



# **Enhancing the Recovery of End-of-life Roofing Materials: *An Implementation Plan***

Canadian Construction Innovation Council  
Natural Resources Canada

March 2007

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Canada 

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## Acknowledgements

### Government of Canada Climate Change Mitigation Program

**Enhanced Recycling, Government of Canada Climate Change Mitigation, Minerals and Metals Program** — is managed by the Minerals and Metals Sector of Natural Resources Canada, which is working towards reducing Canada's greenhouse gas (GHG) emissions from the minerals and metals sector. By matching funds with other partners, this program supports initiatives that enhance recycling practices and provide GHG emission reductions.

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## Executive Summary

The recovery of end of life roofing materials is part of a broader challenge of reducing and diverting our waste. This is a North American challenge with important lessons that can be learned from best practices right across the continent.

According to the Athena Institute's briefing paper on *Enhanced Recovery of Asphalt Based Roofing Materials*, January 2007, 6 to 9 million tonnes of tear-off shingles are discarded every year in the United States and 1.25 million tonnes of asphalt based roofing materials are generated annually in Canada. If in Canada, 5% end-of-life roofing scrap could be substituted for virgin asphalt concrete this would produce an annual savings of 900,000 tonnes of GHG emissions. Currently in North America most of this material is ending up in municipal and private construction and demolition landfills.

In late 2006, Natural Resources Canada engaged the Canadian Construction Innovation Council to develop a national implementation plan for increasing the recovery of end-of-life roofing materials from the residential and Industrial, Commercial and Institutional (ICI) roofing industries. One of the key drivers in developing this plan was a multi-stakeholder workshop that took place in Toronto on February 19 and 20, 2007 which brought together experts from across Canada and the U.S. to look at options for environmentally sound recycling of these materials. Some key recycling applications discussed, include road surfaces, energy recovery and other open and closed loop recycling options which can be implemented over the next 3 to 4 years.

Future action on enhancing the recovery of end-of-life roofing materials will be driven by three key drivers:

1. the large volume of construction waste that is currently disposed of by landfilling;
2. the potential benefits in terms of reduced greenhouse gas emissions from the diversion of end of life roofing materials to other purposes other than landfill; and
3. the increasingly limited availability of landfill space in general which will drive communities to greater levels of waste diversion and management.

The enhanced recovery of end-of-life roofing material will have to address the technological, economic and social/market acceptance barriers and challenges.

To move forward on these challenges an industry led consortium with participation from the public and private sectors will be required. Industry could provide the ongoing leadership and coordination role with support from and participation by the federal government and, potentially, provincial and municipal partners. A key enabler of this leadership will be the provision of an ongoing operating budget. Industry leaders that are impacted by this initiative, including companies that are early movers in this area, may also be willing to contribute either funding or in-kind support to the effort.

Governments will have a critical role to play in supporting and enabling this consortium. Provincial governments are starting to get concerned about the high tonnages and volumes finding their way into landfills and some provinces have drafted legislation to address this issue. The Canadian Council of Ministers of the Environment (CCME) recently hosted a series of meetings in Charlottetown regarding Extended Producer Responsibility (EPR) and how the provinces can harmonize future regulations.

Although not specifically focused on construction and demolition wastes, a list of materials was compiled (includes used asphalt shingles) in which EPR can apply. EPR is intended to place the responsibility for the life-cycle environmental performance of a product onto the producer.

Within the next few months the federal government should work with industry partners to identify and support key research needs and projects. The federal government should also work with willing provinces and industry partners to develop a set of trial projects. The federal government should work with willing industry and provincial partners to develop a set of regulatory best practices that could be trialed on a regional basis. In addition the federal government should consult with the US Environmental Protection Agency as they develop their implementation plans.

Industry should take the lead, supported by government, to develop a database of best practices (that is available to interested parties) and to ensure that there are ample opportunities for stakeholders to meet and exchange ideas. A case study should be undertaken of the Halifax model to see if it is more broadly applicable.

All stakeholders should work together to develop a set of common messages in order to be able to shift perceptions from a waste to products. One important step would be to develop a set of national standards on the classification of materials as a valid product in its own right instead of as 'waste' in order to enable wider public acceptance.

## **1.0 Overview**

In late 2006, Natural Resources Canada engaged the Canadian Construction Innovation Council to develop an implementation plan for increasing the recovery of end-of-life roofing materials from both the residential and Industrial, Commercial and Institutional (ICI) roofing industries. This plan was to be developed through extensive consultations with members of the construction and roofing industry as well as associated government and non-governmental organizations, manufacturers, waste management and recovery organizations and potential users of end-of life waste products.

One of the key components in the consultation process to develop this plan was a multi-stakeholder workshop that took place in Toronto on February 19 and 20, 2007 (please Annex I for the Meeting Agenda and Annex II for a list of participants). There were two primary goals for this session,

1. To identify strategies to shift the flow of materials from end of life roofing materials away from landfill to applications where value can be obtained.
2. To examine strategies to decrease the negative impacts on the environment caused by the disposal of spent roofing materials (asphalt) in a cost effective manner for consumers or disposal for contractors.

