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The Impact of Bioenergy and Biofuel Policies on Employment in Canada

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Abstract

Environmental policy, particularly written to deal with climate change and the related issue of renewable or clean energy production, has the potential to change the capacity of businesses, states, and other organizations to provide employment opportunities. This paper reviews the development of environmental policy in Canada at the federal level as well as in two provinces (Ontario and British Columbia). Key policies include the Canadian renewable fuel standard (included in Bill C-30, the Clean Air Act of 2007) as well as Ontario's Green Energy Act (Ontario Bill 150) and British Columbia's Bioenergy Strategy. Our methodology describes employment associated with the bioenergy and biofuel sectors as concentric circles ranging from direct through indirect and temporary jobs, and describes forthcoming survey analyses that aim to quantify the impact that these policies have had on employment opportunities. We situate our findings within the context of an ambiguous climate or energy strategy at the national level, and discuss what may be at stake when labour issues are excluded from climate policy debates. The paper looks critically upon the strategic "greening" of economies, jobs and governance in Canada, while providing recommendations for future iterations of policy at the federal and provincial levels.

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Introduction

The production of bioenergy - renewable heat, electricity and fuel from biomass - is one component of the emerging Canadian renewable energy portfolio. As with most forms of renewable energy generation, bioenergy production in Canada is largely driven by policy which is designed to meet a series of economic, ecological and social goals. In Canadian policy, the primary goals for bioenergy and biofuel development include rural economic diversification and employment, greenhouse gas emission reductions, and energy security. Arguably, bioenergy and biofuels can make their best claim for success in the first area, as production levels have remained relatively small and thus their ability to contribute meaningfully to GHG emission reduction or to energy security is limited.

There is a strong imperative for developing bioenergy and biofuels, particularly in the forest sector. A long-term downward trend in the Canadian forest products sector has only been made worse by the continuing economic turmoil faced by global markets. In recent years, more than 50% of the pulp and paper capacity in Ontario has been lost, due to competition and ageing infrastructure (Mabee and Mirck 2011). Only three mills currently operate, and those on lowered production schedules. Similar stories can be told in British Columbia and Quebec, and there is a strong need for new forest products which can service growing markets, which can utilize the growing amount of wood that cannot be taken up by the existing industry.

In claiming success via the 'green' labour pool that political platforms are increasingly built upon, the tendency seems to be to define all employment in a single category - not to separate out success by the number of new or continuing, direct or indirect, temporary or permanent jobs. This study asks what 'green' policy may do in terms of addressing each of these categories, in order to better determine what future job profiles will look like in an emerging bioenergy and biofuels subsector. In 2012, a survey of experts across the field will be used to explore these issues to see how successful different policy frameworks have been in terms of enabling job prospects for Canadians in this field.

It is clear from our review that the role of employment in green energy policy is not yet widely studied (Llera Sastresa et al., 2010). In reviewing three key environmental policies in the Canadian context, it is evident that national and provincial governments aim to confront climate change, to some degree, via job creation and a 'greening' of the economy. Considering political commitments to an increase in the green-collar labour force, more detailed research is needed to accompany and substantiate these claims.

We review dimensions of the Canadian renewable fuel standard (included in Bill C-30, the Clean Air Act, 2006), and situate our findings within the context of an ambiguous climate or energy strategy at the national level. Reviewing two significant provincial policies – Ontario's Green Energy Act (Ontario Bill 150, 2009) and BC's Bioenergy Strategy (2008) we provide a more detailed analysis of a double-sided policy approach – the combined strategies of economic growth *and* greenhouse gas (GHG) reductions – at provincial levels. For each of the aforementioned policies, we ask two essential questions: What was the political **context** in which this policy was put forth, and what does its **content** tell us about how employment is understood within the greater

conditions of climate change? Ultimately, we ascertain whether the intended gains, as expressed through policy, can be advantageous *for working Canadians and the environment alike.* Have environmental policies been successful in creating the green-collar workforce that is commonly designated as the lynchpin of a sustainable economic and ecological future. It is evident that understandings of 'work', and economic development in general, will undergo forced re-conceptualizations as renewable energy regimes are established. We assess this transition within the context of the environmental policies under review.

