects the social consensus on climate change



Guest speakers Jennifer Francis (above) and Yoram Bauman (below)



Annual Forum

The idea of seeking common ground to build a new Canadian national energy strategy was the foundation of talks held during PICS fifth annual forum held in Vancouver June 12-13, 2013. The forum brings together researchers and decision-makers across the public, private and non-profit sectors to discuss key climate change issues of relevance to BC.

Day 1 of the “Converging on Solutions” conference focused on select PICS research accomplishments to date, with a capacity audience for the forum’s traditional free public discussion in the evening. Its topic of “Canada’s Energy Future” was explored by Preston Manning, former Leader of the Opposition, and the Globe and Mail national affairs columnist, Jeffrey Simpson.

The discussion around “Finding Common Ground in Canada’s Energy Future” was carried on during Day 2 of the forum by an experts panel featuring keynote speaker David Stern, senior energy forecaster for Exxon Mobil; Alex Ferguson, vice president policy and environment, Canadian Association of Petroleum Producers; Kathryn Harrison: professor of political science

at UBC: the Hon. Mr. Manning, and Mr. Simpson.

Weekly News Scan

The PICS Climate News Scan has enjoyed a steady growth in readership since its launch in 2009, with more than 3200 subscribers now signed up. This weekly summary of major climate change related science, technology and policy advances from around the world has been produced in partnership with the ISIS research centre at UBC’s Sauder School of Business. 2014 will herald a new era in the scan’s evolution, with production moving in-house and being realigned with PICS’ new research direction. The close-working relationship between ISIS and PICS will ensure expertise continues to be shared, and the Climate News Scan, along with ISIS’s new Clean Capital news product for the clean tech sector, continues to deliver critical information and analysis.

The PICS Newsletter continues to be produced as a quarterly and is widely distributed electronically and (as required) as hard copy. It contains details on the latest PICS research, announcements and events, past and upcoming.



The Hon. Preston Manning addresses the PICS annual forum

Short Courses

Climate Insights 101

[Climate Insights 101](#) is a series of free, online animated interactive courses designed to provide an in-depth understanding of the science behind, and issues related to, climate change. The series will ultimately comprise three distinct modules, each containing a number of 30-minute lessons on related subjects. Module 1, "Climate Science Basics", was launched in August 2011. The next module in the series, entitled "Mitigation" was released on January 23, 2014 and will be followed by the final module, "BC Regional Climate Change Impacts and Adaptation," in mid 2014.

Originally intended for civil servants, the short courses have proven popular worldwide, with online users from nearly 150 countries. The series has attracted a variety of audiences, including educators, special interest groups and members of the general public wanting to gain a comprehensive understanding of climate change. The courses combine animation, interactive quizzes, and interviews that offer an engaging experience.

YouTube Videos

PICS has developed complementary products to the Climate Insights modules that make climate change education accessible via shorter animated videos, available on YouTube and the PICS website. The most recent releases for 2013 are two topical videos explaining "Carbon Tax and Cap and Trade" and "What You Can Do About Climate Change". Also on offer:

- **Climate Insights: bite size**

The 'bite size' videos, released in February 2012, are shorter, more accessible videos that cover the 'highlights' of material from the first Climate Insights 101 module, "Climate Science Basics". The 10 videos are mostly under 10 minutes in length.

- **Clear the Air**

These six animated short videos refute common climate change myths each in less than two minutes. Topics include: The Greenhouse Effect; The Sun's influence; Mother Nature; Human Influence; Climate Change Consensus, and The Earth is Cooling?



Over the past year PICS has showcased the suite of Climate Insights 101 products in BC schools, public libraries, and university education expos, as well as to community groups and

NGOs. The series' global audience continues to grow, with the 10 YouTube videos now being translated into Finnish by the Finnish Meteorological Institute. PICS has also received enquiries about translating the products into German and Chinese.

Media Coverage

2012/13 has proven another busy year for PICS in the mainstream media, with solid coverage of its research within Canada, and regular requests for expert commentary on climate issues. Announcements by the Institute that attracted the most interest include PICS white paper on how climate change is compounding problems for BC's stressed agriculture sector, Jennifer Francis's research linking arctic warming and extreme weather, and former Opposition Leader Preston Manning's views on how to engage conservatives on climate change action. News networks picked up on several Vancouver Sun op-eds by PICS staff (Pedersen, Pitt and Sopinka) on issues including ocean acidification, the need for interprovincial building of electrical transmission capacity, and analysis of BC's moves to secure future energy supplies.

In 2012/13, PICS featured in the following print and broadcast media:

- **Print:** Globe and Mail, Vancouver Sun, Times Colonist, The Tyee, Kamloops Daily News, Edmonton Journal, Business in Vancouver, Georgia Strait, Vancouver Observer, Metro News, Dawson Creek Daily News, HQ Cowichan Valley, The Delta Optimist, Nanaimo Bulletin, Biomass Magazine, Windsor Star, 250 News and The Ring.
- **Radio:** CBC Early Edition, CBC On the Island, CBC Kelowna, CKNW Bill Good Show, CFX Radio 1070, BC Almanac and BBC News.
- **Television:** Global TV news, Global News Top Story, CKPG TV and Shaw TV.

Website & Social Media

The PICS website houses information on the Institute's research activities and outcomes, news, events, publications, free educational tools, funding programs and other climate related resources.