The input from the workshop was to be used to develop an implementation plan for increasing the recovery of end-of-life roofing materials and the corresponding GHG emission reductions.

The workshop attracted over fifty participants from across Canada and the United States. There was recognition both that the recovery of end of life roofing materials was part of a broader challenge of reducing and diverting our waste and that this is a North American challenge with important lessons that can be learned from best practices right across the continent.

The key outcomes from the session were to identify and capture:

1. Key barriers and challenges to enhancing the value of recovered roofing materials.
2. Strategies to overcome these challenges.
3. A practical work plan to implement these strategies over the next three to four years.

This report provides a basic summary of the key issues and challenges that were identified at the session and outlines the implementation plan going forward to address these challenges.

## 2.0 Key Issues

In general, there are three categories of barriers and challenges in relation to enhancing the recovery of end-of-life roofing material,

1. Technological
2. Economic
3. Social/Market Acceptance

During the session stakeholders identified a number of key issues that will need to be addressed in each of these categories as we move towards a more integrated approach to recovering end-of-life roofing materials. The most important issue that was identified was the need to reduce the level of uncertainty and risk associated with the recovery of roofing materials. This was a theme throughout the session.

These issues are outlined in Table 1 (below).

**Table 1: Key Issues to Address to Enhance the Recovery of End-of-life Roofing Materials**

Technical Issues	Economic Issues	Social Issues
<p><b>1. Training and Education</b></p> <ul style="list-style-type: none"> <li>• Learning from other industries</li> <li>• Training to address regulations</li> <li>• Training to improve processes</li> </ul>	<p><b>1. Cost</b></p> <ul style="list-style-type: none"> <li>• Is it economic for rural communities to recycle (transportation costs)?</li> <li>• Can we drive down the processing cost (shredding)?</li> <li>• What is the Lifecycle impact of recycling versus disposal?</li> </ul>	<p><b>1. Licence to Operate</b></p> <ul style="list-style-type: none"> <li>• Limit the use of landfills to dispose of roofing materials (get rid of cheap disposal options)</li> <li>• Ban shingles outright from landfills</li> </ul>
<p><b>2. Process</b></p> <ul style="list-style-type: none"> <li>• Storage of shingles in a social acceptable manner</li> <li>• Reducing emissions</li> <li>• Original manufacturers options for reuse</li> <li>• Less waste in original manufacturing</li> </ul>	<p><b>2. Value Proposition</b></p> <ul style="list-style-type: none"> <li>• What is the best way to increase the value of recovered materials (standardized markets, etc)</li> <li>• How will decisions in Canada impact the competitiveness of Canadian</li> </ul>	<p><b>2. Acceptance</b></p> <ul style="list-style-type: none"> <li>• How do we build acceptance of new applications and in new markets?</li> <li>• How do we get the industry to prioritize recycling?</li> <li>• How do we recognize and support leadership</li> </ul>

<ul style="list-style-type: none"> <li>• Less waste in the construction process</li> <li>• Responding to changes in industry standards</li> </ul>	<p>shingles in international markets?</p>	<p>in the field?</p>
<p><b>3. Quality Control</b></p> <ul style="list-style-type: none"> <li>• Reducing contamination</li> <li>• Ensuring common quality/standards for tearoffs</li> <li>• Certification of origin for tearoffs</li> <li>• Ensuring that there is no asbestos present</li> </ul>	<p><b>3. Risk Mitigation</b></p> <ul style="list-style-type: none"> <li>• How do we mitigate the increased risk (and hence cost) associated with using recycled versus virgin materials?</li> </ul>	<p><b>3. Behaviour Change</b></p> <ul style="list-style-type: none"> <li>• How do we overcome NIMBY?</li> <li>• How do we change perceptions of waste to consider it a resource?</li> <li>• How do we implement a stewardship model?</li> </ul>
<p><b>4. Research and Development</b></p> <ul style="list-style-type: none"> <li>• How do we develop and sustain collaborative R&amp;D?</li> <li>• Can we design roof systems to enhance recycling options?</li> </ul>	<p><b>4. Appropriate Disposal Options</b></p> <ul style="list-style-type: none"> <li>• How do we ensure the pricing structure is such that companies make the appropriate disposal decision?</li> </ul>	<p><b>4. Communication</b></p> <ul style="list-style-type: none"> <li>• How do we market post consumer products</li> <li>• How do we share best practices in the private sector?</li> </ul>
<p><b>5. Performance</b></p> <ul style="list-style-type: none"> <li>• Can we enhance service life?</li> <li>• How do we test and validate the performance of recycled product?</li> <li>• Can we measure the GHG impact of recycling?</li> <li>• Can we develop standards and measurements for tearoffs?</li> </ul>	<p><b>5. New Markets</b></p> <ul style="list-style-type: none"> <li>• How do we expand the market for recycled roofing products?</li> <li>• How do we foster competition in the market?</li> </ul>	<p><b>5. Regulatory and Policy</b></p> <ul style="list-style-type: none"> <li>• Worker safety</li> <li>• Build appropriate regs to drive behaviour</li> <li>• Implement the Nova Scotia model</li> <li>• Provide tax incentives for recycling</li> <li>• Put in place penalties for negative behaviour</li> <li>• Recognize energy recovery as a viable end-of-life solution</li> <li>• How do we ensure compliance and enforcement?</li> </ul>

One key horizontal issue that cuts across all three of these areas that was identified was the need to share best practices across the roofing and recycling industries.

