

Garth Hickle

The Policy and Practice of Extended Producer Responsibility

An Assessment of Key Themes and
Policy Choices for Advancing Sustainable
Materials Management

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Beleid en praktijk van producentverantwoordelijkheid: Een Evaluatie van Belangrijke Thema's
en Beleidskeuzes voor Duurzaam Materiaalbeheer

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The Erasmus University logo, featuring the word "Erasmus" in a stylized, cursive script.

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Summary

This thesis was motivated by the author's professional engagement and observations with extended producer responsibility (EPR) as a policy approach to promote sustainable materials management. The argument for EPR is that policy mechanisms that engage producers in the financing and management of collection activities for products at End of Life, not only create market drivers for improvements in product design but the engagement of producers results in greater economic-efficiency than is often attained through other financial mechanisms. As constraints on global resources become more acute and the life-cycle impacts of materials are more transparent, the need strategies, policy and otherwise, for reducing those environmental impacts of products becomes more acute.

The objective of the thesis was to identify and analyze key patterns of EPR policy with the intent of developing recommendations to optimize its implementation and expand the research base of EPR.

The initial chapter of the thesis framed the four research questions as well as specified the research methodology that emphasized the use of case studies of EPR programs and comparative policy analysis to identify the characteristics of EPR policy and structure comparisons between EPR policies and programs.

Chapter 2 followed with a discourse on Ecological Modernization (EM), the theoretical framework that which serves as the theoretical framework for the subsequent chapters. Ecological Modernization emphasized the integration of environmental and economic objectives and particularly pertinent to EPR, recognized the importance of market-based policy approaches and new models of environmental governance. The chapter identified prominent critiques of EM and concluded with the intersection of the theoretical framework and research questions.

Chapter 3 presented the context and rationale for EPR followed by a brief history of its origination and application in the European Union. The chapter then transitioned to a profile of EPR in the U.S.

The subsequent chapter provided an overview of primary policy choices associated with development of EPR policy. Chapter 4 also examined the critiques associated with EPR. The introduction to the topic is followed by Chapters 5-8 that investigate each of the research questions. These four chapters investigated the relevant themes for EPR and each chapter builds on the previous chapter.

Through a comparative case study between EPR in the United States and Canada contained in Chapter 5, the author identified key components of EPR policy and illustrated the similarities and differences between two jurisdictions in North America.

Based on the analysis conducted for Chapter 6 regarding the potential lack of consistency of EPR policy in the United States, the author examined three strategies for potential achievement of greater consistency of EPR policy between jurisdictions in the United States.

Following the two previous chapters, Chapter 7 evaluated the governance of EPR policy regimes and, specifically, the allocation of responsibilities between government and the producers. The author examined different governance structures for EPR with a particular emphasis on the degree of decision-making authority and flexibility accorded to producers for program implementation.

Based on the notion that, in some cases, the practice of EPR is demonstrative of characteristics associated with private environmental governance, Chapter 8 investigated the integration and characterization of EPR within individual company corporate social responsibility (CSR) initiatives.

The thesis concludes with an identification of findings from Chapters 4-8. In the concluding chapter, the author offered recommendations to enhance the policy and practice of EPR including how EPR may contribute to fulfilling the objectives of a circular economy. Finally, this chapter contained a suite of suggestions for future research on the topic.

Samenvatting

Dit proefschrift komt voort uit de professionele betrokkenheid van de onderzoeker en zijn waarnemingen van producentverantwoordelijkheid (EPR) als een beleidsbenadering voor het bevorderen van duurzaam materialenbeheer. Het argument voor EPR is dat beleidsmechanismen die producenten betrekken in het bekostigen en het management van inzameling van gebruikte consumentenartikelen niet alleen marktkrachten creëren voor een beter productontwerp, maar ook een hogere efficiency dan andere beleidsmechanismen. De restricties op mondiale hulpbronnen worden sterker, en de milieu-effecten van producten over hun hele levenscyclus worden transparanter. Daardoor groeit de behoefte aan strategieën en beleidsopties om de milieu-effecten van producten terug te dringen.

De doelstelling van dit proefschrift was het identificeren en analyseren van de belangrijkste patronen in beleid dat gebaseerd is op EPR, om zo tot aanbevelingen te komen om de toepassing van EPR te optimaliseren en te verbreden.

In het openingshoofdstuk worden de vier onderzoeksvragen geformuleerd, en de onderzoeksmethoden geïntroduceerd. Het onderzoek behelsde de uitvoering van case studies van EPR programma's en vergelijkende beleidsanalyse. Daarmee konden de karakteristieken van beleid gebaseerd op EPR bepaald worden, en een structurele vergelijking gemaakt worden van EPR-beleid en -programma's.

Daarna volgt hoofdstuk 2, met een bespreking van de theorie van Ecologische Modernisering (EM), die een theoretisch raamwerk verschaft voor de latere hoofdstukken. Ecologische Modernisering benadrukt de integratie van milieu- en economische doelstellingen. De theorie erkent ook het belang van marktgerichte beleidsbenaderingen en nieuwe modellen van milieu-governance. In dit hoofdstuk komen vooraanstaande kritieken op Ecologische Modernisering aan de orde, waarna het laat zien hoe het theoretisch raamwerk toepasselijk is bij het adresseren van de onderzoeksvragen.

Hoofdstuk 3 bespreekt de context en de rationale voor EPR, en verschaft een korte geschiedenis van ontstaan en toepassing van EPR in de Europese Unie. Vervolgens bespreekt het de ontwikkelingen van EPR in de Verenigde Staten.

Hoofdstuk 4 geeft een overzicht van de belangrijkste beleidskeuzes bij het vormgeven van beleid dat gebaseerd is op EPR. Het bespreekt en onderzoekt de kritieken op EPR. Daarna komen de hoofdstukken 5-8, die elk één van de onderzoeksvragen behandelen. Elk van deze vier hoofdstukken bouwt voort op het voorgaande. Hoofdstuk 5 bevat een vergelijkende analyse van EPR in de Verenigde Staten en Canada. Daarin worden de belangrijkste componenten van EPR geïdentificeerd, en worden de overeenkomsten en verschillen besproken tussen de twee jurisdicties in Noord-Amerika.

Voor hoofdstuk 6 voerde de onderzoeker een analyse uit van het gebrek aan consistentie in EPR-beleid in de Verenigde Staten. Drie mogelijke strategieën werden onderzocht om tot grotere consistentie in EPR-beleid te komen tussen jurisdicties in de Verenigde Staten.

Als vervolg op de hoofdstukken 5 en 6 wordt in hoofdstuk 7 de governance van EPR-beleidsregimes geëvalueerd. Daarbij wordt met name aandacht besteed aan de toekenning van verantwoordelijkheid aan overheid en bedrijven. Verschillende structuren voor EPR werden onderzocht met bijzondere aandacht voor beslissingsbevoegdheid en flexibiliteit bij producenten tijdens de implementatie van beleidsprogramma's.

Hoofdstuk 8 richt zich op de integratie en karakterisering van EPR bij bedrijven die actief zijn op het gebied van maatschappelijk verantwoord ondernemen (MVO, in het engels CSR). Dit is gedaan op de overweging dat de praktijk van EPR kenmerken vertoont van *private environmental governance*.

Het proefschrift wordt afgesloten met bevindingen van de hoofdstukken 4-8. In het laatste hoofdstuk doet de auteur aanbevelingen ter versterking van beleid en praktijk op het gebied van EPR. Daarbij gaat hij ook in op de vraag hoe EPR kan bijdragen tot het realiseren van de doelen van een circulaire economie. Tevens bevat het laatste hoofdstuk een aantal aanbevelingen voor toekomstig onderzoek op het gebied van producentverantwoordelijkheid.

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The past seven years has been a remarkable journey and significantly deepened my conceptualization of environmental policy and the need for a fundamental embrace of sustainability and the critical role that academia plays in the pursuit.

Many colleagues, far too numerous to list, in my profession and through Erasmus, contributed to the building of this thesis and were invaluable in the sharing of ideas and experiences with the topic and often challenging my views and assumptions.

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Acronyms and Abbreviations

CSR	Corporate Social Responsibility
DFE	Design for Environment
ELV	End-of-Life vehicle
EM	Ecological Modernization
EOL	End-of-Life
EPR	Extended Producer Responsibility
IPR	Individual Producer Responsibility
MPCA	Minnesota Pollution Control Agency
OECD	Organization for Economic Cooperation and Development
PPP	Polluter Pays Principle
PRO	Producer Responsibility Organization
RoHS	Restriction on Hazardous Substances
SHARL	Specified Household Appliance Recycling Law
U.S. EPA	United States Environmental Protection Agency
WEEE	Waste Electronic and Electrical Equipment

1. Chapter One: Introduction

As the implementation of Extended Producer Responsibility (EPR) expands globally as an environmental policy principle to address the environmental impacts of products and materials, the motivations and policy choices that drive this expansion demonstrate significant variability across jurisdictions. The policy context offers a rich landscape for analysis that aims to improve the application EPR and its contributions to a more materials efficient society. Now, in its third decade, as a strategy to reduce the environmental impact of products, the OECD estimated that nearly 400 EPR programs are active globally (OECD 2014). This thesis author built upon analyses of existing and evolving EPR initiatives globally and especially focused upon its evolution in Europe, Canada and the United States.

While individual companies as well as industrial sectors are implementing corporate social responsibility (CSR) strategies intended to reduce the environmental impacts of their products, in some cases, by instituting product take-back programs for their products or packaging, this thesis author focused upon the public policy context that is necessary to create the conditions for a broad, systematic approach to promoting improved materials management that supports sustainable production and consumption practices. Through its emphasis on reordering the financing of the End-of-Life (EOL) management of products, EPR was designed to create the policy framework that incentivizes companies to develop sustainable products or create sustainable product-service combinations.

Despite its typical characterization as a tool to finance and increase the collection of products at the EOL, EPR is more appropriately framed as a policy mechanism to promote life-cycle thinking to incentivize environmental impact reduction strategies throughout the product's life-cycle (Dalhammer 2015). The lofty expectations for EPR as well as the documented benefits contributed to its emergence as a central policy strategy to promote sustainable consumption and production (Kronenberg 2007; Maxwell and Sheate 2006), sustainable materials management (OECD 2012) and the circular economy in order to reduce the challenges of waste management as well as some of the constraints on natural resources.

To underscore the imperative for a robust public policy approach to promoting sustainable materials management, The World Bank estimated that 1.3 billion tons of solid waste were generated in 2012 and projected that quantity to increase to 2.2 billion tons by 2025 (World Bank 2012). This increase in solid waste generation is linked to the expansion of the global middle class and to increases in consumption (Guarí and Knorríngá 2014). The use and availability of materials is also impacting supply chain management as illustrated in a recent survey of large corporations; the findings documented that resource scarcity is expected to demonstrably impact global commerce (KPMG 2012).

This thesis researcher assessed several aspects of EPR and developed policy and programmatic recommendations that, if implemented, may be more effective in accomplishing the objectives sought by advocates of EPR programs. This research was designed to build upon the observations and assessments of EPR implementation internationally and the insights from analyses will be of

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particular importance for those nations that are initiating new EPR policies and programs. While the U.S. has embraced EPR for a broader suite of materials and products than many other nations and has instituted a variety of different EPR policy mechanisms, there remains the opportunity for integrating themes and conclusions gathered from global experiences with EPR to further shape and enhance the evolving product policies in the U.S. This analysis and synthesis of policies can contribute to the fulfillment of the more robust objectives of EPR such as the achievement of greater design for environment activities and ultimately, to more transformative product service systems and other strategies that are embodied within the emerging circular economy discourse.

The objectives of the research were to produce an academic exploration of the rationale and history of EPR and to investigate the principal themes, including the challenges facing EPR policy and practice that have emerged as it has matured as an environmental policy principle. The researcher also sought to develop policy recommendations to expand the scope of EPR as a policy principle and increase its effectiveness.

The recognition of EPR as a crucial policy strategy has accelerated in the past decade due to the growing global commodity supply challenges for a wide range of materials and due to the recognition that ensuring supply and price stability is necessary. The constrained materials supply is creating a significant opportunity for EPR to serve as a transformative approach that can assist society to transition beyond the focus upon addressing individual products to dramatically increasing material recovery rates and a more holistic and integrated materials strategy that progresses toward a circular economy.

1.2 Motivations for Developing this Thesis

The selection of this thesis topic was inspired by the author's twenty years of being enmeshed in the policy development and program implementation of materials management policy, including EPR, at the Minnesota Pollution Control Agency (MPCA), the state environmental regulatory authority. In the United States in the 1990s the conceptual framework of sustainable development and market-based approaches to achieving environmental outcomes was emerging in the environmental policy dialogue. At that time, EPR was embraced as a strategy to address the challenges associated with the products entering the waste management system and recognition of the limits of the capacity of government to manage them in an effective manner. Following the enactment of EPR in many U.S. states, a broader evaluative perspective of the policy approach and exploration of key thematic elements had not been undertaken comprehensively from a scholarly perspective.

This thesis author conducted a comprehensive review of the implementation of EPR globally to identify the policy attributes that are central to the goals and functioning of EPR. This review emphasized an analysis of the available policy structures and mechanisms that can be utilized to promote greater consistency of the application of EPR to reduce transaction costs associated with a myriad of requirements. The review also investigated the governance of EPR programs and finally, the characterization and integration of EPR within the CSR programs of companies. Each of this thesis' topics was selected to identify and address gaps in the existing scholarly literature

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and to contribute to the dialogue to improve the design, scope and implementation of EPR policies and programs throughout the U.S. and globally.

Building upon the geographical focus of the thesis, this thesis researcher sought to contribute to and to inform the unfolding and evolving public policy dialogue regarding the design and implementation of EPR in the United States. This objective was of particular relevance given the emergence of EPR as a prevalent public policy response globally for assisting in the transition from an emphasis on recycling to that of an emerging, broader materials management strategy and more recently to that of the circular economy (EPA 2009).

1.3 Problem Statement

Despite a growing body of literature on EPR, there was a lack of research on EPR in the United States that identified key structural elements and policy trends of its application in the U.S. Illustrating the expansion of EPR in the U.S. during the past decade, U.S. states have enacted more than 70 programs in more than 35 states. However, the existing literature and knowledge base of EPR were dominated by analyses of its application in the European Union and with a focus on product categories such as Waste Electrical and Electronic Equipment Directive (WEEE) and packaging (Nash and Bosso 2013). Nash and Bosso 2013; Wagner 2012; Atasu 2013 and others authored important assessments of the application of EPR in the U.S. Their research findings provided a valuable context for this thesis author's research, not only in terms of isolating the predominant policy themes of EPR, but also for identifying and characterizing the elements of EPR policy, which may be improved to enhance their overall functioning.

EPR in the U.S. emerged as a state-level environmental policy approach to address a range of products including selected categories of WEEE, architectural paint, batteries, and mattresses, carpet and other product categories. Because the implementation of EPR in the U.S. was initiated at the state level, there was policy experimentation and differentiation among the states and therefore, a demonstrable variability of program implementation for certain product categories most notably WEEE. The subnational policy context in the U.S. impeded not only the broader adoption of EPR but also inhibited the delivery of cohesive policy signals to producers to engage in 'Design-for-Environment' (DfE) practices as well as potentially restraining the development of closed-loop product collection and management strategies that could be deployed nationally.

Given the state-led EPR policy context in the U.S., the challenges posed by the lack of consistency among state policy efforts for several product categories elicited the question "*How can governance mechanisms for EPR programs be enhanced to improve the efficiency and to enhance achievement of the broader objectives of EPR?*" This policy context in the U.S. also underscored the need for research to learn how EPR specifically, but EOL management for products more broadly, can be elevated within the CSR activities of individual firms.

1.4 Research Questions

Despite the predominance of EPR policy internationally as an environmental policy strategy, several premises and outcomes of EPR had not received sufficient research attention. This was particularly the case regarding the application of EPR in the United States. Through the identification and exploration of research questions, this thesis author decided to build upon and to deepen the literature review to develop recommendations designed to enhance and strengthen EPR policy development and implementation systems throughout the U.S.

This thesis research was designed to answer the following four questions:

Research Question 1) How and to what extent is EPR policymaking in the U.S. being influenced by the global policy landscape, and in particular that of Canada, for EPR policy development and program implementation?

With EPR as an environmental policy approach that is embraced widely, there is significant opportunity to identify the common policy themes and programmatic elements in different countries. The previous comparative research largely focused on analyses of how differing jurisdictions implemented EPR for similar product categories such as WEEE or packaging. Two case studies profiling the WEEE programs in the State of Minnesota and the Province of Ontario were selected to illustrate the differing approaches to the implementation of EPR policy adopted in each jurisdiction. Several other EPR programs were examined in both countries to more fully characterize and distinguish the prevailing practice of EPR in each country.

Research Question 2) What are the strategies and opportunities to achieve a greater degree of consistency for EPR programs in the United States given the prevailing diversity of state-based regulatory approaches?

The lack of consistency of EPR regulations among jurisdictions was frequently cited by many parties including producers, recyclers/processors of products and regulatory authorities as a feature of the EPR policy context for several product categories. While most often communicated from producers as contributing to increased producer compliance costs, the lack of policy consistency inhibits the communication of clear and consistent signals to producers to engage in DfE activities and fulfill the objective of EPR to function as a life-cycle oriented policy approach. This lack of policy cohesion may also detract from producers engaging in more transformative innovation such as product service systems and other strategies necessary for the transition to the circular economy. From the perspective of regulatory authorities, greater consistency may lead to more effective strategies, such a cooperation on program oversight and compliance activities, to address ‘free-riders’ in a coordinated and comprehensive fashion given that program parameters would demonstrate less variability.

Because of the predominantly state-led policy-making mechanisms for solid waste management activities in the U.S., EPR programs demonstrate a significant variability of implementation approaches for some product categories by individual states. To address this research question and the context for greater consistency of EPR programs in the U.S. this thesis researcher investigated three policy strategies that were identified based upon historical antecedents in the

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U.S. as well as the EPR regulatory approaches that are being implemented in the Canadian provinces.

Research Question 3) What are the existing models of governance of EPR programs that are functioning and how might these models be optimized to improve performance of programs?

Because the question of environmental governance is increasingly viewed as central to achieving sustainable development, governance within the context of EPR is receiving more attention in academic scholarship. In the case of EPR, governance is generally characterized as the apportionment of responsibilities among the actors along the product chain. The question of governance is particularly relevant if EPR is implemented to achieve objectives beyond simply transferring the costs of managing products at EOL from government to other actors along the product chain. To address this question, this researcher developed a typology for models of governance of EPR programs with a particular emphasis on the allocation of responsibilities between the producers and governmental actors.

Research Question 4) How do individual firms view EPR as a component of their CSR strategy?

While EPR is a public policy tool that engages producers of products in the financing and management of products at the EOL, the question of how individual firms have integrated EPR and EOL management activities, more broadly, for products and materials into individual company CSR profiles had not been addressed in the scholarly literature. This researcher sought to contribute to the understanding as to whether, and if so how, EPR contributes to a company's CSR activities such as encouraging broader product recovery strategies to recover materials or for providing a service to customers in the management of the used products.

To answer this research question, 121 corporate social responsibility reports were evaluated for specific corporate EPR compliance activities and, more broadly, for firm-level activities to arrange for collection and management of discarded products.

1.5 Research Methodology

This thesis author investigated the research questions through the use of a predominantly qualitative research methodology.

In part, this thesis author relied on case studies and comparative analyses of existing EPR programs, as this approach best matched the structure and intent of the research questions. Another determining factor for the selection of the research methods was the author's professional position within a regulatory authority that oversees three EPR programs. As a result, for example, it was likely that the participation in survey instruments by some of the firms subject, or potentially subject, to EPR regulatory action would be limited.

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Finally, the findings of each of the papers that addressed one research question suggested policy recommendations to strengthen the functioning of EPR programs and identified topics for further research. The recommendations centered on how the policy construction of EPR regulatory mechanisms and programs can be enhanced to achieve greater efficiencies and environmental benefits, throughout the product's lifecycle.

Literature Review

The thesis author undertook an extensive review of the scholarly literature regarding the theoretical framework and application of EPR policy globally. That review served as the foundational context for this thesis and was essential for the identification of gaps in the research base and existing literature. The relevant literature for the thesis was derived from several categories including academic journals, PhD theses, governmental analyses and evaluations and finally, EPR program-specific information released by producer responsibility organizations (PROs) and individual companies. This thesis author built upon articles published in the *Journal of Cleaner Production*, *the Journal of Industrial Ecology*, *the Journal of Waste Management and Research* and *Resources Conservation and Recycling*, among others, which provided a broad, multidisciplinary perspective on the origins, history, visions, applications and gaps in EPR globally and especially with in-depth focus upon EPR within the U.S.

The theses authored by Thomas Lindhqvist, Naoko Tojo and Chris van Rossem were invaluable for providing the historical perspective, articulation of the principles of EPR and analyses of policy choices regarding the application of EPR in several countries.

