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OVERVIEW OF STEWARDSHIP AND EXTENDED PRODUCER
RESPONSIBILITY JOB AND ECONOMIC IMPACT STUDIES

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EXECUTIVE SUMMARY

With the growth of both product stewardship and Extended Producer Responsibility (EPR) programs there has been growing interest in the job and economic impacts of such programs.

Ten major studies conducted between 2008 and 2012 were reviewed. The studies were generally state, provincial or national in scope and reviewed conventional recycling programs and stewardship initiatives such as those for end-of-life electronics. The studies used available statistical and program data to document the employment and economic impacts of a range of different recycling, product stewardship and EPR programs. The metrics used in each study were supplemented in some cases with normalized metrics by which data from the cited report was recast into data expressed as jobs per 1000 or economic impacts per capita based on payroll numbers.

Data comparisons were approached with caution due to difficulties comparing data from programs of varying size, geographical context and differences in scope.

Despite these challenges, comparing study conclusions was made easier because, to varying degrees, all the studies agreed with each other regarding the positive job and economic impacts associated with product stewardship, recycling and enhanced waste diversion. The following three major findings are highlighted:

- Landfill disposal is not job intensive and generates a small number of jobs compared to waste recycling and waste diversion.
- Recycling and the use of secondary materials create significantly higher net value added and jobs at higher income levels than waste disposal.
- Recycling businesses create jobs closer to home and have a smaller environmental footprint than businesses that rely on raw material extraction and manufacture.

While specific study metrics varied and were hard to compare, the studies reviewed concluded that diverting wastes, materials and products from disposal is more employment intensive and has a greater economic impact than simply collecting these materials and products as wastes and landfilling them. These findings are consistent with the March 2012 *West Coast Clean Economy* report tabled with the Pacific Coast Collaborative (PCC) which set out broad opportunities for growing employment in the areas of waste diversion and EPR.

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1. Introduction and Background

With the growth of both product stewardship and Extended Producer Responsibility (EPR) programs there has been growing interest by a number of stakeholders in the job and economic impacts of such programs.

Governments in a number of jurisdictions in both the U.S. and Canada have shown interest in documenting the jobs and economic impacts of product stewardship and EPR programs in their jurisdictions. In addition, municipalities and interested stakeholders such as product stewardship, waste reduction and recycling councils/agencies have supported the development of data which documents job and economic benefits associated with recycling and the diversion of wastes from landfill.

Other stakeholders who have questioned, or are less supportive of product stewardship and EPR policies and who have intervened in legislative processes and elsewhere to oppose such initiatives, have been known to claim that such programs result in net job losses.

In an effort to help to identify the impact of product stewardship and EPR programs the Western Product Stewardship Collaborative (WPSC) directed Duncan Bury Consulting to identify and review recent major studies which either directly or indirectly have addressed the issue.

2. Current Context

In the current economic climate the interest in job creation has grown for governments and the general public. A slowly growing economy coming out of a period of slow growth with high levels of unemployment compared to historic patterns has focused attention on economic growth and job creation. Employment and economic growth concerns, and specifically the interest in both job retention and job creation, have to a significant degree dominated current policy agendas and budgets of governments in both Canada and the US. With these dominant overriding concerns largely guiding political agendas it is perhaps not surprising that product stewardship and EPR programs and the job and economic impacts associated with them have fallen under closer examination.

While economic and employment concerns are equally strong in British Columbia Washington, Oregon and California, the jobs and economic impacts of EPR have not

attracted as much attention in British Columbia as in the three States. Interest in EPR in British Columbia is currently focused on the continuing roll out of provincially regulated EPR programs for e-waste, as well as the packaging and printed paper program under development by industry to be implemented by the spring of 2014.

EPR as an approach to waste management and waste diversion is well established in Canada and support for EPR by the provincial government is both clear and of long standing. Discussion about EPR in B.C. and in fact in most of Canada is focused less on the appropriateness of the EPR instrument and its jobs impact, but more on its specific application to problematic wastes and on how to improve program effectiveness, efficiency and transparency. However, in the states, EPR is still being discussed as a waste management policy option for a variety of waste materials.

