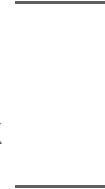


**Sustainable Consumption and Production:
A Draft Canadian Framework**



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1. PROJECT OVERVIEW

The Marrakech Process is a global process to support the elaboration of a regional and national level 10-Year Framework of Programs on sustainable consumption and production (SCP).¹ It was called for at the World Summit for Sustainable Development and included in the Johannesburg Plan of Implementation.² The goals of the process are to:

- assist countries in their efforts to green their economies;
- help corporations develop greener business models; and
- encourage consumers to adopt more sustainable lifestyles.

In support of the Marrakech Process, in November 2008, a joint Canada-US regional meeting on Sustainable Consumption and Production was held in Washington, DC. The meeting was attended by a broad range of stakeholders from government, industry, academia and civil society organizations. A key outcome of the meeting and pre-meeting consultations was recognition that to guide the advancement of SCP in North America, an SCP vision and framework – supported by government, industry and civil society leaders – is needed. The meeting report provides specific findings, recommendations and actions for the advancement of SCP in North America. Two outcomes of particular relevance to the development of an SCP framework for Canada are highlighted below:

The current worldwide economic situation creates opportunities for a shift to more sustainable patterns of consumption and production.

Finding: Today's global economic crisis focuses attention on ways to achieve sustainable economic growth. At its most fundamental level, making progress towards more sustainable communities, countries, regions and the world requires a transformation of the overall patterns of societal consumption and production. Finding leverage points for change and amassing public and political support is a substantial challenge. The urgent economic calamity presents an opportunity to engage North American society in an understanding of

¹ SCP may be defined as: "the use of services and related products which respond to the basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product, so as not to jeopardize the needs of future generations."

² <http://esa.un.org/marrakechprocess/>



consumption and debt issues, and consideration of alternative consumption patterns that can increase societal well-being.

Recommendation: Use sustainable development and SCP concepts to guide new and emerging strategies for large government programs – infrastructure, transportation, health care, housing, energy, security, and environmental services such as water and waste management.

Action: Find opportunities to include SCP concepts, such as green infrastructure, smart growth and green jobs, into government responses to the economic crisis.

Lack of common understanding about SCP (and how best to apply its SCP concepts in the North American context) constrains progress on sustainable development.

Finding: SCP offers a constructive way to frame and analyze environmental, social, and economic issues and provides new tools, strategies and solutions to address environmental, social and economic concerns. Using an SCP “lens” to define problems and explore solutions can lead to more sustainable practices and policies. The underlying concepts of SCP are not well articulated and many people are not yet comfortable with how to apply the broad concepts and ideas in the real world (i.e. in a household, company, community or government agency). There appears to be emerging agreement on underlying SCP principles – such as use of a life-cycle approach, and the importance of innovation and entrepreneurship that values and promotes sustainability. Adoption of SCP in North America will be enhanced when people and organizations better understand SCP and how to apply its powerful concepts to different kinds of issues and at different scales.

Recommendation: Create an easy-to-understand vision and framework for SCP in North America that helps unify ongoing efforts, clarifies where additional efforts are needed and is sufficiently flexible to encourage a diversity of innovative SCP approaches. Use this framework to help shift SCP discussions from theory to practice, with a focus on encouraging productive actions in all parts of society.

Action: Task a small group to propose a simple and practical SCP framework for North America, organized around a life-cycle approach. The framework would help establish SCP as a priority for all segments of society, increase awareness of SCP concepts, provide a starting point for stakeholder consultations, and identify overall North American priorities and approaches, including interactions with the United Nations (UN) Marrakech Process. Engage stakeholders in creating and finalizing the SCP framework.

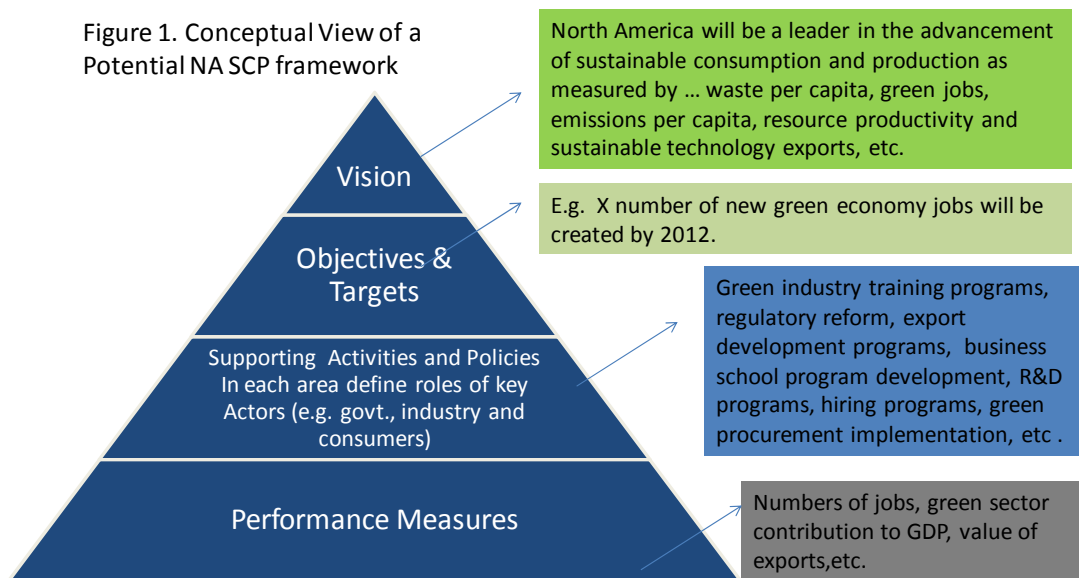
In January 2009, Five Winds International was engaged to develop a conceptual view of what such a framework might look like. An initial concept was developed (see Figure 1), and a draft report, *Sustainable Consumption and Production: Developing a Canadian Framework*, was



prepared. The initial report outlined United Nations Environment Programme (UNEP) guidance on developing SCP frameworks, reviewed some existing frameworks and proposed core elements of a Canadian Framework. The report was reviewed by federal government representatives, as well as by a stakeholder advisory group that included representatives from academia, industry and civil society organizations. Based on feedback from the government representatives and advisory group members, this second report has been prepared. It builds on the North American (NA) Workshop outcomes and the initial paper, and provides:

- a brief description of the key components of SCP and its relationship to Sustainable Development (SD) – this relationship is elaborated in detail in the November workshop background papers;
- an overview of some of the high-level risks and opportunities associated with moving toward, or away, from SCP;
- a description of the main elements of the proposed framework from the initial paper; and
- an illustration of how the framework could be applied in the building and construction sector.