This thesis author also relied extensively on reports issued by governments, particularly those of an evaluative perspective. Of these, the literature on the topic issued by the OECD was particularly valuable because of the breadth of programs it analyzed and due to the emphasis on the economic features of EPR. Planning documents and progress reports issued by producer responsibility organizations and others associated with the implementation of EPR regimes were also systematically analyzed. These sources were of particular relevance for the comparative case studies of the WEEE programs in Minnesota and Ontario, the results of which are presented in Chapter 3 of this thesis.

For the investigation of research question 3, the author examined the literature of environmental governance, and in particular the conceptualization and implementation of private governance mechanisms. The investigation of research question 4 was based upon a review of the foundational literature for corporate social responsibility (CSR) and sustainable supply chain management that was published in journals such as *Business Strategy and the Environment*, *Journal of Business Ethics* and *Business and Society*. The primary methodology for addressing research question 4 was based upon in-depth analyses of corporate social responsibility reports or sustainability reports and assessments of sustainability activities described on company websites.

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Case Studies

As noted by Andolini and Blake, the internationalization of public policy is accelerating, in part due to economic globalization (Andolini and Blake 2010). EPR policy development and evaluation are demonstrative of this dynamic particularly given the global reach of many producers who seek to implement a consistent response to the expanding EPR policy footprint. Given this context, the relevance of comparative policy analysis for EPR based research is crucial for evaluating the dynamics and effectiveness of EPR programs and ultimately assisting in the identification and crafting of potential improvements to the policy instruments.

Case studies, included in Chapters 5 and 6, were essential to document the application of the primary EPR policy choices articulated in Chapter 4. In the case of Chapter 7, in which this thesis author examined the governance of EPR, the use of case studies enabled the development of the typology of common governance models for EPR. The use of case studies supported the comparison and contextual understanding not only to illustrate the differences regarding the policy choices and implementation aspects of EPR programs but also to identify and document the similarities and differences among programs, which was a particularly important research exercise for the examination of policy consistency that was addressed in Chapter 6.

While the use of case studies served as the vehicle for studying EPR program implementation, it was important to recognize the limitations of the case study approach, with respect to its application to a quantitative assessment between EPR programs. Given the differences in EPR programs as well as other influencing factors such as broader legal context, societal characteristics, and complementary environmental policies, which influence the results of a particular EPR program, an analysis of the quantitative outputs from an environmental assessment or economic analysis perspective was not undertaken. The lack of comparability of data due to programmatic differences among EPR programs in different jurisdictions posed a significant obstacle to an adequate assessment of the environmental benefits and economic analyses.

Comparative Policy Analysis

Following the selection of the case studies, this thesis author engaged in the identification of primary policy themes that were representative of the application of EPR in a particular jurisdiction. Comparative policy analysis served as a key methodological tool to achieve generalizations and identify common limitations and those approaches that lend themselves to transferability. The comparative approach was particularly relevant to facilitating the identification of the strengths and weaknesses in the current practice of EPR in the US.

Comparative policy analysis was particularly relevant given the internationalization of EPR and the subsequent and ongoing exchange of policy constructs and evaluation between nations. While the initial policy conceptualization of EPR occurred within the European Union, which established the key concepts and overall framework for EPR, other countries built upon that platform and adapted it for practice in their jurisdictions. This globalization of EPR policies not only demonstrates policymakers' interest in market-based environmental policy instruments but illustrates that many of the producers that are subject to EPR regulatory requirements operate

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globally and often advocate for a consistent EPR policy approach that most closely aligns with their business models.

1.6 Structure of the Thesis

This dissertation was structured into three distinct components as described in the following paragraphs:

Introduction to the Topic

Chapter 1 is an introduction to this research and defined the problem statement, articulated the research questions and research methodology. As described in Chapter 2, the research was guided by the theoretical framework of ‘Ecological Modernization’ that underpins much of the rationale and policy constructions fundamental to EPR. A contextual literature review that addressed the theory and history of the EPR was included in Chapter 2. Several of the predominant choices associated with EPR policy construction were assessed and compared. The examination of policy choices within Chapter 3 was foundational for framing the research questions, the findings of which were presented in subsequent chapters.

This thesis is premised on theories of governance with a particular emphasis on a regulatory approach that is essential for not only ensuring a level-playing field that addresses ‘free riders’ but is also necessary to institutionalize behavior within firms that results in broad-based measurable outcomes towards reducing the environmental impacts of their products.

Published, Peer Reviewed Articles

The thesis contains four articles that were published in peer-reviewed journals. Each of the four articles addressed specific thematic issues inherent within EPR.

Chapter 5 presented a comparative policy analysis of EPR in the United States, and Canada that examined the policy context for EPR in each. The comparative analyses were performed through profiles of the waste electronics programs in the State of Minnesota in the U.S. and in the Province of Ontario in Canada to illustrate the differences in policy choices and program implementation in each nation respectively.

Chapter 6 was built upon the findings of the research results presented in Chapter 5 with the objective to investigate the context of consistency of EPR programs between jurisdictions. This was accomplished by performing an analysis of three policy approaches for achieving greater consistency of EPR policies in the United States.

In Chapter 7, this thesis author presented results of analyses of approaches to governance prevalent in EPR policy development and program implementation particularly, in North America. In this context, governance was construed as the allocation of responsibilities among the various parties along the product chain. This thesis author situated the construct of

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governance within EPR policy regimes and developed a typology of governance structures for EPR in North America.

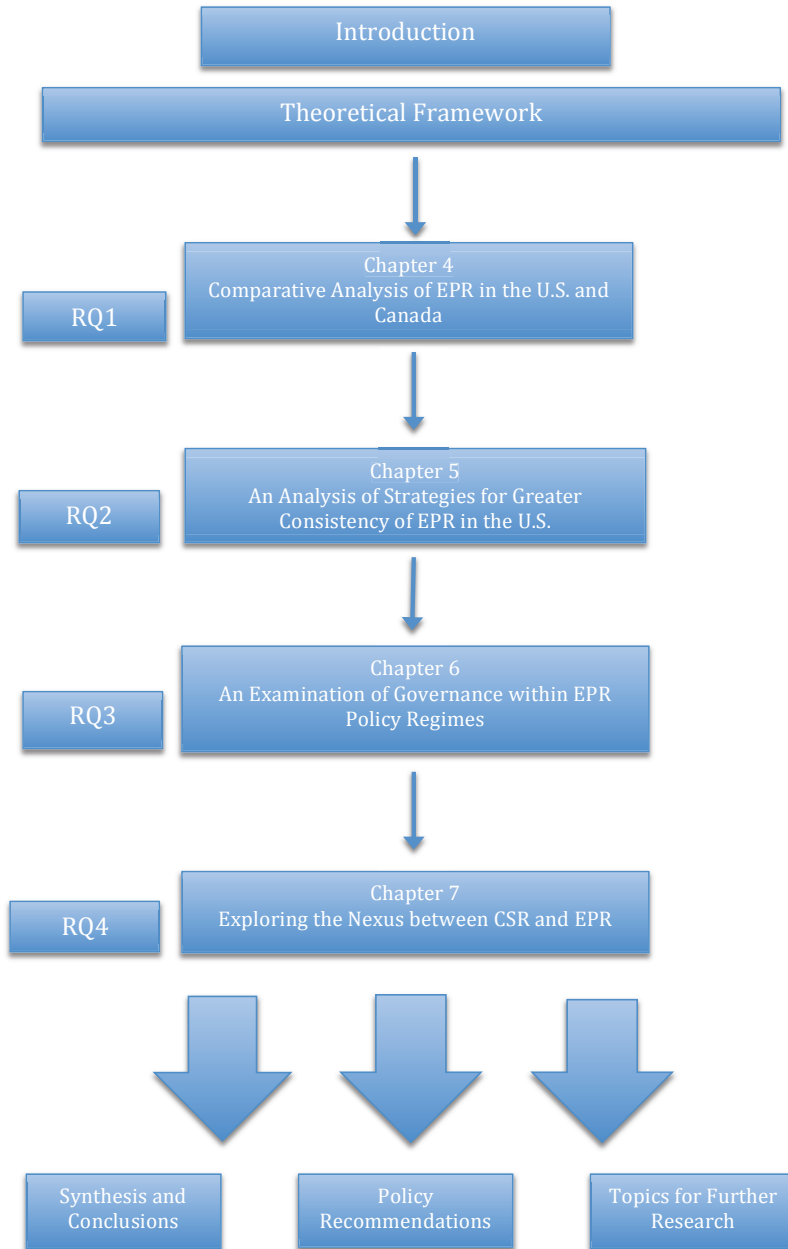
By building on the theme of private governance introduced in Chapter 7, in Chapter 8 this thesis author examined the characterization of EPR within CSR through an examination of corporate sustainability reports. As a result of this analysis, this thesis author proposed several strategies from the EPR policy domain and for the common tools for implementation of CSR that may enhance the integration and effectiveness of both.

Conclusions and Recommendations

This thesis author concluded the thesis in Chapter 9 by building upon the content and findings published in the four articles, which addressed the research questions. Chapter 9 also included policy recommendations for strengthening the application of EPR in the United States. In conclusion, this thesis author underscored additional themes and topics that were identified through the thesis research process, which should be addressed in future research to address gaps in the existing body of research.

Figure 1.1 illustrates the progression of topics throughout the thesis and the relationship of each research question to a corresponding chapter and finally, the synthesis of the individual papers into the concluding chapter.

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Chapter 2: The Theoretical Framework

While EPR is representative of many strands of environmental policy and practice that have emerged during the past half-century, the exploration of the key thematic aspects of EPR that were addressed in the following chapters of this thesis were guided by Ecological Modernization (EM) theory. For the purposes of this thesis, EM is suggested as a framework for social change that presents a context for understanding the history, conceptualization and practice of EPR. The concepts and approaches of EM were developed by European scholars during the 1980s and, as characterized by Schlosberg and Rinfret, EM has emerged as a framework for understanding how environmental policy and practice can utilize economic, technological and social structures to achieve environmental progress (Schlosberg and Rinfret 2008).

The EM theory proposes a comprehensive approach that, as demonstrated through the application of EPR, offers a synthesis of industrial production and growth and environmental protection. While EM served as the foundational underpinning for industrial ecology and sustainable development, its historical development parallels the conception and implementation of EPR. The architects of EM contended that a new phase of industrial development commenced in the 1980s, which was marked by innovations that will continue to guide the transformation to a more sustainable future (Pellow and Brehm 2013).

While EM theory offers a robust worldview, several of the prominent themes are directly relevant to the understanding and analysis of EPR. These themes included the recognition of the changing role of science and technology through modernization and the increased emphasis on dynamics within the economic market to promote sustainability. Huber suggested that technological innovation is central to EM (Huber 2008). As described by Mol and Spaargaren, this rationalization of production and consumption to achieve greater ecological progress is to be accomplished, in part, through the realignment of the responsibilities between governmental authorities and economic actors who must assume greater responsibility in achieving ecological progress (Mol and Spaargaren 2000). Janicke noted that EM extends to the reconceptualization of regulatory measures to promote innovation (Janicke 2008).

A hallmark of EM is the broadening of tools to include outcome focused and market-based regulatory approaches such as voluntary agreements and information disclosures (Williamson and Lynch-Wood 2012). However, as stated by Mol, the role of the state continues to be paramount but is oriented towards the development of strategies that are dependent upon the circumstances to support innovation (Mol 2002). Furthermore, Sonnenfeld and Mol observed that without regulatory intervention and oversight, markets and economic instruments cannot be expected to achieve an economic model premised on sustainability (Sonnenfeld and Mol 2002).

Given the prominence of EM as a framework, several authors have examined the application of EM in particular jurisdictions. In his analysis of environmental policymaking in Sweden during the 1990s, Vail concluded that, in the effort to promote sustainable development, environmental policy decisions meshed with the theory of EM (Vail 2008). Based on an analysis of environmental policymaking, including the adoption of EPR for several product categories in

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Japan since the 1970s, Hotta asserted that the policy emphasis on efficiency and technological innovation that can be traced to the focus on pollution prevention in 1970s is consistent with EM (Hotta 2010). Examining the application of EM in the context of Brazil, Milanez and Buhrs suggested that EM provided a framework for development for middle-income countries but observed that capacity-building should be tailored to local circumstances (Milanez and Buhrs 2008). Lastly, Zhu et al. examined the application of EM in China through an assessment of the adoption of green supply chain management (GSCM) practices by manufacturers (Zhu et al. 2011). The study concluded that the firms that embraced GSCM ahead of competitors exceeded environmental and economic performance measures as compared to laggard companies.

Despite assertions that EM has demonstrated influence in policymaking and implementation activities in Western Europe, Cohen observed that EM has generally not been embraced in the United States, in part, due to the motivations and orientation of many non-governmental environmental advocacy organizations such as a preference towards legislative advocacy and litigation as well as demonstrating a skepticism towards technological innovation approaches (Cohen 2006). Schlosberg and Rinfret offered a more optimistic view of EM's emergence in the United States by citing the linkages between the environment and national security, the rise of the environmental justice movement and the growing presence of the green consumer as illustrations of EM in the U.S. (Schlosberg and Rinfret 2009). Furthermore, Scheinberg observed that the emergence of municipal recycling in the U.S. exhibits many of the attributes of EM including development of technology and the emergence of institutions to facilitate recycling and transformed the relationship between municipal government and waste management to emphasize materials, collection, quality and education activities (Scheinberg 2003).

2.1 Ecological Modernization and Extended Producer Responsibility

The proponents of EM have recognized that it is a contextual framework within which the transition of the roles of the nation state (or regulatory bodies) from prescriptive and enforcement oriented modes to those premised on flexibility and oversight that promote a blending of market forces and environmental protection outcomes are critical to an analysis of EPR. As observed by Williamson and Lynch-Wood, EM embraced many actors including industry, the regulatory authorities and civil society and the responsibility resides with those actors who are best positioned to execute actions to address the problems (Williamson and Lynch-Wood 2012).

Ecological modernization's explicit interdisciplinary nature embraces technological reform, innovative economic constructs and political modernization, which provides an important theoretical framework for EPR. For example, the assertion of EM of the integration of environmental and economic objectives, as actualized within EPR, is worthy of significant evaluation to determine if those objectives are being accomplished and whether more traditional 'command and control' regulatory measures would be more effective. Similarly, the theory's recognition of alternative forms of environmental governance, namely that of the greater centrality of market actors, is foundational to EPR and the evaluative framework necessary to determine if the articulated outcomes of EPR are being met.

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Deutz framed the promotion of environmental protection and the flexibility accorded producers for achieving the objectives of the EPR Directives in the European Union as demonstrative of EM (Deutz 2009). However, the lack of emphasis upon limiting consumption as necessary to achieve the minimization of waste within the Directives is also consistent with little consideration of consumption with the EM framework (Deutz 2009). Lane and Watson also framed EPR within the EM framework on institutional relationships while noting the lack of emphasis on consumption, a critique of both EPR and EM (Lane and Watson 2012).

2.3 Critiques of Ecological Modernization

Despite EM's prominence as an analytical framework for many of the concepts underpinning sustainability, EM is not without its critics. York et al. challenged EM as promoting a synthesis of environmental protection and economic development but failing to recognize the prevailing model of growth and the environmental implications of that model (York et al. 2010). Others observed that some proponents of EM posit an overly optimistic view of clean and sustainable technology to advance at a pace to mitigate environmental decline (Gibbs 2006). Ecological Modernization was cited to be in conflict with the concept of sustainable development due to the emphasis on green consumerism and lack of explicit recognition of the limits to growth (Bakari 2014).

Pataki critiqued EM as overlooking the organizational and managerial dimensions of business with little attention devoted to the methods by which organizations evolve to become more sustainable (Pataki 2009). Pellow and Brehm elaborated further upon this critique of organizational dynamics with the suggestion that EM inflates the degree of capacity within institutions to change (Pellow and Brehm 2013).

Christoff argued that EM can be characterized as either 'weak' or 'strong' with the former illustrated by a focus upon processes which emphasize a technocratic perspective and occur at the industrial nation state level (Christoff 1996). Alternatively, 'strong' EM envisions sweeping changes to institutions and economic models through democratic processes (Berger 2001).

Carolan, among others, faulted EM for its emphasis on production but lack of consideration of the cumulative impacts of consumption even if that consumption is of goods that are increasingly more resource efficient (Carolan 2004). Furthermore, Murphy stated that the EM literature is meager as to how state institutions and public policy instruments may address consumption (Murphy 2001).

Another critique of EM was that it fails to recognize the existing societal power dynamics and the necessity to challenge that structure for EM to succeed. For example, Janicke noted that EM theorists should continue to develop strategies to overcome resistance from entrenched interests (Janicke 2008). Finally, EM was also criticized for its lack of recognition of social outcomes relative to those technological and industrial innovations envisioned by the EM framework (Gibbs 2006).

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2.4 The Theoretical Framework and the Research Questions

In this thesis, EM was employed as an important theoretical framework for EPR with several of the theory's core attributes illustrated by the conceptualization and implementation of EPR as a policy approach. Each of the research questions examined in subsequent chapters reflects the constituent themes of EM.

Chapter 4 of this thesis utilized a comparative policy analysis approach to identify the principal policy choices that were demonstrated within the application of EPR. Those choices illustrated how EM is reflected in the trajectory of public policy that, when applied to reducing the environmental impacts of products, it can further the embedding of an integrative approach for reducing the lifecycle impacts of products. Ecological modernization further recognizes the critical role of producers as best positioned to address those impacts in the most efficient manner.

Chapter 5 was developed to address research question 2, that sought to identify the strategies available to achieve a greater consistency of EPR policy in the U.S. Mol's assessment of EM's influence on environmental reform in the context of globalization is underscored by the expansion of EPR policy adoption but also argued for greater international transference of EPR policy design and evaluation practices (Mol 2002). The argument for consistent application of EPR policy globally aligns with EM's recognition of the increasing global patterns of commerce, and is most relevant to EPR, production and consumption. With the design, production and use of products occurring globally, EPR, when implemented as a producer designed and managed approach was positioned as the policy strategy to address the environmental impacts of products. However, for EPR to truly achieve the intended outcomes that extend up and down the product chain, the application of consistent EPR policy is necessary in order to deliver consistent and substantive signals to producers regarding design for environment priorities, supply chain decisions and end-of-life collection networks.

Research question 3 was: "What are the existing models of governance of EPR programs that are functioning and how can these models be optimized to improve performance of programs?" which, was addressed in Chapter 6. It is focused upon the conceptualization and implementation of the governance within EPR policy regimes. Ecological modernization's recognition of market-based policy instruments that are structured to achieve environmental outcomes more economically efficient than traditional regulatory models combined with multi-actor governance mechanisms, makes it useful within the context of this thesis. This evolving conceptualization of the governance of EPR was embedded within EM's emphasis on the transition from solely state actors to a conceptualization of governance models that support flexibility and the authority of non-state actors. This dialogue was expanded upon within the ongoing globalization and emergence of supranational institutions and processes (Sonnenfeld and Mol 2002).

Research question 4, which is the final research question of this thesis, was: "How do individual firms view EPR as a component of their CSR strategy?" As noted by Pataki, EM's foundational premise of the integration of economic objectives is further demonstrated by the premise of CSR that firms may benefit from recognizing and responding to the ecological context (Pataki 2009).

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In some instances, the evolution of firm level CSR programs was illustrative of Hajer's contention that organizations have the institutional capability to learn, change and adapt (Hajer 1995).

Chapter 3: Extended Producer Responsibility as an Environmental Policy Tool

In Chapter 3, the thesis author presented an introduction to the topic of EPR with an overview of the definition of terms and its genesis in and relationship to the 'polluter pays principle.' This overview was followed by an examination of the operative feature of EPR—that of the internalization of environmental externalities. The chapter concluded with a brief historical synopsis of EPR with an emphasis on its origins in the European Union and its policy roots and application in the U.S.

3.1 Defining Extended Producer Responsibility

Extended producer responsibility is structured to rectify the conceptualization of the EOL management of products as the 'weak link' in the product chain. This circumstance is due, in part, to the dissipated responsibility for all actors who play a role in the product's life cycle. However, the proponents of EPR assert that producers are the operative actors along the product chain since they are making decisions regarding the design and production of products and therefore, have the ability to influence the costs of recycling (Dalhammer 2015).

The Organization for Economic Cooperation and Development (OECD) defined EPR as "an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle (OECD 2001). This definition functions as the operative definition for EPR globally.

EPR policy is generally characterized by two objectives:

- 1) To shift the responsibility (physically and/or economically; fully or partially) upstream to the producer and away from municipalities, and
- 2) To provide incentives to producers to incorporate environmental considerations in the design of their products in order to reduce the overall environmental impacts of those products.

Lindhqvist, Tojo and others characterized EPR as being implemented through three categories of responsibility: financial, physical and informative (Lindhqvist 2000; Tojo 2004). While specific policy tools exist to implement each of these categories, EPR policies and subsequent program implementation vary significantly as to the extent to which legal instruments reflect each of the three categories.

In the United States, the term 'product stewardship' has often been used interchangeably with EPR (Hickle 2014). While product stewardship is generally acknowledged to encompass a broader range of strategies to address the environmental impacts of products, the regulatory requirements established within EPR or product stewardship in the U.S., do not demonstrate any functional differences in responsibilities for producers, retailers, local governments or others along the product chain.