3. The Pacific Coast Collaborative Clean Economy Study

The interest in jobs and economic development on the West Coast has recently been profiled by the March 2012 release of the report, *The West Coast Clean Economy: Opportunities for Investment and Accelerated Job Creation*, commissioned by the Pacific Coast Collaborative and undertaken by Globe Advisors and the Center for Climate Strategies.

The study addresses a number of sectors, such as green building, energy efficiency and transportation, where clean economy opportunities were identified. The study includes a broad look at recycling, reuse and waste diversion as part of a section on environmental protection and resource management. The study does not review in detail EPR or product stewardship programs and does not provide relevant quantitative data on the job and economic impact of EPR programs but it does provide a broad and very valuable context for the work of the WPSC and for the more detailed study reviews.

The *West Coast Clean Economy* study speaks strongly of the benefits of regional cooperation through intra-regional trading, harmonized codes and standards and regional market development. Consistent with these benefits, the study identifies a key opportunity as being the promotion “of new jobs in waste management and diversion related to recycling and reuse, driven in part by industry-led initiatives and public policy requirements such as EPR (page 43)”.

The study also argues that “new jobs will come from the recycling and reuse of products and materials” and that “recycling systems are increasingly and successfully converting traditional waste streams into profit streams (page 42)”. To enable advances in these areas the study argues that “a common set of guidelines and regulations throughout the West Coast region will help to ensure a level playing field for adopting EPR and will increase local processing jobs (page 56)”.

4. Study Selection and Data and Analysis Constraints

A number of studies were reviewed to determine which would be relevant for analysis. A primary source was a list prepared by CalRecycle. This list was supplemented by other studies released more recently in 2010 and 2011.

Only studies conducted since 2008 were examined in the interests of remaining as current as possible. Studies reviewed were selected also by the degree to which they addressed the substantive issues of jobs and economic impacts. Generally only studies with a wide geographic scope - state, provincial or national - and more broadly based data sources were reviewed to ensure that the data was as applicable as possible to the west coast jurisdictions. Studies which focused on individual programs were generally not reviewed on the grounds that extrapolating data and conclusions to larger jurisdictions and economies would be difficult.

While there appear to be numerous studies which document specific recycling and product stewardship programs and quantify such things as rates of diversion and costs of program operation, only a very few investigated the jobs and economic impacts associated with the programs.

One of the challenges of reviewing the studies selected was the difficulty in normalizing and comparing the data from each. Because the scope of the studies varied (e.g. between those that took a more targeted look at recycling versus those that took a broader and longer life cycle look at waste diversion, including the impact of secondary materials markets), the ability to compare reported data was significantly constrained. In addition comparisons were approached with caution where the scope and scale of state or province wide programs were reviewed because there could be a significant degree of difference in the number of programs covered, the levels of public participation, degrees of program maturity and infrastructure. All of these elements can vary widely between jurisdictions and made apples to apples comparisons difficult if not impossible.

Despite the difficulties in managing and reviewing the data reported in the studies, comparing the general study conclusions was easier because they all, to varying degrees, agreed with each other regarding the positive general job and economic impacts associated with product stewardship, recycling and enhanced waste diversion.

5. Overview of Studies

Ten studies which met the general criteria described above were reviewed and are summarized in the table in the attached Appendix. For each study the date, sponsor, scope, key findings, relevant report metrics, normalized metrics and comments are documented.

The metrics from each study have been supplemented in some cases with normalized metrics through which data from the cited report has been recast into data expressed as jobs per 1000 or economic impacts per capita based on payroll numbers. To calculate these numbers, readily available data from Statistics Canada and the US Census Bureau was used.

One of the ground breaking and earliest comprehensive reviews of the impacts of recycling and waste diversion was a study undertaken by R.W. Beck for the National Recycling Coalition and published in July 2001 as the *US Recycling Economic Information Study (REI)*. Significantly, this study was updated in February 2009 although with a different methodology and scope.

The most recent comprehensive study reviewed was the *More Jobs, Less Pollution: Growing the Recycling Economy in the US* released by the Tellus Institute in 2011. It explored the impact of implementing a bold recycling and composting strategy over the next 2 decades and explored the impact of meeting a 75% waste diversion target by 2030.