PICS social media communication has continued to grow over the past year via its Facebook and Twitter platforms and through its YouTube Climate Insight video products.



CAMPUS UPDATES

University of Victoria

As the host institution, UVic houses the central PICS office, comprising the executive and associate directors, four full-time and two part-time staff. PICS at UVic is responsible for directing the Institute's overall programming and outreach activities. This includes administering the PICS research, fellowship and internship programs; producing the weekly news scan and white paper series; organizing PICS annual forums, lectures and other events; creating the Climate Insights 101 short courses; and managing the institute's promotional activities and media relations.

PICS External Review

An external review held in October 2012, identified areas within the PICS consortium that could be improved including, primarily, reducing the number of research projects that the Institute supports in favour of a more tightly focused program. That recommendation fit well with the internal restructuring of the PICS research program that was already underway. See Research section on page 13.

IdeaFest 2013

PICS and PCIC brought the topic of extreme weather to UVic's second annual IdeaFest in March, co-hosting a lecture by US research meteorologist Martin Ralph. IdeaFest is a two-week celebration of research, scholarship and creativity, featuring a wide

range of events and activities. Extra seating was bought in to accommodate overflow guests interested in understanding why atmospheric rivers (or "rivers in the sky") occur, and the latest advances in predicting when, where and for how long these severe downpours occur. Dr. Ralph recently took up a new post as director of the Center for Western Weather and Water Extremes, University of California San Diego/Scripps Institution of Oceanography.

PICS executive director Tom Pedersen organized and was also a member of an IdeaFest panel discussing "How does BC reconcile resource extraction with environmental and economic concerns?"

Congress 2013: Carbon Taxation

PICS hosted an expert panel on BC's carbon tax at UVic during Congress 2013, Canada's largest gathering of scholars across disciplines. The June 4 event featured panelists Stewart Elgie, professor of law and economics at the University of Ottawa and founder and chair of the green economy think-tank Sustainable Prosperity; James



Congress 2013 Panel: Ekaterina Rhodes, Stewart Elgie, James Mack and Tom Pedersen

Mack, head of BC's Climate Action Secretariat (CAS); and Ekaterina Rhodes, an SFU Ph.D candidate and Vanier Canada Graduate Scholar. Tom Pedersen of PICS moderated the panel. Coming five years after the introduction of the tax in 2008, the panelists had plenty of evidence to show that the levy is helping to lower GHG emissions and fuel consumption, while also reducing personal and corporate income taxes.

Outreach

PICS staff members at UVic have given presentations to a wide variety of audiences over the past year. PICS Executive Director Tom Pedersen has lectured frequently across Canada on climate-change issues and solutions to universities, community groups, NGOs, government sectors, professional and business organizations, among others. Audiences between Sept. 2012 and Sept. 2013 include: the Saskatchewan Waste Reduction Council; Dalhousie University; Bedford Institute of Oceanography, Dartmouth; Clean Energy BC Annual Conference, Vancouver; BC Investment Management Corporation; Columbia Institute Annual Conference, Harrison Hot Springs; Probus Club, Sidney; La Ronge Health Collective, Saskatchewan; Vancouver Island University; the International Conference of the Aquatic Ecosystem Health and Management Society, UVic; UVic Continuing Studies on the Peninsula and SFU's Surrey and Burnaby campuses.

Targeted media and industry briefings have also been given by the Executive Director and visiting PICS guest speakers for groups

including the Vancouver Sun Editorial Board, and the BC Business Council. Pedersen also accepted an invitation to help advise Metro Vancouver on establishing a new, large-scale waste-to-energy facility in the region.

PICS Associate Director Lawrence Pitt has given presentations on the changing nature of energy supply and demand in North America to groups including the BC Sustainable Energy Association Institute in September 2012 and at a special Peter Wall Institute event held at UBC in March. PICS Senior Communications Officer Robyn Meyer has provided communications and media training to UVic science graduates.

PICS UVic personnel changes

PICS' first employee, Jessica Worsley, left the Institute in January to take up a new post with the IPCC in Potsdam, Germany. Jessica was the Events Coordinator and Acting Communications Officer while Robyn Meyer was on maternity leave. Robyn rejoined PICS in February 2013. Wendy Phelan (PICS Executive Assistant) retired in June, and her position has been filled by Nancy Chan. Stephanie Inman has been appointed as website manager and assistant events coordinator. And former Science Media Centre of Canada writer, Ami Kingdon, has been contracted to assist with communications, including the in-house production of the PICS Climate News Scan.

Simon Fraser University

PICS SFU continues to build a strong sense of community by engaging with faculty, students, industry, NGO's, government and the general public through programs and activities about climate change issues, and mitigation and adaptation solutions. PICS SFU campus coordinator Nastenka Calle has also been appointed to the VP Research Senior Sustainability Council working group to help implement SFU's new Sustainability Strategic Plan. Key initiatives over the past year include:

UBC-SFU Public Lecture Series

This PICS UBC and SFU joint lecture series focuses on the challenges brought by climate change, as well as the opportunities and the potential solutions toward achieving a low carbon future. Speakers over 2012/13 include:

- Drs. Andrew Riseman and Hannah Wittman (UBC) on Food Sovereignty models for "feeding the world and cooling the planet" (Sept. 2012)
- Dr. Karen Bakker, UBC and Dr. Diana Allen, SFU, on Water Security: Governance and Climate Change Challenges from a Canadian Perspective (Oct. 2012)
- Dr. Martin Ordonez, UBC and Dr. Erik Kjeang, SFU, on Fuel Cell Systems and Power Converters: Technology, innovation and applications (Jan. 2013)
- Dr. Jonn Axsen, SFU, on Electric Vehicles: Matching Low-Carbon Technology to People and Policy (Feb. 2013).

