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# The potential contribution of British Columbia's forest sector to greenhouse gas emission reduction targets:

Final Report from PICS Workshop – December 16-17 2013 Laurel Point Inn, Victoria, BC

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April 2014

# **The potential contribution of British Columbia's forest sector to greenhouse gas emission reduction targets**

## **Final Report from PICS Workshop**

**December 16-17, 2013, Laurel Point Inn, Victoria, BC**

### **Executive Summary**

The Pacific Institute for Climate Solution (PICS) convened a two-day workshop to initiate a new research program on the potential contribution of British Columbia's forest sector to greenhouse gas emission reduction targets. Climate change mitigation objectives in the forest sector can be met through activities that reduce greenhouse gas emissions or enhance carbon sinks. Such activities can be aimed at the sustainable management, expansion and conservation of forests and at the use of products derived from forests (harvested wood products) to store carbon and to displace other emissions-intensive products such as concrete or steel. The use of forest-derived biomass to displace fossil fuels used in heating or transportation can also contribute to mitigation objectives. Workshop participants identified three interdisciplinary priority research themes:

1. Design and evaluation of climate change mitigation options in the BC forest sector;
2. Assessment of the impacts of climate change on proposed mitigation schemes and potential adaptation options to avoid or reduce these impacts; and
3. Design and evaluation of policies, institutional and financing options for forest carbon mitigation.

All three themes will include evaluations of biophysical, socio-economic and other indicators as well as an assessment of the risks (resulting from changing climate) and uncertainties of the anticipated outcomes. Stakeholder choices and the perceived credibility of proposed mitigation portfolios will also be evaluated. The project will involve scientists in universities, provincial and federal agencies and will engage stakeholders in government, industry, environmental organisations, First Nations, and the public across BC. The research will build on existing scientific infrastructure and tools and contribute to further development of these tools. Pending approval and financial support by PICS, research during the first two years of the project (to March 2016) will be designed to yield science-based recommendations for the design of climate change mitigation portfolios in BC's forest sector and an evaluation of their potential contributions to meeting greenhouse gas emissions reduction targets in BC.

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## **Introduction**

The Pacific Institute for Climate Solutions (PICS) is initiating Phase 2 of its research program. The PICS Program Committee has decided to focus on five research questions of specific importance to British Columbia (BC). These will be addressed by multi-disciplinary teams over a period of up to five years. Each team will be responsible for refining and articulating issues within each project, outlining the objectives and methods of analyses, and providing “solutions” in the form of science-based recommendations for consideration by stakeholders in various levels of government, business communities, and the public.

One of the five research questions centers on the potential contribution of BC’s forest sector towards greenhouse gas (GHG) emission reduction targets while the forests are being affected by the projected impacts of climate change. PICS organised a two-day workshop that brought together experts from provincial and federal government agencies and universities to initiate discussions and to develop a project outline. This final report summarises the main results from the workshop, outlines the framework that will be used by a multidisciplinary team to conduct the analyses, and identifies issues that may need to be addressed prior to, or during the early stages of the project.

The next steps are to complete the remaining planning tasks and request funding for the proposed project. This report provides background information for the funding request.

## **Background**

The Government of British Columbia has legislated GHG emission reduction targets for BC relative to a 2007 baseline of six per cent by 2012, 18 per cent by 2016, 33 per cent by 2020, and 80 per cent by 2050. Emission estimates for 2012 will be reported by July 2014. Meeting future stringent emission reduction targets can only be achieved through ongoing commitments to transition to a low-carbon economy, and ongoing efforts to reduce emissions. The targets include accounting for emissions and removals of GHGs associated with afforestation and deforestation as well as fossil fuel use in the forestry sector. They do not, at this time, include the emissions and removals in forest ecosystems, and while these are reported as a ‘memo item’ in the BC GHG inventory, forest ecosystem carbon sinks currently do not contribute to GHG emission reductions.