Another current study which was reviewed was the *Returning to Work: Understanding the Domestic Jobs Impacts from Different Methods of Recycling Beverage Containers*, undertaken by the Container Recycling Institute and published in December 2011. While this study looked exclusively at beverage deposit programs it does have general relevance to the broader jobs and economic impacts issues associated with product stewardship and EPR in general.

Of the ten studies reviewed only 3 specifically addressed EPR programs – a study released in August 2008 by the British Columbia Ministry of Environment on the

economic impacts of the Recycling Regulation which governs EPR programs; a summary of an unreleased 2009 Ontario study on economic benefits which looked at the municipal blue box program, which is 50% funded by producers and 50% by municipalities, the hazardous waste program and the electronics program and; a March 2010 preliminary analysis of e-cycle programs in Washington and Oregon conducted for the King County Solid Waste Division and the Northwest Product Stewardship Council.

6. **Key Findings**

Despite the challenges of a comparative analysis of the quantitative jobs and economic impact data from the studies there is a remarkable degree of consensus on the general conclusions related to the positive employment and economic benefits of product stewardship programs and enhanced recycling compared to traditional waste collection and disposal. To highlight these general conclusions the following findings from the studies are cited:

- Landfill disposal is not job intensive and generates a small number of jobs compared to waste recycling and diversion.
- Recycling creates significantly higher net value added than waste disposal.
- Recycling businesses create jobs closer to home and have a smaller environmental footprint than businesses that rely on raw materials.
- Recycling creates more jobs than disposal and at higher income levels.
- Manufacturing using recycled materials generates a greater number of jobs than virgin materials extraction and manufacturing.
- The number of jobs in recycling far outweighs any jobs lost in virgin material extraction.
- Returning materials to the economy, rather than disposing of them, creates value added jobs and economic activity.
- Material throughput is the primary driver of recycling jobs – higher recovery of materials equates to a higher number of jobs.
- Recycling benefits occur both upstream in the life cycle of products and downstream in the life cycle towards end of life.

It should be noted that the data sources and analyses undertaken by the studies were not investigated in detail, and were basically taken at face value. Despite this, the conclusions reached are significant in their general agreement and are consistent with a general understanding of the operation of a typical waste collection and disposal system and of a typical recycling program, whether supported by tax payers or producers and consumers through a product stewardship or EPR program.

7. Ideas for Further Research

To facilitate a better understanding of the jobs and economic impacts of producer responsibility and EPR programs in British Columbia, Washington, Oregon and California and to assist in evaluating whether more jobs can be created through these programs than traditional waste collection and disposal, the following needs and possible research projects are identified for consideration:

- Baseline data on waste collection and disposal - To enable a fair and representative comparison of the benefits of product stewardship and EPR programs it would be useful to document the number of jobs and the economic impacts of traditional waste collection and disposal without any source separation or recycling. Such a study would serve to further evaluate and assess whether waste collection and disposal are poor job generators with little or no growth prospects and would also serve to provide a baseline to compare with product stewardship, EPR and recycling in general.
- Developing a standardized methodology and reporting metrics – One of the challenges identified in reviewing the studies was the lack of any standard study scope or methodology and by the variations in the data reporting metrics. Some studies for example only narrowly reviewed direct program employment and economic impacts whereas others undertook broader life cycle analysis. Some studies reported on jobs/1000 tons managed, others reported on jobs /capita. Agreement between WPSC jurisdictions and with other stakeholders, such as the product stewardship councils, on the use of standard methodologies and metrics would be very helpful.
- Documenting the direct and indirect, upstream and downstream, impacts of a number of comparable mature EPR programs – The ability to respond to misinformation about the job and economic impacts of product stewardship and EPR programs would be

significantly advanced if the WPSC jurisdictions had at their disposal comprehensive and rigorous data from operational programs within their jurisdictions. The kind of analysis conducted by the King County Solid Waste Division and NWPSO on the Washington and Oregon E-cycle program study is one of very few studies to take a detailed look at a producer responsibility program. It would be valuable to conduct similar analyses on other comparable programs for electronics and for other existing programs such as those for paint.