Context and analysis of existing methodologies

We review key federal and provincial policies within the broader context of a strategic "greening" of economic infrastructures and politics that has occurred more frequently, and on a global scale, from the 1970s to the present day. Since the Stockholm Conference (UN, 1972) or the writing of the Brundtland Report (WCED, 1987), the extent to which 'eco-governance' has altered our understandings of the seemingly benign concepts of *nature* or *work,* is prodigious. Interesting lines of connection can be drawn between the rise of free trade environmentalism, the genesis of ecological modernization discourse, and the 1967-74 dollar-oil crisis. 'Green' governance has functioned inside what Mitchell (2009) terms a post-war carbon democracy, in which fossil fuels have played the pivotal role in shaping both democracy's possibilities and its limits. It is evident that the organization and control of energy has been both a determining force and a product of democratic politics, but as it enters into the political arena "carbon itself must be transformed, beginning with the work done by those who bring it out of the ground" (2009: 401). When looking closely at environmental policies in the Canadian context, and at bioenergy and biofuels policy in particular, we not only have to ask what lines of commerce (scale and scope of economies) they promote, but also how centrally we treat the role of labour as we transition to a low-carbon economy. If, as Mitchell suggests, "the democratic machineries that emerged to govern the age of carbon energy seem to be unable to address the processes that may end it," (2009: 399) radical adjustments need to be made not only to existing fossil fuel and renewable energy infrastructures, but also in systems of governance.

In general, we examine how the promotion of bioenergy or biofuel production may effectively counter climate change while still being compatible as a job-creation initiative. Such analyses have been more common in the European Union than in Canada or the United States, where renewable energy mandates have a slightly longer history (Llera Sastresa et al., 2010; Neuwahl et al., 2008; Berndes & Hansson, 2007; Ryan et. al, 2006).

There are two impediments to consider when assessing employment levels and job creation in renewable energy sectors. First, are enduring semantic difficulties: politicians, researchers and statisticians alike encounter major obstacles when trying to define (let alone agree upon) what constitutes a 'green' job (Calvert & Cohen, 2011; Schrier, 2010). Second, the existing methods used to assess the socio-economic impacts of emerging renewable energy technologies vary widely, and there is significant disparity of opinion

as to the role that employment plays. For example, Domac et al. (2005) cite job creation and economic gain as the principal driver behind bioenergy production, with other benefits (energy security, carbon reductions, environmental protection) an added bonus for local communities. While in a study of bioenergy expansion in the European Union, Berndes and Hansson (2007) conclude that "maximizing climate benefits cost- effectively is in conflict with maximizing employment creation" (Berndes & Hansson, 2007: 5965).

