

CAPITALIZING ON CANADA'S "GREEN ADVANTAGE": LEGAL AND REGULATORY COMPONENTS OF BIOSPHERE GREENHOUSE GAS MANAGEMENT

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Introduction

Biosphere greenhouse gas (GHG) management is a three-pronged climate change strategy that involves increasing carbon sequestration through biological sinks, preserving existing stores of terrestrial carbon, and producing biomass as a substitute for fossil fuel and for products – like cement and steel – that are GHG intensive. Canada's large areas of agricultural and forested land provide significant scope for biosphere GHG management – which has been characterized as our "green advantage" in combating anthropogenic climate change.¹

As Canada moves towards ratification of the Kyoto Protocol, domestic strategies to reduce net GHG emissions will receive increasing attention. Biosphere GHG management is one climate change strategy for which significant work on implementation is required. This article outlines the context for this work and considers its legal and regulatory components.²

The article begins by briefly describing the rationale for biosphere GHG management and the emerging international legal regime. References to biosphere GHG management in recent federal and Alberta policy papers on climate change are then noted. Finally, the article highlights four areas where legal and regulatory measures have a role to play in making biosphere GHG management a reality in Canada.

The Rationale for Biosphere GHG Management

Managing biotic carbon makes sense for several reasons. Globally, deforestation and agricultural practices were responsible for approximately 33% of anthropogenic GHG emissions between 1850 and 1998.³ Measures to retain carbon stored in forests, grasslands and agricultural soil could reduce GHG emissions and slow the rate of climate change.

The protection and enhancement of carbon sinks could also offset emissions from other sources because the terrestrial biosphere has significant unused capacity to sequester atmospheric carbon.⁴ While this capacity is not infinite, carbon sequestration could 'buy time' during the transition from current technology and capital stock to energy sources and production processes that are less GHG intensive.

Finally, sustainable biomass production can yield bioenergy and other products with almost no net GHG emissions when measured over the full harvest cycle.⁵ Biomass can thus displace fossil fuel and produce energy through a "closed carbon cycle".⁶

Biosphere GHG management is also attractive because of its collateral benefits.⁷ Preserving and enhancing forest sinks, for example, can increase habitat and biodiversity, improve flow regulation in watersheds, and reduce soil erosion. Conservation tillage can increase moisture retention in agricultural soil and reduce erosion and the use of





chemical fertilizers. Biomass production could lessen pressures on old-growth forests by providing an alternative source of fibre. Biosphere GHG management can be consistent with a range of recreational and aesthetic values and could be integrated with other initiatives to promote the sustainable use of forest and grassland ecosystems.

Although biosphere GHG management has obvious potential as a climate change strategy, it is not a panacea. Fossil fuel combustion is the driving force behind anthropogenic climate change because, in addition to its direct impact on atmospheric GHG concentrations, it increases the total carbon load in active circulation within the global carbon cycle.

Massive anthropogenic injections of previously isolated fossil carbon will ultimately increase atmospheric GHG concentrations, regardless of the mitigation achieved through carbon sinks.⁸ Biomass production could reduce GHG emissions directly, but cannot by itself meet current energy demand. Other sources of renewable energy (e.g., wind, solar and geothermal power), efficiency gains, and technological breakthroughs (e.g., hydrogen fuel cells) will be needed to reduce dependence on energy from fossil carbon.

The appropriateness of biosphere GHG management as a climate change strategy has been the subject of considerable controversy, in part because of concerns that it will divert attention from the pressing need to reduce fossil carbon emissions directly.⁹ Scientific, technical and policy issues – particularly related to the use of sinks-based offsets when calculating net GHG emissions – have been also been raised in relation to

the so-called 'land use, land-use change and forestry' (LULUCF) provisions of the Kyoto Protocol.¹⁰ These complex issues have led to protracted international negotiations. There are indications, however, that a measure of international consensus is emerging and that domestic implementation of biosphere GHG management will therefore begin to receive more attention.