## 2.1 Potential End Markets

Stakeholders were asked to look at these issues in the context of the three primary markets for end-of-life roofing materials as outlined in Table 2 (below).

**Table 2: Potential End Markets for Recovered Roofing Materials**

End Market	Considerations
<b>1. Transportation Surfaces</b>	<ul style="list-style-type: none"> <li>• has to be able to provide a consistently high quality of products</li> <li>• shouldn't adversely impact on the economics; strive for economic benefit</li> </ul>
<b>2. Energy Recovery</b>	<ul style="list-style-type: none"> <li>• considered by some to be the 'lowest hanging fruit'</li> <li>• perceived environmental impacts from incineration</li> </ul>
<b>3. Other Uses – Closed Loop and Open Loop</b>	<ul style="list-style-type: none"> <li>• must be of similar or better quality to original roofing material</li> <li>• must be cost competitive with original roofing materials</li> <li>• could be used in other applications such as trails or rural roads and others</li> </ul>

Stakeholders at the session broke into three groups to discuss the following questions in relation to each of these markets:

1. Who are the key stakeholders in relation to this market?
2. What are their key objectives?
3. What needs to change in the current system to achieve these objectives?

### 2.1.1 Transportation Surfaces

The transportation surfaces group identified a broad range of key stakeholders that must be engaged to enable recycled roofing materials to successfully enter this market. These stakeholders and their key issues and objectives are outlined in Table 3 (over).



**Table 3: Key stakeholders in the Transportation Surfaces Market**

Stakeholders	Objectives/Concerns
1. Road builders contractors	<ul style="list-style-type: none"> <li>• Product that meets specifications</li> <li>• Environmental concerns</li> <li>• Lower cost</li> <li>• Worker safety</li> </ul>
2. Government road authorities	<ul style="list-style-type: none"> <li>• Long term performance</li> <li>• Lower life cycle cost</li> <li>• Environmental</li> </ul>
3. Tax payer	<ul style="list-style-type: none"> <li>• Quality of the road surface not compromised</li> </ul>
4. User	<ul style="list-style-type: none"> <li>• Safe dependable uniform roads</li> <li>• Long life</li> </ul>
5. Private owners – roads, parking lots, driveways, etc	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Performance</li> <li>• Shorter term horizon than government</li> </ul>
6. Researchers and Developers	<ul style="list-style-type: none"> <li>• Clear research needs</li> <li>• Enhanced technical performance</li> <li>• New process technologies</li> </ul>
7. Hot mix asphalt companies	<ul style="list-style-type: none"> <li>• Develop new specifications</li> </ul>
8. Asphalt suppliers	<ul style="list-style-type: none"> <li>• Specifications</li> <li>• Lower cost</li> <li>• Volume of sales</li> </ul>
9. Concrete Suppliers	<ul style="list-style-type: none"> <li>• Increased sales</li> <li>• Lower cost</li> <li>• GHG reduction</li> </ul>
10. Aggregate suppliers	<ul style="list-style-type: none"> <li>• New business opportunities</li> <li>• New source of products</li> </ul>
11. Policy Makers o government for the Environment	<ul style="list-style-type: none"> <li>• Reduce GHG</li> <li>• Reduce the amount of virgin extraction of raw materials</li> <li>• Fiscal instruments to encourage recycling and improve economic performance</li> </ul>
12. Regulators - Standards	<ul style="list-style-type: none"> <li>• Reduce environmental footprint</li> <li>• Encourage recycling</li> <li>• economic performance</li> </ul>
13. Tire and Auto manufacturers	<ul style="list-style-type: none"> <li>• Same as user</li> </ul>
14. Equipment manufacturer for road builders	<ul style="list-style-type: none"> <li>• Increased sales</li> <li>• R&amp;D for new equipment to better apply revised HMA</li> <li>• Changed standards</li> </ul>
15. Sources of supply for recycled materials	<ul style="list-style-type: none"> <li>• Steady market for product</li> <li>• Collection of product - haulers</li> </ul>

<b>16. Waste management authorities</b>	<ul style="list-style-type: none"> <li>As part of waste management have recycling as a key part of the strategy</li> </ul>
<b>17. Road testers</b>	<ul style="list-style-type: none"> <li>Provide feedback on technical integrity of roads</li> </ul>
<b>18. Designers</b>	<ul style="list-style-type: none"> <li>Mitigation of liability concerns</li> </ul>

### 2.1.2 Energy Recovery

The group looking at energy recovery took a different approach to identifying and overcoming barriers to market entry. They looked at the issue from the perspective of material flows. They began with the recovered material (asphalt shingle tear-offs) and looked at each of the barriers, in order, to convert this material into energy. The key barriers they identified are captured in Table 4 (below).