PICS Climate Research Lecture Series

In September 2013, PICS UBC and SFU began a new joint lecture series to present the results of some of the projects funded across the four PICS universities. The series was launched with a presentation on Engaging with Greenest City Conversations, an interdisciplinary research project involving the City of Vancouver, SFU, UBC, BC Hydro, GRAND NCE, and MITACS. The project led by Dr. John Robinson, UBC and Dr. Alissa Antle, SFU aimed to develop multiple channels for public engagement on municipal sustainability policies.

The series' second lecture in October 2013 was on "Meeting the Climate Change Challenge – the MC3 project" led by Dr. Ann Dale from Royal Roads University (RRU) and involving UBC and SFU researchers. In March 2013, the team released its "Action Agenda for BC Decision-Makers". A panel - including elected officials from Surrey, Tofino and Fernie - responded to audience questions on the agenda's 12 recommendations, and the drivers and barriers they face in the process of climate policy innovation in their cities. Both events were held in Vancouver, attracting some 280 people in total plus 60 via the webcast.

Carbon Talks Public Dialogues

PICS-SFU continued its partnership with SFU Carbon Talks this past year by sponsoring the Carbon Talks public dialogues series. A wide variety of topics were covered including: Liquefied Natural Gas: Risk or Reward; (former) BC Environment Minister Terry Lake on climate action progress since

2008; Nicholas Heap of the Canadian Wind Energy Association on the case for wind energy in BC; “High Tide on Main Street” author, John Englander, on rising sea levels and the coming coastal crisis; and a panel discussion on the upcoming Metro Vancouver transportation referendum. The dialogues reached close to 750 people, both face-to-face as well as online viewers.

Green Tech Exchange Forums

The partnership between Green Tech Exchange and PICS continued this past year to support public forums and networking events to advance innovation and expertise in the green economy. These forums have brought together close to 1300 participants, including entrepreneurs, professionals, industry members, students and the public, both in the Lower Mainland and Vancouver Island. Highlights of recent GTEx Forums include: Developing BC’s Bioenergy and Bioeconomy; Green Buildings – Regional Best Practices & Current Development; Energy Storage – The Promises and Challenges of a Massive Market; Harmonizing Energy and Food - An Expert Panel on Bioenergy and Agriculture; among others.



Science in Action participants experiment with energy generation

PICS sponsored events at SFU:

The SFU Sustainability Network partners, of whom PICS-SFU is a member, co-hosted several events in early January 2013 including a Sustainability Opportunities Fair and a ‘speed networking’ café. New students learned about PICS fellowship and internship programs, as well as the institute’s published research including white papers.

Seven graduate students also gained the opportunity to showcase their research via

the fair’s second annual poster competition, co-hosted by PICS. Shannon Holding, a PhD candidate with SFU’s Department of Earth Sciences won \$1,000 for her poster representing her project: “Water Security Assessment

for Islands”. The award money gives her opportunity to present her research nationally or overseas.

PICS SFU hosted its first “Climate Solutions Heat” as part of the 3-Minute Thesis competition held by universities around the world, where graduates are challenged to explain their research to a non-specialist audience in only 3 minutes. Six students competed for the \$300 prize, with Mary Ann Middleton, a PhD candidate and PICS fellow in the Department of Earth Sciences winning first place by describing her work on



PICS SFU co-ordinator Nastenka Calle presenting a lecture in Ecuador

diverse range of groups including the China Council for International Cooperation on Environment and Development, the BC Water and Waste Association, the International Research Centre on “El Niño” in Guayas, Ecuador,

“Groundwater-surface Water Interactions”. Middleton advanced to the SFU finals competition.

In partnership with SFU Science in Action, PICS hosted energy workshops for grades 4 to 8 children providing them with a hands-on opportunity to explore different ways of generating “green” electricity using wind, sun and water. An important tool for these workshops is the “Clear the Air” video series created by PICS that explains why climate change is happening and what we can do about it. The program, run by Nastenka Calle from PICS with the help of SFU students, has reached over 1000 children and families this past year alone through workshops and special public events such as the Brighthouse Science Bash – Richmond Public Library, and SFU Science Rendezvous 2013 event co-sponsored by PICS.

Outreach & Education

PICS SFU campus coordinator, Nastenka Calle, took up invitations to present within BC and overseas over this past year to a

and to professors and students at ESPOLE (Escuela Superior Politécnica del Litoral). Presentations topics included BC Government’s carbon tax, and climate action plan, and how PICS is supporting these measures, and others, through its research and education program including its innovative Climate Insights 101 series.

University of British Columbia

Interdisciplinary collaboration was central to PICS UBC’s activities over the past year, with a wide range of events being co-hosted with other climate-change specialists and groups both on and off campus. PICS UBC Program Coordinator Sara Muir-Owen was invited to give many presentations, including to the Oxford Round Table in England.