The Emerging International Regime

The Framework Convention on Climate Change¹¹ (FCCC) is the foundation for international efforts to address global warming. Its objective is to stabilize atmospheric GHG concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system".¹² To achieve this objective, the parties have agreed to reduce GHG emissions and to protect and enhance carbon sinks and reservoirs.¹³

The Kyoto Protocol is intended to give effect to the FCCC by specifying limits for net GHG emissions from Annex 1 countries (i.e., developed countries and countries in transition to market economies). It also elaborates on principles and mechanisms for the international climate change regime. Two provisions are particularly relevant to the use of biosphere GHG management within Annex 1 countries such as Canada.

Article 3.3 states that carbon sources and sinks that are directly attributable to human-induced afforestation, reforestation and deforestation since 1990 must be included when calculating net GHG

RÉSUMÉ

L'annonce par le Canada de son intention de ratifier le Protocole de Kyoto se traduira par un sucroît d'attention pour les stratégies de réduction des émissions nettes de gaz à effet de serre. La gestion des gaz à effet de serre par des mécanismes biologiques est une stratégie sur trois fronts visant à augmenter la séquestration du carbone par des puits biologiques, à préserver les stocks de carbone terrestre, et à produire de la biomasse pour remplacer les combustibles fossiles. Cet article explique brièvement pourquoi la gestion des gaz à effet de serre par des mécanismes biologiques est justifiée et décrit l'émergence d'un régime juridique international. La place qu'occupe cette stratégie parmi les récents énoncés de politiques du gouvernement fédéral et du gouvernement de l'Alberta est ensuite notée. Enfin, l'auteur suggère quatre façons dont l'adoption de mesures juridiques et réglementaires faciliterait la mise en oeuvre de la gestion des gaz à effet de serre par des mécanismes biologiques.



emissions. Article 3.4 provides the basis for an expanded list of LULUCF activities for which emissions credits (or debits) would be allocated. Both articles refer to transparency and verifiability in relation to terrestrial sinks and sources.

While these provisions have been the subject of difficult negotiations, progress on key definitions and on the rules governing their application was achieved in 2001 at the seventh conference of the parties (COP 7) in Marrakesh.¹⁴ The international parameters for domestic implementation of biosphere GHG management are therefore becoming clearer. Furthermore, progress at the international level suggests that biosphere GHG management will remain on the table in climate change negotiations regardless of whether or not the Kyoto Protocol receives the ratifications necessary to enter into force.¹⁵

“Canada’s Contribution” – The Federal Discussion Paper

Canada has actively promoted a flexible and expansive approach to sinks-based emissions offsets in international climate change negotiations. This approach is consistent with the federal government’s strategic objectives, which are shaped by high per capita energy consumption, significant economic reliance on energy production and exports, and a comparative advantage in managing biotic carbon. Canadian negotiators claim some success in achieving international rules that reflect Canada’s position.¹⁶

The federal government’s recent discussion paper on climate change strategies includes “targeted measures” to support biosphere GHG management in agriculture and forestry among the options under consideration.¹⁷ In particular, incentives are proposed to promote nutrient management, conservation tillage and reduced summer fallow, grazing management, and the establishment of fast-growing plantations.¹⁸ The paper also refers to the substitution of biomass for fossil fuel, stating that “Greater use of biomass ethanol in our gasoline not only means less CO₂ in our atmosphere, but a new source of income for farmers.”¹⁹

An emissions trading system that includes sinks-based GHG offsets is another key option in the federal package. This mechanism is seen as reducing the need for “costly targeted measures” by allowing “the

power of the market to find the least-costly emissions reductions”.²⁰ The discussion paper notes, however, that promoting LULUCF activities through targeted incentives could also generate offsets for emissions trading.²¹

On the subject of collateral benefits, the federal paper states that the choice of targeted measures should “deliberately take into account the extent to which such measures could help achieve other economic, social and environmental goals (e.g., sustainable development in the agricultural and forestry sectors, cleaner and more livable cities and cleaner air).”²² It also notes that the cost-effectiveness of purchasing GHG credits in the international market should be weighed against the resulting “loss of co-benefits such as cleaner air and domestic investment in state-of-the-art technologies”.²³ Collateral benefits are therefore an important part of the rationale for promoting biosphere GHG management within Canada.