Figure 1. Conceptual View of a Potential NA SCP framework





2. SUSTAINABLE CONSUMPTION AND PRODUCTION

2.1 COMPONENTS OF SCP

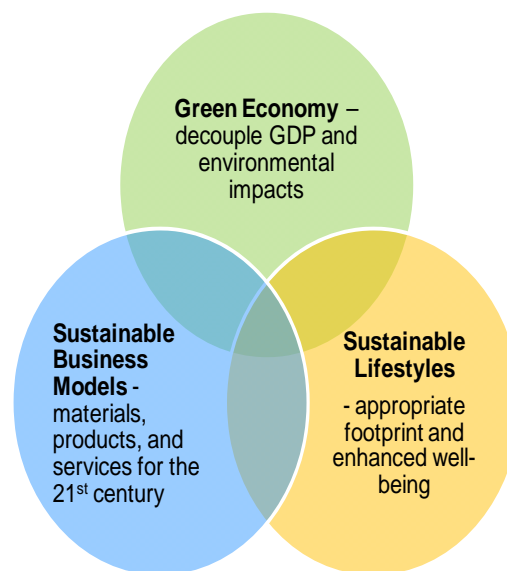
Although Sustainable Consumption and Production is not a widely understood or used term in Canadian industrial and government policy circles, it is a concept that is critical for making progress on sustainable development. For a comprehensive overview of the history, origins and development of the SCP concept, the reader is referred to SCP Workshop Paper #1: *Background on Sustainable Consumption and Production in the Context of North America*.

SCP has three core components:

1. Developing the economy in a way that optimizes the use of resources, promotes social development, and reduces the impacts of production on human health and ecosystems (i.e. decoupling GDP from environmental impacts while optimizing societal benefits). This component is a core aspect of most interpretations of sustainable development and it requires not only separating growth from impacts, but also finding new ways to account for and measure development.
2. Supporting the development of more sustainable consumption patterns through reductions in, and smarter, consumption (e.g. more energy-efficient products, shifting from products to services, raising awareness of the impacts of excessive consumption). It is important to note that for some this could mean reduced consumption and for others it can mean increased consumption. Sustainable consumption requires much more detailed information and data on the impacts and benefits of materials, products and services so that better choices can be made. The UN Commission for Sustainable Development defines sustainable consumption as:

“The use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the

Figure 2. Components of SCP





emissions of waste and pollutants over the life cycle so as not to jeopardize the needs of future generations.”

3. Developing more environmentally and socially responsible business. This includes a strong focus on reducing impacts of production and on the innovation of more sustainable materials, products and services (e.g. products that optimize material use, provide the needed functionality, and are produced in socially and environmentally responsible ways). Market and regulatory forces in some key sectors, such as building and construction, energy, and food and consumer products, are already driving innovation towards improved sustainability performance. For SCP to become “mainstream,” an enabling environment that would create the right market conditions and ensure competitiveness is required. A 2008 UNEP paper on SCP and business described this enabling environment as:

“a rational mix of legislation, regulation, voluntary agreements, economic instruments, integrated product policies, stakeholder engagement. To shape this enabling environment, governments need to develop strategic and practical plans and engage business and industry in the process of consultation, policy formation and implementation.”³

2.2 RELATIONSHIP OF SCP TO SUSTAINABLE DEVELOPMENT

The components outlined in Section 2.1 are focused on improving product systems, reducing or optimizing consumption, and setting the market framework for SCP. The UN guidelines for developing SCP frameworks focus countries toward the following aspects: business and corporate social responsibility (CSR), cleaner production, communications, sustainable product design, life cycle and resource management, safer production, sustainable consumption, eco-labeling and sustainable procurement. It should be noted that these areas do not address the full scope of SD, but rather they focus on activities and actors along the value chains and life cycles of materials, products and services.

Although SCP does not directly address other aspects of SD (e.g. the role of women, managing fragile ecosystems, combating deforestation), it is unique in its ability to contribute to a wide range of SD objectives. Consequently, a number of existing national SCP frameworks are linked to, or incorporated directly in, National Sustainable Development strategies. A Federal Sustainable Development Strategy is currently under development in Canada and it would be valuable for this strategy to address the issue of SCP for several reasons, including:

- the inherent value chain and life-cycle aspects of SCP. Improving the sustainability of production requires consideration of the roles and responsibilities of actors along the

³ The Marrakesh Process: SCP Issues for Business and Industry. UNEP 2008.



- value chain of the product system as well as consideration of the full life-cycle impacts from raw materials through to use and end-of-life;
- the fact that consumption and production provide a focal point for addressing a range of policy priorities such as innovation, job creation, wastes, emissions, toxic chemicals and consumer protection;
 - its simplicity in comparison to SD in terms of general understanding. As such, it is potentially more accessible to the average person who can understand the need for smarter consumption and cleaner production; and
 - the fact that it aligns with current market trends and business activity to provide more sustainable materials, products and services.

Having noted this, there is considerable effort required to engage Canadian government and industry leadership on the need for an SCP framework. Individual sectors (e.g. forestry, building and construction, food, retail) are all actively engaged in SCP-type activities and, similarly, there are a range of government policies, programs and activities that link to SCP. However, there is no overarching vision or strategy or even recognition by many decision-makers that a strategy is required. In contrast, the European Union (EU) SCP framework is seen as a core element of its SD strategy and it was produced through extensive consultations and research.

2.3 DRIVERS FOR SCP

In spite of the lack of leadership and awareness of the importance of SCP, the need for a vision and framework for SCP in Canada is being driven by a number of significant opportunities and some major risks. A selection of these opportunities and risks are outlined below.

Ecosystem risks

Initiated by the UN in 2001 and completed in 2005, the Millennium Ecosystem Assessment evaluated the consequences of ecosystem change for human well-being and the scientific basis for action to protect, conserve and enhance major ecosystems. The assessment was conducted through the work of over 1,300 scientists who looked at the state, trends, and future scenarios for these ecosystems based on current and predicted patterns of consumption and production. Their efforts were reviewed by governments and independent scientists and the major finding was as follow:

“At the heart of this assessment is a stark warning. Human activity is putting such strain on the natural functions of Earth that the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted.”

A key focus of the assessment was on the ability of ecosystems to provide the “services” that underpin our economy. These services include; the provision of goods (e.g. food, water, fibre and fuel), the regulation of systems (e.g. climate, water and disease), cultural benefits (e.g.



aesthetics, spiritual, recreation and education), and supporting benefits (e.g. primary production and soil formation).

Given the seriousness of the assessment, it is clear that moving slowly on SCP poses significant risks for our economy, social cohesion and environment.

Business Opportunity

According to a 2008 PriceWaterhouse survey of technology executives, 61 percent feel it is very important (29 percent), or important (32 percent), that their companies take steps to reduce their environmental impact. The report noted that “this shift towards green products, services and business operations is having a direct impact on the level of collaboration and innovation found throughout the entire technology value-chain, including marketing, human resources, research and development processes, manufacturing and supply chains. Forty percent of the executives claim the green movement creates significant market opportunities for their companies, as evidenced by a noticeable increase in customer demand for green products and services. Additionally, 60 percent of respondents cite energy savings as one of the most important factors in their company’s environmental decision-making process.”⁴

GE’s ecomagination program illustrates the opportunity. When it was launched in 2005 it set a revenue target for green technology of \$20 billion by 2010. In 2007 it had already hit \$14 billion and so revised its 2010 target to \$25 billion (see Box 1). While most large multi-nationals are progressing on their sustainability initiatives, there are a great number of smaller suppliers who are not as well positioned to avail themselves of the market opportunities arising from the need for more sustainable products, technologies and associated services.