**Table 4: Key Barriers to Energy Recovery**

Barrier	Type	Description
<b>1. NIMBY</b>	Regulatory/Social	<ul style="list-style-type: none"> <li>I don't want a waste disposal facility in my town</li> <li>The cost of tipping fees and, potentially, a regulatory requirement to divert shingles could help to overcome this challenge.</li> </ul>
<b>2. Transportation</b>	Economic	<ul style="list-style-type: none"> <li>How do we ensure that there aren't prohibitive transportation costs to get the tear-offs to the processing facility?</li> </ul>
<b>3. Separation</b>	Technical	<ul style="list-style-type: none"> <li>How do we separate the tear-offs into the components that we want to use for energy recovery and the remaining materials (wood, nails, etc)?</li> </ul>
<b>4. Environmental Impact</b>	Technical/Regulatory	<ul style="list-style-type: none"> <li>How do we mitigate the environmental impact of combusting the materials to recover the energy value?</li> </ul>
<b>5. Impact of New Fuel Source</b>	Technical	<ul style="list-style-type: none"> <li>How do we reduce the cost of substituting the recovered end-of-life roofing material as a new fuel?</li> <li>Are there additional equipment costs?</li> <li>Is there a need to adapt existing</li> </ul>

		<p>technologies?</p> <ul style="list-style-type: none"> <li>• Can we support ongoing R&amp;D and process improvement?</li> <li>• The total cost of the feedstock for the energy user is a critical determinant of longer term feasibility</li> </ul>
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### 2.1.3 Other Uses

The group that looked at other uses focused on two primary options,

1. Closed Loop – Using recycled shingles in the manufacture of new shingles
2. Open Loop – Using recycled shingles in other applications such as sheeting, soundboard, interlocking blocks, highway barriers etc.

Table 5 (below) describes the challenges associated with the closed loop system.

**Table 5: Challenges and Barriers in a Closed Loop**

Stakeholders	Roles	Barriers	Research and Development
<b>1. Pre-processing</b>	Preparation of recycled materials	<p>Composition of feedstock (fibreglass and asphalt)</p> <p>Cost in comparison with virgin</p> <p>Deterioration of recycled materials</p>	Separate materials (granulate)
<b>2. Original Manufacturers</b>		<p>Quality</p> <p>International Competitiveness</p>	Manufacture for recyclability
<b>3. Suppliers</b>		<p>Ensure high quality</p> <p>Market Acceptance</p>	
<b>4. Roofers</b>		Product Acceptance	
<b>5. Regulators</b>	<p><i>Federal</i> – building codes, incentives</p> <p><i>Provincial</i> – building codes</p> <p><i>Municipal</i> - disposal, health and safety</p>		

Given the technical challenges (degraded tar paper, oxidation, etc) the working group concluded that right now it is cheaper and easier for companies to use virgin materials than to try and re-use recycled shingles in a closed loop manufacturing system. Other applications such as energy recovery and transportation surfaces can use a lower grade of asphalt and can implement a more economically feasible business plan to make use of end-of-life roofing materials.

### 3.0 Moving Forward: The Implementation Plan

The key outcome of the stakeholder session was to develop an implementation plan going forward. During the session stakeholders were divided into three groups to help to develop an action plan to look at one of,

1. Economic Issues
2. Technical Issues
3. Regulatory Issues

In each of the three potential end markets. The format of the discussion was to identify,

1. The key results that are desired
2. The actions that should be undertaken to address these results
3. Key indicators of success
4. The deadlines for action
5. who should be responsible for the success of this activity

These result areas are summarized in Table 6 (below).

**Table 6: Key Result Areas**

Key Result	Action	Indicator	Deadline	Accountability
<b>1. Technology</b>				
To explore designs of roofing systems for increased recycling at the roofing manufacturer point	By designing for longer life By designing for easier recovery of components			
To identify the components of end-of-life roofing material , characterize them and determine possible secondary markets for each component	By analysing the waste material in selected waste management areas			