Alberta’s “Plan for Action”

The Alberta government has also released a draft plan for addressing climate change. Intended as “a practical alternative to the Kyoto Protocol”,²⁴ Alberta’s plan includes biosphere GHG management as one of eight areas for action. Reduced or zero till farming, comprehensive nutrient management, reduced summer fallow, the development of bioenergy sources, and carbon sequestration in forests are identified as components of this strategy.²⁵ The draft plan notes that sustainable management practices in these areas will benefit not only the environment, but also the agriculture and forestry sectors. Sinks-based offsets are linked with emissions trading as part of the overall strategy.²⁶

Alberta’s draft plan also highlights some obstacles to biosphere GHG management and suggests, in general terms, how they might be addressed. For example, it states that while agricultural and forestry sinks are recognized as a cost-effective means for major GHG sources to meet anticipated regulatory requirements to reduce emissions, “there is currently reluctance to engage in emissions credit trading until a regulatory framework establishes the rules for a trading system.”²⁷ The draft plan also underlines the need for clear policy direction on issues such as ownership of sequestered carbon, regulatory implications of biosphere GHG management for agriculture and forestry, credit for early action, and liability in the event that carbon from sequestration





projects is released prematurely.²⁸

While the draft plan contains few details on how to proceed, it does identify the following as priority areas for action:²⁹

- Exploration of the use of biological sinks as part of Alberta's climate change strategy, including the potential for incentives and market-based instruments to promote carbon sequestration;
- Development of a policy statement on the ownership of sequestered carbon;
- Establishment of a provincial GHG emissions trading framework, including specific criteria for the application of sinks credits to current offset obligations for new thermal power plants and rules for the monitoring, measurement and verification of carbon sequestration and for the registration and tracking of projects; and
- Development of measures to address permanence and liability issues, including mechanisms for determining liability and standard contracts to facilitate trades and minimize risks between buyers and sellers.

Alberta's draft plan thus sets out some general policy directions for biosphere GHG management within the province's broader climate change strategy. Like the federal discussion paper, it endorses the principle that efforts to address climate change should focus, to the extent possible, on domestic measures, rather than devoting resources primarily to the purchase of international emissions credits.³⁰

The Role for Legal and Regulatory Initiatives

The federal discussion paper and Alberta's draft plan signal the intention of these governments to promote biosphere GHG management. However, the precise means for achieving this objective remain to be determined. Implementation of biosphere GHG management is likely to involve a mix of targeted incentives, market mechanisms and other measures. The rest of this article argues that legal and regulatory initiatives in four key areas are essential components of this implementation package.

(1) Credible Credits

Project failure and leakage give rise to the first set of issues that could be addressed through the legal and

regulatory components of biosphere GHG management. Project failure occurs when carbon sequestered through LULUCF activities is released prematurely to the atmosphere by natural or anthropogenic events. Leakage is a problem when the protection or enhancement of carbon stores in one area results in increased GHG-emitting activities elsewhere.

The credibility of carbon sequestration as a climate change strategy depends on effective measures to reduce the risk of GHG emissions due to project failure and leakage. Investment in carbon sequestration will also be hindered if these risks cannot be effectively managed for individual projects. When emissions of this type do occur, they must be included in carbon accounting when calculating offsets at the project level and net GHG emissions at the national level.

The report of the Intergovernmental Panel on Climate Change (IPCC) on *Land Use, Land-Use Change, and Forestry* (hereinafter IPCC Report) considers various sources of project failure.³¹ In addition to events such as fire, drought and pests, it identifies political, economic, financial, institutional, and market risks. Non-enforcement of contracts, the failure to honour guarantees, changes in the fiscal and policy environment, expropriation, and the adoption of land-use practices that are inconsistent with carbon management goals can all result in the failure of LULUCF projects.

The IPCC Report also notes that leakage can occur through a variety of mechanisms.³² For example, preserving terrestrial carbon stores by establishing protected areas may shift activities such as logging and the conversion of forested land to other uses into other regions. The effects of LULUCF projects on commodity prices and investment flows can also result in leakage.