Some national governments see this link. For example, the UK Framework for Sustainable Development notes that progressing on SCP “includes reducing the inefficient use of resources, which is a drag on the economy, so helping boost business competitiveness and to break the link between economic growth and environmental degradation.” The UK government established a Business

Box 1: GE Ecomagination

In 2005, we launched an environmental solutions program that would produce cleaner energy and water and improve efficiency. After more than 125 years in business, we knew that true environmental sustainability would only be possible if the practice could be sustained economically. Ecomagination was conceived as a business strategy, and just three years into the program it is delivering the commercial potential we envisioned across all GE businesses.

In 2007, GE achieved approximately 15 percent growth in ecomagination revenues over 2006, from \$12 billion to \$14 billion. This growth came from providing our customers with products that improve their operating performance and reduce environmental impact. The potential of this mutual benefit is significant. Not only have ecomagination products generated double-digit growth for GE, but they have also become a catalyst for innovation and a new dialogue in business as a whole. As we continue to grow ecomagination, we are excited by the momentum of our products and look forward to the gains that

⁴ Technology Executive Connections, Vol. 6. Going Green: Sustainable Growth Strategies. PwC, February 2008.



Task Force on Sustainable Consumption and Production that has developed information and tools for UK business. The aim of the Task force is to support business in moving toward SCP in “ways that boost competitiveness and contribute to economic growth.”

This perspective was shared by a wide range of stakeholders consulted in the lead up to the November 2008 NA SCP meeting who saw the advancement of SCP as vital for modernizing the NA industrial strategy, achieving competitiveness and spurring innovation(see Box 2).

Job Creation Opportunity

An October 2008 study prepared for the United States Conference of Mayors and the Mayors Climate Protection Center, examined the potential for growth in green jobs in various parts of the economy that will be affected by major environmental issues such as climate change. Table 1 shows estimated job growth for the period 2018, 2028 and 2038 in these areas. The base number for 2008, which included more sectors that are covered in the table, was approximately 750,000 jobs.⁵

Box 2. NA Perspectives on SCP and Competitiveness

“We want to be technology makers not technology takers.”

“We will lose competitiveness if we do not make SCP a primary driver of industry strategy.”

“We need to have industrial strategy which works towards the future and not the past.”

“As we use markets to make things better we can tunnel through the damage created in NA and develop better technologies, expertise and knowledge for export.”

“There is a critical mass of companies that get it, but they are still playing at the edges – there is not the step changes happening that we need.”

Source: Sustainable Consumption and Production Perspectives on a North American Vision

Table 1

Potential New Green Jobs 2038 - U.S. Total			
	2018	2028	2038
Renewable Power Generation	407,200	802,000	1,236,800
Residential & Commercial Retrofitting	81,000	81,000	81,000
Renewable Transportation Fuels	1,205,700	1,437,700	1,492,000
Engineering, Legal, Research & Consulting	846,900	1,160,300	1,404,900
Total	2,540,800	3,481,000	4,214,700

Note this analysis is focused on green jobs and does not reflect general job growth potential (i.e. traditional jobs that could be created or protected by providing materials, products and services in a more sustainable way).

Trade Opportunities

⁵ US Metro Economies: Current and Potential Green Jobs in the U.S Economy. Global Insight, October 2008.



Prior to the recent economic downturn, the green building movement in the US was growing at a phenomenal pace and was driven by:

- an unprecedented level of government initiatives;
- heightened residential demand for green construction; and
- improvements in sustainable materials.⁶

According to a March 2009 report from McGraw-Hill Construction, the overall US green building market (both non-residential and residential) is likely to more than double from today's \$36-49 billion to \$96-140 billion by 2013.⁷ The report found that the green building market "seems to be somewhat insulated" from the construction slump. Reasons cited for the market's stability include: increased awareness that green buildings are often cheaper to operate; and governmental policies that promote or even mandate eco-friendly features.⁸ Canada has an opportunity to provide sustainable materials, products and services to help meet this anticipated growth and should recognize and act on this. The new US administration has indicated that it will "begin building the green economy that will define the next two decades." In its recently released budget, the administration integrates environment and sustainability considerations into a wide range of programs that support energy technology development, manufacturing, housing, basic research, agriculture production, federal buildings and many other areas. This level of activity on the part of its major trading partner is a clear opportunity for Canada – one that an SCP framework could potentially support.

Innovation Opportunity

Current markets are rewarding companies that can provide materials, products and services that have a lower "footprint" on the environment and that are produced in a socially responsible manner. Major retailers such as Walmart, Home Depot, Rona and Loblaws are now driving the demand for more sustainable products and packaging along their supply chains, investors are evaluating climate change risk and opportunities (e.g. through the carbon disclosure project), and government and business procurement is increasingly focusing on environmental and social criteria in addition to traditional cost and technical performance criteria. Jurisdictions that can support their industry in developing products to meet this demand will benefit (e.g. through jobs, market share, trade, innovation).

Competitiveness Risks

⁶ 2008 U.S. Construction Overview. FMI.

⁷ 2009 Green Outlook: Trends Driving Change. McGraw-Hill Construction.

⁸ <http://archrecord.construction.com/news/daily/archives/090304green.asp>



The flipside of the innovation opportunity is loss of competitiveness and access to markets if sustainability performance is lagging. An example of market access risk is the California low carbon fuel standard, which will:

“require fuel providers in California to ensure that the mix of fuel they sell into the California market meet, on average, a declining standard for [Greenhouse Gas] GHG emissions measured in CO₂ equivalent gram per unit of fuel energy sold. The standard will be measured on a lifecycle basis in order to include all emissions from fuel consumption and production, including the “upstream” emissions that are major contributors to the global warming impact of transportation fuels.”

Private-sector “regulation” is also imposing risks as companies integrate sustainability criteria into supplier evaluations, materials selection and procurement decisions. As indicated, most large companies are capable of responding, but there are many small and medium-sized firms that may need support in understanding and responding to market shifts.

2.4 DO WE NEED AN SCP FRAMEWORK?

The selection of risks and opportunities highlighted are among those of major interest to government. There are, of course, many more opportunities and risks associated with SCP that have been well documented in many reports, case studies and books over the last decade. A key question is whether establishing a framework for SCP will significantly affect Canada’s ability to mitigate these risks and capitalize on the opportunities. In a 2008 communication from the European Parliament on its action plan for Sustainable Consumption and Production and Sustainable Industrial Strategy, it was noted that:

“Overall, voluntary and regulatory instruments are not sufficiently connected and potential synergies between the different instruments are not exploited. Implementation is not sufficiently dynamic and forward-looking to drive the performance of products upwards. Divergent national and regional approaches send conflicting signals to producers, and as a result the full potential of the Internal Market is not realized.”

This assessment is from a jurisdiction that is considerably more advanced than Canada in regard to policies and programs to address SCP. The European Commission further notes that a more integrated policy approach to SCP, focusing on high impact products, could “lead to substantial environmental and economic gains.” To realize this opportunity, it has developed a comprehensive framework that seeks advancement on SCP in ways that contribute to competitiveness (see Appendix A for a summary of the EU SCP framework).