Every sector of the economy must contribute towards meeting emission reduction targets. Identifying the emissions reduction potential or mitigation wedges (Pakala and Sokolov 2004) in each sector is one step towards meeting this goal. British Columbia’s forest sector can contribute both by reducing GHG sources and increasing carbon sinks. The forest sector is unique in that it can contribute to the removal of carbon dioxide ( $\text{CO}_2$ ) from the atmosphere and, where forests are managed sustainably, they can provide timber, fibre and energy to help meet society’s demands for renewable products (Nabuurs et al. 2007). Scientific and economic knowledge of mitigation options has improved in recent years

(Lemprière et al. 2013; Smyth et al. 2014; BC MFLNRO 2013). Moreover, in forest ecosystems, activities aimed at enhancing adaptation to climate change impacts may also provide benefits towards climate change mitigation, such as reduction of forest dieback due to climate change and the resulting maintenance of carbon stores and sinks.

To develop effective and appropriate portfolios of climate change mitigation options in BC's forest sector it is necessary to understand:

- What are the forest sector's mitigation objectives (for example the portfolio elements can be affected by the choice of geographic area in which emissions are to be reduced);
- How can these mitigation objectives best be achieved;
- Over what time period;
- At what costs;
- With what risks and co-benefits; and
- What policy and institutional arrangement are necessary for effective and legitimate forest carbon mitigation strategies?

Scientists in federal and provincial laboratories, in universities and in other institutions have addressed elements of these questions over the past years at scales ranging from national-scale strategic analyses to site-specific local analyses. Such research is ongoing with financial support from various sources. The goal of this PICS initiative is to bring together and support an interdisciplinary research team that will address three core themes (see below), design and outline a research agenda, and develop and apply the methodology that will yield science-based recommendations focussed on solutions for British Columbia.

Pending acceptance by PICS of the workplan and budget requests, this team will then proceed with the implementation of the research program. This approach has a high probability of success because it will enable and support the integration of multiple research streams, build on past and ongoing research efforts, and focus the research program on specific questions and policy solutions relevant to BC.

## Project Objectives

The project has a two-pronged overarching challenge: identify and evaluate mitigation strategies that reduce emissions from and increase carbon uptake in BC's forest sector, while supporting the sector's adaptation to ongoing climate change. For both prongs, social, environmental and economic indicators should be considered.

Workshop participants identified three interdisciplinary priority themes:

1. Design and evaluation of climate change mitigation options in the BC forest sector;

2. Assessment of the impacts of climate change on proposed mitigation schemes and potential adaptation options to avoid or reduce these impacts; and
3. Design and evaluation of policies, institutional and financing options for forest carbon mitigation.

Each of these themes is described in more detail below. Common to all three themes will be engagement with the public and stakeholder communities in the design and evaluation of options and to garner support for timely implementation of mitigation activities. Work on all three themes would start in parallel from the outset of the project and results from each theme will inform activities in the other two.

## Priority Themes

### **Theme 1: Design and evaluation of climate change mitigation options in the BC forest sector**

Theme 1 seeks to identify forest sector climate change mitigation options in both land management and the forest sector, including harvested wood products (HWP) and their use as substitutes for more emissions intensive building products such as concrete, steel and plastics, and the use of biomass to substitute fossil fuels used for heating and transportation. Building on existing tools and infrastructure (Smyth et al., 2014), and on prior analyses conducted by both provincial and federal agencies, the project team will design and evaluate regionally differentiated climate change mitigation portfolios for BC's forest sector. To enhance the likelihood of implementation of a portfolio, the design and evaluation of options will seek stakeholder engagement, including licensees, First Nations, and environmental non-governmental organisations (ENGOs) including those in coastal, interior and northern regions of BC.

The project will evaluate the net reduction of emissions to the atmosphere over time. Several ways to quantify, report, and credit these changes in emissions are available and the methods used may be affected by the objectives and intended use of the statistics. For example current international reporting and accounting rules under the United Nations Framework Convention on Climate Change (UNFCCC) require that mitigation impacts be assessed relative to a forward-looking baseline or reference level of emissions. Provincial policy targets may be the reduction of emissions relative to a historic emission level, e.g. in 2007. Payments for carbon credits may require emission reduction quantification using sector- or activity-specific protocols, e.g. those developed by the Pacific Carbon Trust and other organisations. Government policy goals may focus on absolute reductions of emissions to the atmosphere, regardless of the causes, while project-specific emission reductions that seek monetary compensation may have to demonstrate the additionality of their actions relative to a

baseline. Methodologies for assessing the reporting and accounting options will need to be explored and evaluated against criteria such as climate mitigation effectiveness and credibility.