Options for addressing project failure and leakage include improved project design, more sophisticated carbon accounting (e.g., discounting sequestered carbon or applying a tonne-year formula for accruing credits), and the use of risk mitigation mechanisms such as insurance and the pooling and diversification of sinks-based offsets.³³ Accurate monitoring and verification are also essential, a point underlined by both the federal³⁴ and Alberta³⁵ governments. Legal and regulatory measures could play a role in implementing all of these options. In particular, they could address many of the political and institutional



risks identified in the IPCC Report, support risk mitigation mechanisms, and reinforce the use of monitoring and verification to guarantee the integrity of sinks-based offsets.

The legal and regulatory response to leakage from LULUCF projects could also extend to broader aspects of land-use and resource management. The IPCC Report comments that “Program-level actions are generally much less prone to leakage than narrow projects that are tightly circumscribed in space, time and subject matter.”³⁶ For example, “broad policy initiatives are more likely to influence deforestation rates than are direct actions of limited scope.”³⁷ Commentators have also argued that the underlying causes of leakage should be addressed through land-use planning and zoning, regulation, financial incentives, socio-economic initiatives, and other measures designed to influence patterns of land and resource use.³⁸

(2) Preconditions for Investment and Emissions Trading

The establishment of well-defined property rights and effective contractual mechanisms is a second area where legal and regulatory measures could support biosphere GHG management. Secure legal underpinnings for LULUCF projects are essential if the stimulus for investment in carbon sequestration is to come in large part from market mechanisms. The Alberta government’s draft plan³⁹ and recent commentary in the newsletter of Alberta’s Climate Change Central⁴⁰ have underlined the need for clear rules regarding ownership of carbon rights and associated emissions credits.

Various legal mechanisms could be used to establish secure and transferable rights in sequestration potential and sequestered carbon.⁴¹ Property law could be adapted to create legal interests in carbon sinks and reservoirs. For example, carbon rights could be defined through easements that ‘run with the land’ and thereby bind subsequent purchasers. Contractual mechanisms will also have a role to play in the creation and transfer of sequestration rights.

Given the importance of protecting terrestrial carbon, rights to sequestration potential and carbon stores will have important implications for other owners and users of the land and resources in question. Injunctions may be necessary to block inconsistent land uses and rules could be established to determine

liability for the premature release of terrestrial carbon. A regulatory backstop for rights in sequestered carbon could also enhance their security.

One legal model is the *Carbon Rights Legislation Amendment Act*, enacted by the Australian state of New South Wales in 1998.⁴² This legislation amended forestry and property law in order to establish transferable property rights in carbon sequestration from existing or future trees or forests. These rights attach to the land, making them enforceable against subsequent purchasers. The rights holder is entitled to the benefits from carbon sequestration and can protect his or her interest through a legally enforceable forestry covenant.

Canadian jurisdictions have yet to develop this type legislative framework for LULUCF projects. In its absence, uncertainty regarding the security and transferability of carbon rights will be a major impediment to investment in biosphere GHG management.

(3) Land-use Conflicts and Environmental Risks

The relationship of LULUCF activities to other land and resource uses is a third area where legal and regulatory measures are needed to support biosphere GHG management. As noted in the IPCC Report:

“The use of land to hold stocks of carbon and to provide energy as a substitute for fossil fuels adds to the existing primary uses of land for agriculture, forestry, settlements, recreation and conservation. The competition for land among these uses will partly determine the extent to which land can be used to reduce greenhouse gas concentrations”⁴³

Significant land-use conflicts are already emerging in regions where the land and resource base is heavily allocated to industrial users and other interests.

In Alberta, for example, rapid expansion of the oil and gas industry has major implications for forestry operations.⁴⁴ These two sectors, however, operate under different rights issuance, planning and regulatory regimes. Lack of integration between these regimes is a major impediment to managing cumulative environmental effects and to setting and meeting landscape-level objectives. This situation will be further complicated if biosphere GHG management is added to the multiple-use mix.





Biosphere GHG management may also encounter obstacles within the regulatory regimes governing existing land and resource uses. The forest management practices – including minimum cut requirements – that are prescribed in legislation and forest management agreements may, for example, be inconsistent with the preservation and enhancement of terrestrial carbon stores.

There is potential as well for conflict between LULUCF projects and environmental values. For example, replacing natural forests or grasslands with monoculture plantations could reduce wildlife habitat and biodiversity. Regulatory mechanisms could be used to establish criteria and review processes for sequestration projects in order to minimize risks of environmental harm.