Key Result	Action	Indicator	Deadline	Accountability
	<p>By reviewing manufacturers information on the composition of the roofing materials over the past 50 years</p> <p>By looking at where the components might be used regionally across Canada – local aspects</p>			
<p><b>Energy</b> To identify existing energy recovery opportunities for the use of roofing materials as compared to other fuels</p>	<p>By identifying criteria for the selection of opportunities</p> <p>By determining the BTU value of the recovered material</p> <p>By investigating ways to increase the BTU value of recovered material</p> <p>By identifying impact on emissions</p> <p>By having a fuller understanding of the impact of the energy replaced (GHG and others)</p> <p>By identifying GHG emissions reductions per tonne and having in place a measurement system which could be used if emissions trading is introduced.</p>			
<p><b>Road Surface</b> To ensure that the quality of Hot Mixed Asphalt is not reduced</p>	<p>By characterizing the composition of the waste stream</p> <p>By identifying the components from roofing waste that can be used in HMA</p>	<p>Information on waste from each landfill List and % of products in waste</p>		

Key Result	Action	Indicator	Deadline	Accountability
	<p>By changing the design specs of the composition of HMA to accept more roofing waste</p> <p>By further researching the amount of roofing waste that can be used in HMA</p>			
<p><b>Building materials</b> To identify classes of potential building products or applications where roofing waste might be used</p>	<p>By conducting market research into products that use the components or share the characteristics of the components of roofing waste</p> <p>By benchmarking other countries that use asphalt based roofing systems</p> <p>By stimulating innovation</p>	<p>List of products or applications</p> <p>List of Practices</p> <p>Number of New Products</p>		
<b>2. Economic</b>				
<p>To have a full knowledge of the SYSTEMS required to reach various markets</p>	<p>By fully understanding the players in the system</p> <p>By fully understanding the costs in the system</p> <p>By fully understanding the steps and materials conditions about the value chain</p> <p>By determining distances to processing facilities and increasing the availability of processing facilities</p> <p>By determining future requirements</p>			
<p>To determine the cost of using these materials versus current incumbent sources</p>	<p>By determining the true energy and other values of spent shingles</p>			

Key Result	Action	Indicator	Deadline	Accountability
To document success	By developing case studies  By developing pilots that can be studies			
To fully understand the other options handling this material	By looking at options like energy use  By understanding the environmental and ecological impacts of burial			
To get full credit for GHG betterments	By developing a baseline  By developing a reporting and verification system  By determining attribution of the emissions reductions along the chain			
To ensure that no harm is caused to the industry and its works	By identifying adverse consequences  By measuring adverse consequences  By laying some misconceptions to rest			
To determine the transition costs and strategies that will not damage the existing industry	By determining the costs of new systems and measures to existing industry			
To develop financial incentives for all parties in the value chain to be at the table to solve problems in the system	By developing governmental economic incentives			
To have a standard product that is accepted and approved i.e., ensuring that there is no discrimination across technologies				
To develop rewards for different behaviour	By having LEED credit and other forms of green certification for the diversion of spent roofing materials			

Key Result	Action	Indicator	Deadline	Accountability
To determine a way to ensure that deferring the challenge is not an option	By developing technologies to make shingles last longer			
To determine if the total alternative market that is accessible will take all of our spent roofing materials	By developing an economic white paper By developing a local economic model			
<b>Energy</b> To have a full understanding of the by-products after combustion	By determining if we are creating any hazardous outcomes			
<b>3. Social and Regulatory</b>				
To generate a high level of awareness and education among the public about the recovery of end-of-life building materials	By clearly communicating the economic benefit By supporting a federal social marketing program By ensuring that there is provincial input on the program By clearly communicating the environmental benefits By ensuring that all levels of government are involved By packaging sets of numbers and statistics to ensure that the business case is made effectively By developing information that is publicly accessible and directly applicable to the public's lives By making best practices available to individuals By including manufacturers and industry associations in the plan			



Key Result	Action	Indicator	Deadline	Accountability
To reduce political hurdles to use residual materials	<p>By encouraging public engagement of politicians</p> <p>By developing a beneficial use permitting process or standard (international best practice)</p> <p>By clearly articulating the benefits for politicians</p> <p>By providing federal guidance on the use of residual materials</p>			<p>NFP and Industry</p> <p>Provincial government</p>
To use regulation to drive market development	<p>By setting minimum recycled content standards</p> <p>By banning from landfills</p> <p>By establishing tax incentives to change behaviour</p> <p>By using regulation as a tool to build markets</p> <p>By using the building code to drive performance standards</p>			<p>Provincial government, CSA</p> <p>Federal</p> <p>Provincial</p>
To encourage innovation by inviting bids for least cost and environmentally acceptable solutions	<p>By providing incentives for innovation</p> <p>By supporting pilot projects</p> <p>By encouraging or enhancing the role of CCMC</p> <p>By redefining definitions of what is waste and what is a residual product</p>			
To develop an integrated approach that clearly articulates the full range of actions	<p>By ensuring that the outcomes of this session are integrated into general use</p> <p>By encouraging widespread adoption of the Nova Scotia model</p>			

Key Result	Action	Indicator	Deadline	Accountability
	By ensuring the regulators provide a mix of incentives and regulations  By identifying an ongoing champion or leader			

As is often the case in multi-stakeholder sessions, many key results and appropriate actions were identified without much focus on the indicators of success, deadlines and accountabilities.