The multivariate assessment of mitigation options will quantify the amount of emission reductions by 2020, 2030 2050 and possibly 2100 (as climate change impacts are projected to increase over time and long-term interactions between climate change, mitigation and adaptation will be considered in Theme 2). The assessment will also include estimates of the costs per tonne of CO<sub>2</sub> reduction, and socio-economic indicators including regional estimates of employment outcomes of various mitigation portfolios

The design of climate change mitigation portfolios for BC's forest sector requires an understanding of the impacts of mitigation activities on (1) ecosystem carbon stocks, (2) carbon stored in harvested wood products, and (3) the displacement of fossil fuel emissions achieved through the use of harvested wood products and bioenergy. Using an integrated systems approach, changes in all three components will be evaluated jointly and over time to design mitigation portfolios that achieve net reductions in GHG emissions to the atmosphere. All activities in a mitigation portfolio need to be evaluated against a baseline (or reference level) to quantify the incremental contributions of activities to GHG balances, and methods for the development of credible reference levels will be outlined and implemented following internationally-agreed guidelines. Depending on the intended use of the analyses, other indicators of changes in GHG emissions will also be evaluated, such as the absolute change in net emissions to the atmosphere or changes in periodic (decadal) cumulative emissions in BC's forest sector.

The choice of system boundaries, with regard to space, time, and the elements that are included in the analysis, can strongly affect the outcome and resulting recommendations. Analyses will therefore distinguish mitigation portfolios with regard to their contributions to BC's GHG balance, but also attempt to quantify climate change mitigation benefits beyond BC's borders. For example the use of cross-laminated lumber produced from wood harvested in BC will reduce BC forest C stocks, but increase C stored in harvested wood products (inside and outside of BC) and reduce emissions where such wood is used to substitute concrete or steel products with the associated high emissions in the regions where these products are manufactured.

The focus of the mitigation analyses will be on the impacts of activities on the net GHG balance (including carbon dioxide and non-CO<sub>2</sub> greenhouse gasses such as CH<sub>4</sub> and N<sub>2</sub>O). It is recognised that there can be further impacts from mitigation activities on the global climate system, such as changes in hydrology, albedo, emissions of volatile organic compounds, and other processes. While these may reduce or enhance mitigation benefits, current scientific understanding is insufficient to reliably quantify these impacts in the design of mitigation portfolios. As scientific understanding improves, the biophysical processes can be further evaluated.

Examples of specific mitigation options that could be explored include forest management and the use of the harvested material.

1. Role of bioenergy from post-harvest residues in place of slashburning.

2. Role of bioenergy in remote communities, from fuel management (Blanco et al. 2013), forest management, to biochar production (de Ruiter et al. 2014).
3. Impacts of deforestation for municipalities and regional districts and opportunities to meet zero-net deforestation goals and Climate Neutral Government obligations.
4. Potential for afforestation and reforestation (e.g. following natural disturbances) to reduce regeneration delays, to increase forest area, and to affect species distribution in the face of climate change.

Mitigation analyses have demonstrated the benefit of increasing the proportion of harvested wood products in long-term uses to increase both carbon storage and displacement of emissions-intensive alternative building materials (Smyth et al. 2014). BC's "Wood First" policy seeks to achieve this objective. Developing methods to quantify the change of carbon stocks in the built environment at the community or municipality level and monitoring such changes may provide a mechanism to incentivise increased C storage in buildings. Research on housing half-lives and other indicators of C storage in the built environment is ongoing in BC (e.g. Sianchuk and McFarlane 2011; Sianchuk et al. 2012; Dymond 2012). However, data and methods to operationalise such analyses at the scale of municipalities are lacking.