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Extended producer responsibility reflects the transition to a broader recognition of the life-cycle impacts of products and materials and the interest in integrative policy approaches to address those impacts. It is clearly infused with an emphasis on preventing pollution and is designed to extend the producer's responsibilities beyond those envisioned with traditional tools such as bans, taxes and fees that illustrate the traditional policy emphases of 'end-of-pipe' strategies.

Much attention has been devoted to EPR's origins in the framework of the 'polluter pays principle' (PPP) that emerged in the global context with the Stockholm Declaration at the United Nations Conference on the Human Environment that was held in Stockholm, Sweden, in 1972 (Fitzmaurice 2010). The PPP was subsequently enshrined within international accords and in regional treaties such as the Treaty for a European Union. Furthermore, the Waste Framework Directive adopted the concept within Article 9 and stressed that preventive action should be taken as well as PPP.

As noted by Forslind, EPR was often characterized as a logical extension of the PPP (Forslind 2007). However, while PPP was premised on two desired outcomes, the prevention of pollution and clean up and remediation if pollution does occur as illustrated by the Superfund Act in the U.S., it is argued that EPR goes beyond PPP (Deutz 2009). While often framed together, important distinctions between PPP and EPR exist. The most notable distinction is the difference that, under EPR, the producers of products are not the actual actors engaged in the end-of-life management activities that create waste and thus pollution (OECD 2004). EPR policies recognize, however, that producers have the greatest ability and capability to exercise authority over other players along the product chain to reduce the environmental impacts and ultimately waste (OECD 2004).

Given that the primary premise underpinning EPR is the promotion of the internalization of environmental externalities throughout the entire product chain, the implementation of EPR typically results in more economically efficient methods for achieving societal goals related to reuse and recycling by shifting financing from taxpayers—who may have no economic nexus with the product or material being addressed—to the producers and consumers.

3.2 Internalization of Externalities and Promoting Economic Efficiency

A fundamental principle of ecological economics is the internalization of externalities that are not now usually recognized by the market. As noted by Weismeth, the internalizing of the environmental costs of goods or services takes steps towards ensuring a more efficient functioning of the market (Weismeth 2012). The resulting benefits of this internalization were noted above and were suggested by Massarutto, as the internalization of costs sought by EPR reduces the incentives for non-compliance that may be associated with other financial instruments such as taxes or advance disposal fees (Massarutto 2014). Kalimo et al. noted that the internalization of the environmental costs could be efficiently addressed through inclusion in product prices (Kalimo et al. 2015). Kaffine and O'Reilly observed that EPR is differentiated from other forms of environmental regulation in that it addresses the life-cycle of the product including the end-of-life management (Kaffine and O'Reilly 2013). Furthermore, EPR was

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positioned to serve as a more efficient financing mechanism than taxes or fees that require governmental establishment and oversight.

Sachs identified two types of externalities associated with products, the first being the economic costs to dispose of products and the second being the environmental impacts associated with their disposal (Sachs 2006). However, EPR is being implemented as a strategy that extends, not only to the downstream externalities as defined by Sachs, but also to the upstream externalities such as the impacts of energy consumption and use of toxic and hazardous constituents associated with the production of the products.

The concept of the internalization of externalities was broadly embraced as a tenet of environmental policy with Principle 16 regarding the internalization of environmental costs contained in the Rio Declaration on Environment and Development, which endorsed action by national authorities to promote the internalization of environmental costs and the use of economic instruments by taking into account the approach that the polluter should, in principle, bear the costs of pollution, with due regard to the public interest and without distorting international trade and investment. Such internalization was intended to correct the failures of the market so that the social costs are recognized (Nahman 2010).

Of course, the achievement of the internalization of externalities is highly dependent upon the policy choice of financing mechanisms for a particular product or material. For example, in the case of the ‘eco-fees’ as commonly used in the Canadian provincial EPR programs, Bury argued that fees included in the product price more clearly support the objectives of EPR including incentivizing more environmentally beneficial product design choices (Bury 2012).

3.3 History of Extended Producer Responsibility

Extended producer responsibility emerged in recognition of the need to transition from sole emphasis on the ‘end-of-pipe’ policy measures to those that address the growing complexity of solid waste dominated by products to embrace a life-cycle perspective to reduce the environmental impacts of products. The term ‘extended producer responsibility’ or ‘förlängt producentansvar’ in Swedish was first introduced by Lindhqvist and Lidgren (1990) in a report to the Swedish Ministry of the Environment in 1990 (Manomaivibool 2011). Lindhqvist expanded and refined EPR as a product-oriented policy mechanism (Lindhqvist 2000).

Reflecting an increased emphasis on ecological concerns in Germany during the 1980s, the German Parliament passed *the Ordinance on the Avoidance of Packaging Waste in 1991*. The Ordinance is often referred to as ‘Topfer’s Law’ after Klaus Topfer, the German Minister of the Environment and chief advocate for the Ordinance. That Ordinance inspired France and Austria to adopt similar EPR laws for packaging in 1992. This individual country activity spurred the European Union to enact Directive 94/62/EC on packaging and packaging waste to address the potential for disruption to the single market posed by individual member state’s regulatory activities.

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The Origins of EPR in the European Union

Following the issuance of the Directive on Packaging, the European Union embraced EPR for a suite of other categories of products and enshrined EPR as a policy vehicle for reducing the environmental impacts of products. For example, the Waste Framework Directive (WFD), a Directive adopted in 2008 that emphasized waste prevention strategies and established the target of 50 percent of household waste to be recycled, also stipulated that individual member states may pursue EPR for products or materials deemed by them to be important to address.

For each Directive, the European Commission Directives outlined the general policy framework and established performance goals. Following enactment by the EU, each EU member states was required to transpose the Directive into its national laws. However, individual member states were accorded significant flexibility as to how to implement the Directives with notable differences that ranged from the allocation of responsibilities amongst parties, to financing mechanisms, to the design of implementation scenarios such as single or competitive compliance organizations. As an illustration of the diversity of implementation by the member states, there is variety in the scope of packaging addressed by the EPR programs in place, whereby, some countries initially only implemented targets for commercially generated packaging while other member states addressed commercial and household packaging simultaneously (Cahill et al. 2011).

1) The Packaging and Packaging Waste Directive 94/62/EC

Inspired by the German Packaging Ordinance and subsequent regulatory requirements in other EU member states, the Packaging Waste Directive was enacted in 1994 and revised in 2004. The rationale for EU action on packaging was premised on ensuring the proper functioning of the common market. The Directive did not explicitly require the implementation of EPR but most member states have chosen EPR as the principle upon which to implement the Directive.

2) The End-of-Life Vehicles Directive 2000/53/EC

Following the example of the Packaging Directive, the European Commission promulgated the End-of-Life Vehicle Directive (ELV) that was adopted in 2000. The ELV directive took effect on July 1, 2002, but vehicles placed on the market in the EU before July 1, 2002, were not covered until January 1, 2007. The reuse and recycling rates as of January 1, 2015, were 80 and 85 percent respectively.

The ELV Directive also included the provision to restrict the use of four heavy metals (lead, mercury, cadmium and hexavalent chromium) in vehicles marketed in the EU after July 1, 2003.

3) The Waste of Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

The Waste Electrical and Electronic Equipment Directive (WEEE) is the European Community Directive 2002/96/EC, which was adopted in 2003. The WEEE Directive established ten categories of WEEE for reporting purposes. The Directive specified a collection target of four

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kilogram per capita/year. The Directive imposed the responsibility for the disposal of waste electrical and electronic equipment on the manufacturers or distributors of such equipment. It required that those companies establish an infrastructure for collecting WEEE, in such a way that users of electrical and electronic equipment from private households should have the option of returning WEEE without fees assessed at the point of collection.

An update to the WEEE Directive, referred to as the 'Recast' was promulgated in 2012. The Recast reduced the number of categories of WEEE while increasing the number of products addressed. In addition, the collection targets were increased and measures were enacted to reduce the number of non-compliant producers (Yla Mella et al. 2014).

4) The Directive 2006/66/EU on Batteries and Accumulators and Waste Batteries and Accumulators

The Batteries Directive was adopted in 2006 and prohibited the sale of batteries that exceed certain limits for lead, mercury and cadmium and established specified recycling targets and implementation timelines. The Directive addressed all batteries including automotive, industrial and portable batteries. The overall target set by the Batteries Directive was that 25 percent of all waste portable batteries should be collected by 2012 and 45 percent by 2016.

The Organization for Economic Cooperation and Development (OECD)

Following the pioneering EPR policy development in the European Union, the Organization for Economic Cooperation and Development (OECD) convened a three-phase working group on EPR between 1994 and 2001. Based on the working group, the OECD issued the Guidance Manual for Governments in 2001, which was a seminal document, intended to guide EPR policy consideration around the globe (OECD 2001). In addition to the Guidance Manual, the OECD Working Group issued several other formative documents including the Economic Aspects of EPR that have assisted with the development of EPR policy globally (OECD 2004).

EPR in the U.S. Context

As discussed in Chapter 4, recycling policy in the United States is largely implemented at the state and local level with very few regulatory requirements and financial assistance emanating from the federal government. As an outgrowth of the historical role for waste management, local government is responsible for ensuring availability of recycling services for households. EPR, however, emerged in the 1990s as a response to the limitations inherent with that framework for waste management in the U.S. and the identified need for a broader strategy to promote policy reform and innovation that was built upon the capability and responsibility of the private sector to participate in advancing a more material efficient society.

The Resource Conservation and Recovery Act (RCRA), the controlling federal statute for solid and hazardous waste management in the United States enacted in 1976, did not provide statutory authority for the U.S. Environmental Protection Agency (U.S. EPA) to institute EPR

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requirements for products. Congress subsequently amended RCRA in 1984 with the Hazardous and Solid Waste Amendments (HSWA). Those amendments to RCRA required the phasing out of land disposal of hazardous wastes. Some of the other provisions of this law included increased enforcement authority for the EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program. The hazardous waste program established under RCRA created an approach for the management of hazardous wastes that covered the responsibilities from the initial generation to the final disposal of the hazardous wastes, which is generally referred to as a ‘Cradle-to-Grave’ approach (Kollikkathara et al. 2009).

The President’s Council on Sustainable Development

The most robust effort at the U.S. federal level to consider EPR measures occurred within the discussions of the President’s Council for Sustainable Development (PCSD) meetings convened between 1993 and 1999. The PCSD was charged with examining new and innovative policy options for many longstanding and emerging environmental concerns. The PCSD took up EPR in 1995 with an emphasis on recognizing voluntary actions of EPR. The Council’s efforts were not translated into policy or regulatory action by the federal government, but the PCSD’s members recognized the emerging roles for manufacturers and others along the product chain to assume responsibility for reducing the environmental impacts of their products (President’s Council on Sustainable Development 1996).

The Emergence of EPR Policy and Practices within the U.S.

Because of the need for policy strategies that were based upon pollution prevention that reach beyond the end-of-pipe approaches, EPR emerged in state policy discussions in the late 1990s. The enactment of statutes in several states for EPR for rechargeable batteries during the 1990s was formative for establishing EPR as a state-level policy choice to address problem materials, particularly those with toxic or hazardous constituents that followed in the subsequent decade (Nash and Bosso 2013). Building on this experience, the Minnesota Pollution Control Agency (MPCA) issued the first state policy regarding EPR in early 1999 (MPCA, 2009). The policy stipulated criteria for identifying products as well as for assigning roles to various players along the product chain. The policy was issued as part of the biennial, state solid waste policy report. While the policy was not enacted into law by the state legislature, the policy served to articulate a role for producers in the of EOL management and contributed to a framework for the emergence of the EPR discourse in the U.S. Other states such as New York, Massachusetts and Oregon have subsequently adapted EPR for application in the U.S. and integrated it as a core strategy into their state solid waste management plans (New York State 2010; State of Oregon, 2012; Commonwealth of Massachusetts 2013).

In the United States, national dialogues during the 2000s engaged a wide range of stakeholders for the examination of EPR for specific products such as carpet, paint and WEEE and were instrumental to identify data needs, to articulate stakeholder perspectives and to develop policy strategies.

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The first of those efforts, focused on EOL management of used carpet, resulted in ‘The National Carpet Recycling Agreement.’ This was a voluntary agreement concluded in 2002 among the states, the U.S. EPA and the carpet industry. The Agreement (also referred to as the Memorandum of Understanding) stipulated specific reuse and recycling goals for post-consumer carpet management over a ten-year timeframe (Helms and Hervani 2006). The agreement prompted the creation of the Carpet America Recovery Effort (CARE); a producer funded and managed organization that was charged with achieving the goals. Following the enactment of an EPR regulatory measure in the State of California in 2010 to increase the recycling of carpet, CARE transitioned to serving as the producer responsibility organization (PRO) for manufacturers to comply with the statute.

The National Electronic Product Stewardship Initiative (NEPSI) was convened by the U.S. EPA between 2001 and 2005 with the objective of developing a strategy for a comprehensive national approach to managing waste electronics (Widmer et al. 2005). The initiative did not result in a national program but was instrumental for establishing the terms of discussion and expectations for implementation of EPR in the U.S.

Architectural paint emerged as the first product to be implemented through a national dialogue premised on consistent state policy adoption. Based upon a national dialogue that convened between 2003 and 2009, the effort resulted in an agreement on a financing mechanism and outlined a state-based legislative strategy to enact the model that has been adopted by eight states and the District of Columbia (Nash and Bosso 2013).

Chapter 4: Expected Outcomes, General Policy Choices and Critiques of EPR

Chapter 4 built on the contextualization of EPR in the previous chapter and characterized the expected benefits to be achieved through the enactment of policy instruments to implement EPR. This Chapter further described the common suite of themes contained within the EPR policy approach and the prevailing choices available to implement those themes. This overview identified the typical elements of EPR policies that are isolated and analyzed in Chapters 5 and 6. Finally, this Chapter concluded with an inventory of the critiques of EPR.

4.1. Desired Outcomes of Extended Producer Responsibility

Extended producer responsibility policies were designed to assign financial responsibility to producers associated with the EOL management of their products to realize the environmental benefits not achieved through the reliance on ‘end-of-pipe’ policy mechanisms. As a result of this internalization of environmental externalities, the intention of proponents of EPR was to move beyond a policy focus on the impacts of products at EOL to that of a broader policy principle that extends both up and down the product chain (Lifset 1993).

Of primary importance in supporting the rationale for EPR was the recognition of the market failures associated with the design, manufacture, distribution, sale, and use generally associated with products in commerce today (Dubois 2012). Because EPR served as a vehicle to identify and to implement the internalization of environmental externalities, it created a defined economic incentive to reduce the environmental impacts of products, materials and services and spurred development of more environmentally preferable products and services.

To conduct a thorough analysis of EPR, it is essential to understand the landscape of the solid waste management and recycling policies and programs that have traditionally been implemented to address products and materials at the end of their useful lives. These programs, often operated by local government, demonstrated significant limitations in their ability to uniformly achieve high material recovery rates, to promote source reduction and to influence product designers and manufacturers to develop more environmentally benign products.

Improved Environmental Performance

A primary objective of EPR was to achieve an overall reduction in the lifecycle environmental impacts associated with products that may not be as efficiently accomplished by other product-oriented tools or suite of tools. For example, EPR initiatives have resulted in expanded and dedicated collection and recycling activities, particularly if legally enforceable targets for product recovery or access to collection services are stipulated in the regulatory instruments. Such expanded collection infrastructure not only results in an increase of materials for reuse and recycling but consequently leads to decreased illegal disposal activities and poor recycling practices. Several studies have identified an increase in collection that can be attributed to EPR

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(Favot et al. 2016; Kunz et al. 2014; Massarutto 2014; Nash and Bosso 2013). In an assessment of 36 case studies in the EU, a recent analysis illustrated the collection rates, and in some cases the recycling and recovery rates, for eight product categories subject to EPR requirements in the EU (BIO by Deloitte 2014). This increase in the collection and recycling of products that results from EPR measures is often due to the regulatory incentives and stability that channel investment in the processing infrastructure and promote innovation as demonstrated by the experience with tires in the EU (Sienkiewicz et al. 2010).

There is expanded evaluation of the environmental benefits including GHG emission reductions due to the increased collection and recycling of products that are achieved through EPR programs (Geyer et al. 2015). Geyer et al. examined the GHG savings potential from the expanded collection and recycling of mattresses and box springs in the U.S. that will result if the EPR programs enacted in three states to date are expanded to address all mattresses generated annually nationally (Geyer et al. 2015).

Incentivizing Design for the Environment

With producers assuming the financing of the collection and management of their EOL products, EPR is intended to internalize previously externalized environmental costs. The assumption of the costs associated with EOL management thus translates into a financial incentive for DfE activities such as reducing the environmental impacts of their products through reduction of toxic and hazardous constituents and through activities that facilitate product disassembly for reuse and recycling.

More broadly, EPR was structured as a market-based approach for re-conceptualizing and for redesigning of the product system to support product-service systems and for implementing closed-loop models whereby EOL products are reclaimed to serve as feedstock for new products or are reused, remanufactured or repaired.

While significant debate continues regarding the influence of EPR to serve as a stimulus for product design change, particularly for more durable products that may not reach their EOL for a decade or more, there are some identifiable system benefits from implementation of EPR. These include enhancing the flow of information among suppliers and producers and supporting the development of new business models such as product-service systems. As noted by Kroepelien, EPR can motivate producers to assess their product design as well as their product information, reporting and labeling (Kroepelien 2000). As Tojo and Lindhqvist and others have observed, the effectiveness of EPR to provide signals for DfE is dependent upon the fundamental policy choices inherent in the policy design of a particular EPR program. The majority of research that examined the menu of EPR policy levers to promote DfE has suggested that individual producer responsibility (IPR), whereby, individual producers are responsible for their own branded products, presents the greatest opportunity to align and incentivize producers' design choices around environmentally preferable options.

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In a review of EPR for certain appliances and personal computers in Japan, Sawaki concluded that the enactment of EPR requirements contributed to more robust DfE activities, such as design for recyclability and a reduction in the use of hazardous substances between 2000 and 2010 for products addressed by the Specified Household Appliance Recycling Law (SHARL) and for computers that were addressed under the Act on the Promotion of Effective Utilization of Resources (Sawaki 2011).

Private Governance

As examined in Chapter 7, another motivation for EPR was the intention, clearly identifiable in the U.S., to transfer financial and programmatic responsibilities for EOL management of products to private actors. This is due, in part, to the demonstrable limitations of a recycling system rooted in municipal government but also to the recognition that a bi-furcated system, whereby financial responsibility lies with one entity and programmatic decision-making with another, fails to capture the potential improvements in program efficiency and dynamism offered by a more integrated, producer designed and managed EPR system.

Promoting Sustainable Supply Chain Management

As addressed in Chapter 8, the growth of EPR globally has emerged in parallel with an expansion of the emphasis on CSR within firms. While the definitions and expectations for CSR vary and the frequently implemented metrics seldom identify EPR measures, the theoretical underpinnings of CSR have supported not only individual firms' actions to reduce supply chain impacts of their products but also have incentivized their proactive engagement in the policy dialogue regarding EPR. Citing the example of the requirements for ELVs in Germany, Hart asserted that EPR regulations have spurred a revolution in product design based upon life-cycle management approaches (Hart 2007). Extended producer responsibility may be viewed as a tool to operationalize CSR objectives such as the integration of the collection and reuse or recycling of materials that are then used for the production of new products and thus essential for their processes and products. This product management strategy aligns with the notion that EPR can be integrated with producers' and material processors' objectives to process and to recover greater quantities of EOL products. As Koppius et al. noted, implementing product management programs not only facilitates closed-loop supply chains but also provides information for shaping of regulatory actions (Koppius et al. 2015).

From a firm-level perspective, EPR may operationalize supply chain objectives that are playing a more visible role in corporate social responsibility activities. Motivated by objectives such as the accrual of goodwill of customers and meeting sustainability goals or supply chain needs, companies have increasingly identified EOL recovery goals for their products. For example, the Coca-Cola Corporation established a goal in 2014 to ensure that at least 75 percent of their containers sold in developed markets were recycled at EOL by 2020. Dell established quantitative goals for product recovery efforts to reach two billion pounds of used electronics by 2020 (Dell 2015). For packaged goods, Unilever established targets for increasing recycling rates by fifteen

percent by 2020 in their companies in fourteen countries as well as targets for utilizing higher percentages of post-consumer materials in their packaging (Unilever 2015).

4.2 General Policy Choices for Extended Producer Responsibility

As the OECD definition of EPR stated, EPR exists as a policy principle rather than a rigid roadmap for application in each jurisdiction. This policy entails a series of individual policy choices that address influence the overall cohesiveness of the regulatory approach and thus have implications for its ability to achieve the overall objective of EPR. Despite their treatment as distinct policy choices, they are often very much interlinked with one policy provision impacting the selection of another. The following discussion of the thematic policy choices provided a framework for the subsequent chapters of this thesis and importantly, provided the context for the recommendations following each of this thesis' articles.