- Applying data and metrics from an existing study to WPSC jurisdictions - Application of the normalized metrics calculated from the B.C. 2008 study of 8 EPR programs (i.e. 0.35 jobs/1000 population) to existing and possible programs in the 3 state jurisdictions could be undertaken. While other studies identified have some similar data, the B.C. study was conducted in one of the WPSC partner jurisdictions and was explicitly focused on EPR programs. Such an undertaking would prorate and apply the B.C. data to the other jurisdictions assuming programs of comparable scope and level of service. From this analysis an estimate of the potential number of jobs across all the WPSC jurisdictions could be provided.

8. Suggestions For Some Strategic Analysis

To assist in determining next steps in making the case for jobs and economic development an analysis of stakeholder views and interests in product stewardship and EPR could be helpful. It would help identify where alliances could be built and where challenges to program job and economic benefits need to be addressed and responded to. From this kind of analysis research and study needs along the lines outlined above could be identified and prioritized.

For example, if the waste haulage industry and landfill operators are concerned about employment impacts in their industry, it would be valuable to document more thoroughly the conclusions of the studies reviewed that the number jobs in these sectors are small relative to jobs in the recycling sector.

Finally, the WPSC should consider making stronger connections with the clean economy initiative and work of the PCC. The PCC interest in growing the clean economy has been demonstrated and waste management and enhanced waste

diversion through harmonized EPR strategies, regulations and programs was explicitly identified in the *West Coast Clean Economy* report.

9. Conclusion

While specific metrics vary and are hard to compare, the studies reviewed confirm that increasing the diversion of wastes, materials and products is more employment intensive and has a greater economic impact than simply collecting these materials and products as wastes and disposing of them. The adoption of EPR or any other kind of product stewardship program, increased recycling and increased material throughput might have some minor negative impacts on jobs in the waste collection and disposal sector but these job losses will almost assuredly be more than offset by a growth in jobs in the collection of a greater number of waste streams, more processing for recycling and more jobs in the use of the secondary materials recovered.

These findings are consistent with the recently released *West Coast Clean Economy* report which sets out broad opportunities for growing employment in the waste diversion and EPR areas.

APPENDIX

Overview of Stewardship and EPR Job and Economic Impact Studies

STUDY 1	Returning to Work: Understanding the Domestic Jobs Impacts from Different Methods of Recycling Beverage Containers
DATE	December 2011
SPONSOR	Container Recycling Institute (Jeffery Morris, Clarissa Morawski)
SCOPE	<ul style="list-style-type: none"> - Quantified US jobs created when beverage containers are collected recycled compared to jobs lost in garbage collection and disposal - Developed a jobs impact calculator - Sourced data from municipal programs, reports and interviews in the beverage container supply chain and in recycling and disposal
KEY FINDINGS	<ul style="list-style-type: none"> -Deposit return creates more jobs than curbside recycling -Recycling creates more jobs than disposal -Jobs in recycling far outweigh any jobs lost in virgin material extraction -Material throughput is the primary driver of recycling jobs –higher recovery equates to higher jobs
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> - Manual curbside recycling 2.33 jobs/1000 tons -Automated curbside recycling 0.77 jobs/1000 tons -Depot, redemption centres, retail collection 7.03jobs/1000 tons -Curbside waste collection 0.69 jobs/1000 tons
NORMALIZED METRICS	
COMMENTS	Major and detailed focus on beverage deposit return at all stages in contrast to curbside recycling
STUDY 2	Earnings Jobs and Innovation: The Role of Recycling in the Green Economy
DATE	2011
SPONSOR	European Environment Agency (Based on a technical report for the European Topic Centre on SCAP for the European Environment Agency)
SCOPE	Broad review of positive economic impacts of recycling and its role in the green economy
KEY FINDINGS	<ul style="list-style-type: none"> -Revenues from recycling are substantial and are growing fast -Recycling creates more jobs at higher income than disposal or incineration