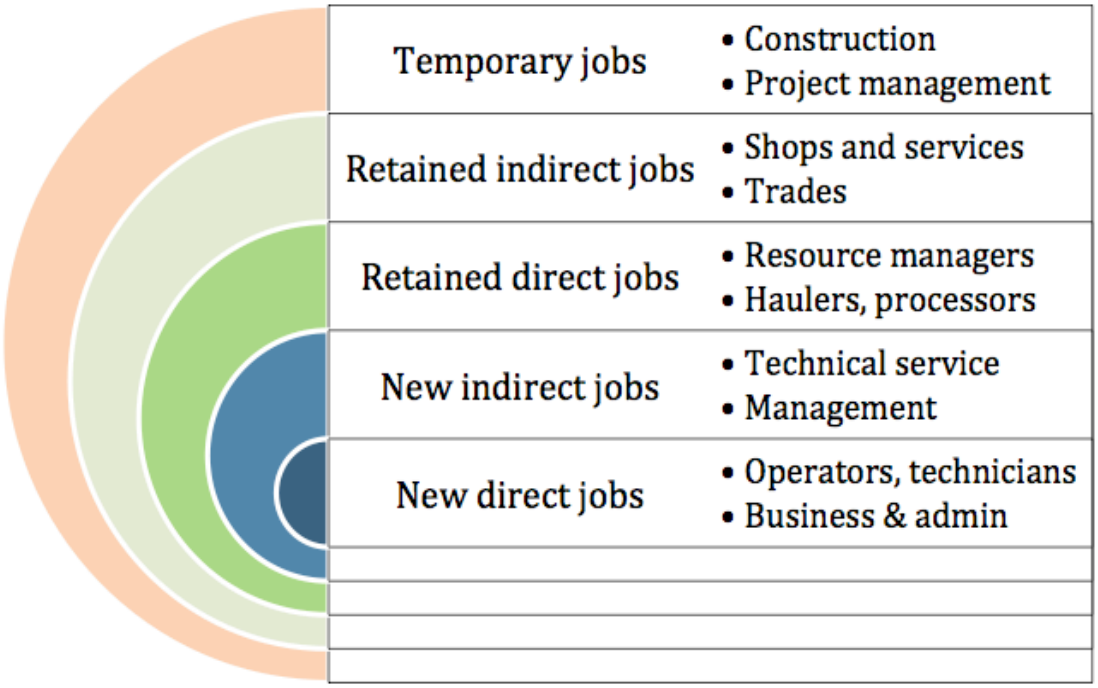
Conventional input-output models for employment associated with renewable energy projects are widespread (Neuwahl et al., 2008; Lehr et al., 2008; EREC, 2007), though there has been increasing use of integrated multi-criteria and multi-stakeholder approaches (Kowalski et al., 2009; Mendonça, Lacey, & Hvelplund, 2009; Domac, Richards, & Risovic, 2005). We find that an integrated approach aligns with the interdisciplinary and complex nature of bioenergy production, as it is situated within a policy sphere that requires dialogue across government agencies (Natural Resources Canada, Environment Canada, National Energy Board, Canadian Council of Forest Ministers, Agriculture and Agri-Food Canada) and industrial sectors (energy, forestry, agriculture and transport). Llera Sastresa et al. consider job creation as the most direct measure of socio-economic potential present in the use of renewable energy sources; they "opt for a socio-economic analysis of the impact of renewable energy with the employment factor as its starting point, as [they] consider it to be key for the development of a region and because it offers multiple connections and repercussions in all areas: social, environmental, economic, technological and territorial development." (Llera Sastresa et al., 2010: 680).

Existing methodologies vary in their classifications of employment, from a three- tiered analysis of direct, indirect, and induced employment (Pollin & Garrett-Peltier, 2009; Berndes and Hanson, 2007) to more nuanced descriptions of employment in bioenergy production, integrating multiple sources and types of jobs (i.e. induced, supply chain, direct transport, direct agricultural, direct plant) as detailed by Thornley et al. (2008). We use these concepts to suggest a new quantification of employment in Canada's bioenergy and biofuels industries, which we hope will lead to a wider understanding of the social, economic, and environmental values embedded within major policy decisions.

Methodology

Our methodology describes employment associated with the biofuel sector in national and provincial jurisdictions as concentric circles ranging from direct through indirect and temporary jobs. The model is essentially provided in Figure 1 below.

Figure 1:



Using the literature as a guide, we have derived the above set of job classifications and used them to create a questionnaire survey, which will be administered to firms/individuals knowledgeable about environmental policies and changing employment patterns in Canadian bioenergy industries in early 2012. These include government officials; industry and sector representatives; business leaders and associations; and communities (stakeholders at a municipal or local level). Survey results will be used to substantiate (or disprove) the employment projections that have been described in specific environmental policies.

The survey is designed to explore the impacts of a series of existing environmental policies in effect in Canada. The next section describes these policies and specifically, their role in relation to employment and regional strategies.

Review of environmental policies and implications for employment

4.1 Bill C-30: Clean Air and Climate Change Act (2006)

The Canadian renewable fuel standards (RFS) fulfill commitments made by the government in 2006, through amendments made to the *Canadian Environmental Protection Act 1999,* more commonly known as the Clean Air Act. As of December 2010, the amendments required an annual average renewable content of 5% in gasoline, and a 2% requirement for renewable content in diesel and heating oil as of July 2011. The purpose of the regulations can be described as two-fold:

1. To reduce Canada's total GHG emissions by 17% from 2005 levels by 2020; an incremental reduction of GHG emissions of about 1 MT CO2e per year over and above the reductions attributable to existing provincial requirements already in place;
2. To provide regulatory certainty and investment security to industry, both in the petroleum refining and renewable fuel production sectors; to encourage an increase in conventional fuel sales due to the lower energy content of ethanol-blended gasoline while simultaneously providing an opportunity for the renewable fuel sector to grow, wherein "some increase in employment and other economic activities is also expected from this expansion" (Government of Canada, 2010).