Individual versus Collective Responsibility

A primary point of departure for EPR policy design was whether the producers are required to fulfill their legal obligation individually or through engagement with a PRO that operates on their behalf. It was argued that collective approaches facilitate compliance and provide a more cost-efficient mechanism for collection and recycling activities (Atasu and Subramanian 2012). An oft-voiced concern of the collective model was that it might incentivize 'free riders', thus placing greater financial responsibility on the participating companies (Khetriwal et al. 2009). On the other hand, individual producer responsibility (IPR) suggested that producers assume responsibility at EOL for the products that they placed on the market (Rotter et al. 2011). Individual producer responsibility was suggested as a strategy that allows producers to be incentivized and thus to derive benefit from proactive design changes that facilitate product reuse or recycling. As noted by Kalimo et al., the dialogue regarding collective versus individual responsibility hinges on the 'trade-off' between aligning incentives for DfE and a less complex system (Kalimo et al. 2012). Rotter noted that collection of products at the EOL remains an obstacle for IPR (Rotter 2011). However, Mayers et al. suggested that PROs could adopt financing methodologies that more directly connect the fees assessed to the costs of processing products the EOL (Mayers et al. 2013).

Allocation of Responsibility within EPR

A principal question, and often the most difficult, that underlines EPR policy development is the degree of financial and programmatic responsibility that should be borne by producers relative to other actors along the product chain. Despite the nomenclature of EPR, the majority of regulated EPR programs generally reflect a 'shared responsibility' approach whereby entities beyond the producers are often subject to legal requirements as participants in the system. As noted by Massarutto, EPR systems allocate financial responsibilities among various players (Massarutto 2013). However, in noting the difference between operational responsibility for EPR and the entities who may be contracted to satisfy it, Kalimo et al. suggested that, for the purposes of proper alignment of incentives, given that producers assume legal responsibility associated with

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an EPR regulatory requirement, should also be accorded significant flexibility to design systems and engage other entities as needed (Kalimo et al. 2012).

Competition within EPR Programs

Another aspect of EPR policy design is the determination as to what extent is competition desired among participants in an EPR program and where along the product chain should that competition should take place. Within the dialogue on competition and EPR, the question is usually posed as to whether one PRO is optimal to accomplish obligations imposed on producers or whether multiple organizations offer a more optimal design. Huisman asserted that in competitive EPR schemes with multiple PROs, producers are not motivated to engage in collection and recycling activity beyond what is required (Huisman 2013). Richter and Koppejan further illustrate this in an analysis of EPR for lamps in the Nordic Countries (Richter and Koppejan 2015). Toyasaki et al. suggested that single-PRO arrangements result in a more efficient approach that benefit from the economies of scale (Toyasaki et al. 2011). Furthermore, Niza et al. suggested the PROs fulfilling the requirements for packaging recovery in Portugal developed a stronger position to negotiate and eventually reduce the fees paid by producers (Niza et al. 2014). With systems with multiple PROs, Mayers observed that allocation of waste collection is essential to an efficient and equitable functioning (Mayers 2007).

Financing Mechanisms for EPR

The financing mechanisms that are most commonly associated with EPR programs are cost-internalization and the eco-fees. The cost internalization method is generally associated with EPR implementation methods by which producers arrange for collection and recycling individually. Eco-fees are common with participation in a PRO that establishes a set schedule of fees for each product or category. The fees are typically material type specific and are determined by the weight and size (Fleckinger and Glachant 2010). Associated with the implementation of eco-fees is the question of fee visibility. As Bury noted, in some jurisdictions, including Canada, the question of whether the eco-fees should be visible to consumers was debated (Bury 2010). It was also asserted that visible fees may result in the PROs accumulating significant reserves (Mayers et al. 2011). Clift and France argued that the imposition of visible fees undermines a fundamental tenet of EPR, that of encouraging producers to strive for improved resource efficiency (Clift and France 2006).

While financing systems whereby fees are paid by PROs by producers are often assumed to provide fewer incentives for DfE than cost internalization approaches, Eco-Systems, a PRO for WEEE in France, modulates fees based on environmental considerations of the product in order to incentivize DfE activities (Kunz et al. 2014).

Performance Goals

A much-debated feature of EPR is how performance goals are set, measured and evaluated. The determination of performance goals is often determined by the characteristics of the product, for

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example, if it is a consumable or durable product. For some product categories such as for packaging, the regulatory instrument may stipulate an overall collection or recovery target and then specify individual targets by material type (De Jaeger and Rogge 2013).

As noted by Dubois, targets are difficult to change and the lack of dynamism that reflects evolving and maturing programs may inhibit dynamism (Dubois 2012). In the case of the ‘Recast’ of the WEEE Directive in the EU, the collection targets migrated from a static per capita rate to one that is a fixed percentage of the amount of products placed on the market (Van Eygen et al. 2016). Other performance goals stipulate convenience of collection opportunities. For example, the statute for the e-waste program in the State of Washington contains a ‘convenience standard’ that requires collection opportunities in jurisdictions with a population greater than 10,000 residents (Gui et al. 2013).

Van Sluisveld and Worrell, in their examination of source reduction activities within the Dutch packaging market, concluded that while packaging waste increased during the study time frame, the weight-based performance goals might not result in the optimal environmental outcome (van Sluisveld and Worrell 2013). The authors suggested that a life cycle approach with a suite of metrics broader than the weight-based recycling measure may be appropriate to more accurately evaluate the environmental benefits of packaging recovery efforts.

4.3 Critiques of EPR

Most of the specific criticism directed at EPR has been leveled at various aspects of implementation rather than overall conceptual approach. As discussed in Chapter 7, local government has challenged the conceptualization of EPR with the assertion that local governments are best positioned to address waste and recycling issues within a community (Hickle 2014). Furthermore, Hobson argued that policy measures such as the WEEE Directive fail to incentivize producers to adopt more radical production models that transcend an incremental resource efficiency approach (Hobson 2015). For example, several EPR laws have been criticized as requiring a collective compliance approach through a singular producer responsibility organization. More broadly, as noted by Atasu et al., some producers view EPR simply as a tax rather than as a market-based financing mechanism with broader policy objectives (Atasu 2011). Additionally, it is suggested that producers, given the differing requirements across jurisdictions, face significant administrative responsibilities (Kunz et al. 2014).

Within the context of policy dialogues, the allocation of specific responsibilities for those entities along the product chain is also challenged. For example, the distribution of the responsibilities for financing collection activities among brand owners, retailers and municipalities is debated. For example, Hackl and Wiesmeth questioned the exclusion of municipalities given their potential to optimize the solid waste system in order to promote recycling (Wiesmeth and Hackl, 2012).

An often-voiced criticism of EPR in practice was the lack of individual responsibility compliance options. This critique is frequently articulated by firms that are resistant to participation in

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collective organizations as well as by supporters of IPR due to its potential role to promote practices for DfE. While collective schemes are often viewed as reducing the resources necessary for regulatory oversight, they are criticized for not allocating costs equitably (Mayers 2010).

As addressed in Chapter 6, significant attention was devoted to the lack of harmonization across jurisdictions that often accompany EPR regulations and the accompanying challenges this presents (Khatriwal et al. 2011; Cahill et al. 2011).

Performance Goals

The question of the efficacy of legally binding performance goals such as recovery or recycling targets has also been subject to significant critique which was, in part, based on the argument that the amount of material available for collection is often quite challenging to determine (Gui et al. 2013). Thus producers may be legally accountable for collection and recycling targets that require active participation on the part of consumers (Kalimo et al. 2015). The legal targets are often challenged due the lack of a producer's ability to compel participation in a collection program, which is an action engaged in by consumers voluntarily and potentially irregularly.

Legal instruments utilizing EPR have implemented a variety of metrics for tracking progress of programs. While these metrics range from a traditional recycling rate based on percentage recovered of what is placed on the market to those premised on convenience requirements that stipulate availability of collection services per population or geographic area, legally binding goals are often resisted since they generally require cooperation by entities which extend beyond the producer's product sales chain.

As Dubois noted, the static collection and recycling targets contained in many EPR regulatory instruments do not promote innovation on behalf of the PRO to go beyond the legal requirements (Dubois 2012). Furthermore, once established, the process to amend targets is often politically challenging thus delaying the updating of targets to account for new information regarding collection system dynamics and consumer participation among other factors.

Lack of Incentives for Product Design Changes

Significant scrutiny has been applied to the assertion that EPR serves as a factor for implementing DfE practices, particularly for more durable, longer-lived products. Several segments of the electronics industry have offered this argument given the lifespan of televisions, for example, and that collection and recycling of older units offers no value for the design of units being produced today. However, the empirical evidence to draw a conclusion on the relationship between EPR and DfE changes for the range of products subject to EPR requirements is not determinative.

The prevailing application of EPR has also been challenged as failing to achieve the stated policy outcomes, namely, to create incentives for product design changes. It has been observed that the predominant allocation scenarios that may be based either on current market share or upon return

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share are not adequate to send sufficient financial signals to the producers to implement DfE for WEEE (Gui et al. 2013).

Several potential reasons for this lack of a clear causal connection between EPR and DfE were published in the literature. Assessing the efficacy of EPR as a motivator for DfE is problematic due to the methodological challenges associated with this type of evaluation. Given the many factors at play associated with products, it is often difficult to correlate a specific DfE outcome with EPP. For example, complementary measures such as the EU's Restrictions on Hazardous Substances Directive (RoHS) for WEEE that restricts the usage of several heavy metals and brominated flame retardants impedes an assessment as to what impact EPR may have had on reducing these constituents in electronic products. For example, in their study of the European lighting sector, Gottberg et al. stipulated that bans on hazardous substances, public procurement and product declarations demonstrated clearer impacts on the producers' product design practices than EPR (Gottberg et al. 2006). Another observation was that the lack of policy consistency across jurisdictions inhibits a consolidated signal being sent to producers for design changes. Finally, for some product categories such as WEEE, the linkage of financial benefits associated with DfE activities and thus reduced EOL management costs with future product returns cannot be demonstrated (Husiman 2013). In some cases, the costs associated with the EOL management of products may not be sufficient to significantly impact a company's product design choices.

Others challenge EPR from the perspective that it failed to take into account the full environmental impacts of products by emphasizing EOL, and recycling in particular. For example, EPR regulatory tools often do not sufficiently incentivize the repair, refurbishment and reuse of products. For example, the WEEE Directive did not specify a firm target to incentivize the reuse of unwanted electronic products (Roller and Fuhr 2008). Furthermore, Sachs noted the assessment that EPR regulatory mechanisms fail to explicitly address the issue of the consumption of the products within a regulatory regime (Sachs 2006).

Finally, EPR policy was also faulted for the lack of specific requirements as to how products and their constituent materials are to be managed to ensure that producers and producer responsibility organizations adhere to environmentally sound management practices. Specifically, it was observed that EPR has resulted in increasing flows for materials and, particularly in the case of WEEE, resulted in expansion of low-quality recycling operations (Zoeteman et al. 2010). Alev et al. argued that EPR might result in interference in secondary markets for durable goods (Alev et al. 2014).

Chapter 5: Comparative Policy Analysis of EPR in the U.S. and Canada

5.1 Introduction

Chapter 5 addressed research question 1 (*How and to what extent is EPR policymaking in the U.S. being influenced by the global policy landscape, and in particular that of Canada, for EPR policy development and program implementation?*) Given the geographic proximity and shared characteristics between the two nations, the Canadian experience with EPR has influenced the development of EPR policy in the U.S. However, as the following article that compares the implementation of EPR in the U.S. and Canada, illustrated, there are notable differences regarding prevailing policy choices between the U.S. states and the Canadian provinces.

This chapter is foundational to the other articles in this thesis because it identified the prominent elements of EPR policy such as the definition of producer, structure of financing and performance metrics. Through the use of a comparative framework, the analysis facilitated the recognition of broader structural questions for EPR policy development. This included an exploration of the rationale and potential strategies to achieve policy consistency between jurisdictions that is the focus of Chapter 5 and the following chapter's investigation of the governance of EPR programs.

Hickle, G. T. (2013). Comparative analysis of extended producer responsibility policy in the United States and Canada. <i>Journal of Industrial Ecology</i> , 17(2), 249-261
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Comparative Analysis of Extended Producer Responsibility Policy in the United States and Canada

Garth T. Hickle

Keywords:

e-scrap
extended producer responsibility (EPR)
governance
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recycling
waste electrical and electronic equipment (WEEE)

Summary

This article analyzes the policy choices and programmatic elements of extended producer responsibility (EPR) as implemented in the United States and Canada. The article traces the historical development of EPR in each country and defines common features of EPR in each nation. The U.S. states and the Canadian provinces have assumed the primary role, rather than the federal governments, for enacting producer responsibility requirements in their respective countries. However, the paths taken demonstrate several fundamental differences, including the prevalence of individual versus collective responsibility and the financing mechanisms implemented for EPR. Given the deepening experience with EPR and the breadth of its application to a widening array of products in the United States, the Canadian model for EPR is starting to receive more examination from policy makers in the United States, indicating that the policy and programmatic differences between the two nations may eventually be narrowing.

The comparative policy analysis is illustrated through the lens of EPR regulatory efforts for waste electronics, with particular profiles of the programs in the State of Minnesota and Province of Ontario. Both approaches broadly reflect many of the policy considerations and governance and programmatic themes that dominate EPR programs in each country. Finally, the article offers recommendations for collaborative work between the United States and Canada to explore consistency between programs and other complementary strategies to support producer responsibility activities.

Overview

While the United States and Canada share a common border, a significant trade relationship with Canada as the largest trading partner for the United States, and an interconnected economy with many of the same manufacturers, retailers, and others along the product chain, the political cultures and governing structures demonstrate significant contrasts. These differences are illustrated by the prevailing policy approaches to implementing the principle of extended producer responsibility (EPR) that are currently in place in the U.S. states and Canadian provinces.¹ Despite similar motivations and policy drivers for implementing EPR, such as shifting the waste management costs from local governments to brand owners and the

internalizing of costs to promote the design of more sustainable products that are shared by both U.S. states and the Canadian provinces, important differences exist in terms of how programs are implemented to achieve these outcomes.

For example, the policy path in the United States has been premised, until recently, on detailed statutory requirements, while the Canadian provincial approach has emphasized a more flexible outcome-based regulatory model. In another notable difference, the Canadian regulatory approach to EPR has generally resulted in collective producer responsibility organizations funded by brand owners through the use of eco-fees. In the United States, however, the trend has been to emphasize the collection and recycling obligations placed on individual brand

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owners with few regulatory incentives or requirements for the brand owners to work in a collective fashion.

The article identifies the primary policy approaches and implementation scenarios for EPR in Canada and the United States and illustrates the thematic differences in policy structures through the use of two case studies for waste electronics, one in the Province of Ontario and the other in the State of Minnesota. Both case studies demonstrate several of the prevailing policy features of EPR in their respective countries.

Finally, the analysis identifies opportunities for potential collaboration between programs as well as promoting policy consistency in North America, albeit with the recognition that such an effort may be well into the future. The analysis is intended to inform the policy development process, including identification of opportunities to support the evolving cross-fertilization between the two countries on EPR.

The analysis is particularly timely with the application of EPR policy to a wider breadth of products in Canada and the ascendant influence of the Canadian policy structure for EPR that is influencing the legislative footprint in the United States (e.g., the EPR framework law adopted in Maine and the carpet and paint statutes enacted in California in 2010).

Review of Comparative Environmental Policy Analysis Between the United States and Canada

Despite the fertile ground for comparative environmental policy and program analysis between the United States and Canada relatively little research has been devoted to the topic (Rabe 1999a). Harrison (2007) analyzes the differing approaches to climate change with a particular emphasis on the Kyoto Treaty. Harrison (2007) also offers a comparison of the regulation of the pulp and paper industry and Casey (2011) identifies opportunities for collaboration in the area of public resource management. Product-oriented policy more broadly and producer responsibility in particular has yet to receive comparable attention. However, the research presented here identifies specific characteristics of governing, policy making, and implementation that are clearly at play for EPR in each nation.

Fundamental to any comparative policy analysis is a recognition of the differences between a parliamentary system, as exists in Canada, and the presidential system with a distinct separation of powers that exists in the United States (Harrison 2007). These differing governing structures translate into an ease of policy making in Canada that is not replicated in the United States due to the clear division between the administrative and legislative branches.

While both the United States and Canada can be characterized as exhibiting environmental regulatory regimes that invoke both national and subnational governments, Canada is generally considered to do much more without federal government preemption of provincial statutory actions or transfer grants to provinces to implement national environmental laws, a hallmark component of state implementation of federal statutes

in the United States (Rabe 1999b). The United States has a much more expanded national government footprint, an intertwined federal and state implementation approach, and thus an often confrontational relationship between the national and state regulatory authorities (Rabe 1999b). However, despite the differing intergovernmental allocation of authority, both the states and provinces are perceived as the environmental policy innovators and more adept at replicating and enhancing environmental policy adopted in other jurisdictions.

The literature emphasizes that the United States has had a historical tendency toward a more legalistic approach to environmental regulation and enforcement activity than in Canada (Howlett 2000). On the other hand, Canada exemplifies a more cooperative model of policy making, with the environmental administrative agencies allowed more flexibility for implementation of provincial laws (Rabe 1999b). This dynamic is reinforced by a broader deference to the regulatory agencies and generally less direct oversight and intervention from legislative bodies than is often present in the United States (Rabe 1999a).

In keeping with the overall tone of policy making, the judicial system in Canada plays a much smaller role in regulatory or policy implementation than in the United States, which is not only more litigious generally, but offers broader access to courts for citizens and advocacy organizations (Howlett 2000). In Canada, however, compliance and enforcement activity often illustrate a more cooperative than prosecutorial emphasis (Harrison 1995).

As Howlett (2000) observes, little evidence of historical policy convergence between the United States and Canada exists, but during the 1990s, both nations embraced voluntary, collaborative, market-based strategies that include more stakeholders. This dynamic is clearly demonstrated with the embrace of producer responsibility and the endorsement of market-based, outcomes-oriented policy instruments.

As is evident in the EPR policy dialogue in the United States, many elements of environmental policy making in Canada are not only worthy of consideration for application in the United States but present opportunities for joint policy consideration and action (Casey 2011). As the following analysis demonstrates, the broader differences in environmental policy making between the United States and Canada are manifested in the policy choices and implementation strategies for EPR. For example, the primacy of the provincial regulatory, rather than statutory, mechanism in Canada to mandate EPR for individual products or categories of products combined with brand-owner-driven plans and significant flexibility allocated to provincial authorities is reflective of broader themes of environmental policy making in Canada and is influencing EPR policy development in the United States.

Profile of Extended Producer Responsibility in Canada

The evolution of EPR in Canada borrows significantly from the experience in the European Union and reflects an industry-managed and financed approach that generally offers significant

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flexibility to brand owners (often referred to as “stewards” in the provincial programs).

Recognizing that voluntary measures were insufficient to achieve substantive results or ensure a level playing field for brand owners, particularly for packaging, the Canadian provinces have been engaged in developing and implementing producer responsibility measures for a wide range of products initiated with the Post-Consumer Paint Stewardship Program Regulation in British Columbia in 1994 (Driedger 2001). As of 2011, there were approximately 65 mandated producer responsibility programs in Canada, all regulated and implemented at the provincial level, making Canada a global leader in terms of applying EPR to the broadest palate of products. Given the reach of EPR, it is serving as a transformative tool for transitioning waste management from a local government responsibility to brand owners and consumers.

As in the case of the United States, there is no existing federal authority to implement a federal approach for producer responsibility except, under the Canadian Environmental Protection Act of 1999, to address products that contain toxic substances (McKerlie et al. 2006). Unlike the United States, however, the Canadian Constitution specifically reserves the significant authority for environmental protection matters for the provinces, a key dynamic that has arguably propelled provincial regulatory activity because the question of at which level of government regulations should be executed is largely resolved. Therefore the provincial environment agencies are responsible for drafting regulations, providing oversight of programs, and ensuring compliance.

As illustrated by table 1, broad environmental protection statutes such as the Environmental Management Act in British Columbia and the Waste Reduction and Recycling Act in Manitoba provide the statutory underpinning for issuing regulatory requirements for specific products or materials. However, a number of provinces, including British Columbia and New Brunswick, offer a more comprehensive regulation that provides authorization for the Minister of the Environment to designate individual products or product categories for inclusion in EPR programs through an amendment to the comprehensive regulation without issuing a separate regulation.

The recycling regulation in British Columbia, issued in 2004, consolidated all of the existing producer responsibility programs in the province and created a pathway for adding additional products for producer responsibility. The British Columbia recycling regulation, in particular, emphasizes an industry-managed, outcomes-based approach (British Columbia Ministry of the Environment 2006).

Four provinces, New Brunswick, Newfoundland and Labrador, Ontario, and Quebec, have created nongovernmental organizations to oversee the development and implementation of producer responsibility programs. The organization in Ontario, Waste Diversion Ontario (WDO), was created by the Waste Diversion Act and serves as a permanent nongovernmental corporation with 16-member multistakeholder governance. These entities have not functioned without some criticism, and Recyc-Quebec, a sister organization to WDO, was briefly

considered for dissolution (Solid Waste and Recycling 2010). Similarly, the elimination of WDO was suggested by one of the political parties in Ontario in 2012 as part of a restructuring of stewardship programs in the province (The Canadian Press 2012).