PICS UBC and Pembina joint initiatives:

PICS UBC worked with the Pembina Institute and other partners to help organize a national “Shale Gas Thought Leaders Forum” held on September 19-20, 2012 at the UBC Point Grey campus. The event brought

together industry leaders and decision makers from across Canada and the US to discuss the future of shale gas development in Canada. Under Chatham House Rule, there was open dialogue on environmental concerns, industry standards and practices, policy frameworks and enforcement amongst a diverse group of over 80 stakeholders from First Nations, community groups, academics, public and private industry, and environmental NGOs.

PICS UBC and Pembina also joined forces to assist the City of Campbell River with establishing its new electric vehicle (EV) infrastructure. A joint workshop in October 2012 outlined the benefits that EVs offer such as GHG reduction and better air quality, as well as discussed practical measures such as identifying priority locations for the 10 charging stations, possible public-private partnerships to support infrastructural development, and a communications strategy for the new electric network. City staff, environmental organizations and local business representatives attended. The city officially opened the charging stations in time for International Earth Day, April 22, 2013.

PICS sponsored events at UBC:

PICS provided sponsorship support for the **Regenerative Neighbourhoods Summit** held at UBC on February 14-15, 2013. Approximately 65 sustainability business leaders, industry representatives,

leading architects and designers attended the event from a range of countries and states including Sweden, Oregon, California, Massachusetts, New Mexico, Washington, Vancouver and Victoria.



PICS UBC program co-ordinator Sara Muir-Owen

Led by Dr. John Robinson from UBC's Sustainability Initiative, and facilitated by international business leader Göran Carstedt from Sweden, the two-day session discussed the development and design of regenerative systems that foster both human and environmental wellbeing.

UBC faculty, staff and students took the opportunity to learn about the work of Dr. Jennifer Francis from Rutgers University, during her February

2013 presentation on **"Enhanced Arctic Warming and Extreme Weather in Mid-Latitudes."** The event was co-hosted by PICS UBC and UBC's Department of Earth, Ocean and Atmospheric Sciences. Dr. Francis also gave a public lecture at UVic.

PICS UBC lent its support to **The New Economy Summit** held April 4-6, 2013 at the Centre for Interactive Research on Sustainability (CIRS), UBC. The two-day event organized by UBC students and community members featured speakers David Korten, founder and president of the Living Economies Forum, UBC Professor Emeritus William Rees, historian and cultural critic, Morris Berman. Its purpose was to share and stimulate ideas on a new economy for Canada. For a complete list of speakers and topics visit the [New Economy website](#).

From January to March 2012, UBC held its annual **3-Minute Thesis Competition**, with 135 graduate students participating. PICS-UBC provided sponsorship funding for the competition and Program Coordinator, Sara Muir Owen volunteered as a semi-final judge for the event.

“The Wall Hour” on North America’s Energy Landscape

The Peter Wall Institute for Advanced Studies (PWIAS) and PICS UBC partnered to host “The Wall Hour” held Thursday, March 7, 2013, at UBC’s CIRS. The panel session, titled “The North American Energy Landscape - From Importer to Exporter?” provided an overview of the region’s changing demand and supplies of oil and gas, including the growth in domestic production and the policies needed to manage these impacts. Panel members were from Pembina, UBC, and PICS, and more than 80 people attended.

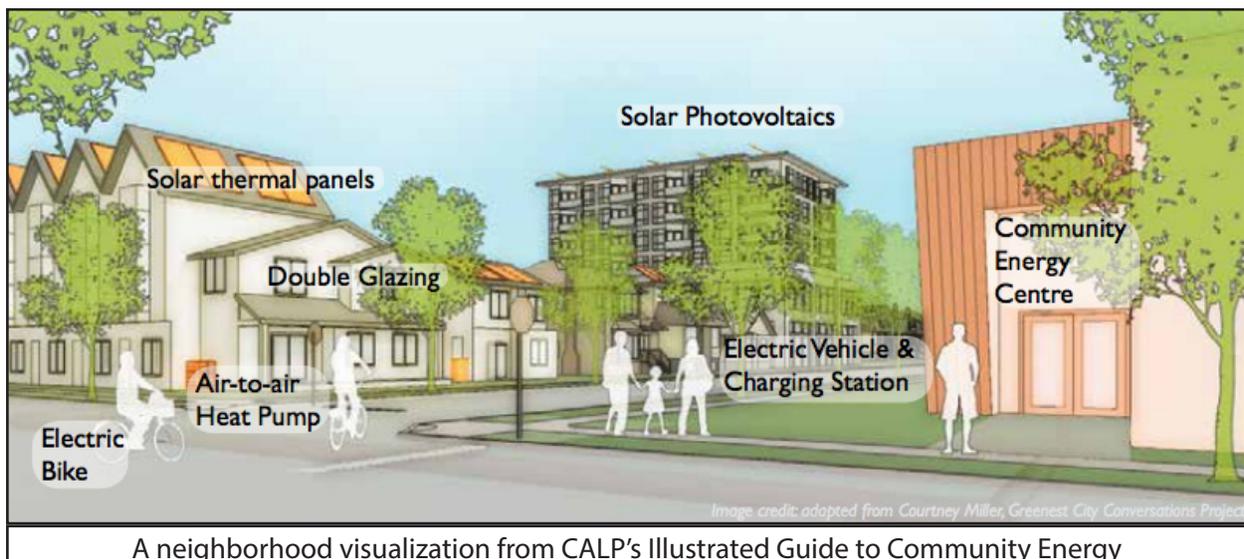
Community Energy Symposium

PICS UNBC, Metro Vancouver and the Collaborative for Advanced Landscape Planning at UBC (CALP) co-hosted a

Community Energy Symposium on June 4, 2013 to mark the release of the new Illustrated Guide to Community Energy. Presentations topics included: the innovative tools and processes available to local governments for community energy planning and implementation, first-hand reports of projects underway, and discussions about policy and public/citizen engagement processes. More than 70 professionals in the area of local government planning, engineering and transportation attended the event. The guide was developed by CALP and the Elements Lab in partnership with Metro Vancouver, the City of Richmond, the City of Surrey and with support from the Neptis Foundation, Vancouver Foundation and PICS.