Forests of BC are managed to meet multiple objectives of the citizens of BC. In recent years, the forest sector's contribution to BC's GHG balance has been added to the management objectives. It is therefore important to quantify how climate change mitigation options will affect the outcomes of other management objectives including timber and fibre supply, employment and revenues to the province. Other biophysical indicators, such as potential impacts on hydrology, biodiversity, and wildlife habitat, may be considered but are not the primary focus of these mitigation analyses.

## **Theme 2: Assessment of the impacts of climate change on proposed mitigation schemes and potential adaptation options to avoid or reduce these impacts**

Theme 2 will address the impacts of climate change on BC's forests and forest sector, their implications for the design of mitigation portfolios, and the potential for adaptation options to avoid or reduce these impacts. The risk that mitigation portfolios will not meet their mitigation objectives increases with climate change impacts on forest ecosystems. Theme 2 will explore changes in growth and mortality rates already observed in recent years using long-term measurements of permanent sample plots in BC to improve the capability to forecast species-specific responses to environmental changes. Some region and species combinations in BC are expected to show increases in net increment (e.g. Hember et al. 2012) while others are expected to decline due to both reduced growth rates and increased mortality rates. Impacts may also arise from natural disturbances, including fires, forest insect outbreaks, and diseases (Metsaranta et al. 2011; Kurz et al. 2008; Wood 2011). Information on changes in stand dynamics and productivity (Hember et al. 2012; Peng et al. 2013) changes in disturbance regimes (Haughian et al. 2012), and shifts in environmental envelopes due to climate change (Haman and Wang

2012) and past analyses of vulnerability to climate change<sup>1</sup> can all contribute to an assessment of the vulnerability of BC forest ecosystems to climate change. Climate change impacts are expected to extend beyond forest ecosystems into the forest sector. For example, where climate change impacts increase the amount of dead or dying trees, increased salvage logging or reductions in allowable harvest of green timber may also affect the forest sector by altering the amount and composition of available harvest (e.g., Dymond et al. 2010) and thus the amount of carbon available to add to harvested wood products.

One conceptual challenge will be to simplify the at-times complex analyses of ecosystem vulnerability to climate change and to extract the relevant information on the impacts of climate changes on the risks to mitigation portfolios in the forest sector. One possible simplification is to build on existing vulnerability assessments<sup>2</sup> and new research, to stratify the province into five (or more) classes of forest ecosystem response to climate change and the associated ability to remove carbon from the atmosphere. The classes could simply range from (1) strong negative impacts, to (2) negative impacts, (3) neutral, (4) positive impacts, and (5) strong positive impacts. Criteria for such an assessment of the climate change induced risks to the success of mitigation portfolios will need to be developed. Improved understanding of the key processes that drive negative and positive forest responses to environmental change can then support the design of mitigation portfolios and the available options to adapt to climate change impacts.

The specific question is how mitigation portfolios will have to be customised to reduce the risk of failure and to cope with the anticipated ecosystem responses. For example, in regions with anticipated strong negative impacts, salvage logging of dead and dying timber, fire protection and other activities may initially be more effective at reducing GHG emissions than measures aimed at enhancing forest carbon sinks through silvicultural or other management activities, though such activities could later be important to establish a new forest after disturbance. In contrast, in regions where a strong positive response to climate change is anticipated mitigation activities that focus on enhancing tree growth may be identified. Knowledge of species and provenance vulnerabilities to drought and the velocity of environmental changes can help inform the design of climate change mitigation options and adapt these to the risks of climate change impacts.

The approach to addressing this theme will involve enhancing the ability of existing models of forest dynamics to account for and represent responses to climate change. Models will then be driven with scenarios of climate changes to 2100, to quantify changes in forest dynamics, the associated changes in carbon budgets and the interactions among climate change impacts and forest management mitigation activities. Identifying the synergies between climate change adaptation and climate change mitigation will also be required, but the focus of this analysis is foremost on strategies that will reduce emissions and increase sinks, relative to a baseline that can also include responses to climate change impacts.