## 4.0 Conclusion

Overall there was recognition that future action on enhancing the recovery of end-of-life roofing materials will be driven by three key drivers:

1. The large volume of construction waste that is currently disposed of by landfilling;
2. The potential benefits in terms of reduced greenhouse gas emissions from the diversion of end of life roofing materials to other purposes other than landfill; and
3. The increasingly limited availability of landfill space in general which will drive communities to greater levels of waste diversion and management.

On the basis of these three drivers, participants expressed a lot of interest in developing an implementation plan going forward. So what does the implementation plan look like?

Stakeholders at the session were strong at identifying general actions that need to be taken but did not identify the key indicators and individuals who would take responsibility for moving forward. In general, however, there were five key types of activities that should be initiated within the next few months to precipitate action.

These five activities are summarized in Table 7 (below)

**Table 7: Implementation Plan**

Activity	Who	Description	Next Steps
<b>1. Trials and Case Studies</b>	Government Industry	There was general agreement that it is critical to continue to develop and implement real world trials to test out new applications, to develop new markets, and to reduce the risk for companies to implement new technologies using recovered materials.  It is also critical to learn from and implement the outcomes of existing projects.	The federal government should work with willing provinces and industry partners to develop a set of trial projects.
<b>2. Research and Development</b>	Government Industry	There is a real need to continue research into the types of processing that are needed to create a standard post-market product from end-of-life materials, and to address other barriers like material separation.  It is particularly important to continue work on flat-roof end-of-life materials.	The federal government should work with industry partners to identify and support key research needs and projects.

<p><b>3. Best Practices and Business Models</b></p>	<p>Industry Associations</p>	<p>It is critical for all stakeholders along the end-of-life materials value chain to fully understand the business model to ensure viability and profitability. It is also critical to share best practices among industry and among all stakeholders</p>	<p>Industry should take the lead, supported by government, to develop a database of best practices that is available to interested parties and to ensure that there are ample opportunities for stakeholders to meet and exchange ideas through events such as the workshop which should be made into an annual event.</p>
<p><b>4. Incentives and Regulation</b></p>	<p>Government</p>	<p>In the end, end-of-life materials recovery is likely to be driven primarily by regulation. It is important to involve all levels of government and all stakeholders in the development of appropriate regulations and to ensure that regulations are balanced with appropriate incentives and an understanding of the international nature of the roofing market.</p>	<p>A case study should be undertaken of the Halifax model to see if it is more broadly applicable.</p> <p>The federal government should work with willing industry and provincial partners to develop a set of regulatory best practices that could be trialed on a regional basis.</p> <p>The federal government should consult with the US EPA as they develop their implementation plans</p>
<p><b>5. Communication and Education Strategy</b></p>	<p>All</p>	<p>Education and communication will be critical for the longer acceptance of the use of end-of-life materials by the general public.</p> <p>The US Environmental Protection Agency has indicated its willingness to share a web site dedicated to enhanced recovery of roofing materials.</p>	<p>All stakeholders should work together to develop a set of common messages in order to be able to shift perceptions from a waste to products.</p> <p>One important step would be to develop a set of national standards on the classification of materials as a valid product in its own right instead of as 'waste' in order to enable wider public</p>

			<p>acceptance.</p> <p>Arrange with the US EPA the sharing and expansion of the existing web site.</p>
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While it was identified at the workshop that roofing materials provides a viable opportunity for enhanced recovery at their end-of-life, with its high intrinsic value and potential uses in other material and as a fuel source, there is a significant need to take specific steps to get governments to pay attention to this issue amongst all of the other issues that are vying for their attention. Consequently a communications plan is vital to any movement in this area.

The key components of this communications plan would be as follows:

**A. Audience:**

- *Who is the primary audience?*

Feedback at the session indicated that the primary audiences would have to be at the provincial and municipal levels. First movers will be those jurisdictions that have the most pressing challenge for example Ontario and the GTA region.

Nova Scotia has taken the lead in implementing regulations that enable the diversion of end of life roofing materials from landfill. Other potential early movers could include Ontario (landfill space scarcity, climate change, energy) ahead of the provincial election. Alberta could also be a useful first mover.

Jurisdictions which are facing an impending landfill shortage and that have implemented aggressive waste diversion targets may be particularly interested in taking action. Given the pressures currently facing the Greater Toronto Area there is a very real possibility that there could be strong interest at the municipal level in moving forward with test cases and pilots.

- *Which governments (federal, provincial, municipal) and why?*
- *Which departments and why?*
- *Which individuals and why?*

One of the first tasks in developing the communications campaign will be to identify and engage key stakeholders, to identify their needs and interests and to connect key players in each sector and region to begin to move forward with solutions.

**B. Messenger:**

- *Who is to deliver the messages?*

In this case the people delivering the message do not necessarily have had to have been at the workshop. It is critical, however, to identify and task a set of messengers who have accountability for the success of delivering the message.