One notable aspect of the EPR approach in the provinces is the emphasis on brand owner development and submittal of stewardship plans that outline the financing and operational aspects of the proposed program. The regulations generally require a consultation process that engages other entities such as local governments or recyclers in the development of the plan and ultimately requires review and approval by the regulatory authority.

While the majority of provincial programs assign financial or physical responsibility to brand owners, the packaging and printed paper regulations enacted to date specify a defined financial obligation for local government. This ranges from 50% of the net costs of operating the program in the case of the Ontario “Blue Box” program to a 20% municipal share in the Manitoba regulation (Green and Treiblock 2010). In 2010, Quebec announced a regulation that transitions from the cost-sharing arrangement for packaging and printed paper akin to Ontario to 100% brand owner funding of municipal recycling programs by 2013 (Government of Quebec 2011a). Furthering the transition to 100% producer funding, the British Columbia Ministry of the Environment issued a provincial regulation in May 2011 for packaging and printed paper that places the full financial responsibility on the brand owners (Solid Waste and Recycling 2011).

Canadian EPR regulatory requirements emphasize, and in some cases require, collective responsibility through producer responsibility organizations (also referred to as industry funding organizations [IFOs] in a few provinces) that are managed and funded by brand owners. Most of the producer responsibility obligations are fulfilled by formal producer responsibility organizations representing the majority, if not the entirety, of brand owners selling in a particular province. While this approach provides an efficient portal for brand owners to comply with the producer responsibility requirements and, it is argued, results in greater economies of scale and improved compliance, it is criticized as not promoting competition to attain higher performance or drive down program costs (Quinn and Sinclair 2006).

A developing aspect of the EPR landscape in Canada is the presence of organizations that provide services to fulfill the brand owner EPR obligations in multiple provinces. For example, Product Care, after an initial programmatic focus on British Columbia for several different product categories of household hazardous waste, including paint, expanded to and began operating paint producer responsibility programs in British Columbia, Alberta, Saskatchewan, New Brunswick, and Nova Scotia.

Another key feature of the provincial producer responsibility programs is the use of eco-fees as the financing mechanism to fulfill the brand owner obligations. Eco-fees, as distinct from fees collected on a product at its end of life, are generally determined

by the estimated cost to fulfill the EPR program requirements and are paid by producers to the producer responsibility organization on a per weight or unit basis of products placed on the market in a particular jurisdiction. The characteristics of eco-fees are not uniform and may or not be visible to the consumer at the point of sale and managed through the sales chain by different methods. The prevalence of eco-fees as the primary financing vehicle chosen by producer responsibility organizations, whether visible to consumers or not, are an illustrative outcome of the policy intent to support collective responsibility approaches as well as the brand owners recognition of the benefits of a collective approach.

The reliance on eco-fees, rather than cost-internalized individual producer responsibility approaches, is often supported due to the presumed benefits of promoting transparency regarding the costs of the program and as a communication tool for consumers. It is argued that visible eco-fees support more consistent pricing across the nation (Bury 2010). The retail sector has consistently supported the use of visible eco-fees, as illustrated by the positions taken by the Retail Council of Canada, the primary trade association for retailers in Canada (Bury 2010).

However, the use of eco-fees, and particularly those that are visible, is receiving more scrutiny due to the controversy generated by the implementation of the municipal hazardous or special waste (MSHW) program in 2010 in Ontario with eco-fees being assessed on an expanded range of products (Green and Trebilcock 2010). In a departure from the other provinces, both New Brunswick and Quebec have taken regulatory action to curtail the use of visible fees (Bury 2010).

One notable feature of the provincial programs is the inclusion of "first importers," as is included in the Saskatchewan waste electronics regulation. The obligation for "first importers" applies when a brand owner does not exist or an entity, such as a retailer, takes title to the product or material as an option for fulfilling stewardship obligations (Deathe et al. 2008). The first importer obligation varies from province to province; for example, Ontario has fewer first importers registered as stewards relative to a province such as Manitoba.

Another prominent attribute of producer responsibility in Canada is the Canadian Council of Ministers of the Environment (CCME) work program. The CCME has led a discussion to promote harmonization among provinces for particular products, but there is also a broad, yet common, framework that has been applied across the product spectrum. This degree of consistency not only substantiates the emphasis placed on consistency by the CCME but also reflects the priority placed on engagement in the EPR policy dialogue by representative industry associations. In October 2009 the Council of Ministers approved the Canada-wide Action Plan for Extended Producer Responsibility that specified products to be designated by all of the provinces for inclusion in EPR programs in two phases (CCME 2009a). Recognizing the importance of promoting consistency in the provincial packaging programs, the CCME issued the Canada-wide Strategy for Sustainable Packaging (CCME 2009b).

Profile of Extended Producer Responsibility in the United States

Individual states in the United States have enacted producer responsibility measures that emphasize a specific policy and programmatic focus for each product. All mandated EPR activities have occurred with statutory direction rather than regulation under a broader environmental law. As with many other aspects of solid waste management, and recycling in particular, the federal government does not play a significant role in solid waste policy, leaving the states to assert leadership regarding producer responsibility (Vogel et al. 2010). However, individual states in the United States are considering a statutory producer responsibility framework underpinning that would guide the designation of products, articulate the expectations for brand owners, and direct the development and submittal of stewardship plans as the key programmatic vehicle for implementing programs.

Producer responsibility measures were first enacted in the United States in the mid-1990s with state statutes requiring producer responsibility for rechargeable batteries that spurred the development of the Rechargeable Battery Recycling Corporation (RBRC), the first producer responsibility organization in the United States (Sachs 2006).²

Given the preeminence of the product-specific statute-driven mechanism in the United States, the statutes enacting producer responsibility programs are thus necessarily often quite detailed and stipulate specific performance requirements such as recycling goals, standards for collection convenience, or requirements for certain practices by recyclers. For example, under the New York State Electronic Equipment Recycling and Reuse Act, manufacturers must provide at least one reasonably convenient method of collection within each county and within each municipality with a population of 10,000 or greater (Buseman 2012). The statutory approach, while ensuring a degree of accountability, contributes to a lack of flexibility for the programs to accommodate new products placed on the market or respond to changes in the collection and processing infrastructure without returning to the legislative body for amendments to the statute.

State environmental agencies are charged with oversight, compliance, and enforcement and in some cases an active role in implementation. In the United States, several producer responsibility programs for certain products offer a "government administered" compliance option; examples include electronics in Maryland and mercury-containing lamps in Washington (Gregory and Kirchain 2008).

A key component of the compliance and enforcement mechanism to reduce the number of "free riders," those companies whose products are being collected and managed in the EPR program but who are not fulfilling their financial obligations, is the inclusion of a "do not sell" provision that prohibits both brand owners and retailers from distributing products within the state. This mechanism is featured in many of the state waste electronics laws and is emerging in statutes for other products such as that enacted for unwanted paint in Oregon (Oregon Department of Environmental Quality 2011).

The prevailing method for achieving the program outcomes in the United States, particularly for electronic waste (e-waste) laws, is to assign responsibility to individual brand owners of a particular product to make collection and processing arrangements to meet their legal obligation. This variant of individual responsibility, more akin to an individual compliance approach, places legal responsibility on brand owners to achieve a specific obligation that is, in the case of several state statutes for waste electronics, determined by the share of their products being returned or by the total weight of products placed on the market. While this approach for determining a brand owner's responsibility departs from the conventional emphasis of individual responsibility whereby brand owners are specifically responsible for their own products placed on the market, it differs markedly from the collective responsibility approach that offers few opportunities for differentiation by product or brand (Atasu et al. 2008).

The emphasis on a specific obligation for each brand owner rather than obligations assigned to a producer responsibility organization illustrates several important threads conspicuous in the U.S. marketplace. The broader political context regarding imposition or authorization of additional fees, frequently construed as taxes, is apparent in the dialogue in the United States and contributed to a preference for models that do not result in programs funded by defined fees. This application of an individual obligation model also suggests policy makers' interest in spurring design for environmental activities on behalf of individual brand owners, a fundamental precept of EPR and a theme of the policy dialogue in the United States (Lindhqvist and Lifset 2003).

The competitive landscape in the United States spurs the creation of distinct business models that often inhibit brand owner collaboration, thus contributing to a desire for mandated producer responsibility to accommodate this diversity and support individual company efforts to, for example, implement product take-back programs. However, a significant driver for the hesitancy to embrace collective responsibility models is the concern regarding violating antitrust or anticompetitive conduct requirements, as could occur with collective fee-setting activities. As Salzman (1997) and others have noted, recognizing restrictions on activity that may violate antitrust or anticompetitive conduct statutes should give rise to provisions addressing this issue. Several state statutes, such as the Minnesota Electronics Recycling Act, contain provisions that essentially immunize brand owners for the purposes of fulfilling the intent of the producer responsibility program.

However, the EPR landscape in the United States is undergoing a transition, as the paint and carpet producer responsibility laws, at the behest of the brand owner trade associations, stipulate establishment of collective organizations. These organizations, Paint Care in Oregon and California and the formerly purely voluntary organization the Carpet America Recovery Effort (CARE) in California, are funded by statutorily authorized eco-fees, a financing mechanism similar in practice to that in Canada (Palmer and Walls 2002).

With a few notable exceptions, such as the waste electronics program in the State of Maine whereby municipalities are required to provide collection services, local governments often play a crucial role in providing collection infrastructure in EPR programs, but it is generally of a voluntary rather than mandatory nature (Wagner 2009).

Products addressed have emphasized household hazardous waste broadly and waste electronics more specifically. By early 2011, 24 states had enacted producer responsibility requirements for waste electronics. Oregon and California adopted laws for paint and California also added carpet to the list of regulated programs in 2010. Following the first producer responsibility statute for mercury-containing lamps in Maine in 2009, Washington followed suit in 2010 and Vermont in 2011 (Wagner 2012). Maine and Washington have also considered proposals for unwanted pharmaceuticals. In contrast to other jurisdictions globally that have prioritized packaging as a waste stream well positioned for producer responsibility, only Vermont has considered, but not yet enacted, an EPR approach modeled after the programs in Canada for packaging and printed paper (Hickle 2010).

Key Differences Between the State and Provincial Extended Producer Responsibility Policy Approaches

As illustrated above, substantive policy and programmatic differences exist between the United States and Canadian approaches to EPR. These differences reflect not only contrasts in constitutional and legal authorities, and parliamentary versus presidential governance structures, but they also illustrate cultural differences between the two nations.

The history and context for producer responsibility in Canada reflects the higher degree of influence of the European Union and other international policy activity and, in particular, the Organization of Economic Co-operation and Development (OECD). In contrast, the European experience has had a much less direct influence on producer responsibility in the United States, as evidenced by hesitancy to embrace the term, the products prioritized for producer responsibility, and elements of policy design (Jackson 2007).

The maturity of EPR in the Canadian provinces has also provided both provincial regulatory agencies and brand owners with a common understanding of how the policy approach will be applied and has resulted in a transition of the dialogue from whether EPR is appropriate to how to optimize its application in Canada.

A fundamental distinction between the U.S. and Canadian policy structure is the process by which products are designated for an EPR program. By instituting a regulation-driven designation, the provinces arguably create a streamlined approach that favors greater industry engagement and thus a more direct role, through the program planning process, in determining many aspects of program design and implementation. With the requirement for legislative action, the U.S. landscape for EPR may be

subject to legislative politics and ensures that each product is addressed individually, a factor that inhibits consistency.

Legal statutes in the United States are more prescriptive than is generally encountered in the regulations adopted in the Canadian provinces. U.S. practice is partly driven by the desire to avoid the financial resources and time required to engage in state agency promulgation of administrative rules (MPCA 2009). However, as the stewardship planning component becomes more commonplace in the United States, it is expected that many of the requirements and program expectations currently contained in the statutes will migrate to content requirements for inclusion in stewardship plans.

A prominent feature of the provincial EPR programs that contrasts with those in the United States is the centrality of collective producer responsibility organizations. While this aspect of EPR in Canada reflects the experience of the brand owner response to EPR in the European Union, it also indicates the leadership demonstrated by several of the industry trade associations in assuming a proactive role in shaping EPR policy development in Canada. This is illustrated, for example, by the engagement of Electronics Product Stewardship Canada (EPSC), an electronics industry association formed in 2003. The EPSC forged a consensus among brand owners of electronic products, advanced an industry-developed approach for provincial consideration, and engaged in the policy development process in each province in order to promote consistency (Deathe et al. 2008). However, the Ministry of the Environment in Ontario in 2009 signaled their intent to move toward individual responsibility and full financial responsibility (Ontario Ministry of the Environment 2009).

Another striking feature of the Canadian approach is the primacy of the stewardship plans submitted on behalf of brand owners as the tool to define brand owner obligations and illustrate the functioning of the program. While the United States is beginning to implement a plan-driven approach, particularly in regards to paint and carpet, many of the strictures and expectations for brand owners and others along the product chain are specified in statutes and regulations. The Canadian approach to consultation during stewardship plan development and review and approval by the provincial authority shift much of the decision making outside of the legislative process.

The significant difference in the use of eco-fees, and particularly those that are visible, reflects a difference between the U.S. and Canadian financing approaches and illustrates a greater degree of comfort with collective organizations in Canada, but also demonstrates the political challenges in the United States facing the imposition of any fees that may be construed as a tax. As opposed to the political dynamic in the United States, retailers have been much less reticent to accept visible eco-fees that are, for example, reflected on the receipt for products purchased or to serve as the fee remitter on behalf of brand owners. However, both the provincial and state regulatory approaches have shied away from imposing mandatory collection requirements for discarded products as exemplified in the European Union's Waste Electrical and Electronic (WEEE) Directive.

While the United States has targeted EPR regulatory activity for a single product or narrow suite of products within a particular category, the provinces have typically addressed a broad scope of products within a particular regulation. This more comprehensive approach is exemplified by the household hazardous waste regulations adopted in several provinces that address products ranging from paint and solvents to mercury-containing lamps. However, even within the more narrowly tailored regulations for products such as waste electronics, the scope of products is broad.

Case Studies of the Extended Producer Responsibility Programs for Waste Electronics in Minnesota and Ontario

This article offers two case studies of producer responsibility programs to illustrate the similarities and differences between a state product-specific producer responsibility program for waste electronics and its counterpart in Ontario. Both programs are representative of many of the policy principles for EPR in the respective countries and demonstrate the common programmatic emphasis in implementation. The programs in Minnesota and Ontario for waste electronics were chosen due to their representative nature as well as the availability of data for evaluation and analysis.

Overview of Extended Producer Responsibility for Electronics in the United States

As of May 2011, 25 states had enacted state waste electronics recycling laws. All of them, with the exception of an advance recycling fee (ARF) program in California that was enacted in 2003, place requirements on brand owners to undertake activities to increase the collection and recycling of waste electronics. However, these requirements often vary significantly from state to state with varying degrees of statutory prescription and responsibilities placed on brand owners (Ezroj 2010). These differentiations range from, for example, what products are included in the regulated program to whether brand owners are required to meet certain performance criteria annually.

Most statutes address televisions, computer monitors, and laptops, with several states obligating printers and desktop computers. The statute adopted in New York in 2010 included a much broader range of products, including gaming consoles and equipment such as digital video disc (DVD) players, and this may inspire other states to broaden the scope of obligated products (Buseman 2012).

As opposed to other financing mechanisms that rely on eco-fees established and managed by producer responsibility organizations, the producer responsibility programs are often premised on each manufacturer registering with the state regulatory agency and, in most programs, being obligated to reach a certain level of recycling determined by their return share or current market share. Unlike the context for the EPR program in Canada and the European Union, there are no traditional representative industry producer responsibility organizations

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Table 1 Overview of provincial legal authority and stewardship organizations for extended producer responsibility (EPR) in Canada as of 2012

Province	Enabling statute	Broad EPR regulation	Stewardship oversight board
Alberta	<i>Environmental Protection and Enhancement Act, RSA 2000, c E-12</i>		
British Columbia	<i>Environmental Management Act, SBC 2003, c 53</i>	Recycling Regulation, BC Reg 449/2004	
Manitoba	<i>The Waste Reduction and Prevention Act, CCSM c W40</i>		
New Brunswick	<i>Clean Environment Act, RSNB 1973, c C-6</i>	Designated Materials Regulation, NB Reg 2008-54	Recycle NB
Newfoundland and Labrador	<i>Environmental Protection Act, SNL 2002, c E-14.2</i>	Waste Management Regulations, 2003, NLR 59/03	Multi-Materials Stewardship Board (MMSB)
Nova Scotia	<i>Environment Act, SNS 1994-1995, c 1</i>		
Ontario	<i>Waste Diversion Act, 2002, SO 2002, c 6</i>		Waste Diversion Ontario
Prince Edward Island	<i>Environmental Protection Act, RSPEI 1988, c E-9</i>		
Quebec	<i>Environment Quality Act, RSQ, c Q-2</i>	Regulation respecting the recovery and reclamation of products by enterprises, RRQ, c Q-2, r 40.1	Recyc-Quebec
Saskatchewan	<i>Environmental Management and Protection Act, 2002, SS 2002, c E-10.21</i>		

that are engaged in proactive EPR program design and development activities such as authoring stewardship plans, developing and arranging collection infrastructure, and joint reporting activities. In the United States, however, compliance entities such as the Electronic Manufacturers Recycling Management Company (MRM) have emerged to serve as vehicles for brand owners in several states (Ongondo et al. 2011). For example, the MRM contracts with one or more vendors to collect sufficient weight to fulfill the individual obligations of its member companies in states, such as Minnesota, with a market-share-based obligation. These compliance entities, while easing the burden of fulfilling a weight-based recycling obligation, are not representing the majority of the brand owners and are characterized as providing a service rather than proactively developing and managing an EPR program.

In the United States, the state waste electronics programs can be broadly characterized by four approaches, as illustrated in table 2: return share, a hybrid of market and return share, market share, and registration and planning requirements. The programs are often categorized by the methodology utilized for establishing a brand owners obligation. This mechanism for establishing obligation has often ignited significant debate during legislative deliberations and is often determinative of several other aspects of the program.

The return share approach, such as in Maine, determines a manufacturer's financial obligation based on the actual weight or percentage of a manufacturer's branded products that are

collected for recycling (Atasu and Van Wassenhove 2011). On the other hand, the market share model establishes a producer's obligation based on the weight of their products placed on the market during a year. A hybrid approach embraces both the return and market share approaches, typically implementing the return share approach for information technology products such as computers and peripherals and market share for consumer electronics such as televisions.

Following the precedent established with the waste electronics law enacted in California that requires compliance with the European Union's Directive on the Restriction of Hazardous Substances (RoHS), seven states as of 2011 have followed suit with either a requirement for compliance with the RoHS or disclosure regarding compliance with the directive (Sachs 2006).

Finally, the registration and plan model generally requires producers to register with the state regulatory authority and submit a plan that outlines their strategy for the collection of discarded products. The states that have implemented this approach have generally not imposed collection and recycling goals and have lower recycling rates than other models.

Case Study: Minnesota Electronics Recycling Act

The Minnesota Electronics Recycling Act was enacted by the legislature in 2007 following 5 years of intensive evaluation and consideration of various policy approaches. The policy options, such as an advance recycling fee enacted in California in

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Table 2 Models of U.S. extended producer responsibility programs for waste electronics as of 2011

Market share obligation	MN, WI, IN, NY, PA, VT
Return share obligation	WA
Hybrid approach obligation	ME, CT, RI, SC, OR, NJ, IL
Registration and plan	MI, HI, MD, MO, NC, OK, TX, UT, VA, WV

Table 3 Provincial extended producer responsibility (EPR) regulations for waste electronics*

Province	Program implemented	Stewardship organization (industry funding organization)
British Columbia	2007	Electronics Stewardship Association of British Columbia
Manitoba	Regulation approved in 2010	Electronic Products Recycling Association (EPRA) Manitoba
Nova Scotia	2008	Atlantic Canada Electronics Stewardship (ACES)
Ontario	2009	Ontario Electronic Stewardship
Prince Edward Island	2010	Atlantic Canada Electronics Stewardship (ACES)
Saskatchewan	2007	Saskatchewan Waste Electronic Equipment Program
Quebec	Regulation issued in 2010	Electronic Products Recycling Association (EPRA) Quebec

Notes: *The waste electronics program in Alberta is operated by the Alberta Recycling Management Authority (ARMA), a provincial crown agency governed by a broad range of stakeholders, including government representatives, that provides services for several other stewardship programs in Alberta. While it shares several characteristics with the EPR programs for waste electronics across Canada, the brand owners have few responsibilities under the regulation.

2003 as well as the return share obligation enacted in Maine in 2004, received significant scrutiny (Atasu and Van Wassenhove 2010). The statute enacted in Minnesota is representative of many of the producer responsibility measures enacted in the United States, including those in Indiana, Wisconsin, New York, Vermont, and Pennsylvania.

Driven by concerns regarding heavy metals in electronic products, increasing management costs borne by local governments due to their presence in municipal solid waste, and a disposal ban on cathode ray tube-containing products enacted in 2003, the legislature ultimately endorsed a producer responsibility model as the preferred policy option. The Minnesota Pollution Control Agency (MPCA), the state environmental regulatory authority, is charged with oversight, compliance, and enforcement activities to ensure implementation of the statute.