Climate change forecasts and anticipated responses of ecosystems remain highly uncertain. Analyses of mitigation options therefore will also need to consider how these uncertainties can be addressed in the

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<sup>1</sup> [http://www.for.gov.bc.ca/hfp/future\\_forests/council/index.htm#completed-projects](http://www.for.gov.bc.ca/hfp/future_forests/council/index.htm#completed-projects)

[http://www.ccfm.org/pdf/TreeSpecies\\_web\\_e.pdf](http://www.ccfm.org/pdf/TreeSpecies_web_e.pdf)

<sup>2</sup> Morgan and Daust, undated, A Climate Change Vulnerability Assessment for British Columbia's Managed Forests; [http://www.for.gov.bc.ca/hfp/future\\_forests/council/](http://www.for.gov.bc.ca/hfp/future_forests/council/)

design, evaluation and implementation of mitigation portfolios. For example, the likelihood of success in achieving mitigation objectives in a changing environment could be an important factor in the selection of mitigation options.

### **Theme 3: Design and evaluation of policies, institutional and financing options for forest carbon mitigation**

Theme 3 addresses policy and institutional issues that will support the implementation of mitigation portfolios in BC's forest sector. Theme 3 will be initiated at the same time as the other two themes and will contribute through stakeholder engagement to the design of potential mitigation options.

Understanding the biophysical and economic dimensions (Theme 1) and the interactions with climate change and the resulting risks to mitigation portfolios (Theme 2) is necessary but not sufficient to implement mitigation portfolios. The successful implementation also requires sustained public and political support, institutional arrangements that enable the implementation of mitigation actions, and financing mechanisms that provide the required resources.

Approaches to addressing Theme 3 will include assessing current policies in BC and best practices elsewhere. These will be summarised in a "Primer on forest sector policies to mitigate climate change within the framework of BC climate policies" (such as carbon tax and other government policies). This theme will also discuss barriers and constraints that could limit the implementation of mitigation activities, for example, existing policies and regulations.

Building public and other stakeholder support for climate change mitigation portfolios in BC's forest sector can also be supported through communication and engagement activities. One such activity discussed at the workshop is the creation (with engagement of experts in Themes 1 and 2) and communication of a vision of how the forest sector in a low-carbon economy could function.

Articulating a future vision of how sustainable forest management and afforestation can meet society's demands for timber, fibre and energy, while also contributing to climate change mitigation objectives could be a powerful tool to engage the public and other stakeholders. Information from such a visioning exercise can also help in the design and analysis of climate change mitigation portfolios. For example, at present the amount of carbon annually harvested in BC averages 18 megatonnes (Mt) C per year (or about 60 Mt CO<sub>2</sub>) and contains slightly less carbon than the amount of CO<sub>2</sub> in the emissions from all other sectors. Under past GHG reporting guidelines, all C removed from the forest was deemed emitted to the atmosphere (i.e. instant oxidation) at the time of harvest. These reporting rules removed incentives to prolong carbon storage in HWP. New GHG reporting guidelines allow for the reporting of carbon retention in HWP and increasing carbon storage through the production and use of long-lived HWP has been shown to contribute to climate change mitigation objectives (Smyth et al. 2014).

Theme 3 will also address policy instruments (e.g. carbon tax, financing, etc.) for the implementation and financing of forest sector mitigation options, including criteria for how well instruments could perform. This could include a scan of best practices in other jurisdictions.

## Cross-cutting Activities

In addition to the priority themes, workshop participants identified cross-cutting activities that should be considered during the project.

### Credibility

Public support for policies and investments aimed at enhancing the contribution of BC's forest sector to climate change mitigation requires that the proposed actions are perceived to be credible. This means that they contribute to achieving genuine reductions in net emissions to the atmosphere and are not based on accounting artefacts that may result from the inappropriate use or definition of baselines. Because the mitigation benefits of activities are evaluated as the change in emissions relative to a reference or base-case of emissions in the absence of the mitigation activity (Lemprière et al. 2013), the definition of the reference level or base-case can influence the perception of credibility of such mitigation actions.