Given the new direction of the US administration, and the advanced nature of the EU strategy on SCP, Canada should – at a minimum – be analyzing the potential benefits of developing an SCP



framework. This is necessary to meet our UN commitments and we may find it can help address a range of other policy priorities and opportunities in a more integrated and efficient manner.

3. RECOMMENDED ELEMENTS OF A CANADIAN FRAMEWORK

This section provides more detail on the elements of the framework outlined in Figure 1.

3.1 VISION

A high-level vision for SCP is important as it will provide the necessary direction required for aligning objectives, policies and performance measures. The process for developing the vision will be as important as the vision itself due to the lack of understanding of SCP, the diverse number of stakeholders, and the need to engage civil society organizations and all levels of government. It is recommended that the vision be informed by:

- The elaboration of a well-developed information base on key social, economic and environmental factors of relevance to SCP. This information base should be built from the best available science, economic models and social policy data, and should focus on key risks and opportunities for Canada that could arise from the pursuit of more sustainable forms of production and consumption. As noted in the paper *Sustainable Consumption and Production Perspectives on a North American Vision* “aggressively progressing toward SCP represents an opportunity for North America to become a leader in knowledge, expertise, and technology areas that will be critical for all countries to adopt in the 21st century.” Quantifying the potential scope of this opportunity will be a key piece of foundational information to support the development of an SCP framework that can be widely supported by policy makers and business leaders.
- The development of scenarios on future environmental, social and economic trends and how they may affect consumption and production patterns and trends. Scenarios can be very informative in helping decision-makers explore the implications of policies and programs to support sustainable consumption and production. For example, the World Business Council for Sustainable Development (WBCSD) and others have utilized scenarios to explore future labour markets, the future of fossil fuels, impacts of bio-fuels, mobility and many other topics. To be effective, scenario exercises need to be linked to the vision development process and involve key stakeholders. Canada already has experience with scenarios as they are being used in the *4 FUTURES Scenario Planning Project for Canadian Natural Resource Processing Industries – to 2025*, being run by Industry Canada.
- Stakeholder input on priorities, risks and opportunities associated with SPC. Stakeholders from industry, academia, research institutes and civil society organizations



are an important resource and can provide informed perspectives on what a vision for Canada should include and, importantly, how that vision should be translated into sector-specific policies, programs and objectives. For example, in developing its eco-imagination strategy General Electric held focus groups to get input from customers and other stakeholders on what types of technologies and innovations will be required in the future. It also established an eco-advisory committee to provide ongoing advice on its strategy and investments.

Most importantly, the development of the vision will require the participation of political, business and civil society leaders. High-level commitment and participation is a hallmark of successful sustainability strategies and an SCP framework will not gain any support or momentum without this leadership. As noted, in a number of jurisdictions covered in the UNEP report national SCP programs are linked to an overarching sustainable development strategy. These strategies typically have separate chapters on key issues (e.g. climate change, public health, resource development), and this type of structure enables the SCP component of the strategy to address a narrower set of themes/issues often focused on products and consumption.

Another key consideration is how to develop an SCP vision at a national and sector level. A national vision will need to be high level and linked to an overarching sustainable development strategy. The sector visions can be more specific and provide clearer direction. A sector approach can be complemented by cross-cutting initiatives. Examples of cross-cutting areas include:

- pricing of pollution;
- product labeling;
- education; and
- decision-support tool development and deployment (e.g. eco-design and sustainable design tools, life cycle assessment).

An illustrative example of how such a national-level vision could be articulated is provided as follows:

National SCP Vision:

Canada will be a world leader in sustainable production as measured by:

- the environmental footprint and social benefits of our resource production, manufacturing and service industries;
- the ability of our financial industry and capital markets to support investments in sustainable production;



- our ability to create jobs and wealth from the production of more sustainable products, services and technologies;
- resource productivity;
- innovation and commercialization of new products and services with improved sustainability performance; and
-

Canada will be a world leader in sustainable consumption as measured by:

- percentage of products and services that meet the highest standards of sustainability performance (e.g. adhere to or exceed leading standards);
- per capita energy consumption;
- per capita material consumption;
- per capita generation of wastes;
- decoupling of GDP from resource consumption (e.g. fish stocks, industrial water use, land use....); and
-

It has been suggested that it may be better to keep the measures separate from the vision. These measures are high level and are intended to illustrate how a macro-level tracking of how we are moving toward the vision could be undertaken.



3.2 OBJECTIVES

Objectives are more specific and tangible directional statements, and are best elaborated on a sector basis. They provide a clear direction and lend themselves to specific performance measures. Illustrative examples of objectives include:

- creating x number of manufacturing jobs related to green technology by 2012;
- creating and executing a consumer awareness campaign on green product standards;
- developing sustainable consumption and production training materials with industry associations representing 75% of the construction industry;
- achieving full integration of sustainable production and consumption criteria into infrastructure projects receiving government funding by 2012;
- increasing the commercialization rate of sustainable technologies and products relative to a 2008 baseline; and
- integrating sustainability criteria into all government purchasing.

3.3 SUPPORTING ACTIVITIES AND POLICIES

The vision and objectives will need to be supported by a range of policies, programs and activities. The review of existing frameworks in the UN report clearly indicated that these policies, programs and activities need to be drawn as much as possible from current efforts but will likely also include new activities and actions to better integrate existing activities. From a process perspective, the steps to identify supporting activities, programs and policies could be undertaken as follows:

- establish a steering committee to oversee and coordinate tracking of progress toward the objectives (depending on the objectives, the make-up of this group could contain a variety of representatives from government, industry and civil society organizations);
- identify key stakeholders that need to be involved in supporting the objectives;
- identify existing policy and programs activities that contribute to achieving the objectives;
- identify major gaps that may result in a failure to meet the objectives; and



- developing a coordination plan to measure progress from existing activities and to close the gaps.

An example of how the framework could be elaborated for the building and construction sectors is provided in Section 4, including illustrative examples of supporting activities, policies and programs. In examining other national frameworks, it was evident that SCP frameworks include a range of mechanisms/activities. For example, the UK SCP document notes activities such as:

Enabling policies and programs: these are actions that help build the capacity within organizations to move toward more sustainable consumption and production. They support the shift to SCP by providing knowledge and education, supporting tools, and resources and funding.

Engagement activities: these actions bring together key stakeholders to address key issues and groups. The UK effort identified areas such as a Round Table on Sustainable Consumption, partnerships with key sectors, Trade union initiatives and sector sustainability challenges.

Activities/mechanism designed to encourage SCP: these include fiscal measures such as landfill taxes and differential tax rates on vehicles, as well as funding to support environmental actions and an ethical trading initiative.

Activities that exemplify SCP: these are leadership initiatives such as being a leader in the EU in the implementation of sustainable procurement.

The EU SCP framework also identifies a range of activities, including: promotion of ecodesign; sustainable procurement; eco-labelling; fiscal incentive programs; boosting resource efficiency; and lean production.