PICS-UBC Fellows

PICS-UBC fellows met in the fall 2012 to provide research updates and receive feedback from colleagues. In September 2012, Paul Teehan, PhD candidate, Resource Management and Environmental Studies, UBC presented on “Operationalizing Sustainability” following his six month project with the BBC aimed at optimizing



A neighborhood visualization from CALP’s Illustrated Guide to Community Energy

environmentally-driven decision making over technology equipment purchases. In November, Lisa Westerhoff presented an overview of her research, "Making Climate Change Meaningful: Exploring Narratives and their Outcomes in BC Communities."

SFU UBC Fall 2012 Public Lecture Series

PICS UBC continues to work with SFU to coordinate the PICS Public Lectures. Since 2010, over two dozen professors from collaborating universities have come together at free public venues to share their climate change research results and knowledge with each other and the broader community. The events typically draw 80 to 100 attendees, with an additional 25 to 30 viewers joining each live webcast. For more information on the 2012/2013 talks please see the SFU-UBC Lecture Series on page 23.



PICS Fellow Matt Beedle (LHS) with his supervisor, Dr. Brian Menounos, measuring volume changes in the Cariboo Mountain's Castle Creek Glacier.

PICS Visiting Scholar Summer 2013

Nico Stehr of the University of Zeppelin in Germany, joined UBC from June and July 2013 as a PICS visiting scholar. At UBC, Dr. Stehr worked on a number of research issues including the "adaptation to climate change in a novel theoretical sense as a deliberate co-production of social and cultural transformation...[and on] the question of governing climate change impacts

with special reference to the efficacy of democratic governance." Dr. Stehr discussed these challenges at a public event at PICS UVic.

Outreach:

PIC UBC Program coordinator Sara Muir Owen joined a diverse group of some 30 academics and professionals at the **Oxford Round Table on Critical Public Issues** in

late July 2013. Sara gave a presentation entitled BC's Climate Action Plan: Six Years of Leadership and Learning. The session provided the opportunity to connect with professionals in the area of climate change, as well as those with insight into other complex and pressing social and ecological issues.

Sara partnered with Climate Reality to offer talks to Grade 6 and 7 students at Laura Secord Elementary and Grade 3 to 6 students at Queen Elizabeth

Elementary School in Vancouver during spring 2013. The presentations aimed to build awareness about climate change among youth, to encourage them to want to learn more, and to talk about their future—and the many climate solutions it will hold—with their peers, parents, teachers and community leaders.

University of Northern British Columbia

It's been another busy year for PICS at Canada's "Green University" with a growing PICS UNBC community and higher visibility on climate change solutions in the wider region. Highlights of the 2012/13-year include expansion of low-and-no-carbon emission vehicles in and around campus, advances in research, and a higher presence in the local media.

PICS on campus

The PICS-UNBC community has now grown to more than 72 members on campus. PICS Program Coordinator Kyle Aben continues to chair the UNBC Carbon Neutrality Subcommittee, is a steering committee member for the university's Natural Resource and Environmental Studies Institute (NRESI), and is a member of the Green University Planning Committee. Kyle has supported research efforts dealing with climate change and First Nations, the cost of carbon neutrality for regulated public service organizations, and forest and wood products carbon

sequestration and accounting. In addition to his work on campus Kyle also acts as a third party consultant for forestry carbon projects in the northern region. The PICS-UNBC office is located in UNBC's Green University Centre, working closely with the university's Sustainability Manager and Energy Technician.

PICS in the wider community

PICS-UNBC continues to work with the historic site of Barkerville to reduce its carbon footprint, and over the summer a **PICS internship** in the nearby District of Wells led to the involvement of the Green Heat initiative to investigate renewable

energy options for these two communities not connected to natural gas. PICS-UNBC will also be involved with the carbon accounting for the upcoming 2015 Canada Winter Games to be held in Prince George. With over 2,350 athletes, 950 coaches and 4,500 volunteers participating, it will be the largest multi-sport and cultural event ever held in northern BC.

Outreach & Education

Kyle has given a range of presentations in BC this year on the topics of carbon accounting, climate change impacts and policies, green jobs, and mitigation



PICS UNBC program co-ordinator Kyle Aben tries out one of the university's new electric Might-E trucks.



and adaptation opportunities. Talks were given to the following; the Comox Valley Elders College Lecture Series, North Island College biology classes, the Thompson Rivers University Alumni Mentorship Event and to a number of UNBC classes (Global Environment Change, Natural Resources, Environmental Issues and Public Engagement, and Sustainable Tourism).

Kyle has also provided the local media in Prince George with TV news and radio interviews throughout the year on topics ranging from the carbon tax to the installation of electric car chargers at UNBC. In summer 2013 he took part in the UNBC youth summer school, Active Minds, by teaching about climate change and solar energy.