Thus one cross-cutting question in all three themes will be to understand what criteria the public and stakeholders use to determine the credibility of proposed mitigation analyses. While this is a research focus of Theme 3, the results have implications for the design and evaluation of mitigation portfolios in Themes 1 and 2.

### Implications of accounting rules

A secondary technical issue will be the transition from the current practice of listing the GHG contributions of BC forests as a memo-item in the provincial GHG emissions inventory. If forest sector contributions to climate change mitigation are to be counted towards GHG emissions reductions targets, then forest sector emissions have to be included in the main GHG inventory. Under the rules for the second commitment period (2013-2020) of the Kyoto Protocol accounting for emissions and removals associated with forest management has become mandatory. Although Canada has withdrawn from the Kyoto Protocol, it is still planning to account for managed forests using a reference level approach (Government of Canada 2013). It can be anticipated that future international climate change agreements will continue to include mandatory accounting of GHG emissions associated with forest management, and it is anticipated that Canada will develop a post-2020 reference level as part of its participation in international negotiations on a climate change agreement (Government of Canada 2013).

Options for the inclusion of GHG emissions from the forest sector in BC's GHG inventory need to be explored and the implications of the addition of the forest emissions and removals to future targets need to be quantified. To establish credibility of forest sector mitigation portfolios, the benefits of the use of forest products to sequester carbon in HWP and to off-set emissions in other sectors, including fossil fuels, can only be accounted if the associated carbon costs—i.e. the reduction of carbon stocks in

forest ecosystems—are also fully accounted. The emissions associated with the transportation and manufacturing of wood products are included in federal and provincial GHG emission reporting.

## **Communication and outreach**

Development of publically supported climate change mitigation options in BC's forest sector will require education and dialogue with the public and stakeholders in land management. This project can play an important role in this process by developing outreach and background material (e.g. White Papers, seminars, web-based information) and by engaging the public in a visioning exercise about the potential future role of forests in a low-carbon economy.

## **Integration with the other four research foci of PICS**

Some research questions in the PICS forest sector initiative are closely linked to questions in the other four research foci and the Project Advisory Panel will coordinate and ensure linkages with other PICS research. For example, questions in the energy portfolio about the role of renewable energy sources and their use in industry and communities are closely linked to the availability of biomass resources in the forest sector. Improvements in the housing sector can also involve forest sector resources both in construction and heating. Close integration of PICS research programs will therefore be required to avoid double-counting or competing uses of the same limited resources derived from BC's forest sector.

## **Next Steps**

### **Research team and roles**

Workshop participants did not discuss the specifics of the research team but will continue to develop details of the team and the workplan.

### **The Advisory Panel**

PICS projects also require an Advisory Panel which will be comprised of the Executive Director of PICS or his/her designate, an appointee from the BC Climate Action Secretariat, and two to three other experts from the NGO, business and academic communities who are familiar with the area of research but are not directly involved in the project.

## **Anticipated Output and Knowledge Mobilization**

While the details of the project outputs have not been finalised and will depend on available resources, examples of the types of outputs and project results can include:

- Background papers and primers;
- Visioning exercise, assessment of stakeholder preferences and choices, and associated communication materials;
- Workshops and other forms of stakeholder engagement;
- Quantitative descriptions of mitigation portfolios, including multivariate analyses of costs and benefits (carbon, financial costs, employment, etc.) (Theme 1);
- Vulnerability assessment and implications of climate change impacts on mitigation portfolio design (Theme 2);
- Design and evaluation of policies, institutional and financing options for forest carbon mitigation (Theme 3);
- A project-level summary for policy makers;
- Peer-reviewed scientific publications; and
- Reporting and presentation of results in scientific conferences and public meetings.

## **Timelines, Milestones and Budget**

Proposed project start: April 1, 2014. The project will be designed to produce solution-oriented outputs within two years.

Project progress review: First quarter of 2016, i.e. the end of the second year of the project.

April 1, 2016 and onwards: duration will depend on success achieved and remaining research questions.