3.4 PERFORMANCE MEASURES

Performance measures, or indicators, are a means to track progress toward objectives. Typically, indicators need to be:⁹

- **Relevant** – the indicators should be relevant to current or probable SCP objectives. In choosing indicators, one needs to ask, “Why do we want to know this? Is the information just for the decision-makers or is it also relevant to other stakeholders?”
- **Easy to understand** – stakeholders should easily understand the indicators being used. A good benchmark is to determine if they can be easily explained to the general public. If the public doesn’t understand the indicators, it is unlikely that senior decision-makers will understand them.
- **Conceptually sound**
- **Accurate** – should reflect the facts about the underlying reality.
- **Available in a timely fashion**
- **Acceptable** – should be done via a process of agreement on indicators that is based on sound science.
- **Regionally/sectorally relevant**
- **Technically Feasible** – data should be available or collected in a cost-effective way.
- **Tailored to the user**
- **Aggregated appropriately**
- **Amenable to graphics** – information could be effectively summarized, displayed on charts/graphs, etc.
- **Accompanied by explanatory information to tell a story**

Another key consideration is how these measures, or indicators, will be developed and communicated. Ideally, the framework should have high-level indicators that address the activities/actions of governments, industry and consumers (as appropriate). Appendix B provides an example set of indicators from the UK.¹⁰

⁹ Adapted from Climate Change Indicators Framework & Strategy. Five Winds International, 2001. Prepared for NAICC.

¹⁰ The list is illustrative only and not a recommendation on a Canadian set of indicators.



3.5 ROLES/KEY ACTORS

Stakeholder groups have different roles and responsibilities when it comes to SCP implementation. The following are proposed roles of three main groups.

Role of Governments

The federal government has the responsibility to convene the process to develop and implement an SCP Framework.¹¹ Federal and provincial governments have the ability to set regulations and policies that can mandate and promote sustainable products and smarter consumption. Governments also have procurement powers which can create markets for sustainable products. Additionally, governments can develop and implement fiscal measures to encourage SCP and support research and development on concepts and tools to promote SCP. A key current challenge is the regulation of environmental and sustainability market claims.

Role for Business

Business has a role to play by working with government and other stakeholders to develop and implement the SCP framework. Big business, in particular, can lead the implementation of initiatives and help promote SCP to suppliers, customers and the public. This might include voluntary standards, supplier programs, transparent communication of performance, sustainable procurement and collaborative research initiatives on common challenges. Through industry associations, business can help build capacity for SCP within sectors. Business involvement is critical in identifying unintended consequences and advising on the practicality of proposed measures.

Role for Civil Society

Civil society organizations, such as environmental groups, trade unions, social welfare groups and consumer groups, have a role in developing the SCP framework. They can be promoters and advocates for SCP initiatives and provide advice on key measures and policy tools. Civil society organizations can also play a cohesive role by bringing groups of diverse interest together on SCP and in the promotion of sustainable consumption. And they can provide tools and organizational focus for citizens to participate in SCP discussions(e.g. Smart Growth BC's Community Assistance

¹¹ During consultations prior to the Nov. 2008 Canada- US meeting in Washington, many Canadian stakeholders, representing a diversity of interests, stressed the need for government leadership to move SCP forward in Canada.



Program). Additionally, the academic community –, particularly business, engineering, design and public policy schools –, can integrate SCP into core curricula.

4. BUILDING AND CONSTRUCTION SECTOR – ILLUSTRATIVE EXAMPLE

Buildings represent the largest “no-regrets” opportunity to reduce GHG emissions and to contribute to economic growth.

Canada Green Building Council

This section provides an example of how an SCP framework could be elaborated for the building and construction sector. It has been created by the report authors for illustrative purposes only. (Note: Consultations with the building and construction sector on this example were outside of the scope of this project.)

As indicated in Section 3, the development of a vision, goals, policies, etc. will need to follow a process that is based on sound analysis and engagement of appropriate governments, industry actors, and academic and civil society stakeholders. Thus, the example that follows is provided to demonstrate the types of policy initiatives, objectives and activities that could be considered if the framework was applied to the building and construction sector. Although drawn from a review of various sustainability initiatives in the sector, the practicality or feasibility of the examples has not been evaluated.

The construction sector can be broken down into four main sub-sectors: residential building and renovation; building of heavy industrial facilities; building of commercial and institutional facilities; and engineering of infrastructure (e.g. highways, waterworks, dams, bridges). Each of these sub-sectors has specific needs and areas of expertise. Objectives for each sub-sector may be similar; however, policy initiatives and activities will need to be targeted.

According to Statistics Canada, more than one million Canadians are employed in construction trades and professions. Construction workers are involved in the installation, repair or renovation of more than \$150 billion of work every year. There are over 260,000 firms in the construction industry – over 65,000 in residential construction and 150,000 in the trade contracting industry. Construction led the industrial employment growth in the Canadian economy by increasing 7.1% (68,000 workers) between 2004 and 2005.

The framework to address sustainable construction is focused on four types of activities:

1. Building performance for energy efficiency, as well as water efficiency, air quality and healthy living space.
2. Sustainability of construction materials and technologies from a life-cycle perspective.



3. Reduction of waste from construction and demolition.
4. Consideration of site preparation, and interaction with the community and community infrastructure.

4.1 VISION

The Canadian construction and building industry is a world leader in the provision of sustainable materials, projects, products, buildings and related services.

4.2 INTEGRATION WITH EXISTING INITIATIVES

The following are examples of existing initiatives that could contribute, or have the potential to contribute, to improving the sustainable consumption and production performance of the building and construction sector. For this project, examples are primarily restricted to federally funded programs. One industry-sponsored program (Canada Green Building Council's Leadership in Energy and Environmental Design [LEED]), and two civil society programs (Smart Growth BC and the Ontario Smart Growth Network) are included to illustrate how all segments of society have a role to play. There are numerous additional provincial, municipal, community group and industry initiatives that will be important in the fully developed framework.

Natural Resources Canada (NRCan) – Canmet Energy

Canmet Energy programs research and demonstrate clean energy science and technology. Canmet is also promoting net zero housing technology with respect to energy.

- Net-zero houses, buildings and communities will emerge from new urban planning and building design practices, supported by the introduction of innovative technologies to capture, store, distribute and optimize renewable energy. The overarching challenge is the integration of these pieces to achieve net zero targets, breaking through current limitations to reach high-performance, viable market solutions for our daily lives.
- CanmetENERGY works nationally and internationally as a leader in providing energy solutions in built environments. It provides clean energy project analysis, modeling and simulation software tools to enable industry to optimize integrated energy efficient design, comply with code requirements, and qualify for funding and incentives programs.

NRCan – Office of Energy Efficiency (OEE), EcoEnergy Efficiency Initiative



The ecoEnergy Efficiency Initiative operates several programs aimed at improving energy performance of buildings.