Going electric and carbon free

Program Coordinator Kyle Aben was instrumental in the expansion of the electric vehicle infrastructure on campus. This included securing funding through the Plug in BC initiative for two additional electric car chargers available for use by the public at no additional cost over other parking spots. In addition, PICS UNBC purchased five electric Might-E trucks with financial supports from the BC Ministry of Energy Mines and Natural Gas's Clean Energy Vehicle Academic Fund. The trucks will be used by the UNBC Facilities Department, the Enhanced Forestry Lab and Campus Security. PICS UNBC also supported a student attending a renewable energy summer school in Iceland, and co-sponsored Bike to Work week.

On a personal note, Kyle has been utilizing the waste vegetable oil (WVO) produced on campus to run his own converted vehicle,

a Volkswagen TDI over the past year. The result? More than 20,000 km of carbon neutral driving (equating to over 2 tonnes of CO₂ emissions saved), and the money saved from not buying diesel has paid for the conversion kit. He says, "The car runs more smoothly and with more power on waste canola oil, has no sulfur emissions associated with traditional diesel and the fuel source is renewable within one year."

Sponsored Initiatives

Special initiatives supported by PICS funding in 2012/13 include:

- EcoENERGY Innovation Initiative-** Powering Plug-In electric Vehicles with Renewable Energy in BC
- Climate Action Secretariat –** Atmospheric Rivers Risk Assessment for BC. Developing a multi-agency risk assessment for British Columbia.

Working with the BC Government

PICS continues to build and maintain strong relationships with the BC government, primarily through the Climate Action Secretariat. The PICS Executive and Program Committees includes a representative from CAS, and the PICS Executive Director communicates regularly with James Mack, the Head of CAS, to keep the province up to date regarding the Institute's activities, as well as to ensure that research is addressing provincial government information needs in a timely manner. CAS and other government representatives frequently attend PICS lectures and meet with invited speakers to discuss a wide range of relevant topics.

FINANCIAL REPORT

PICS is funded through an original \$90 million endowment from the Province of British Columbia in 2008 and held by the University of Victoria Foundation. The 2012/13 budget to support all PICS operations was \$3.91 million.

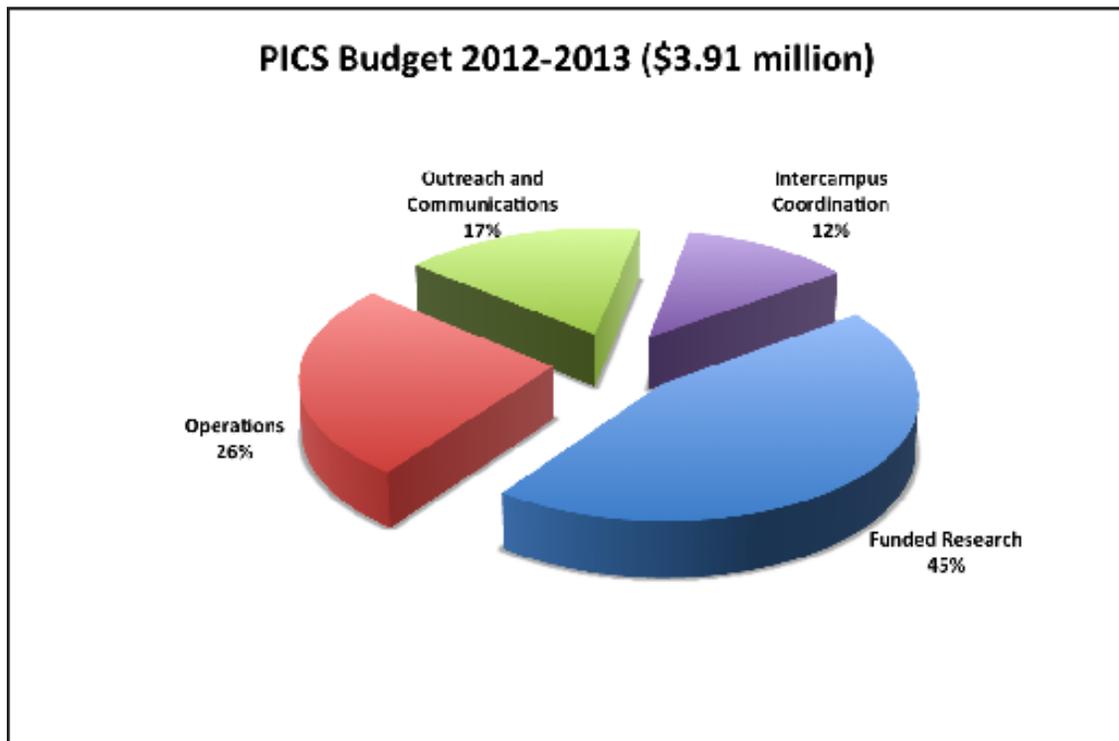
Budget expenditures are summarized as follows:

Funded Research includes: research theme projects, fellowships, unsolicited proposals, internships and white papers.

Operations include: UVic overhead, salaries and administrative costs.

Outreach and Communications include: PICS seminars and events, briefing note and news scan program, short courses, sponsorships and the annual forum.

Intercampus Coordination includes: funding for the PICS Campus coordinators at the University of British Columbia, Simon Fraser University and the University of Northern British Columbia.