Biosphere GHG management in Canada will occur on a crowded landscape. Existing land and resource uses are shaped by complex legal, institutional and policy arrangements. Ensuring that these arrangements accommodate and support LULUCF projects will therefore require innovative legal and regulatory measures.

(4) Collateral Benefits

The final set of legal and regulatory issues concerns the incorporation of collateral benefits into decision-making. Since the value of emissions credits may not reflect the important public goods and environmental services – such as biodiversity, erosion control and watershed flow regulation – that are produced by LULUCF projects, the market for these credits may not yield the socially desirable level of investment in biosphere GHG management.

While incentives appear to be the preferred policy instrument in the federal government's discussion of "targeted measures" for biosphere GHG management,⁴⁵ other mechanisms could be used to correct market failures that result in the under-provision of public goods. For example, government could provide these goods directly or enact regulatory requirements to ensure their provision.

Conclusion

Biosphere GHG management will be shaped by the emerging international legal regime and by scientific and technological advances. It will also be guided by

the legal and policy measures adopted by national and subnational governments. Effort will be required in all of these areas in order to manage biotic carbon effectively within a broader climate change strategy.

Canada is an active participant in international climate change negotiations and Canadian scientists are currently investigating a range of questions related to the global carbon cycle, carbon sequestration, and the sustainable use of biomass.⁴⁶ The federal and Alberta governments have both included biosphere GHG management among the options under consideration. Some policy analysis of this option has also been undertaken,⁴⁷ but little attention has been paid to its legal and regulatory components. Progress in this area is essential if biosphere GHG management is to achieve its potential as a significant element of Canada's climate change strategy and as a source of important collateral benefits for Canadians.

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Notes

1. See the web site of BIOCAP Canada: www.biocap.ca.
2. Some of the issues that are touched on in this article are examined in more detail in a paper entitled "National Policies for Biosphere Greenhouse Gas Management: Issues and Opportunities", forthcoming in the journal *Environmental Management*.
3. Intergovernmental Panel on Climate Change (IPCC), *Land Use, Land-Use Change, and Forestry* (Cambridge, U.K.: Cambridge University Press, 2000) at 4 (hereinafter IPCC Report).
4. *Ibid.*, at 41.
5. *Ibid.*, at 46.
6. *Ibid.*, at 227.
7. *Ibid.*, at 105-118.
8. Bernhard Schlamadinger & Gregg Marland, *Land Use & Global Climate Change: Forests, Land Management and the Kyoto Protocol*, Prepared for the Pew Center on Global Climate Change, June 2000, at 10 (available at www.pewclimate.org).
9. See, for example: Chris Rolf, *Turning Down the Heat: Emissions Trading and Canadian*