- **ecoENERGY Retrofit** - ecoENERGY Retrofit provides grants to homeowners and financial incentives to small and medium-sized businesses, and to industry and public institutions to help them invest in energy and pollution-saving upgrades.
- **ecoENERGY for Buildings and Houses**
 - Publications, training, tools and other technical information to guide choices in energy-efficiency measures and practices for existing buildings.
 - Tools and activities, including modelling software, training, information, access to stakeholder networks and validation of new building designs to promote energy efficiency in new buildings.
 - Working with other levels of government to encourage the adoption of more stringent energy codes and to update the Model National Energy Code for Buildings, as well as consulting with stakeholders to further develop a voluntary rating and labelling system for new and existing buildings.
 - For buildings owned by the Government of Canada, the Federal Buildings Initiative is a proven, turn-key solution that enables federal departments and agencies to retrofit their buildings without necessarily using their own capital funds. This program is not part of the ecoENERGY Efficiency Initiative.
 - For newly built homes, standards such as the R-2000* Standard and EnerGuide rating system and regional energy-efficiency initiatives such as ENERGY STAR for New Homes will advance energy efficient home building in Canada.
- **ecoENERGY for Industry** - While it is focused on facility operation, the activities of ecoEnergy for industry will help to raise awareness of the value of constructing energy-efficient facilities. The OEE works hand-in-hand with industry to encourage the sector to invest in, develop and use methods and industrial processes that are more energy efficient. It:
 - helps companies to assess their capacity to reduce energy use;
 - trains managers in energy efficiency and conservation;
 - identifies least-cost options for companies taking steps to reduce greenhouse gases and other emissions; and
 - provides a forum for sharing information on new technologies and best practices.

Small and medium-sized industrial facilities can also apply for the ecoENERGY Retrofit financial incentive.



NRCan – Forest Products Innovations

Canada's leading forest research institutes – Forintek, FERIC and Paprican – joined to form FPInnovations, the largest private, not-for-profit forest research institute in the world. The Canadian Wood Fibre Centre (part of Natural Resources Canada) was created to work with FPInnovations to improve forest productivity and increase the value of Canada's wood resources.

A key part of FPInnovations' research is the Transformative Technologies Program, which brings together governments, industry and academia to conduct research along the forest “value chain.” The objective is to come up with innovative products and to increase investment in a higher-value-added forest sector. Looking ahead, FPInnovations expects to form more partnerships with academia, financial institutions and other research groups both in Canada and abroad. Investment will be directed toward the development and adaptation of emerging and breakthrough technologies.

Transport Canada – Moving on Sustainable Transportation Program

Transport Canada has established the Moving On Sustainable Transportation (MOST) Program to support projects that produce education, awareness and analytical tools to make sustainable transportation a reality. The MOST Program provides funding to support projects that will:

- stimulate the development of innovative tools, approaches and practices for increasing the sustainability of Canada's transportation system and the use of sustainable modes of transportation;
- realize quantifiable environmental and sustainable development results on Transport Canada's sustainable development priorities; and
- provide Canadians with practical information, tools and opportunities for better incorporating sustainable transportation options into their daily lives.

Relevant project areas focus on urban planning and smart growth and eco-industrial networking opportunities.

National Research Council – Model National Energy Code

The Model National Energy Code of Canada for Buildings 1997 (MNECB) contains cost-effective minimum requirements for energy efficiency in new buildings. The MNECB applies to all buildings, other than houses of three storeys or less, and to additions of more than 10 m² to such buildings. The MNECB is prepared under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC) and was first published in 1997 by the National Research Council Canada (NRC).



After consultation with provinces, territories and stakeholders, the CCBFC agreed at its February 2007 meeting to update the MNECB 1997. This project is made possible by collaboration between Natural Resources Canada and the NRC. They will work together, along with the provinces and territories, to support the work required for updating the MNECB under the leadership of the CCBFC.

NRC – Centre for Sustainable Infrastructure (CSIR)

The NRC-CSIR, in close collaboration with universities, municipal governments and industrial partners, is pursuing a multi-disciplinary research and development program to develop innovative technologies and decision-support tools that address the economic, social, and environmental aspects of infrastructure sustainability. This effort will have significant implications at the local and national levels. Working with the University of Regina, the City of Regina, industry and other partners of the Communities of Tomorrow, NRC-CSIR will help to serve as the catalyst for a technology cluster in Regina making it a model community in sustainable development and infrastructure renewal. It will also help develop a technology base that will give Saskatchewan a competitive advantage in sustainable infrastructure technologies. At the national level, this effort will help communities across Canada achieve the goal of sustainability in urban development (from planning to construction) and municipal infrastructure asset management (including operation, maintenance, and rehabilitation through to renewal or decommissioning).

The Canadian Construction Materials Centre

The Canadian Construction Materials Centre (CCMC) offers a national evaluation service for all types of innovative building construction materials, products, systems and services. Operating within the National Research Council's Institute for Research in Construction (NRC-IRC), CCMC evaluations are supported by the latest technical research and expertise and are based on the requirements of the National Building Code of Canada or provincial/territorial building codes.

CCMC-evaluated products are used in commercial and residential buildings. CCMC also provides export support for evaluated products by providing technical credibility to Canadian industry's efforts through:

- standards and certifications for construction materials; and
- sustainability initiatives and life-cycle assessment in the building and construction sectors – cement and concrete, steel, forest products and aluminum.

Federation of Canadian Municipalities (FCM) – Green Municipal Fund

FCM's Green Municipal Fund™ (GMF) supports municipal initiatives across Canada that benefit the environment, local economies and quality of life.



GMF grants and below-market loans directly support municipal initiatives, while GMF education and training resources help municipal governments share expertise and strengthen their ability to set and surpass their sustainable goals. The Government of Canada endowed the FCM with \$550 million to establish GMF. Funding is allocated in five sectors of municipal activity: brownfields, energy, transportation, waste and water.

The Canada Green Building Council – Leadership in Energy and Environmental Design and Green Performance Initiative

The Canada Green Building Council (CaGBC) has embarked upon a multi-year development project to introduce the next generation of LEED in Canada through the LEED Canada Initiative. In parallel to this effort, the CaGBC also launched the Green Building Performance Initiative – a focused effort to develop an affordable and easily accessible tool for energy and environmental management for new and existing buildings. Both initiatives will enable large-scale reduction in greenhouse gas emissions, energy savings, and other environmental benefits for all building types and communities across Canada. The Canada Green Building Council is closely associated with the US Green Building Council where the LEED standard was developed

Through market-based solutions and provision of tools to industry and partners, the CaGBC aims to support the performance improvement of 100,000 buildings and 1,000,000 homes across Canada by 2015, with a verified 50% reduction in energy and water use from a 2005 baseline. Realizing these goals could result in:

- 50 MT/year reduction in GHG emissions;
- pro-investment strategies where owners will invest in building improvements, across all regions of the country, to stay competitive in the marketplace and demonstrate corporate environmental responsibility;
- direct employment in construction, manufacturing and professional services, with new skills, products and markets;
- large, measurable and immediate reductions in water consumption, use of resources and generation of waste;
- a receptive market for new, green technology, products and services;
- building renewal and significant reductions of public-sector deferred maintenance liabilities;
- avoidance of electricity generation and transmission capacity;
- reduced pollution and improved indoor environmental quality, with direct benefits to public and community health;



- utility cost savings for homeowners and for public- and private-sector building owners, and creation of a large supply of certified carbon credits.