Summary of the Act

The statute implements an individual responsibility approach that offers significant flexibility for brand owners to achieve their obligation. The act implements a market share obligation that applies to manufacturers of video display devices such as computer monitors, televisions, and laptop computers. The brand owner's obligation for collection and recycling is equivalent to 80% by weight of obligated products during the program year (Eifert 2010). The determination of a brand owner's market share is accomplished through knowledge of direct sales to consumers rather than through traditional retail locations, such as the sales model employed by Dell, or through the use of national sales data adjusted for Minnesota's population.

The statute does not prescribe requirements as to the type of collection infrastructure that must be provided or contain a convenience requirement as found in several other state's

legal requirements, such as Washington, New York, and Oregon, that require at least one site per county (Wagner 2012). However, the act does attempt to ensure collection opportunities through an additional 0.5 pound credit for pounds collected outside of the Twin Cities Metropolitan Area as an incentive for collection in less densely populated areas of the state (Buseman 2012). The act also does not prohibit end-of-life fees from being charged by collectors; a provision restricting such fees is present in several others states' EPR statutes for waste electronics.

Recognizing that precisely gauging collection volume is challenging, the statute contains a provision for recycling credits that are created and held by manufacturers if they collect more than their annual obligation. Following an amendment to the statute enacted in 2009, manufacturers may only meet 25% of their annual obligation through the use of credits (MPCA 2010).

In order to facilitate accurate accounting, annual registration and reporting is required for collectors, recyclers, and manufacturers. However, individual manufacturers report their sales and collection weight to the Minnesota Department of Revenue, rather than the MPCA, as a measure to ensure proprietary sales data are not available to the public.

The statute also requires the disclosure by brand owners of whether their obligated products are compliant with the European Union's RoHS directive.

Products Addressed

Although the obligation is determined by the individual brand owner's sale of video display devices, a broader category of electronic products labeled covered electronic devices, such as printers, desktop computers, and video cassette recorders (VCRs), among others, can be collected and applied toward the individual brand owner's obligation.

Financing

The financing mechanism can be defined as “cost internalization,” given the lack of set fees, visible or otherwise, that are common with many EPR programs for waste electronics globally. However, if a manufacturer does not fulfill their individual obligation or chooses not to, the law stipulates a per pound penalty of 0.30, 0.40, or 0.50 (U.S. dollars) per pound determined by how close they are to meeting their obligation (Ezroj 2010). The fee amounts were deliberately set by the legislature at above market rates to encourage manufacturers to establish their own programs.

Implementation

Since the program is premised on individual brand owner responsibility, the law did not stipulate the creation of a formal compliance organization. However, the act does permit one or more collective organizations to represent obligated brand owners, and in recognition of this option, it specifically authorizes collaborative activity through statutory protections from state anticompetitive conduct regulations. Manufacturers have generally worked directly with recyclers who in turn develop arrangements with collectors to provide sufficient pounds for manufacturers to meet their program-year obligation.

While the law does not prescribe a particular responsibility for collection and encourages a wide array of entities to serve in that role, local governments in Minnesota are central to the existing infrastructure, collecting approximately 50% of the weight collected annually (MPCA 2011). The program also supports a mix of collection strategies including permanent collection sites, collection events, and mail-back efforts. Retailers such as Best Buy, for example, are becoming essential to the collection infrastructure in the state and collect approximately 30% of total weight of household-generated waste electronics in the state. The Minnesota-based retailer began collecting a defined set of discarded electronics through in-store offerings in the summer of 2008 and has become the single largest collection entity in the state.

Program Outcomes

Approximately 75 brand owners of video display devices have registered with the MPCA each year of the program and thus have a defined collection and recycling obligation determined by the weight of their products sold during the program year.

Achieving one of the desired outcomes of the statute, there has been a significant increase in the number of collectors as well as the number of recyclers providing service in the state since the law was implemented. The number of permanent collection sites across the state has increased with nearly 80% of Minnesota’s 87 counties having at least one permanent collection site.

The program has resulted in approximately 30 million pounds of consumer electronics recycled in Minnesota each year of the program. The program has resulted in per capita collection rates of 5.7 pounds, 6.7 pounds, and 6.3 pounds for the three completed program years (MPCA 2010).

One consequence of the absence of a central producer responsibility organization that publishes and collects fees as well as reports on overall program costs is the difficulty in conducting an economic analysis. However, the cost per pound to recycle waste electronics from households has declined significantly from the prevailing per pound costs prior to implementation of the law, based on reported and anecdotal evidence from local government collection programs (MPCA 2010).

While the program has resulted in a significant increase in the collection of waste electronics from households in Minnesota, it is not clear whether other desired outcomes of EPR are being achieved. For example, no evaluation has been conducted into what impact, if any, the program has had on influencing product designs.

Summary of Extended Producer Responsibility for Waste Electronics in Canada

As referenced in table 3, as of May 2011, eight provinces had promulgated regulations for waste electronics in Canada, all of which, with the exception of Alberta, are premised on EPR. The regulations and implementation demonstrate a remarkable degree of consistency, not only with each other, but also with the overall framework for EPR in Canada as demonstrated by significant flexibility in program design, stewardship plans, collective compliance, and financing mechanisms. The producer responsibility obligations are generally fulfilled by collective compliance organizations and funded by eco-fees, referred to as “environmental handling fees” in some provinces, that are often visible to consumers at the point of sale.

With the exception of the regulation for EPR for waste electronics adopted in Quebec in 2011, the provincial regulations do not specify quantitative performance goals for brand owners, although the stewardship plans generally outline targets such as, for example, collection volume (Government of Quebec 2011b).

Case Study: Extended Producer Responsibility for Waste Electronics in Ontario

Ontario is one of six provincial e-waste programs that are operational and is illustrative of the general policy approach adopted in Canada for implementation of EPR. Other provinces that have embraced EPR for waste electronics include Prince Edward Island (PEI), Saskatchewan, British Columbia, and Nova Scotia.

All of the mandatory EPR programs in the province are regulated under the authority of the Waste Diversion Act (WDA) of 2002. The WDA authorizes the Minister of the Environment to designate a material for a producer responsibility program. The WDA also created Waste Diversion Ontario (WDO) to develop, implement, and operate waste diversion programs for a broad range of materials.

In December 2004 the Minister of the Environment submitted the regulation for WEEE with a program request letter submitted to WDO for creation of a diversion program for WEEE

in June 2007. The initial regulation outlined seven categories of electrical products as designated waste under the WDA. The Waste Electrical and Electronic Equipment Regulation did not specify particular performance goals to be attained.

In September 2007 Ontario Electronic Stewardship (OES) was created as the industry funding organization (terminology used in Ontario for producer responsibility organization) for WEEE in the province and led the effort to develop the stewardship plan (OES 2009). While the first program plan was approved by the minister in July 2008, a revised program plan for phases 1 and 2 was submitted in July 2009 and approved by the minister in August 2009.

Despite the central role of OES, the WDA creates a pathway for individual manufacturers or a group of brand owners to submit plans to WDO as long as it will fulfill the objectives of the diversion program as an alternative to full participation in OES. However, no brand owners, as of 2011, have availed themselves of the individual plan option. The stewardship plan stipulates performance goals for the program including 5-year collection, reuse, and refurbishment and recycling targets. However, failure to achieve the goals does not lead to potential enforcement activity against a specific company.

Ontario Electronics Stewardship

OES is the producer responsibility organization responsible for implementing the program for WEEE in Ontario. OES manages the program on behalf of the obligated brand owners and is governed by a board of directors composed of representatives from the obligated brand owners.

OES activities to fulfill the brand owner obligations are funded through fees that OES establishes. Unlike the cost-sharing arrangement in place for the packaging and printed paper program in Ontario, brand owners are obligated to assume full financial responsibility for the costs of managing e-waste. The fees are based on several factors, including the overall program costs and the number of units placed on the market in Ontario. In addition, several other considerations influence the fee structure, including the desire to avoid the cross-subsidization of products using an approach that defines the management costs for each product category. However, management costs that are common for all brand owners are shared. The fees remitted by brand owners are not specifically designed to promote or reflect design for environment activities and are not differentiated by brand owner or other features within the product category.

While OES establishes the fees, the regulation and program plan do not prescribe how the fees are managed through the product chain. In practice, many of the brand owners pass along the fees to retailers, who then voluntarily implement visible fees for consumers. OES also permits entities such as large retailers, rather than brand owners, to remit fees to OES.

OES requires contracted recyclers to abide by the recycler qualification requirements established by EPSC that were created to ensure environmentally sound management practices and adherence to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Lepawsky 2012).

Products Addressed

The producer responsibility program for managing waste electronics currently addresses 44 product types comprising the phase 1 and phase 2 product categories articulated in the regulation. Phase 1 of the program began on April 1, 2009, with six initial products, including televisions, monitors, desktop computers, laptop computers, computers peripherals, and fax machines. Phase 2, which began on April 1, 2010, added new products including phones, cameras, and audiovisual equipment.

Financing

OES collected 45 million Canadian dollars (C\$) in eco-fees during first program year, April 2009 to March 2010, with current fees ranging from C\$26.25 for displays with a larger than 29-inch screen to C\$0.10 for cell phones and pagers (OES 2010).

Program Outcomes

As of early 2011, there were approximately 780 stewards, 566 permanent collection sites, and 12 approved processors. The goal of the first year of the program, April 2009 to March 2010, was to collect 42,000 metric tons of electronic waste; the program actually collected 17,303 tons, or 1.31 kilograms (kg) per capita (2.9 pounds). The cost for the year 1 WEEE program was C\$1604 per ton. It is estimated that OES is managing 60% to 70% of all waste electronics managed in the province. It is important to note that no disposal ban is yet in place in the province.

Influence of the Canadian Approach to Extended Producer Responsibility in the United States

Policy makers in the United States are examining EPR, not only for specific products with a successful track record in Canada, such as paint and pharmaceuticals, but they are also conducting an intensive examination of the policy structure guiding the provincial programs and the resulting outcomes. This focus is directly manifested in the development of producer responsibility “framework” legislative proposals considered in several states. These initiatives are directly influenced by the provincial approach, particularly that in British Columbia, to producer responsibility. Maine enacted a modified “framework” in 2010, with similar bill introductions in New York and Rhode Island in 2011 (Product Stewardship Institute 2010). Regardless of the fate of these individual state proposals, the themes of consistency between programs, brand owner leadership in program design and implementation, and an emphasis on outcomes are coming to the fore in the EPR dialogue in the United States.

With the enactment of several producer responsibility measures in several states starting in the 2009 legislative session that borrow significantly from the approach to EPR in Canada, the provincial policy influence continues to expand and deepen in the United States. The producer responsibility statutes enacted in Oregon for paint in 2009, in California for paint and carpet in 2010, and in Maine for mercury-containing lamps

in 2009 all demonstrate thematic similarities to the general policy approach prevalent in the provinces featuring broad programmatic outlines in the statutes, significant flexibility in how the outcomes are achieved, and a stewardship plan requirement.

It is expected that policy makers in the United States will continue to seek guidance from the experience in the provinces both in terms of policy construction and in terms of emphasis on particular products or product categories.

Opportunities for Collaboration

Given the historical cooperation between the United and Canada on a number of environmental measures, an identification of potential avenues and topics for collaboration with a focus on steps toward consistency in EPR programs is worthwhile. Several institutions devoted to supporting cooperation on environmental matters, such as the International Joint Commission between the United States and Canada that addresses the Great Lakes region and the Commission for Environmental Cooperation (CEC) serving the North American Free Trade Agreement (NAFTA) region, create institutional bodies that establish common environmental priorities and could serve as vehicles for collaborative action.

There are several specific options for promoting program consistency between the United States and Canada, including joint identification and designation of products and materials for producer responsibility measures. While challenging, the United States and Canada could initiate an effort to identify the common objectives and policy objectives of producer responsibility and seek to realize their recognition in policy measures. Of particular interest for both the United States and Canada may be an emphasis on policy measures to support “design for environment” in the context of EPR or developed as supporting measures as demonstrated by the RoHS directive in the European Union.

Another potential initiative worthy of attention is to enable and support producer responsibility organizations that function on a cross-border basis furthering the objective of program consistency. An emerging binational initiative under way is the Western Product Stewardship Collaborative (WPSC), which is identifying opportunities for joint action, including policy consistency and program assessment on EPR for California, Oregon, Washington, and British Columbia (Bury 2012).

The development of a materials processing roadmap for ensuring adequate end-market processing availability in North America would be valuable for identifying currently available processing locations and gaps in commodity end markets to channel investment.

Finally, both the United States and Canada would benefit from a coordinated effort at evaluation to further identify the economic efficiency and environmental outcomes, such as the nexus of EPR and product design, of the respective policy choices and program implementation strategies.

Acknowledgments and Disclaimers

The views expressed in this article are solely the author's and do not necessarily reflect the views of his agency or any other organization with which he is affiliated.

Notes

1. For the purposes of this article, EPR is characterized by the Organization for Economic Co-operation and Development (OECD) definition: EPR is an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. An EPR policy is characterized by (1) the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities, and (2) the provision of incentives to producers to take into account environmental considerations when designing their products (OECD 2001).
2. Lindhqvist and Lifset (2003) and Walls (2006) among others cite deposit refund policies, most prominently for beverage containers, as a policy tool that reflects the principles of EPR. However, given the often significant level of prescriptive requirements and a financing mechanism that does not incentivize design for environment practices, deposit programs are best characterized as “proto” EPR or placed within a broader category of product-specific policy instruments.

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Chapter 6: Promoting Consistency of EPR Policy in the United States

Introduction

Chapter 5 examined research question 2 (*What are the strategies and opportunities to achieve a greater degree of consistency for EPR programs in the United States given the prevailing diversity of state-based regulatory approaches?*) Chapter 4 established the policy context for EPR in the U.S. and Canada and identifies the prevailing policy choices by U.S. states and Canadian provinces. In both countries, EPR is implemented at the subnational level with significant flexibility accorded to individual jurisdictions for policy design and program implementation. As a result of this flexibility, the potential and in some cases, the reality, of lack of consistency between jurisdictions is a feature of EPR. The question of policy consistency in the United States is addressed in the following paper through an examination of three strategies to promote consistency between state enacted and implemented EPR policies.

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Moving beyond the “patchwork:” a review of strategies to promote consistency for extended producer responsibility policy in the U.S.



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ABSTRACT

Product-oriented environmental policy with an emphasis on extended producer responsibility (EPR) (frequently referred to as product stewardship in the U.S.) is being applied in the United States for an increasingly broad scope of products including waste electronics and household hazardous wastes such as paint and mercury-containing lamps. However, due to the lack of a unified federal response, these efforts are driven by state-level policies and regulations. This state-led approach is frequently characterized as resulting in a “patchwork” of disparate regulations. Historically, two strategies are often suggested as offering a remedy for this situation; 1) federal legislation and 2) model state legislation. However, another policy strategy has emerged in the U.S., that of an overall EPR policy framework, which creates a clear process for selecting and designating products and articulates the roles and responsibilities for the various players along the product chain. This article provides an analysis of the experiences and prospects for each of the three strategies to serve as a policy vehicle for greater consistency of EPR regulations throughout the U.S.

In part motivated by global extended producer responsibility policy approaches, particularly in the Canadian Provinces, efforts are now underway to investigate a similar comprehensive regulatory approach to be implemented by individual states in the U.S. The article examines the “framework” model that is envisioned in the U.S. and outlines the recommend components of this policy concept. Finally, the article provides a comparison with other jurisdictions, most notably, British Columbia, which has implemented a broad extended producer responsibility policy.

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1. Introduction

Motivated by concerns about the environmental impacts of products such as electronic goods and household hazardous waste, policymakers in the United States are taking a more expansive look at products and are grappling with the appropriate policy response to reduce their environmental impacts as well to address the increasing costs for management at the ‘end-of-life’ management phase of products. However, as with many public policy issues, the debate surrounding what constitutes the most effective strategy to address the problem and the appropriate roles for federal, state and local governments are far from resolved.

Much of the policy attention is centered on the concept of extended producer responsibility (EPR), a principle that is designed to help society to reduce the environmental impacts of products throughout their lifecycles (Lindhqvist and Lifset, 2003). Extended producer responsibility, also commonly referred to as product

stewardship in the United States, seeks to internalize the environmental costs of products thus serving as an incentive to reduce toxic or hazardous constituents and embrace other ‘design-for-the-environment’ practices (Scheijgrond, 2011). Significantly, such cost internalization is intended to move the ‘end-of-life’ product management costs from taxpayers and ratepayers, to the relationship between manufacturers, retailers and consumers (Forslind, 2009).

EPR has historical antecedents in the polluter pays principle and embraces the integration of economic and environmental objectives illustrated by ecological modernization theory (Pellow et al., 2000). Ecological modernization theory recognizes that market dynamics can serve as an important tool for minimizing environmental impacts and stimulates technological developments and product innovations that create societal value (Berger et al., 2001). While EPR is implemented through regulatory action by the state, the primary actors are the producers and therefore, they are generally accorded significant flexibility to implement a program (Deutz, 2009).

Initially implemented in Europe for packaging in the early 1990’s and enshrined in waste policy in the European Union, EPR

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has been adopted, particularly for waste electronics (Ongondo et al., 2011) in many of the OECD countries and is being, gradually implemented in non-OECD nations (Manomaivibool, 2011). However, despite its expanding impact, EPR policy globally is marked by the lack of a consistent policy approach, even for particular products, and by inconsistent application of policy in a particular jurisdiction such as the European Union (Mayers, 2007).

Often influenced by the EPR experience globally with the European Union and Canadian Provincial programs, in particular, EPR is emerging as a prominent feature of waste management policy in the United States, particularly for products containing hazardous substances such as mercury-containing products and waste electronics (Silveria and Chang, 2011). In the absence of a U.S. federal policy for regulating the environmental impacts of products, policy considerations currently reside with individual U.S. states that view EPR as an innovative strategy that transcends the typical “command and control” regulatory architecture (Sachs, 2006).

However, this strategy must be placed in the context of the market participants, most notably the brand owners and argues for a greater attention to jurisdictional consistency. Unlike the major environmental media statutes that emphasize site-specific impacts, EPR arguably requires a more concerted strategy for consistency given its insertion into the movement of goods that are manufactured, distributed and consumed in differing jurisdictions. In another distinguishing feature, EPR programs that emphasize the collection and recycling of materials result in commodities (e.g. steel, plastic) destined for global markets.

The state level legislative activity in the U.S. is heightening calls by many stakeholders, with the impacted product manufacturers at the forefront, for the U.S. Congress to assume a greater role to avoid the emerging patchwork of disparate state EPR laws for the collection and recycling of certain products. However, as discussed in subsequent paragraphs of this paper, significant impediments exist for the U.S. Congressional action on this topic.

While the desire for a more harmonized approach is often felt most acutely by manufacturers of designated products, the current regulatory landscape for waste electronics offers a cautionary tale as to the potential consequences for all actors along the product chain as other products are subject to state regulatory requirements. The desire for greater consistency and harmonization presents an opportunity for the U.S. Congress, or in lieu of federal action, for individual states to fulfill their role as policy innovators to establish a comprehensive policy framework that more fully embraces EPR as a tool to address the environmental impacts of products.

This article identifies three public policy strategies to achieve greater consistency and suggests that the growing rationale for producer developed and managed programs to be the avenue, best suited to promote consistency of EPR policy efforts. Such a comprehensive approach may be necessary to not only promote consistency across jurisdictions but to realize the full potential of EPR, not only as a tool to address ‘end-of-life’ management responsibilities but to achieve a reduction in the *lifecycle* impacts of products.

1.1. State leadership on producer responsibility

Given the lack of policy momentum at the federal level, individual states have emerged as the vanguard and source of innovation for producer responsibility policy in the U.S. (Ezroj, 2010). This state action has focused on individual products thus far but is now evolving to consider comprehensive producer responsibility framework policies that may potentially be applied to wide range of products and materials.

By serving as a catalyst to expand the suite of products addressed by an EPR policy approach, measures for waste electronics have been

enacted in twenty-four U.S. states since 2004 (Atasu et al., 2012). The State of California requires an advanced recycling fee to be collected by retailers for funding of collection and recycling efforts – a policy approach that is generally not considered to be producer responsibility (Kahhat et al., 2008). Such laws require manufacturers to finance, to varying degrees, the costs to collect, transport and process waste electronic products that are generated. As Eilert (2010), Buseman (2012) and others note, that these laws are emblematic of a “patchwork” of differing requirements and expectations for manufacturers as well as others in each state. A marked outcome of the state-level legislative deliberation on waste electronics has been to greatly advance the policy debate on EPR and an examination of the allocation of roles between manufacturers and governments in the U.S. However, while there are some similar provisions among the various state laws, each state program demonstrates unique characteristics, some of which were driven by local state political considerations. Several products including paint, batteries, mercury-containing products and carpet among other products are under consideration for EPR requirements in individual U.S. states.

Capitalizing on the momentum for EPR stimulated by the grappling with several waste electronics management approaches, many states are not only broadening the scope of products under consideration for EPR regimes but are also recognizing the need for a broad policy framework to guide decisions regarding individual products in an effort to produce a consistent and more efficient approach for PR. While this effort reflects a maturation of EPR in the U.S., attention does need to be paid to the potential for “policy chaos” and what tools, whether coordinated state activity such as model state legislation or a federal presence is needed to achieve greater policy and program harmonization.