	-Recycling can meet a large part of the economy's demand for resources – particularly critical resources (rare metals)
RELEVANT REPORT METRICS	-Overall employment benefits across Europe 422 jobs/million population in 2000; 611 in 2007
NORMALIZED METRICS	
COMMENTS	-Focus on the total EU market - Showed some slowing of economic impacts during recent market slowdown
STUDY 3	More Jobs, Less Pollution; Growing the Recycling Economy in the US
DATE	2011
SPONSOR	Tellus Institute; Sound Resource Management
SCOPE	- Report assesses the impacts of implementing a bold recycling and composting strategy over the next 2 decades - Specifically explores the impact on jobs and the environment of a 75% diversion rate by 2030
KEY FINDINGS	- Enhanced recycling and composting can significantly and sustainably address national priorities including climate change, lasting job creation and improved health. - Landfill disposal is not job intensive and generates the smallest number of jobs per ton of waste, and materials collection generates relatively few jobs. - Manufacturing using recycled materials generates the greatest number of jobs.
RELEVANT REPORT METRICS	2030 green economy scenario compared to projected baseline to 2030 -2.3 m more jobs compared to baseline – twice as many as projected baseline to 2030 -2.7 times as many jobs as in 2008 - Reduction of 515m tonnes CO2 equivalent Jobs -landfill 0.1 jobs/1000tons MSW -manufacture with recycled materials: Paper 4.0 jobs/1000 tons Steel - 4.0 jobs Plastic - 10.0 jobs
NORMALIZED METRICS	
COMMENTS	- High level analysis based on 20 year projections for a green economy scenario - Compares a baseline of “business as usual” continuation of current trends against a 75% diversion green economy by 2030

	- Measures jobs against MSW tonnage
STUDY 4	Recycling in North Carolina – Momentum Towards Sustainable Materials Management
DATE	August 2011
SPONSOR	North Carolina Department of Environment and Natural Resources
SCOPE	Survey of the benefits of recycling on waste disposal and the state economy
KEY FINDINGS	<ul style="list-style-type: none"> -Recycling a dynamic source of green jobs -Reduced waste disposal -Enhanced materials recovery -Growth in jobs and economic development
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> -15,200 jobs -\$395m jobs payroll
NORMALIZED METRICS	<ul style="list-style-type: none"> -1.62 jobs/1000 population -State-wide recycling cost benefit (payroll): \$42.11/capita
COMMENTS	Study focused mostly on municipal recycling and on the electronics stewardship program
STUDY 5	Preliminary Analysis of E-Cycle Programs in Washington and Oregon
DATE	March 2010
SPONSOR	King County Solid Waste Division and NWPSC
SCOPE	Assessment of the first 10 months operation of the WA and OR E-cycles programs
KEY FINDINGS	<ul style="list-style-type: none"> -Programs generated new jobs -Efficiencies were demonstrated -Collection success -Environmental benefits
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> - 140 net new jobs - 360 ongoing jobs - Program net costs (\$0.24/lb): \$13.8 m
NORMALIZED METRICS	<ul style="list-style-type: none"> - .034jobs/1000 population (ongoing jobs) E-Cycle cost benefit (net program costs): \$1.31/capita
COMMENTS	Specific focus on the first 10 months of 1 program collecting TVs, computers, and monitors