The regulations themselves do not detail this expansion any further, though rural diversification is often discussed as the primary driver for biofuels expansion by policymakers (Mukhopadhyay & Thomassin, 2011; Mabee & Saddler, 2010).

The objectives of the RFS have been operationalized through the government's ecoACTION plan, under the rubric *Using Less, Living Better*. Since 2006, various programs have been developed to facilitate the production and use of biofuels. Agriculture and Agri-Food Canada have been responsible for the promotion of the Biofuels Opportunities for Producers Initiative (BOPI). As of March 2007, an additional $10 million (CAN) was added to the fund for a total of $20 million (CAN) to encourage farmer participation in the creation of new infrastructure, feasibility studies, and business proposals. The ecoAgriculture Biofuels Capital (ecoABC) program was introduced on April of 2007 promising $200 million in repayable contributions to new or expanding biofuel producers using agricultural feedstocks. Natural Resources Canada is responsible for the administration of the ecoENERGY for Biofuels Program, which involves $1.5 billion over 9 years (2008-2012), orienting its investments towards the development of a competitive domestic biofuels industry more generally. Sustainable Development Technology Canada (SDTC) is a not-for-profit foundation that supports the commercialization and RD&D of next-generation biofuels. $500 million over 8 years has been committed to the NextGen Biofuels Fund, financing that may decrease the technology risk hindering the progression of first-run, next-generation biofuels facilities to market; the $590 million SD Tech Fund is similarly oriented, but directs its funds towards clean technology solutions more generally. These programs were all intended to aid Canada in achieving its renewable fuel standard as it was set out in the *Clean Air Act* of 2006.

In 2007, the National Roundtable on the Energy and the Environment (NRTEE) responded to a request from the federal government asking the organization to provide the details that the *Clean Air Act* that were absent in the amendments, to describe what the possible pathways towards long-term reductions in GHG emissions might actually look like, and how Canadians would remain employed throughout this transition. *Getting to 2050: Canada's Transition to a Low-emission Future* (2007) called for a focus on the "policy options available to Canada to address these issues and on the economic and environmental implications of those options," (NRTEE, 2007), though the topic of jobs or employment rarely, and only descriptively, throughout the document. The NRTEE

expects that the size of the Canadian economy will more than double by 2050, though the looming and widely unspoken question is how deep carbon reductions may reduce this prosperity.

One of the most controversial aspects of biofuel production has been over its terms of scale. Mukhopadhyay & Thomassin (2011) argue that enlarged plants, with the ability to achieve economies of scale, can be considered the only efficient and plausible way forward. Studies coming from the United States estimate that a tripling of plant size (from 55 to 150 million liters per year for dry-mill plants and from 110 to 375 liters per year for wet-mill plants) reduced capital costs by about 40% and operating costs by 15-20% (Walburger, 2006). However, the story of modernity's mechanized and industrialized trajectory is a story of decreasing demands on human labour, and this may act as a precautionary principle for future biofuels policy. As devoted as we are to labour-saving technologies, by "decisively shifting productive forces from human labor to machines, fossil fuels generalized the conditions for a class monopoly over the means of production" (see Huber in Bridge, 2011: 312). In designing renewable energy portfolios, we need renegotiate our commitments to a fossil fuel mode of production, as well as our commitments to economies of scale. Renewable energy technologies have been distinguished as "generally more labour intensive than conventional energy technologies in delivering the same energy output," (Thornley et al., 2008, p. 1922; see also Berndes & Hansson, 2007) though this conclusion is not unanimous across the literature.

If we interpret Bill C-30 as an employment policy, it is evident that the expected job goals are lacking in two respects. There is no differentiation made between gradations of employment. There is no recognition of the classificatory differences that exist between direct, indirect and temporary employment; no distinction is made between new jobs and job retention. As a broad, national strategy the *Clean Energy Act* does not address regionally specific implications, of particular importance when attempting to understand the unique relationship that resource-based communities will have with new bioenergy technologies.