1.2. The context for consistency of state programs

“It is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.” – U.S. Supreme Court Justice Louis Brandeis, *New State Ice Co. v. Liebman* (1932)

Due to the federalist nature of American governance, the tension between individual state policy actions, thus realizing Justice Brandeis’ exhortation and a consistent national approach is an enduring feature of the political landscape in the U.S. While consistency is often acknowledged to be desirable, several impediments often exist for achieving this goal among state legislative efforts. Most prominently, the lack of consistency reflects the differing constituencies, political contexts and past experiences with EPR.

Of course, the perception is that policy approaches must be tailored to the real or perceived unique state circumstances for each state and developed in the context of factors such as available collection and processing infrastructure available for a particular product or material. In some arenas, “policy competition” between/among states is a prevailing practice to promote policy innovation (Adler, 2011). However, such individual state policy actions often inhibit consistency. Also, there often exists a lack of a comprehensive understanding of the variables contributing to program design and the implications of certain policy decisions. Finally, the potential for the lack of agreement among producers e.g. the lack of agreement amongst manufacturers of electronic products as to how EPR obligations should be established and financed, serves as a disincentive for consistency.

As noted in reports by two federal agencies, the U.S. Department of Commerce in 2005 and the U.S. General Accountability Office in 2010, the lack of consistency among state level programs is illustrated by the differences inherent in the 24 states with statutory

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Table 1
The scope of obligated products by state E-waste laws in different U.S. states.

Obligated products	State and year of initial passage
Televisions, laptops, monitors (screen size nine inches or greater)	Minnesota (2007)
Televisions, laptops, desktop computers, and monitors, printers, portable DVD player, (screen size greater than seven inches)	Wisconsin (2009)
Televisions, monitors and laptops and tablets (screen size four inches or greater)	Indiana (2009)
Televisions, desktops, laptops, tablets, monitors (screen size four inches or greater), printers	Connecticut (2007), Michigan (2008)
Televisions, desktop printers, video game consoles, digital picture frames, portable computers, monitors, and/or portable DVD players	Maine (2004)
Televisions, desktop computers, laptops, tablets, and computer monitors (screen size of four inches or greater)	Washington (2006), West Virginia (2008), Oregon (2007), Maryland (2005), New Jersey (2008)
Televisions, desktop computers, monitors, combination units, laptops (screen size of nine inches or greater)	Rhode Island (2008)
Computers, televisions, small scale servers, computer peripherals (monitors, keyboards, mice or similar pointing devices, facsimile machines, scanners, printers, small electronic equipment (VCRs, DVRs, portable digital music players, DVD players, digital converter boxes, cable or satellite receivers, game consoles)	New York (2010), Illinois (2008)
Televisions, laptops, desktop computers, monitors, printers, keyboard/mouse (screen size of four inches or greater)	Pennsylvania (2010), Vermont (2010), Hawaii (2008)
Televisions (9 inches or greater), desktop computers, monitors, combination units, tablet computers, laptops (no screen size limitation on IT devices), keyboards, mice, printers, s canners, other peripherals	North Carolina (2007)
Desktop or notebook computers, monitors, and printing devices, Televisions (9 inches or greater), combination units, tablets, laptops (no screen size limitation on IT devices)	South Carolina (2010)
Televisions, desktop computers, laptops, printers, keyboard/mouse, portable DVD player, VCR, and tablets (no screen size specified)	Utah (2011)
Desktop computers, laptops and monitors	Missouri (2008), Oklahoma (2008), Virginia (2008)
Desktop computers, laptops, and monitors, televisions (9 inches or greater TVs only)	Texas (2007)

Source: National Center for Electronics Recycling.

EPR programs for managing waste electronics (U.S. Department of Commerce, 2006 and U.S. GAO, 2010) While it is difficult to accurately determine the actual compliance costs for both regulated entities as well as the costs to state oversight agencies but certainly the lack of consistency reduces the efficiency of compliance efforts and may contribute to dissuading the development of national initiatives.

To illustrate the differing requirements of the state electronics waste management programs including the scope of products addressed, the determination of producer's obligations and the role of state government among others, Table 1 outlines one of the provisions of state EPR laws, the significant variations of which products are addressed under the various state e-waste laws.

Several of the factors that often serve to inhibit consistency include that fact that while individual states are keenly aware of innovative policy measures that have been enacted in other states, there is generally no strong constituency within a particular state to strive for policy consistency with neighboring states. Another consideration is that achieving consistency requires strong consensus among the impacted brand owners with the ability to translate that consensus into policy leadership and ability to

navigate the political landscape in multiple states. However, this approach requires significant agreement amongst industry leaders with potentially disparate business models, product lines, vertical integration of take-back and recycling operations. The most vocal constituency arguing for greater consistency among state-based programs are the brand owners principally but other entities along the product chain with defined responsibilities such as recyclers, for example, who stand to benefit as well. While the additional costs to brand owners for compliance with the myriad of individual state programs beyond what would occur with greater consistency of state laws is difficult to ascertain, research indicates that the differing compliance activities ranging from differing brand owner registration procedures to reporting requirements require significant resources (NERIC and NCER, 2006).

Arguably, the implementation of national programs will result in a reduction in the requirements for compliance resulting from the disharmonized state programs and can result in improved economies of scale that lead to an enhancement of the efficiency of the programs. Another potential outcome of greater consistency that is often overlooked is the reduction in staff and resources necessary for state regulatory and implementation activities, a

Table 2
Comparison of Strategies to Promote Consistency of EPR Policy.

Implementation tool to promote consistency	Implementation mechanism	Advantages	Disadvantages
Federal legislation	Statute enacted by U.S. Congress	Implements national approach that potentially mandates a consistent set of requirements for a particular product group	<ul style="list-style-type: none"> In keeping with other federal environmental statutes, a federal law may delegate significant decision-making to individual states Necessitates creation of a new body of federal environmental law
Model state legislation	Product specific statute enacted by individual state legislatures	Allows for phased-in national program through consistent state legislation	<ul style="list-style-type: none"> Requires producer-led legislative engagement Does not prevent individual state action that may be inconsistent with other state's initiatives
Framework	State statute enacted that creates platform for producer-led EPR programs	Creates common approach for all products and provides a vision for producer-led program development and implementation	<ul style="list-style-type: none"> Politically challenging Requires that a similar framework must be adopted in each state

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critical factor given the constraint due to the fiscal situation facing many state environmental agencies.

Finally, more consistent policy application across states would enhance the feasibility of robust program evaluation, particularly to facilitate comparisons as to how EPR programs are functioning in differing states.

1.3. Strategies for promoting consistency for EPR policy

Two principal strategies are often evaluated to emphasize national consistency for EPR as well as other product-related regulatory efforts. These strategies include federal legislation and model legislation implemented at the state level. Recently, however, the EPR “framework” concept has emerged in the U.S. and offers an alternative approach for promoting consistency that places much of the responsibility on brand owners for program design. Table 2 presents a brief comparison among the three policy approaches. Each approach is elaborated upon in subsequent sections of this paper.

1.3.1. Federal legislation

While federal action on EPR may be warranted, and certainly offers the promise of greater harmonization than is occurring with the diverse state efforts, there are several impediments, both substantively and politically, facing such action and therefore, there is little agreement about the approach and timing for action that is needed by the U.S. Congress.

While a national approach may reduce the state “patchwork” of regulatory requirements for a particular product, it requires congressional action as the U.S. Environmental Protection Agency (U.S. EPA) does not have the regulatory authority under the Resource Conservation Recovery Act (RCRA) to implement a regulated EPR program (Sachs, 2006). Furthermore, as discussed in the previous section, much of the solid waste and recycling regulatory responsibilities are addressed by the states. Even if federal legislation is practicable, many of the existing federal environmental statutes envision a model whereby, states have significant roles for implementation (Kraft, 2010). If the state delegation dynamic is permitted by an EPR statute, the realization of consistency between states may not be realized.

While there have been several Congressional bills introduced to promote recycling requirements for products such as electronics in the past decade, including a bi-partisan effort by Senator Wyden and former Senator Talent, none has received significant consideration (Drayton, 2007). Previously, following action by several states to enact EPR requirements for rechargeable batteries, Congress enacted the Mercury-Containing and Rechargeable Battery Management Act of, 1996 to facilitate the states laws by addressing management requirements, but the act did not impose EPR requirements for the collection and recycling of rechargeable batteries (Mercury-Containing and Rechargeable Battery Management Act of 1996).

Of particular interest to regulated parties is that the federal regulatory framework provides the prospect of lower compliance costs and greater consistency across the nation. A national program, given the federal government’s jurisdiction over trade related matters, may also be able to more effectively address the tracking of products and to promote compliance for firms importing products into the U.S. Another element of a product policy that may be more appropriate for implementation at the federal level is the implementation of ‘*design-for-the-environment*’ requirements such as those required by the European Union’s Restrictions on Hazardous Substances Directive (RoHS). Lastly, the most compelling argument for a greater federal presence in product-oriented policy is that a national approach should result in greater environmental benefit-

increased recycling and resource conservation than can be achieved by individual state approaches.

Despite the compelling rationale for Congressional action on EPR, several impediments, reflecting political challenges exist for the U.S. Congress to enact a comprehensive EPR approach for products. As states continue to enact EPR requirements for specific products in the absence of a federal leadership, the need for federal action on national EPR measures may diminish. The inertia and investment of the state programs serve as a potential obstacle to state support for a federal approach. This is particularly true for states that have funding derived from product-specific legislation but also due to the investment in the program from a staff and program perspective.

Of particular concern, from the states’ perspective, is the potential for a policy approach that embraces federal preemption of existing state programs or establishes a level of performance that is less aggressive than that established in the more rigorous state programs, a provision that would be strongly opposed by those states and local interests.

From a political vantage point, the example offered by the electronics industry illustrates the challenges facing enactment of a national statute. Conflict has existed within the electronics industry and among manufacturers and retailers and other stakeholders with regard to the type of financing mechanism that is preferable as well as how to apportion responsibilities along the supply chain. This lack of consensus, a factor that has contributed to the disparate nature of programs at the state-level, also impedes Congressional action.

The fact that a viable proposal with broad stakeholder support has yet to be put forward further complicates the viability of national program. The difficulty in arriving at a broadly supported approach is complicated by the lack of an existing precedence for such an effort. It may also be argued that the lack of Congressional success on a federal approach for waste electronics has been stymied, in part, due to the lack of a broader product-oriented framework and context to address the collection and recycling of consumer products.

1.3.2. Model state legislation

Model state legislation, sometimes referred to as uniform laws, is typically developed by organizations, such as the Uniform Law Commission that has produced more than 250 acts, or interests independent of state legislatures and provides guidance for state lawmakers through templates or frameworks to address particular topics (Fish, 2012).

The Toxics in Packaging model legislation, developed by the Council of Northeastern Governors (CONEG) in 1989 to reduce the use of toxic materials in packaging, has been adopted by nineteen states and remains a preeminent example of the capacity of model legislation to achieve consistency (Schneeweis, 2006). The standards contained in the model legislation were subsequently adopted internationally (Lewis, 2012). The legislation spurred the creation of the Toxics in Packaging Clearinghouse in 1992, a multi-stakeholder entity, to provide assistance with compliance and a forum to propose amendments.

Recognizing the need for consistent EPR legislation, the American Coatings Association (ACA), following a multi-year national dialog, developed model state legislation and supported the language in a schedule of states. Oregon was the first state to enact the law in 2009. California followed suit in 2010 with Connecticut in 2011 and Rhode Island in 2012 adopting similar statutes. In all four states, the provisions of the laws are similar regarding statutory requirements for development and submittal of a producer developed plan and the specified fee-based financing mechanism. Connecticut requires all brand owners to participate in the collective

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Table 3
Typical components of an extended producer responsibility framework.

Component of framework	Description
Definitions	A framework will establish common definitions for key terms underlying product policy. For example, defining commonly used terms such as "manufacturer," "brand owner" and "recycling" is beneficial for ensuring consistency across programs for products.
Criteria for designating products	A framework will establish the specific criteria such as toxicity, quantity in solid waste, and costs to manage that will guide policymakers in making determinations with products which should be considered for an EPR program.
Process for designating products	Of critical importance to the functioning of the framework is the mechanism for determining which products should fall under an EPR approach and the timeframe by which that should occur. The traditional options for this type of action, legislative fiat or a regulatory determination by an agency, offer their respective benefits and drawbacks.
Roles and responsibilities	Identifying and allocating responsibility for the players along the product chain are also essential. This will not only address the role of manufacturers but clearly identify the appropriate roles for federal, state and local government, as well as distributors, retailers and consumers as appropriate.
Financing mechanisms	Since much of the legislative consideration for EPR in the U.S. centers on the appropriate financing mechanism for particular products or family of products, a framework approach will identify the potential range of financing approaches such as cost-internalization or visible "eco-fees."
Promote industry collaboration	While many industry-wide EPR programs anticipate a level of industry collaboration, action to facilitate industry cooperation is essential. For instance, business interests often voice legitimate concerns regarding potential state-regulated anti-trust activity during the policy and regulatory development process for products. Starting with several states that enacted EPR statutes for rechargeable batteries in the 1990's, the exemptions for state, anti-trust laws have now become commonplace (Weinberg, 2008).
Program plans	A framework requires the submittal of EPR plans to the appropriate regulatory authority, an approach that identifies the manufacturers recommended approach for fulfilling the EPR responsibilities including the collection strategy among other attributes.
Performance metrics	A crucial component of a framework is the goal setting mechanism. Transparent goals not only permit more effective evaluation but also serve to ensure that the collection and recycling infrastructure is used effectively, is closely matched to the demand and can be adjusted as necessary. The framework may stipulate a suite of potential performance standards such as recycling and reuse goals along with for collection opportunities.
Reporting	A framework also institutes a common reporting methodology that will not only support accountability and transparency but will also facilitate evaluation of the program to determine if course corrections are necessary.
Process for engaging stakeholders	A framework enumerates a process for stakeholder input, frequently referred to as a consultation; this is akin to what may be accomplished under traditional administrative rulemaking by a state environmental agency.

EPR organization thus precluding the option for individual responsibility.

The ACA responded to the statutory requirements with the formation of PaintCare, an industry-managed stewardship organization. Importantly, PaintCare is serving as a national entity to implement the paint statutes in the states where they have been enacted thus reinforcing a strategy of national consistency.

While the four enacted EPR laws for managing unwanted paint, demonstrate remarkable consistency, the example illustrates the necessary circumstances for achieving consistency of state-based producer responsibility programs for a particular product namely significant unanimity among the brand owners and acceptance by state policymakers as well as by other key stakeholders. It does little, however, in terms of establishing consistency of programs within a particular state and requires significant resources from the brand owners and other actors in the legislative arena.

1.3.3. An extended producer responsibility framework

The current situation with state waste electronics programs illuminates the need for action to, not only, support efforts to harmonize disparate state EPR laws but, more pointedly, it illustrates the need for a transition to broader product policies or "framework" that establishes clear expectations and outcomes for EPR programs. The challenge for harmonization is not only facing the manufacturers of electronic products confronted by individual state regulations but is likely to extend to other manufacturers, such as those of mercury containing products well as other items in household hazardous waste and as well as to products that are difficult and expensive to manage.

An EPR framework is designed to move beyond the current piecemeal regulatory approach that addresses products individually and recognizes that, in many cases for consumer products, the sales chain may be quite similar with even some manufacturers offering disparate products (e.g. electronics and lighting products) under consideration in stewardship programs. The framework

concept suggested for application in the U.S. asserts extended producer leadership in program design and implementation decision through the use of EPR plans and departs from a more traditional regulatory model that is usually quite prescriptive. The framework offers the promise of a consistent, yet flexible, approach that recognizes that each product has unique features but places producer responsibility efforts within a standardized format. Such a framework could greatly accelerate the development and marketing of "greener products" thus supporting the "cradle to cradle" paradigm more effectively than traditional recycling programs.

While a comprehensive product policy implemented at the federal level potentially offers greatest promise for national consistency, adoption of the framework approach by multiple states offers a vehicle for greater harmonization than is occurring with the current disjointed landscape of state efforts. A consistent state statutory framework for selecting and designating products for an EPR reduces the likelihood that state level political considerations will unduly influence regulations for individual products thus thwarting attempts to promote harmonized state approaches. The industry-led stewardship plan development component, a centerpiece of the framework, shifts the locus of decision-making from prescriptive legislative requirements to brand owners thus encouraging manufacturers to implement multi-state implementation strategies thus fostering program consistency.

An argument offered in support of a framework is that it presents the opportunity to institute a consistent approach for identifying products as well as the mechanism for designating products under the framework. Under a framework, two mechanisms, administrative action through rulemaking and, most frequently suggested, affirmative legislative action, are required to obligate products for EPR requirements.

Embracing the call for industry driven programs, such a framework will encourage the development of extended producer responsibility organizations that can more efficiently manage multi-state programs. Similarly, a framework may support the

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Table 4
U.S. states with legislation introduced for an extended producer responsibility framework.

State	Legislatively required study report	"Framework" bill introduction	Products specified in the framework	Enacted in statute
California	No	Yes (2009)	None	No
Maine	No	Yes (2010)	None	Yes
Massachusetts	No	Yes (2011)	None	No
Minnesota	Yes	Yes (2009)	None	No
New York	No	Yes (2011)	None	No
Oregon	No	Yes (2009)	Mercury-containing lights and rechargeable batteries	No
Rhode Island	Yes	Yes (2011)	Paint, medical sharps, mattresses	No
Vermont	No	Yes (2010)	Packaging and printed paper	No
Washington	No	Yes (2009) Included in Omnibus Climate Change Bill	Carpet, mercury-containing-lighting, mercury-containing thermostats, paint, and rechargeable batteries	No

engagement of stewardship organizations that function in multiple states as demonstrated by PaintCare in the four states that have enacted paint stewardship statutes.

A framework approach would not only serve to reduce the complexity and confusion inherent with multiple approaches to product regulation but would also reduce the state resources required for implementation. If crafted to support industry-managed programs and promote accountability across various stewardship efforts, state agencies would be able to focus on ensuring a level-playing field and other compliance activities rather than devoting significant staff and potentially financial resources to multiple programs for specific products.

While the framework approach may offer a strategy to promote consistency for the application of EPR measures in the U.S., its effectiveness hinges on several factors. Aside from the significant political obstacles that may inhibit widespread adoption of a broader regulatory framework for EPR in the U.S., the framework must be relatively consistent overall to serve as an effective tool to promote consistency. A regulatory framework measure must also balance the need for flexibility to account for the unique features of each product while retaining the value of a regulatory strategy that provides sufficient guidance for relatively consistent program development. For example, the policy may require some accommodation for product-specific financing mechanisms, particularly those that obligate participation by other parties such as retailers.

It is important to acknowledge that this approach is to be implemented through the public policy process and is not designed to replace firm-level environmental management strategies such as ISO 14001 or other environmental managements systems that are designed to achieve firm-level objectives but are necessary for effective in achieving the broader public goals sought by PR regulatory action (Kautto, 2006). Similarly, the framework policy concept, discussed in the U.S. as well as that implementation in other jurisdictions around the globe, cannot be considered a policy tool to address all of the environmental impacts of products and other complementary measures such as product sales or disposal bans, material's restrictions or other tools that may be appropriate for particular products.

1.4. Components of a comprehensive extended producer responsibility policy

As EPR measures for specific products are contemplated in the U.S., several key components of a comprehensive policy are emerging that would improve consistency if implemented by individual states. However, these components must be balanced between the articulation of sufficient detail to establish expectations for producers of designated products but also remain sufficiently flexible to accommodate variations between the various product sales chains and end-of-life management systems.

The components of a comprehensive EPR policy illustrated in Table 3 were identified from the state legislative initiatives referenced in Table 4 as well as from reports for specific states such as Minnesota (MPCA, 2009) and Rhode Island (PSI, 2010) and were influenced by the regulation enacted in the Canadian Provinces.

Other potential provisions for a comprehensive EPR policy include the integration of government purchasing requirements to support markets for environmentally preferable products. A renewed commitment to the government exerting its market presence to reward manufacturers that have invested in sustainable products needs to be coupled with an emphasis on the development of product evaluation and selection tools such as the Electronic Product Environmental Assessment Tool (EPEAT) that is being implemented by public entities, as well as by corporate purchasers to identify environmentally-preferable computer equipment (Fava et al., 2011).

While the particular components of a legislated EPR framework may be influenced with regard to how the framework is implemented at the state level, the components describe an essential roadmap for all parties, regulated and otherwise, as to how a robust and consistent framework can be applied. However, depending upon the specific product and circumstances that warrant consideration for EPR, other policy tools such as restrictions on disposal or material's bans or disclosures may be necessary as complementary measures.