- Implementation of the Kyoto Protocol* (Vancouver: West Coast Environmental Law Research Foundation, 1998) at 335-336; Paige Brown, *Climate, Biodiversity, and Forests: Issues and Opportunities Emerging from the Kyoto Protocol* (Washington, D.C.: World Resources Institute, 1998) at 9.
10. Kyoto Protocol to the United Nations Framework Convention on Climate Change, 10 December 1997, UNFCCC COP, 3d Sess., UN Doc. FCCC/CP/1997/L.7/Add.1, 37 I.L.M. 22.
 11. *United Nations Framework Convention on Climate Change*, (1992) 31 I.L.M. 849.
 12. *Ibid.*, article 2.
 13. *Ibid.*, article 4.1 (c), (d).
 14. United Nations Framework Convention on Climate Change, Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001, addendum, Part Two: Action Taken by the Conference of the Parties, Volume 1, FCCP/CP/2001/13/Add.1 (21 January 2001) at 54-63. (Decision 11/CP.1, "Land use, land-use change and forestry").
 15. Schlamadinger & Marland, *supra* note 8 at 48-49.
 16. Government of Canada, *A Discussion Paper on Canada's Contribution to Addressing Climate Change* (2002) at 5 (available at www.climate-change.gc.ca).
 17. *Ibid.*, at 29
 18. *Ibid.*, at 52.
 19. *Ibid.*, at 17.
 20. *Ibid.*, at 33.
 21. *Ibid.*, at 52.
 22. *Ibid.*, at 34, 26.
 23. *Ibid.*, at 19.
 24. Government of Alberta, *Albertans & Climate Change: A Plan for Action* (2002) at 2 (available at www3.gov.ab.ca/env/climate/actionplan/docs/actionplan.pdf).
 25. *Ibid.*, at 23.
 26. *Ibid.*, at 24.
 27. *Ibid.*, at 23.
 28. *Ibid.*, at 24.
 29. *Ibid.*, at 24-25
 30. *Ibid.*, at 2.
 31. IPCC Report, *supra* note 3 at 315.
 32. *Ibid.*, at 308-309.
 33. *Ibid.*, at 310-314, 316.
 34. Government of Canada, *supra* note 16 at 29, 52.
 35. Government of Alberta, *supra* note 24 at 23, 25.
 36. IPCC Report, *supra* note 3 at 84.
 37. *Ibid.*, at 84.
 38. See, for example, Brown, *supra* note 9 at 24, 28.
 39. Government of Alberta, *supra* note 24 at 5.
 40. *C3 Views*, Climate Change Central Newsletter (Issue 3, April 2002) at 1, 4-5 (available at www.climatechangecentral.com).
 41. See, K.L. Rosenbaum, "Climate Change and the Forestry Sector: Possible Legislative Responses for National and Subnational Governments", United Nations Food and Agriculture Organization (FAO), FAO Legal Papers Online #14 (March 2001) at 27 (available at: www.fao.org/Legal/default.htm).
 42. Information on the *Carbon Rights Legislation Amendment Act* 1998 is available at www.forest.nsw.gov.au/carbon/legislation/default.asp.
 43. IPCC Report, *supra* note 3 at 46.
 44. Monique M. Ross, *Legal and Institutional Responses to Conflicts Involving the Oil and Gas and Forestry Sectors*, CIRL Occasional Paper #10 (Calgary: Canadian Institute of Resources Law, January 2002).
 45. Government of Canada, *supra* note 16 at 52.
 46. See, for example, the research program of the BIOCAP Canada Foundation, *supra* note 1.
 47. National Climate Change Process (NCCP), *Sinks Table Options Paper: Land-Use, Land-Use Change and Forestry in Canada and the Kyoto Protocol* (September 23, 1999) (available at www.nccp.ca/html/tables/pdf/options/Sinks_OR-Sep-23-1999_en.pdf).



HUMAN RIGHTS AND RESOURCE DEVELOPMENT IN ALBERTA: A WORKSHOP – OCTOBER 4 AND 5, 2002

The Canadian Institute of Resources Law and the Alberta Civil Liberties Research Centre will hold a two-day workshop to consider issues related to human rights in the context of resource development. The workshop will take place on October 4-5, 2002 at the University of Calgary in Calgary, Alberta.

The objectives of this workshop are two-fold. First, the workshop will explore the legal bases for defining health and cultural impacts of resource development as human rights issues. Second, the workshop will consider the opportunities for advancing human rights-based claims in the resource development process in Alberta.

The workshop will examine the legal foundation (in domestic and international law) for such human rights as the right to health, the right to a clean and healthy environment and the right to cultural integrity. Using a case study to illustrate how issues of health and culture can arise in connection with oil and gas development in Alberta, the workshop will discuss how human rights-based claims could be advanced in the resource development process. Along with legal remedies, the workshop will explore non-legal solutions (such as corporate social responsibility) for addressing human rights concerns in resource development.

Speakers include: Danielle Brezina, David Corry, Gary Dickson, Q.C., Jim Hope-Ross, Elaine Hughes, Janet Keeping, Steven Kennett, Hon. Roger P. Kerans, Jennifer Koshan, Linda McKay-Panos, Andrew Nikiforuk, Ciaran O'Faircheallaigh, Monique Ross, Richard Schneider, Richard Secord, Sharon Venne, Nickie Vlavianos, Michael Wenig, and Nettie Wiebe.

If you would like to receive more detailed information about this Workshop, either visit CIRL's website at www.cirl.ca or contact Pat Albrecht at telephone 403.220.3974, fax 403.282.6182 or e-mail palbrech@ucalgary.ca.

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