4.2 Bill 150: Ontario's Green Energy and Green Economy Act (2009)

When introduced in 2009, the Green Energy Act (GEA) specified three central tenets on which to build a green economy: the proliferation of renewable energy projects (enabled by a feed-in tariff regime), a culture of conservation, and job creation. The Ministry of Energy and Infrastructure projected the *creation* of 50,000 jobs in Ontario over a three-year period. Premier Dalton McGuinty worked to position his government in such a way that the Liberal Party now considers Ontario to be a "global leader in clean energy development" (Ministry of Energy, 2011a). As of July 2011, the plan had generated 20,000 jobs and over 2,000 MW of new electricity supply has come online by way of sustainable and renewable resources (Ministry of Energy, 2011b). The GEA has ushered the Ontario government and the Ontario Energy Board towards a new model of economics: one that is supposedly green, enabled by a culture of conservation, and will fulfill the generous promise of the comforts and high standards of living that come along with secure employment. The Act was straightforward in its 50,000 jobs projection.

Ontario-based manufacturing supplying the proliferation of technology needed to support the FIT and microFIT programs was central to the province's green jobs theme.

The most thorough study of employment opportunities tabled by the GEA was conducted by a coalition of independent organizations, comprised of the Green Energy Act Alliance, Blue Green Canada and WWF-Canada. Their publication, *Building the Green Economy: Employment Effects of Green Energy Investments for Ontario* (2009) forewarned that "without a significant increase in the amount of conservation and green power resources being built into Ontario's electricity system from what was contained in the Ontario Power Authority's 2008 Integrated Power System Plan, the Province will not achieve its goal of at least 50,000 new green jobs as a consequence of the Green Energy Act" (Pollin & Garrett-Peltier, 2009: 4). The report goes on to examine two different investment agendas and quantifies the generation of jobs for each: a baseline investment of $18.6 billion (over a ten year period) would produce approximately 35,000 jobs per year; an expanded $47.1 billion agenda (over a ten year period) would produce approximately 90,000 jobs per year. However, once again we caution, that political maxims of job creation are often questionable ones. Calvert and Cohen (2011) evaluated the terms presented in the Alliance report, among other publications put forth by associations of renewable energy producers, and gather that "it is very unusual for any promise of job creation in the energy sector to be monitored"; accounts of *jobs to be created* need to treated with caution (Calvert and Cohen, 2011: 37).

The province released their Long-term Energy Plan (*Building Our Clean Energy Future)* in November of 2010, framing Ontario's way forward as a continuation of the triumphs the McGuinty government has achieved since 2003. It describes Ontario's electricity system, historically, as "weak and unreliable...[Our] energy infrastructure was crumbling...Today, our system is cleaner, more modern, more reliable and we plan ahead" (OMEI, 2010). The phasing-out of coal-fired plants by 2014 certainly makes 'space' for alternative energy production, but what the impact will be on employment is still ambiguous. As part of the Growth Plan for Northern Ontario, the conversion of the Atikokan Generating Station to biomass by 2013 will create up to 200 jobs and help to protect existing ones at the plant (Ontario Ministry of Energy, 2010). It also reports 25,000 jobs to be generated via the refurbishing of the Bruce and Darlington reactors and 20,000 direct and indirect clean energy jobs as a result of the FIT program.

Planning for the protection of existing jobs and the creation of new jobs is a fine line to weave. The policy documents put forth by the Ontario government do make an attempt at differentiating between job classifications, but are still in need of a more thoroughgoing and systematic evaluation in this regard. In addition, there is very little effort made towards designing a provincial green jobs and green economy policy that is attuned to regional variations within Ontario.

4.3 British Columbia's Bioenergy Strategy, 2008

The *BC Bioenergy Strategy: Growing our Natural Advantage* followed in the wake of the *BC Energy Plan: A Vision for Clean Energy Leadership* released in 2007. In terms of employment, both documents emphasize the same key iterations contained in the federal

RFS and *Ontario's Green Energy Act:* the diversification of rural economies. The *Energy Plan* itself contains a subsection of "skills, training and labour policies" in which labour strategies specific to alternative and renewable energies are included. The 'deliverables' coming out of the plan are, to a degree, more precise than what has been put forth in Ontario. The policy language is less about job creation than it is about skills and training curriculum, and identifying the key players in industry (such as the Wood Pellet Manufacturing Association or the Canadian Home Builders Association of BC) and education (i.e. building partnerships with Malaspina College to support the creation of a Green Building and Renewable Energy Technologist program; creating co-operative education placements; supporting the Ministry of Education in the development of curriculum that encourages energy education in primary and secondary schools).