It was suggested that what is needed is probably a consortium approach with participation from the public and private sectors. It was suggested that the Canadian Construction Innovation Council could play an ongoing leadership and coordination role with support from and participation by the federal government and, potentially, provincial and municipal partners. There was recognition that a key enabler of this leadership will have to be the provision of an ongoing operating budget. Industry leaders that are impacted by this initiative, including companies such as Lafarge that are early movers in this area, may also be willing to contribute either funding or in-kind support to the effort.

Ideally the spokesperson for the consortium would be someone who wants to make a business out of handling/processing spent shingles (for instance, ideally you would want someone of the stature of a Jeff Westeinde, CEO of Quantum Murray, Ontario's largest demolition and Canada's pre-eminent Brownfield remediation company)

Resourcing will be a key issue. If this process is to move forward there must be a commitment to provide ongoing funding and in kind support to those taking action.

#### **C. Message:**

- *Once we have got their attention what are we going to ask them to do (specifically)*
- *What solutions do we have to offer (specifically)?*

There is a strategic decision to be made around which messages to bring forward to which stakeholders. These decisions will need to be made with ongoing involvement from stakeholders in every sector and coordinated by the designated messenger.

It is critical that this process and the message that is brought forward continues to support early action and further research and development efforts.

#### **D. Tools and Venues:**

- *What communications tools are we going to need to develop?*
- *What support data / documentation needs to be assembled behind the primary communications materials?*
- *Which occasions and what events are we going to use to deliver messages?*

The team that is developing the communications plan will need to create a set of common tools and communication vehicles to be utilized with a broad array of audiences.

#### **E. Supporters:**

- *Who will need to be seen to be supporting the need to act and the suggested solutions?*

Again, the supporters do not have to be/nor should be limited to those at the February 19<sup>th</sup>–20<sup>th</sup> workshop. The messengers will be tasked with building a broader coalition of like minded individuals and organizations.

- *Who do we still need to engage for this task?*

Part of the primary task of the messengers will be to identify the key individuals who need to be engaged.

**F. Tactically speaking:**

- *What are we going to do to get the audiences attention?*
- *Who is going to develop the message?*
- *Who is going to develop the tools?*
- *Who is going to engage the messenger(s)?*
- *Who is going to engage the supporters?*
- *Who is going to coordinate all of the above i.e. run the campaign?*

This is really the primary question in developing a communications strategy. Someone needs to be tasked and resourced to undertake the work of building a communications campaign and seeding ongoing work. None of the stakeholders at the session were sufficiently motivated to set aside dedicated resources and time to make this happen.

If this is a strategic priority going forward, the choice will have to be made by those with resources (likely the government or a coalition of governments) to provide funding to set up an ongoing secretariat to work on this issue.



## Annex I: Agenda

### Enhanced Recovery of Roofing Materials Workshop February 19/20 2007

Westin Bristol Place Hotel (Toronto Airport)  
950 Dixon Road, Toronto ON 416-675-9444.

Monday Feb 19, 2007	
6:00 pm	Reception Bristol A foyer
7:00	Dinner Bristol A Room
8:30	<b>Opening comments and introduction</b> Denis Legace`, Assistant Deputy Minister Natural Resources Canada
8:45	<b>Shingles Recycling in North America: The Future of a Promising New Opportunity</b> Dan Krivit, President Dan Krivit and Associates
Tuesday Feb 20	
7:30 am	Continental Breakfast Sutton A Foyer
8:30	<b>Opening Plenary</b> - Sutton A Ballroom - Randal Goodfellow <ul style="list-style-type: none"> <li>- Review of Agenda and the General Objectives of the Day</li> <li>- Round the Room Introductions</li> </ul>
8:55	<b>Enhanced Recovery of Asphalt-Based Roofing Materials</b> Jamie Meil, Athena Institute
9:35	<b>Recycling of Flexible Vinyl Roof Materials and Systems</b> Dan Moore, Sika-Sarnafil
9:50	<b>Doing Things Differently: Developing a System that Addresses Stakeholders' Objectives.</b> – Full room discussion lead by Randal Goodfellow <ul style="list-style-type: none"> <li>- Who are all the stakeholders and what are their objectives?</li> <li>- What needs to be changed in the current system to achieve stakeholders' objectives?</li> <li>- What consequences will be created (both positive and negative) by a change to the current practice (the current system) to stakeholders, existing markets and to new markets?</li> </ul>
10:20	<b>Break</b>
10:35	<b>Barriers to Market Entry: (regulatory / technical / economic)</b> - Break out session <ul style="list-style-type: none"> <li>- Energy - Carlyle Room</li> <li>- Transportation Surfaces - Balmoral Room</li> <li>- Reuse in buildings - Windsor Room</li> </ul>
11:40	<b>Report back to Plenary with Q&amp;A</b>
12:15	<b>Lunch:</b> Sutton A Ballroom