Canada Mortgage and Housing Corporation (CMHC)

CMHC conducts research and publishes information on the housing sector and community planning. In collaboration with government and private sector stakeholders, they have developed the Equilibrium House Sustainable Housing Initiative to:

- develop a clear vision and approach to developing and promoting low-environmental impact healthy housing across Canada;
- build the capacity of Canada's home builders, developers, architects and engineers to design and build EQUilibrium™ homes and communities across the country;
- educate consumers on the benefits of owning an EQUilibrium™ home and achieve market acceptance of EQUilibrium™ houses and sustainable communities; and
- enhance Canada's domestic and international leadership and business opportunities in sustainable housing design, construction services and technologies.

Smart Growth BC

Smart Growth BC is a non-governmental organization devoted to fiscally, socially and environmentally responsible land use and development. It works throughout BC with community groups, businesses, developers, planners, municipalities and the public to create more livable communities.

Smart Growth BC provides community education workshops, land-use principles, guides and toolkits, consulting services on land-use, and planning, voter education, They also prepare reports and best practice guides.

Ontario Smart Growth Network

The Ontario Smart Growth Network brings together organizations that are working toward the goals of stopping urban sprawl, fostering healthy communities and supporting community involvement in planning. It provides a forum for sharing ideas about smart growth, low-cost speakers for community groups, and access to a network of civil society groups interested in sustainable communities.

4.3 OBJECTIVES AND MEASURES

The following are illustrative of the types of objectives and measures that might be developed. Some include a hard target by way of example, and others are more open-ended. They are



categorized into: land-use planning and design; infrastructure; building performance; sustainable construction materials and technology; and waste reduction.

Land-use Planning and Design

Decisions on locating new residential construction incorporate sustainable community development (smart growth) principles.

Facility design and location of industrial plants incorporates strategies to build communities of mutual benefit (eco-industrial networks) which can promote recycling, energy sharing, 'green links' between businesses, transportation efficiency and waste minimization.

Infrastructure

Infrastructure development incorporates sustainable design and places a high value on reducing the environmental impact of projects.

Life-cycle concepts and tools are used to inform the selection of materials and to evaluate design options for infrastructure projects.

GHG emissions resulting from construction of public infrastructure are reduced by 20% by 2015.

Building Performance

Building performance refers to the use phase of a building. However the site location and design, the materials used for construction, as well as technologies used for heating, cooling, lighting, ventilation and water systems will determine how a building performs. Within building performance are the sub-sectors: residential; industrial; commercial and institutional. Buildings with better energy and water efficiency will reduce demands on infrastructure supports such as water treatment, waste-water treatment and power generation and transmission.

- **Residential Building and Renovation**

- Improve the energy efficiency of residential buildings by a factor of 10 by 2015. *(Measured by energy consumption of the residential sector.)*
- Increase the environmental performance of new residential and commercial buildings by a factor of 10 by 2015. *(As measured by LEED certification or another environmental performance standard to be developed.)*

- **Industrial Facilities**

- Retrofits and new construction of industrial facilities incorporate the highest standards for energy and water efficiency and environmental performance. *(Measured by energy consumption and GHG emissions, water use, and wastewater discharges by facility and sector.)*



- New industrial facilities are incorporated into new or existing eco- industrial networks.
- Brownfield developments utilize eco-industrial thinking.
- **Commercial and Institutional Buildings**
- Improve the energy efficiency of commercial buildings by a factor of 10 by 2015.
- New institutional buildings meet environmental performance criteria such as LEED.
- Renovations of commercial and institutional buildings include environmental performance and energy efficiency goals.

Sustainable Construction Materials and Technologies

The performance of a building is greatly affected by the materials used in its construction. Newly developed building materials and sometimes ancient techniques are providing huge gains in energy-efficiency performance, water conservation, 'green energy' sources, healthy buildings and reduced environmental footprint of construction materials.

Canada is well positioned to be a global leader in developing sustainable construction materials and technologies. NRCan, NRC and CMHC have long-running programs in partnership with industry stakeholders to stimulate research, validate technology and demonstrate results. The temperature extremes of the Canadian climate have inspired research and development of energy-efficient heating and cooling systems and building methods. There is an opportunity to export this technology and product around the world. There is a need to promote these technologies in the domestic market in order to increase demand and make new sustainable building materials and technologies competitive.

- Sustainable construction materials and technologies are an affordable and preferred option for new home construction and renovations. (*Measured by sales.*)
- Sustainable energy sources for buildings are competitive in price and availability with traditional non-renewable energy. (*Measured by survey.*)
- Increase sales of sustainable construction materials and technologies developed in Canada in global markets. (*Measured by sales.*)



Waste Reduction

- Waste from the demolition and construction sector is reduced by 50% by 2015. (Measured by *Statistics Canada surveys*.)

4.4 POLICY INITIATIVES

As noted in Section 3, SCP frameworks include a range of mechanisms/activities: enabling policies and programs; engagement activities; activities/mechanisms designed to encourage SCP; and activities that exemplify SCP. The following provides illustrative examples in each of these areas for the building and construction sector.

Enabling Initiatives

Work with banks and other lending institutions to develop guidelines for evaluating new buildings which utilize sustainable construction technologies and materials. The goal is to ensure that the use of new technologies is not penalized by lending institutions due to a lack of understanding.

Provide tools for lending institutions to evaluate total cost of ownership of buildings.

Promote the application of life-cycle concepts and decision-support tools for all major infrastructure projects to identify opportunities to improve the sustainability of different design options.

Implement the Model National Energy Code for Buildings (2011) to provide the Canadian construction sector with a single source of minimum requirements for energy efficiency in buildings.

Incorporate sustainable design and analysis tools into the education and training of engineers and architects.

Improve the training of building designers and architects to include consideration of design for environment and reuse of materials

Provide training and awareness for construction professionals and skilled trades to encourage reduction of materials used, as well as reuse and recycling in project implementation.

Continue efforts to develop a Building Energy Use label.

Make greater use of Canmet Canadian Centre for Housing Technology to evaluate and demonstrate energy technologies for housing. Utilize successful technologies in federally funded projects.

Encouraging Initiatives



Link all funding provided by the federal government for new building construction or renovation to strict energy, water and environmental performance criteria.

Provide grants and financial incentives for use of sustainable energy technologies in institutional and commercial buildings. Promote the success of these technologies in improving environmental performance.

Continue the ecoENERGY grants program to provide incentives for home owners, small and medium-sized business and industrial facilities to improve the energy performance of their facilities.

Link permit/approvals process to energy and environmental performance of the facility.

Institute carbon trading or carbon penalties to provide incentives to improve energy performance.

Require LEED certification for publically funded institutional buildings.

Increase costs for traditional disposal of construction waste.

Require that all new federal building projects meet LEED performance criteria.

Ensure clients, especially public clients, take the lead in promoting sustainability in construction and the built environment through their procurement efforts.

Implement the Federal Buildings Initiative for renovations to federal buildings.