When the strategy was issued in 2008, BC led the country in energy production from biomass: over 800 megawatts of electricity capacity and over 900,000 tonnes of wood pellets, 90% of which is exported internationally (Government of British Columbia, 2008). The features of the strategy are as follows:

- $25 million in funding to establish the Bioenergy Network.
- $10 million over the course of three years for biodiesel production
  Meeting 50 per cent or more of B.C.'s renewable fuel requirements by 2020 with biofuels produced in B.C.
- Establishing at least 10 community energy projects that convert local biomass into energy by 2020.
- Establishment of one of Canada's most comprehensive provincial biomass inventories that creates waste-to-energy opportunities (Government of British Columbia, 2008).

Literature addressing climate change adaptation strategies and energy typically focus on the province's hydroelectric resources, as 89% of BC's electricity is generated from water resources (Walker and Sydneysmith, 2008: 352). Water shortages and reduced snow packs are already an issue in the province. However, the jobs theme surfaces with most urgency in the forestry sector, particularly in those regions in which the most recent and most extensive mountain pine beetle outbreak has resulted in tree mortality for roughly half the mature lodgepole pine *(Pinus contorta)* in the province – the most lucrative of commercially harvested tree species in BC's southern interior. The Mountain Pine Beetle Action Plan, 2006-2011 (Ministry of Forests and Range, 2006) has attempted to chart the transition for forest-dependent communities, as the sector diversifies their forest products – away from a reliance on dimensional lumber, and pulp and paper products – and towards bioenergy production. It is estimated that between 9.3 and 12.3 million dry tonnes per annum of beetle-killed wood might be accessible to the Canadian bioethanol industry (Mabee et al., 2006a).

The province's most recent jobs strategy (released September, 2011) is titled *Canada Starts Here: the BC Jobs Plan.* The title itself is indicative of the jurisdictional divisiveness that exists amongst provinces, and between provincial and national governments in Canada; it is a divisiveness that is very much situated in the extreme bio-geographical heterogeneity that comprises the country. The *Jobs Plan* clearly describes a

provincial economy that increasingly orients itself towards the Pacific Rim and, perhaps, away from Ottawa where any semblance of a national energy or climate strategy might be agreed upon. The focus is on export diversification, and the streamlining of permitting and approval processes for new investors in natural resource management. Clean technologies and the 'green economy' afford very little attention, and the priorities put forth in the *BC Energy Plan* and the *Bioenergy Strategy* seem largely ignored.

Numerical estimates of job creation are not put forward at all by the province, allowing BC to escape the criticisms we direct towards the Ontario and federal strategies, insofar as they fail to present us with the *spectrum* of job profiles at hand. It is evident that BC does go further in trying to differentiate job strategies by region – looking at coastal communities and urban centers as characterized by their Pacific Rim orientation, or the forest-dependent populations of the central and southern interior. However, the extreme variance of the province's bio-geographical regions still call a more sophisticated indication that such regional differentiations matter; the role of work in renewable energy strategies will be influenced by this regional dynamic to a high degree.

Conclusion

Ultimately, the objective of our policy review and survey methodology is to assess the implications of policy in terms of green jobs. We find that policies intended to support bioenergy and biofuel production are not, by and large, specific when it comes to employment, and put forth a model of employment that aims to document the more variegated occupations that support the sector. We conclude with a description of the obstacles that future iterations of policy need to address first and foremost.

- There is a tension that exists between green jobs and GHG mitigation – where most often the latter means minimizing the former. This calls for a sphere of policy-making that effectively prioritizes both.
- Employment policy must be differentiated by region, where the numbers of direct and indirect jobs, and the ratio between the two, varies.
- Policy needs to be more explicit regarding the job classifications it uses to structure its models of projected employment. These new models need to identify the characteristics of new versus existing jobs, the characteristics of permanent versus temporary jobs, as well as the difference between the modification/adaptation of work versus creating new sectors.

The issues as expressed above are all considered impediments to successful policy in practice. It is expected that a more rigorous and detailed description of employment within the bioenergy and biofuels sector, as evidenced through the survey work to be carried out in 2012, will add to the suitability and applicability of future environmental policies.

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