1:15 pm	<b>The way forward</b> – Randal Goodfellow A review of the key points from the morning session and an introduction of the afternoon breakout sessions.
1:25	<b>Establishing Action Plans for Each Market:</b> Three breakout sessions building on the discussions of the morning with specific discussion themes based on the economic, technical and regulatory issues of each market. <ul style="list-style-type: none"> <li>– What are the <b>key results</b> that we want to achieve?</li> <li>– What are the <b>actions</b> that we will undertake to achieve the desired results?</li> <li>– How do we know that we have been successful, what is the <b>indicator</b> of success for each action?</li> <li>– By when do we want to get things done; what are our <b>deadlines</b>?</li> <li>– Who is <b>responsible</b> for getting things done?</li> </ul> <ol style="list-style-type: none"> <li>1. Economic issues for each market- Carlyle Room</li> <li>2. Technical issues for each market - Balmoral Room</li> <li>3. Regulatory issues for each market- Windsor Room</li> </ol>
3:00	<b>Break</b>
3:15	<b>Report back to plenary session with Q &amp; A</b>
4:00	<b>Wrap up and final comments</b> Gerry Meade, Executive Director, CCIC
4:15	<b>Adjournment</b>

## Annex II: List of Attendees

Category	Company	last name	First name
Consultant	Halcrow Yolles	Armstrong	Scott
Consultant	Dan Krivit & Associates	Krivit	Dan
Energy Recovery	Halifax Recycling	Chaisse	Daniel
Energy Recovery	Biothermica	Drouin	Guy
Energy Recovery	Lafarge	Hodder	Ryan
Energy Recovery	Cement Association of Canada	Masterdon	Bob
Energy Recovery	Lafarge	McHanson	Christine
Energy Recovery	Urban Wood Waste Recyclers	McNeill	Bob
Energy Recovery	Try Recycling	Vandersluis	Rick
Energy Recovery	Primary Power International	Wenzlaff	Curtis
Fed Govt	Environment Canada	Andronesco	Mihaela
Fed Govt	National Research Council Canada	Baskaran	Bas
Fed Govt	Public Works and Government Services Canada	Boyle	Craig
Fed Govt	U.S. Environmental Protection Agency	Carver	David
Fed Govt	Natural Resources Canada	Clapham	Mike
Fed Govt	National Research Council Canada	Delgado	Ana
Fed Govt	Public Works and Government Services Canada	Kyle	Brian
Fed Govt	Natural Resources Canada	Stockman	Tanja
Fed Govt	Natural Resources Canada	Thomas	Martin
Fed Govt	Industrial Research Assistance Program (IRAP),	Willoughby	Roger
Industry Associations	Canadian Plastics Industry Association	Knowles	Graham
Industry Associations	Canadian Construction Association	Morrison	Jeff
Industry Associations	Canadian Standards Association	Torrey	Dwayne
Mfgs	Dofasco	DeSouza	Ken
Mfgs	IKO Industries Limited	Hatch	Aaron
Mfgs	EMCO Building Products Corp.	Janneteau	Guy
Mfgs	Canadian Asphalt Shingle Manufacturers Association (CASMA)	Kandy	Jayant
Mfgs	IKO Industries Limited	Lodge	Andy
Mfgs	Sika-Sarnafil Inc	Moore	Don
Mfgs	Sika-Sarnafil Inc	Schroeder	Scott
Mfgs	IKO Industries Limited	Wong	Annmeza
Municipalities	Region of Peel	Gilliland	Krista
Municipalities	City of Toronto	Smith	Amanda
Municipalities	Central Okanagan Regional District	Suhan	Carol
Municipalities	Greater Vancouver Regional District	Yang	Wilbert
NGO	Ontario Centre for Environmental Technology Advancement	Burnett	Neil

NGO	Recycling Council of BC	MacDonald	Brock
NGO	Canadian Association of Recycling Industries	Shaw	Len
NGO	Recycling Council of Ontario	St. Godard	Jo-Anne
Prov Env	Nova Scotia Ministry of Environment	Kenney	Bob
Prov Env	Ontario Ministry of Environment	Pope	Bruce
Prov Env	Alberta Ministry of Environment	Whitfield	Dave
Prov Natural Res	Ontario Ministry of Natural Resources	Corlett	Raegan
R&D	University of Windsor	Sawyer-Beaulieu	Susan
R&D	Ministry of Transportation Ontario	Tam	Kai
Road Surface	Ontario Hot Mix Producers Association	Brown	Sandy
Road Surface	Lafarge	Lum	Paul
Road Surface	Bitumar	Miller	Laverne
Road Surface	University of Windsor	Tam	Edwin
Roofing Contractors	Canadian Roofing Contractors Association	Kalinger	Peter
Team	Goodfellow Agricola	Brook	David
Team	Goodfellow Agricola	Goodfellow	Randal
Team	Canadian Construction Innovation Council	Meade	Gerry
Team	Athena Institute	Meil	Jamie
Team	Hudson Travel Group	Walton	Wendy