The anticipated project budget could be used to fund:

- Three or four postdocs;
- Workshop(s) both scientific/technical meetings required for the analyses as well as workshops required for focus groups and stakeholder engagement;
- Support for graduate students; and/or
- possibly one (part-time?) research coordinator

Separate PICS budgets that could be leveraged:

- Budget for white papers (background) and
- Internships (up to four months).

Workplan and budget details were not discussed at the workshop and will be described elsewhere. The proposed activities will be coordinated with ongoing research in provincial, federal and university facilities.

## Acknowledgements

The report was prepared by Werner Kurz and edited by Tom Pedersen and Ami Kingdon. We thank all participants for their contributions of ideas and challenges to the discussions at the workshop. We also thank Caren Dymond and workshop participants who provided constructive comments and suggestions on a draft of the report. In addition to providing editorial assistance, Ami Kingdon skilfully compiled notes during the workshop and provided formatting expertise in the preparation of this document.

Financial support for the workshop was provided by the Pacific Institute for Climate Solutions.

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## **Appendix 1: Workshop Agenda**

### **PICS Workshop**

December 16-17, 2013, Laurel Point Inn, Victoria, BC.

#### **The potential contribution of British Columbia's forest sector to greenhouse gas emission reduction targets**

##### **AGENDA**

Day 1 – December 16, 2013

- 8:30 Registration and Coffee
- 9:00 Welcome, Introductions and Workshop Objectives (Tom Pedersen)
- 9:15 PICS Phase 2 approach and Objectives (Tom Pedersen)
- 9:30 The Challenge: BC's GHG emission reduction targets and information needs of the Climate Action Secretariat (James Mack, Head, Climate Action Secretariat)
- 10:00 The Setting: Forest Sector Contribution to BC's emissions budget (James Sandland, BC FLNRO)
- 10:30 Coffee/Tea Break
- 10:45 The Science: Forest Sector Mitigation Options (Werner Kurz, CFS)
- 11:30 Questions and Discussion
- 12:00 Lunch
- 13:00 Roundtable (5 min max per person) of current research activities relevant to this project
- 14:00 Discussion of Key Issues and Questions
- 15:00 Coffee/Tea Break
- 15:15 Discussion of elements of an Analytical Framework, scope, and key indicators.
- 16:15 Summary of Day 1
- 16:30 Adjourn
- 18:00 Group Dinner at Laurel Point Inn.

**Day 2 – December 17, 2013**

- 8:30 Registration and Coffee
- 9:00 Summary of Day 1 (Tom Pedersen and Werner Kurz)
- 9:15 Outline of Research Agenda
- 10:30 Coffee/Tea Break
- 10:45 Key participants and their potential roles
- 12:00 Lunch
- 13:00 Priorities and Preparation of Project Terms of Reference
- 14:00 Elements of workplan, key activities and timelines
- 15:00 Coffee/Tea Break
- 15:15 Resource Requirements
- 16:00 Meeting Summary and Next Steps
- 16:30 Adjourn

## Appendix 2: Workshop Participants\*

Kurz	Werner	Canadian Forest Service (Co-chair)
Pedersen	Thomas	Pacific Institute for Climate Solutions, University of Victoria, (Co-chair)
Arora	Vivek	Environment Canada
Coops	Nicholas	University of British Columbia
Fletcher	Christine	Ministry of Forests, Lands, and Natural Resource Operations
Fredeen	Art	University of Northern British Columbia
Hember	Robert	University of British Columbia
Hoberg	George	University of British Columbia
Lemprière	Tony	Canadian Forest Service
Li	Qinglin	Ministry of Forests, Lands, and Natural Resource Operations
Mack	James	Climate Action Secretariat
Paradine	Dennis	Ministry of Environment
Smyth	Carolyn	Canadian Forest Service
Spittlehouse	Dave	Ministry of Forests, Lands, and Natural Resource Operations
Wang	Tongli	University of British Columbia
White	Thomas	Climate Action Secretariat

\* This list does not include several experts who have been invited but were unable to attend.