STUDY 6	Economic Benefits of Recycling in Ontario
DATE	2009; Not officially released -summary only available Feb 2012
SPONSOR	AECOM for the Ontario Ministry of the Environment
SCOPE	<ul style="list-style-type: none"> - Focus on municipal blue box program, MHSW and WEEE programs - 2007 baseline; projections to 2012 - Assessed up-stream (collection, processing etc.) and down-stream (re-use and manufacture) direct, indirect and induced effects
KEY FINDINGS	<ul style="list-style-type: none"> -Total recycling jobs comparable to total waste management jobs -Recycling creates significantly higher net value added than waste disposal - Up-stream and down-stream impacts (GDP, gross output, labour income, jobs) similar
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> - Total recycling jobs 6,160; total waste jobs 6,245 - Recycling jobs/1000 tonnes – 6.6 - Waste jobs/1000 tonnes – 0.7 - Value added/tonne – recycling \$645; waste \$49
NORMALIZED METRICS	<ul style="list-style-type: none"> - 0.48 jobs/1000 population - Cost/benefit payroll (total up and down stream) \$58/capita
COMMENTS	Identified some methodological challenges and future needs – e.g. standardized reporting; better materials markets tracking; regular reporting on economic benefits
STUDY 7	Environmental Value of Metro Region Recycling for 2007
DATE	June 2009
SPONSOR	Metro Sustainability Center, Portland, Oregon (Sound Resource Management Group)
SCOPE	Application of an environmental benefits calculator (MEBCalc – climate change, health, eco-system toxicity etc.) to recycling in Metro Portland
KEY FINDINGS	<ul style="list-style-type: none"> -Environmental costs of recycling operations are equivalent to waste collection and disposal. -Benefits from recycling come upstream and from diversion from disposal
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> - 1,292,500 tons recycled - \$154.6 m recycling environmental benefit
NORMALIZED	- Recycling environmental benefit (modeled - MEBCalc):

METRICS	\$68.40/capita
COMMENTS	Focus on municipal recycling, electronics, tires, wood, yard debris
STUDY 8	Recycling Economic Information (REI) Update
DATE	February 2009
SPONSOR	Northeast Recycling Council (DSM Environmental; Mid Atlantic Solid Waste Consultants)
SCOPE	Documented the contribution of recycling and reuse industries to the economies of the states of DE, ME, MA, NY and PA
KEY FINDINGS	<ul style="list-style-type: none"> -Reuse and recycling industries yield significant economic benefits -Recycling businesses create jobs closer to home and have a smaller environmental footprint than businesses that rely on raw materials -Recycling industry is highly diversified
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> -11,425 recycling and reuse establishments -105,146 jobs -\$4.2 b annual payroll -\$35 b annual revenues -6.4 m tons of GHG avoided
NORMALIZED METRICS	<ul style="list-style-type: none"> -2.56 jobs/1000 population -Cost benefit (payroll) \$102.58/capita
COMMENTS	<p>Surveyed 26 recycling and reuse categories across 5 states. Major activity concentrated in:</p> <ul style="list-style-type: none"> -collection -recyclable materials wholesalers -paper and paperboard and de-inking pulp mills -steel mills
STUDY 9	Economic Impacts of the B.C. Recycling Regulation
DATE	August 2008
SPONSOR	B.C. Ministry of Environment, Environmental Quality Branch (Gardner Pinfold)
SCOPE	Economic impacts of stewardship programs
KEY FINDINGS	<ul style="list-style-type: none"> -Employment benefits -Avoided landfill -Reduced GHG benefits
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> -1,600 jobs -\$109m total program revenue -73,000MTCE reduction
NORMALIZED METRICS	<ul style="list-style-type: none"> -0.35 jobs/1000 population -EPR cost benefit (program revenues): \$23.93/capita

COMMENTS	Focus on 8 EPR programs: beverages, beer, electronics, tires, paint, used oil, medications, and tree paint
STUDY 10	US Recycling Economic Information (REI) Study
DATE	July 2001
SPONSOR	National Recycling Coalition; R.W. Beck
SCOPE	National US survey of the size and economic impact of 26 recycling and reuse categories
KEY FINDINGS	<ul style="list-style-type: none"> -Returning materials to the commodities stream is a value-added, job providing and economy spurring activity -Recycling and reuse industry is a significant contributor to the US economy providing large numbers of good jobs that pay well -Investments in local recycling and recycling policies support large scale private investments in down-stream manufacturing and processing
RELEVANT REPORT METRICS	<ul style="list-style-type: none"> -56,061 establishments -1,121,804 jobs -\$36.71 b annual payroll -\$236.3 b annual receipts
NORMALIZED METRICS	<ul style="list-style-type: none"> -4.74 jobs/1000 population -Cost benefit (payroll): \$130.45/capita
COMMENTS	<ul style="list-style-type: none"> -An older study but with useful methodology used in other later studies -Comprehensive national baseline -Significantly higher jobs and economic benefit documented compared to the NERC 5 state study of 2009