APPENDIX 1: GOVERNANCE

Board and Committee Membership: July 1, 2012 to December 31, 2013

Advisory Board

Michael Miller, Associate Vice-President Research, UVic(Chair)

Lyn Brown, Vice-President, Catalyst Paper Corp.

David Demers, Chief Executive Officer, Westport Innovations Inc.

Karen Dodds, Assistant Deputy Minister, Environment Canada

Mark Edwards, Director, Environment, Teck Cominco Ltd.

Richard Flury, former Chief Executive, Oil, Gas and Renewables, BP plc (retired)

Graham Kissack, Director, Sustainability and Communications, Catalyst Paper Corporation

Gordon Lambert, Vice-President, Sustainable Development, Suncor Energy

John MacDonald, Chairman and Chief Executive Officer, Day4 Energy Inc.

Jonathan Rhone, President and Chief Executive Officer, Nexterra Energy Corp.

Peter Robinson, Chief Executive Officer, The David Suzuki Foundation

James Tansey, Executive Director, ISIS Research Centre, Sauder School of Business, UBC

Mossadiq Umedaly, Cleantech Entrepreneur and Business Executive

Executive Committee

Howard Brunt, Vice-President Research, UVic (Chair)

Ken Denman, Chief Scientist, Victoria Experimental Network Under the Sea (VENUS), UVic

Ranjana Bird, Vice-President Research, UNBC

Peter Keller, Dean of Social Sciences, UVic

James Mack, Head, Climate Action Secretariat, BC Ministry of Environment

Michael Miller, Associate Vice-President Research, UVic

Tom Pedersen, Executive Director, PICS

Mario Pinto, Vice-President Research, SFU

Brent Sauder, Director, Strategic Partnerships, University Sustainability Initiative, UBC

Program Committee

Tom Pedersen, Executive Director, PICS (Chair)

Stephanie Bertels, Assistant Professor, Technology, Operations Management / Innovation & Entrepreneurship, SFU (Joined 2013)

Art Fredeen, Professor, Ecosystem Science and Management, UNBC (returned from sabbatical September 1, 2013)

John Fyfe, Research Scientist, Canadian Centre for Climate Modelling and Analysis, Environment Canada

Robert Gifford, Professor, Department of Psychology, UVic (Joined 2013)

Zoe Meletis, Assistant Professor, Geography, UNBC (Joined 2013)

Walter Merida, Associate Professor, Department of Mechanical Engineering, UBC (Joined 2013)

Lawrence Pitt, Associate Director, PICS

Stephen Sheppard, Professor, Faculty of Applied Sciences, School of Architecture & Landscape Architecture; Forest Resources Management, Faculty of Forestry Director, UBC (Joined 2013)

Afzal Suleman, Professor, Department of Mechanical Engineering, UVic

Tim Takaro, Associate Professor, Faculty of Health Sciences, SFU (returned September 2013)

Thomas White, Manager, Science and Adaptation, CAS, BC Ministry of Environment

David Wilkinson, Professor and Canada Research Chair, Department of Chemical and Biological Engineering, UBC

Monika Winn, Associate Professor, School of Business, UVic

Diana Allen, Professor, Department of Earth Sciences, SFU (Term ended in 2013)

Nancy Olewiler, Director, Public Policy Program, SFU (term ended in 2013)

Ken Wilkening, Chair, International Studies, UNBC (Term ended in 2013)

APPENDIX 2: PICS FELLOWSHIP HOLDERS

Graduate Fellowships 2012-2013

Simon Fraser University

Eric Brown, PhD Candidate, Geography: *Transitioning Campbell River: from resource-dependent to climate-resilient*

Jordan Burbacher, Master's Candidate, Faculty of Health Sciences: *Can boil water advisories in BC be linked to extreme weather events that may increase with climate change?*

Steven Conrad, PhD Candidate, Resource & Environmental Management: *Improving water allocation adaptation policies and decision-making through an integrated hydrological-stated preference water demand model.*

Sabine Jessen, PhD Candidate, Geography/ Resource & Environmental Management: *Planning for marine ecosystem resilience under climate change in British Columbia.*

Freya Kristensen, PhD Candidate, Institute for Resources, Environment and Sustainability: *Meeting the Climate Change Challenge (MC3): Dynamics of Community Responses to Climate Change in British Columbia.*

Melissa Kruger, Master's Candidate, School of Public Policy: *Climate Change and the Energy-Water Nexus: Implications and Obligations for the Columbia River Treaty.*

Isabelle Larocque, Master's Candidate, Earth Sciences: *A framework for identifying climate change impacts and management strategies related to groundwater resources in mountain communities.*

Mary Ann Middleton, PhD Candidate, Earth Sciences: *Evaluating the impacts of climate change and water use on groundwater sensitive streams.*

Cedar Morton, PhD Candidate, Resource & Environmental Management : *Enduring waters: Building resilient international water institutions in a changing climate.*

Heather Munro, Master's Candidate, Resource and Environmental Management: *Trade-offs between carbon offsets and timber harvest revenue opportunities in the central coast of BC: A decision analysis approach.*

Vinu Subashini Rajus, PhD Candidate, Interactive Arts & Technology: *Ambient, interactive displays and controls for sustainable living.*

Ekaterina Rhodes, PhD Candidate, Resource and Environmental Management: *Environmental and Economic Effectiveness of Vancouver's Greenest City Action Plan.*

Michael Ton, Master's Candidate, Geography: *Ecological resilience to disturbance interactions in pine forests of central interior British Columbia.*