Exemplary Initiatives

Urban revitalization projects and social housing retrofits provide an opportunity to demonstrate energy-efficient design and materials while improving the living environment for people. The federal government will link funding to projects that can demonstrate environmental performance of the buildings and technology used.

Build on existing programs, such as the Canmet Net-Zero House project and FPInnovations, to demonstrate and promote sustainable building materials and technology.

Engagement Initiatives

Work with the Green Building Council to promote LEED.

Build on the Eco-industry networks model to bring stakeholders together on industrial planning and redevelopment.

Further develop mechanisms to promote successful building energy technologies in the international marketplace.



Develop a deeper understanding of international progress in SCP and sustainable construction in order to develop and market needed materials and technology.

Develop programs with trade associations in regional areas to build networks and infrastructure support for reuse of construction material.

5. POTENTIAL NEXT STEPS

1. Assemble documentation supporting sustainable consumption and production in the Canadian context. From this, prepare the business case to support a framework for SCP in Canada and North America.
2. Engage with leaders of Canadian industry, consumer groups and the federal government to obtain their endorsement and solidify their respective roles in the SCP framework process.
3. In preparation for the 2009 regional Canada–US meeting on Sustainable Consumption and Production, conduct a more extensive consultation on the proposed framework. The purpose of the consultation would be to develop a vision, objectives, measures and (where appropriate) targets for a Canadian SCP framework. Stakeholders should also be asked for their perspectives on priority sectors for a comprehensive framework and to consider how the framework might be elaborated for horizontal issues such as eco-innovation.
4. Build on the example of a framework for the building and construction sector by consulting with stakeholders in this sector to develop a more comprehensive sector framework.



APPENDIX A: EU SCP ACTION PLAN - BETTER PRODUCTS AND SMARTER CONSUMPTION

The European Union is committed to moving towards an energy- and resource-efficient economy. The following information, drawn from the EU action plan, shows how SCP fits into this overall vision.

Rationale

“Sustainable consumption and production maximises business' potential to transform environmental challenges into economic opportunities and provides a better deal for consumers. The challenge is to improve the overall environmental performance of products throughout their life-cycle, to boost the demand for better products and production technologies and to help consumers in making informed choices.”

Process Aspects

Proposals introduced in July 2008 will build on existing EU initiatives and measures and fill gaps where gaps have been identified. The proposals follow a multi-stakeholder consultation and are integral to the EU Sustainable Development Strategy. The SCP Action Plan is also linked to the EU Sustainable Industry Policy.

Elements of the Plan

Smarter Consumption

- Labelling
 - Expanded range for products covered by the EU EcoDesign.
 - Expanded range for The Energy Labelling Directive.
 - Streamlined process for The Ecolabel.
- Public procurement – Regulatory and voluntary measures for public procurement for EU members (linked to Ecolabel).
- Consistency of data and methods related to products.
- Work with retailers to influence more sustainable consumption through their own operations, supply chains and consumer behaviour.
- EU support for actions to increase consumers' awareness and help them to make more informed choices.

Better Production

- Resource efficiency - Further tools will be developed to monitor, benchmark and promote resource efficiency, taking into account a life-cycle perspective and including trade.
- Supporting eco-innovation - Tools will be developed to monitor, benchmark and boost eco-innovation and its uptake in the EU.



- Technology verification - An EU-wide environmental technology verification scheme will be established to provide reliable third-party verification of the performance and the potential impacts on the environment of new technologies.

Enhancing the environmental potential of industry

- Revising EMAS (Eco-Management and Audit Scheme) Regulation to increase the participation of companies, and reduce the administrative burden and costs to SMEs.
- Developing industrial policy initiatives for environmental industries to further the competitiveness of environmental industries and favour their uptake by traditional industries.

Helping Small to Medium Enterprises (SMEs)

- Measures to support European SMEs, including the improvement of their environmental performance will raise awareness and disseminate know-how and expertise gained through other EU programmes and initiatives in the field of environment and energy.
- Work toward global markets for sustainable products
- Efforts in various international fora focused on climate change, trade and sustainability.



APPENDIX B: EXAMPLE INDICATOR SET (UK) ¹²	
Indicator Topic	Indicator Topic
Greenhouse gas emissions <i>e.g. Kyoto target and CO2 emissions, 1990 to 2012.</i>	Waste <i>e.g. Waste arisings by sector, 1998-99 to 2002-03.</i>
Carbon dioxide emissions by end user <i>e.g. CO2 emissions from industry, domestic, transport sectors (excluding international aviation and shipping), 1990 to 2005.</i>	Household waste per person <i>e.g. Recycled or composted, 1991-92 to 2005-06.</i>
Aviation and shipping emissions <i>e.g. Greenhouse gases from UK-based international aviation and shipping fuel bunkers, 1990 to 2005.</i>	Agriculture sector <i>e.g. Fertiliser input, farmland bird population, ammonia and methane emissions and output, 1974 to 2006.</i>
Household energy use <i>e.g. Domestic CO2 emissions, domestic energy consumption and household spending, 1990 to 2005.</i>	Land recycling <i>e.g. New dwellings built on previously developed land or through conversions, 1990 to 2006.</i>
Road transport <i>e.g. CO2, NOx, PM10 emissions from road transport and Gross Domestic Product, 1990 to 2005.</i>	Fish Stocks <i>e.g. Sustainability of fish stocks around the UK, 1998 to 2005.</i>
Private cars <i>e.g. Private car CO2 emissions, car-kilometres and household spending, 1990 to 2005.</i>	Emissions of air pollutants <i>e.g. NH3, NOx, PM10 and SO2 emissions and GDP, 1990 to 2005.</i>
Road freight <i>e.g. Heavy Goods Vehicle (HGV) CO2 emissions, freight moved and Gross Domestic Product, 1990 to 2005.</i>	River quality <i>e.g. Rivers of good biological quality, 1990 to 2005.</i>
Manufacturing sector <i>e.g. CO2, NOx, SO2, PM10, emissions and output, 1990 to 2005.</i>	Economic growth <i>e.g. Gross Domestic Product, 1990 to 2006.</i>
Service sector <i>e.g. CO2, NOx emissions and output, 1990 to 2005.</i>	Productivity <i>e.g. International comparisons of productivity growth, 1991 to 2005.</i>
Public sector <i>e.g. CO2, NOx emissions and output, 1990 to 2005.</i>	Investment <i>e.g. Total investment and social investment relative to GDP, 1990 to 2006.</i>
Resource use <i>e.g. Domestic Material Consumption and Gross Domestic Product, 1990 to 2005.</i>	Demography <i>e.g. Population and population of working age, 1970 to 2006.</i>
Water resource use <i>e.g. Total abstractions from non-tidal surface and ground water, leakage losses and Gross Domestic Product, 1990 to 2005.</i>	Households and dwellings <i>e.g. Households, single person households and dwelling stock, 1971 to 2004.</i>
Domestic water consumption <i>e.g. Litres per person per day, 1995 to 2005.</i>	

¹² <http://www.defra.gov.uk/sustainable/government/progress/national/index.htm>