University of British Columbia

Mohammad Dara, PhD Candidate, Chemical and Biological engineering: *Coupled removal of carbon dioxide and water treatment for BC relevant industries.*

Syed Raza Jaffery, Master's Candidate, Civil Engineering: *Utilizing Building Information Models (BIM) to Monitor Building Performance.*

Thor Jensen, PhD Candidate Institute for Resources, Environment and Sustainability: *Development models for community scale heating utilities.*

Kim Lau, PhD Candidate, Resource Management & Environmental Studies: *British Columbia's "carbon-neutral" government: A critical evaluation.*

Stephen Mak, Master's Candidate, Earth and Ocean Science and Mining engineering: *Assessment and mitigation of geo-risk associated with the development of enhanced geothermal systems.*

Georgia Piggot, PhD Candidate, Sociology: *Collaborative networks and climate change action: A British Columbia case study.*

Elizabeth Schwartz, PhD Candidate, Political Science: *Climate policy in Canadian cities: A comparative study.*

Gerald Singh, PhD Candidate, Resource Management & Environmental Studies: *Cumulative impacts and resilience in social ecological systems.*

Paul Teehan, PhD Candidate, Resource Management & Environmental Studies: *GHG implications of cloud computing: Analyzing large data centre construction in the Columbia Basin.*

Lisa Westerhoff, PhD Candidate, Resource Management & Environmental Studies: *Governance for climate change: Local decision-making for low-carbon, resilient communities.*

Lilia Yumagulova, PhD Candidate, Resource Management & Environmental Studies: *Resilient by design: The role of institutional adaptation to environmental risk in cities.*

Kevin Zhang, Master's Candidate, Community & Regional Planning : *The effect of urban design on transit rider perceptions and ridership.*

University of Northern British Columbia

Matthew Beedle, PhD Candidate, Natural Resource & Environmental Studies:
Communicating the implications of climate change through the study of glacier recession.

Alana Clason, PhD Candidate, Natural Resources & Environmental Studies: *The resilience of high-elevation ecosystems to cumulative disturbances across a climatic gradient.*

Ian Picketts, PhD Candidate, Natural Resources and Environmental Studies: *An exploration of community adaptation to climate change in Prince George, BC*

Geoff de Ruiter, PhD Candidate, Environmental science/engineering: *Comparing industrial biochar applications: Optimizing revenue versus CO₂-equivalent emissions reductions or carbon sequestration.*

University of Victoria

Jeffrey Daines, Master's Candidate, Earth and Ocean Science: *Assessing the Present and Future Wind Energy Resource in Western Canada.*

Jeff English, PhD Candidate, Mechanical Engineering: *GHG mitigation through coordinated management of large hydro reservoirs in adjacent jurisdictions.*

Italo Franchini, Master's Candidate, Mechanical Engineering: *Prospects for optimal tidal energy integration in British Columbia.*

Heike Lettari, Master's Candidate Environmental Studies: *Social adaptation to rapidly changing ecosystems.*

Benjamin Lyseng, PhD Candidate, Mechanical Engineering: *Methane at the Gate: the role of natural gas in future energy systems.*

Erik Schindler, PhD Candidate, Business, *Securing energy and water sustainably: Managing critical inputs for an expanding mining industry in BC.*

Jason Straka, Master's Candidate, Environmental Studies : *Humming along or buzzing off? The resilience of pollination services to climate change in British Columbia.*

Cedar Welsh, PhD Candidate, Geography

Past trends and future change in the hydrologic regime of the upper Stikine River basin in northern British Columbia, Canada.

Postdoctoral Fellowships

Simon Fraser University

Dr. Mehdi Shahraeeni, Mechanical Engineering Fluid Dynamics, *Development of a customized lifecycle assessment tool for low carbon emission vehicles*

University of Victoria

Dr. Amy Sopinka, Economics, *Understanding western electricity markets with a view to pricing carbon.*

APPENDIX 3: STUDENT INTERNSHIPS 2012-2013

District of Wells

Tom Cheney (UNBC Master's of Environmental Studies) Affordable Climate Change Solutions for a Small Northern Community

WWF Canada

Thomas Williams (SFU Master's of Public Policy) Energy Futures Intern

City of North Vancouver

Benjamin Cross (SFU Master's of Resource and Environmental Management) Research Assistant, Climate Adaptation

The Pembina Institute

Natalie Alteen (UNBC Environmental Engineering) Feasibility analysis for a Kootenay wood pellet manufacturing and export cooperative

Ministry of Forests, Lands and Natural Resource Operations

Morgan Bawtree (UBC Biology) Nanaimo Forest Ecology Research Internship

The Society Promoting Environmental Conservation

Katherine Schilt (SFU Masters Public Policy) Roadmapping Food Waste Reductions: Policy Solutions for Sustainable BC Communities

West Coast Environmental Law

Nivedhya Ramaswamy (UBC Law) Climate Professional Practice Intern

Climate Smart

Elissa Liu (UBC Environmental Science) Climate Support Intern

Canadian Centre for Policy Alternatives

Tom Woodsworth (UBC Geography PhD) Climate Justice Research Project

Ministry of Forests, Lands and Natural Resource Operations, Victoria

Amy Law (UVic Master's of Public Administration) Scientific Policy Information Specialist

Photos in this report are sourced from PICS staff and from Evan Leeson, <http://www.flickr.com/photos/ecstaticist/>



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