1.5. The framework approach in the United States

Inspired, in part, by the examples of the Canadian Provinces, as well as by experience with specific product efforts, states in the U.S. have begun to consider broader product policy frameworks to focus and streamline policy considerations. As illustrated by Table 4, framework legislation has been introduced in nine states since 2009 and was enacted in one. Several of the legislative proposals, not only create the framework policy architecture with the components specified above, but also identify products to be initially addressed within the framework. Unlike the British Columbia Recycling Regulation among other "framework" regulatory tools in Canada, the "framework" policy approach in the United States typically identifies a set of specific criteria to select products for EPR and a regulatory mechanism for doing so.

In two states, Minnesota in 2009 and Rhode Island in 2010, the framework bill was preceded by legislatively mandated studies that required state environmental regulatory agencies to conduct analyses of the issues and to provide recommendations of policy strategies to improve the management of such products.

The following state examples provide context and historical background for two states identified in Table 4.

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1.5.1. California

As with many environmental law and policy matters, California demonstrated a leadership role with the development of a framework approach issued in 2009. Inspired by a 2006 decision to remove the hazardous waste exemption on household hazardous and the ensuing calls for EPR from local government, the California Integrated Waste Management Board (CIWMB), now part of Cal Recycle, initiated a process with significant stakeholder input to develop an EPR framework.

The Board's framework articulated guiding principles, definitions, outlines roles and responsibilities for various parties along the product chain and implements a priority product selection process (CIWMB, 2009). Building on the CIWMB's policy development efforts, legislation to enact a statutory EPR framework was introduced and considered, but not enacted, in 2009 (CA Assembly, 2009).

1.5.2. Maine

Embracing many of the components of an EPR framework identified above, the Maine framework statute, An Act to Provide Leadership Regarding the Responsible Recycling of Consumer Products creates a process for the state agency, the Maine Department of Environmental Protection (DEP), to identify and prioritize candidate products using a set of criteria articulated in the statute (Maine Legislature, 2010). The DEP is to file an annual report to the legislature on the existing stewardship programs such as those for waste electronics and mercury-containing lamps in the state and may elect to recommend products for stewardship consideration.

While the statute still vests ultimate decision-making authority with the legislature regarding whether a particular product or material is to be regulated, the statute does require the DEP to develop legislative proposals for products prioritized in the annual report, an important step towards harmonizing financing and expectations for collection infrastructure.

The first report issued by the DEP in December 2011 identified several products including architectural paint, unused pharmaceuticals, and medical sharps, for consideration (Maine DEP, 2012). In contrast, the second report issued in 2013, did not recommend specific products for inclusion under the statutory framework but suggests amendments to the framework to achieve more effective implementation (Maine DEP, 2013). Specifically, the report identified producer responsibility program requirements that are not directly required as part of the existing statute. For example, the DEP spells out expectations for a product stewardship program including necessary provisions for the stewardship plan, the allowance for collective or individual company compliance and a requirement for a collection system that is prevalent through the state and offer collection opportunities in both urban and rural areas.

1.6. Global examples of a comprehensive regulatory approach

The consideration of an EPR framework in the United States, as EPR matures conceptually, is in large measure inspired by similar policy developments and implementations in other nations, most notably Canada. However, the producer responsibility framework concept is applied differently in different nations as illustrated by the following examples.

1.6.1. Australia

With the issuance of the National Waste Policy in 2009, the Australian federal government recognized that product stewardship is key tool available to advance many of the goals articulated in the Waste Policy and create a national approach to promote consistency (National Waste Policy, 2009). The Department of the

Environment, Water, Heritage and the Arts' Waste Policy Task Force specifically articulated that a broad, flexible product stewardship framework should be considered to not only advance the concept but to create a consistent approach to addressing products such as waste electronics and tires.

Following the direction articulated in the Waste Policy, Parliament enacted the Product Stewardship Act in June 2011 to establish a national framework to reduce the environmental impacts of products (Product Stewardship Act, 2011). As Lane and Watson note, the National Waste Policy and Product Stewardship Act suggests a recognition of the full lifecycle impacts of products and packaging and suggests the need for greater engagement of all parties from all parties along the product chain to reduce environmental impacts (Lane and Watson, 2012).

As opposed to other broader EPR regulations, the Act creates a three-tiered structure for PR programs by establishing guidelines for regulated, co-regulated or voluntary approaches. Building on the experience with the National Packaging Covenant that has been in place since 1999 and its co-regulatory structure, the Act's co-regulatory model presents a requirement for participation on behalf of product manufacturers but offers significant flexibility as to how the program's goals are attained (Lewis, 2005). The voluntary option provides for accreditation of programs to ensure accountability and transparency.

The law stipulates that each year, the Ministry will publish a list of products being considered for coverage by the legislation. Televisions and computers were identified in the Act as the initial product category. The National Television and Computer Recycling Scheme, a co-regulatory arrangement supported by regulations that became effective in November 2011 is the first product to be addressed under the Act. The Regulations require importers and manufacturers of televisions, computers and computer products to fund and implement recycling services for these products, and to meet a range of requirements (Product Stewardship for Televisions and Computers) Regulations 2011 (the Regulations).

In late 2011, the Government issued a notice that a Consultation Regulation Impact Statement (RIS) is prepared to consider options to improve packaging recycling and reduce litter. The outcome of the analysis could lead to packaging being addressed as a co-regulatory scheme under the Act.

In 2012, the Ministry issued the Product Stewardship (Voluntary Arrangements) Instruments regulation document to fulfill Part 2 of the Act that implements an accreditation process for promoting voluntary stewardship programs (Government of Australia, 2012). The instrument sets out the requirements and conditions for accreditation by the Australian Government for voluntary product stewardship arrangements.

While it is premature to evaluate the effectiveness of the Product Stewardship Act, the policy recognizes the importance of an intentional and structured approach to implementation of product stewardship in Australia.

1.6.2. The European Union

While the European Union has not adopted an extended producer responsibility framework, per se, that permits the designation of products under a common framework; the concept is enshrined in the EU's Community Waste Strategy. Building on the EU's Thematic Strategy on Waste Prevention and Recycling, the Waste Framework Directive adopted in 2008 clearly articulates the role that producers have in fulfilling the waste management objectives of the EU with Article 8 stipulating that individual member states may take measures to ensure producer responsibility (European Union, 2008).

The European Union has implemented producer responsibility through the use of Directives that have been enacted for packaging,

Table 5
The primary taxonomy of EU packaging programs.

Policy mechanism	Member state examples
Packaging taxes	Denmark
Tradable credits	United Kingdom, Poland
Dual model (Full responsibility for industry for collection, sorting and recycling; separate collection system besides collection by local authorities, limited influence from local authorities)	Germany, Austria
Shared model (Shared responsibility between industry and local authorities, common agreements on the way of collection necessary)	France, Spain, Czech Republic

Source: Joachim Quoden, PRO Europe (2011).

end of life vehicles, waste electronics and batteries (Milanez and Bihrs, 2009) While the Directives are developed by the Commission with adoption by the Council and the Parliament, they must be transposed by the 27 individual member states. As Khetriwal and Widner have acknowledged, the implementation has been variable (Khetriwal and Widner, 2011). Of particular relevance for the policy dialog in the United States, the transposition by the member states, as illustrated by Table 5 regarding the variety of implementation strategies for the Packaging Directive, has not resulted in the desired level of consistency that was expected.

1.7. Canada

Ranging from products such as waste electronics to pharmaceuticals to “blue box” curbside recyclables, the Canadian Provinces are at the vanguard of global policymaking for EPR measures (McKerlie et al., 2006). Responding to calls for greater consistency, the Provincial programs are taking steps to create consistent standards for EPR programs, harmonize their programs, and experience industry stewardship organizations beginning to operate in multiple provinces simultaneously (CCME, 2009). The Canadian Council of Ministers of the Environment (CCME) issued a Canada wide action plan for producer responsibility to strive for consistency between provincial efforts with a separate document offered for packaging and printed paper. While the “framework” concept is prevalent throughout Canada, British Columbia and Manitoba are highlighted as examples.

1.7.1. British Columbia

British Columbia is a leader in establishing and implementing a flexible, stewardship framework that now underpins several stewardship programs in the province. Authorized by the statutory, Environmental Management Act, the province has implemented a variety of stewardship programs beginning with a regulation for managing leftover paint in 1994 with other regulations implemented soon thereafter (Driedger, 2001). The province currently has stewardship programs in place for 18 product categories.

In an effort to move from a “product by product” approach to one that is based upon a methodical and comprehensive stewardship program, the Ministry of the Environment developed an Industry Product Stewardship Business Plan that was adopted in 2002. The business plan articulated a framework for the existing as well as for new stewardship programs. The framework was based on four principles: 1) producer/user responsibility 2) level playing field, 3) results-based and transparency and 4) accountability. Following the release of the business plan, the Ministry determined that a new regulatory model was necessary to meet the objectives of the business.

Initially promulgated in 2004, the Province’s Recycling Regulation implemented a performance-based, flexible, extended producer responsibility approach to promote consistency among the stewardship programs (Deathe and McDonald, 2008). Most notably, the regulation presents the legal framework, program principles and schedules for product categories to be used for creating industry-led stewardship programs. The regulation outlines the requirements for a stewardship plan including how a 75 percent recovery rate will be attained as well as addresses the need for stakeholder consultation and the roles of the Ministry (Bury, 2010). The regulation replaced the Beverage Container Product Stewardship Program Regulation and Post-Consumer Residual Stewardship Program Regulation with those programs now functioning under the broader regulation.

Since the Province’s extended producer responsibility programs were folded into the framework of the recycling regulation, several other products including electronic products in 2006, tires in 2007 and batteries in 2009 have been added. The regulation for electronic products is notable since it established a comprehensive five-phase schedule of products that also included products such as lighting equipment and batteries, two products typically addressed separately in the U.S. In 2011, the Ministry designated packaging and printed-paper for EPR under the recycling regulation with a 2014 program implementation date.

1.7.2. Case study of mercury-containing lamps producer responsibility program in British Columbia

To illustrate the application of the implementation of the Recycling Regulation in British Columbia, the program for lamps and lighting equipment is examined. The stewardship organization’s LightRecycle program demonstrates a producer-led initiative demonstrates the significant flexibility inherent within the Province’s Recycling Regulation and reflects the “framework” concept described above.

1.7.3. Regulatory context

The British Columbia Ministry of the Environment issued a statement in 2008 indicating the intention to add mercury-containing lamps to the schedule of products addressed by the Recycling Regulation. A stewardship program was required to be in place by July 1, 2010 for household compact fluorescent lamps (CFLs) and fluorescent tubes.

Recognizing that fluorescent lamp and lighting equipment collection options needed to be available for all generators, the BC Recycling Regulation also stipulated a requirement in Schedule 3 of the regulation to expand the types of lamps included, commercially generated lamps, as well as specified lighting equipment including such as fixtures and ballasts. A plan recognizing the program expansion was prepared by Product Care and issued to the Ministry on October 1, 2011 and subsequently approved in April 2012 with an implementation date of October 1, 2012 (Product Care, 2012).

1.7.4. Stewardship plan

The LightRecycle program exemplifies the prevailing trend of producer responsibility programs in British Columbia, that of producer-led with few prescriptive regulatory requirements. While the Regulation permits companies to fulfill the regulatory requirements on an individual basis, all of the manufacturers of lighting equipment subject to the regulation in British Columbia are participating in an industry-wide compliance organization. The regulation does not prescribe the governance, cost structure or program management of the stewardship organization but does recognize the value of engagement of other stakeholders, either formally through representation on the governing board or in advisory role.

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In response to the regulation, the Electrical Equipment Manufacturers Association of Canada (EEMAC) steered the development of the BC Fluorescent Lamps Stewardship Plan as required. EEMAC retained the Product Care Association, a stewardship organization that has been operating producer responsibility programs in the Province since 1997, was to manage and operate the program. The plan was jointly submitted by EEMAC on behalf of six lamp manufacturers and Product Care by January 1, 2010 with an expected duration of five years.

The plan was approved by the Ministry in March 2010 to enable implementation by the July 1, 2010 deadline.

Section five of the Recycling Regulation outlines the specific program components that are to be addressed by the stewardship plan. The regulation stipulates that the plan must detail the collection system and opportunities for consumer access, identify a recovery rate, indicate how program costs will be managed and specifies the steps to manage environmental impacts among other requirements (BC Ministry of the Environment, 2012).

To ensure identification of potential implementation challenges through the solicitation of input from interested stakeholders, a central component of the planning development process and specified in the Recycling Regulation, is the consultation process. The essential consultation process, akin to administrative rule-making in the U.S., is managed by the stewardship organization.

In keeping with the flexibility inherent in the regulation and consistent with the other EPR programs in the Canadian Provinces, the financial responsibility of the industry members is fulfilled through the use of eco-fees that are remitted to Product Care based on type of product and unit sales. As Bury and others have noted, the question of eco-fee visibility is debated, and in accordance with the lack of a requirement for visibility or eco-fee included pricing in the Recycling Regulation, the fee may or may not be visible to consumers (Bury, 2010).

The fees for the first program year ranged from \$0.20 per fluorescent tubes that two feet or less to \$0.40 for those tubes greater than four feet. However, starting in October 2011, the fees were decreased for compact fluorescent lamps while increasing for tubes greater than two feet.

The program plan does not make a distinction between current, orphan or historic products, thus providing an 'end-of-life' management system regardless of whether the manufacturer of a lamp still exists or is no longer manufacturing that product.

To support one of the objectives of EPR, that of reducing lifecycle impacts of products, the Recycling Regulation stipulates that the plan identify design for environment strategies. In the case of the program plan for lamps and lighting equipment, Product Care provides a summary of the constituent materials of lamps and lighting equipment as well as acknowledges the extension of the lifespan of several of the products but does not specify specific design for environment objectives or targets (Product Care, 2012).

Much of the program plan is devoted to the program's performance measures and targets. Reflecting the Recycling Regulation's requirement for stewardship programs to achieve a 75 percent recovery goal to be achieved, the plan outlines the collection methods as well as the annual performance goals that will benchmark progress towards meeting the required targets.

1.7.5. Program performance

Since the implementation of the program, now branded as LightRecycle, on July 1, 2010, the program members has expanded beyond the six founding members to include other brand owners as well as retailers and distributors.

Given the longer lifespan of lighting products, Product Care departs from calculating a traditional recycling rate to instead using a capture rates that is based on units collected relative to what is

available for collection based on the traditional lifespan of a product during a specified timeframe.

The capture rate goals contained in the stewardship plan ranged from an initial ten to twelve percent during the first six months of the program and escalating to between 40 and 75 percent for 2015 (Product Care, 2012). LightRecycle's network of 165 collection opportunities is dominated by 145 retail locations with only nine municipal facilities participating in the program (Product Care, 2011).

The LightRecycle program in British Columbia, while clearly recognizing the existence of product-specific attributes and differing collection and recycling needs for lamps and lighting equipment, shares many of the same program elements as the other regulated producer responsibility initiatives in the province. The similarities between the EPR programs reflect the thematic elements of the Recycling Regulation, most notably the emphasis on producer developed and managed programs and the Ministry of the Environment with an oversight and, if necessary, compliance and enforcement role.

1.7.6. Manitoba

The Waste Reduction and Prevention Act (WRAP) enacted in 1994, provides the statutory support for product stewardship regulations in Manitoba (Manitoba, 1994). The first stewardship program to move forward in the province assessed a two-cent levy on beverage containers to finance the collection and recycling of "blue box" materials (Quinn and Sinclair, 2006). The province is moving forward with a suite of product stewardship regulations under the WRAP Act addressing household hazardous waste, packaging and printed paper and waste electronics. The first of these programs, packaging and printed paper, was implemented in 2010.

2. Conclusion

The burgeoning interest of state policymakers in EPR illustrates not only the increasing interest in innovative policy tools to address the environmental impacts of products, but also reinforces the argument for a cohesive approach that promotes consistency and efficiency of producer responsibility measures. Given the experience to date, an opportunity exists for policymakers to enact broader EPR measures that lessen the likelihood that other products will face a similar fate of inconsistent and divergent state regulations now confronting the electronics industry. The current approach, whereby, products are addressed on a case-by-case basis and outside of a broader, more systematic approach, is not sustainable and will create substantial additional transaction costs for all of the players along the product chain.

The trend of product-specific regulations by states is certain to accelerate as climate change, environmental health considerations and state and local budget constraints rise on the public agenda. The challenge facing state policymakers is how to develop a coherent, systemic approach for EPR that recognizes flexibility for regulated parties yet promotes efficiency and consistency that transcend the current trend of disparate state efforts. This challenge is even greater given that a national imprimatur, which may be necessary to achieve a truly uniform approach in the U.S., is unlikely in the near term. While the "framework" approach certainly does not guarantee uniformity among states, it offers the greater likelihood that, not only are state-specific EPR programs addressing products more consistently, but that industry developed and managed stewardship programs can be implemented in multiple states. Given the obstacles confronting the creation of a new body of environmental law at the federal level, the framework concept offers a vehicle for achieving greater national consistency for EPR efforts.

While the “framework” concept is seated within the U.S. environmental regulatory architecture, it draws heavily from global EPR policy precedents, particularly from the Canadian provinces. With a recognition that several of the framework components may be solely germane to the U.S., the overall policy approach may have resonance in other jurisdictions as EPR becomes further embedded in environmental policy strategy.

The framework is designed to not only increase recycling rates but to lead to a productive dialog regarding an overall materials management strategy such as that suggested by a recent report by US EPA, promoting effective policy based on resource conservation and sustainability (U.S. EPA, 2009). With increasing demands globally, for resources, recycling and management of discarded products will play an increasing role in maintaining U.S. economic competitiveness and to take advantage of strengths in product innovation and the development of market opportunities such as moving from products to product—service combinations.

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Chapter 7: An Examination of Governance within Extended Producer Responsibility Policy Regimes

Introduction

Chapter 7 addressed research question 3 (*What are the existing models of governance of EPR programs that are functioning and how might these models be optimized to improve performance of programs?*)

As illustrated in Chapter 5, the question of the allocation of responsibilities among the actors along the product chain and, in particular, the extent of program flexibility accorded to producers to design and operate programs to fulfill the legal requirements varies substantially across jurisdictions. An exploration of the governance of EPR programs illuminated the tensions that are often present within EPR such as the desire to inject a greater emphasis on private governance models while at the same time recognizing the historical responsibilities of local authorities for managing products at EOL.

The comparative analysis of programs in the United States and Canada in Chapter 4 highlighted the producer-led EPR program planning approach common in the Canadian provinces that allocates significant responsibilities to producers for the construction and operation of EPR programs. The following article analyzed the approaches to governance of EPR programs in Canada through the use of case studies and then constructed a typology of governance mechanisms of EPR programs.

Hickle, G. T. (2014). An examination of governance within extended producer responsibility policy regimes in North America. <i>Resources, Conservation and Recycling</i> , 92, 55-65.

Review

An examination of governance within extended producer responsibility policy regimes in North America



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ABSTRACT

Extended producer responsibility seeks to integrate environmental impacts into the product lifecycle and achieve greater economic efficiencies in the management of products at end of life. For such integration to be actualized, however, producers may need to be accorded greater programmatic authority and flexibility than is often in some EPR policies that stipulate defined roles for other entities along the product chain. The proper allocation of responsibility among the parties and, in particular, the roles of the producers and local authorities remains a principal component of EPR policy construction. The analysis outlines four broad categories of financial and programmatic responsibility that currently reside within EPR programs in North America. The article concludes with recommendations for a research agenda to further define the governance characteristics that result in effective and efficient EPR programs.

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1. Introduction

As extended producer responsibility (EPR) is applied to a greater number of products in an expanding number of jurisdictions, the question of governance, the processes and decisions grant power and define actions, and the proper allocation of responsibilities amongst key parties in EPR policy regimes is receiving greater scrutiny. To further the objectives of EPR beyond simply existing as a tool that transfers a financial obligation from municipalities to brand owners and achieving the internalization of environmental costs, the identification and evaluation of effective governance strategies is crucial.

As is frequently referenced, the changing, more complex nature of environmental problems necessitates not only innovative strategies, regulatory and otherwise, but also necessitates new governance mechanisms that, in the case of waste management and recycling, engage a multiplicity of actors including producers, local authorities, recyclers, and global commodity markets (Agrawal and Lemos, 2007). The diffuse supply chains for materials and products are indicative of the trend of globalization and not only require greater interaction among actors along the supply chain but necessitate a governance model that departs from the prevailing public authority model that is in place today. Extended producer responsibility is an environmental policy tool that is illustrative of a governance mechanism that reflects many of the attributes associated with the conceptualization of private environmental governance, an approach to governance that is led in large measure by private actors.

The further definition of enabling private governance mechanisms within EPR may be critical if the policy tool is to achieve the vision of producer responsibility of creating informed decision-making and robust feedback throughout the product lifecycle. As Kalimo and colleagues (2012) observe, such full authority, whereby the producer needs the autonomy to fulfill the regulatory objectives and responsibility for their costs, may be necessary if EPR is to fully achieve the envisioned objective of stimulating product design for environment activities by firms. While there are a myriad of governance models within the context of EPR ranging from the firm level to governance structure within collective compliance organizations, this analysis focuses on the diverse approaches to allocation of responsibility, often stipulated through regulation, between producers and governmental authorities.

While a substantive body of literature exists that examines the changing nature of governance for a range of environmental governance, voluntary environmental management activities by private actors such as those engaged in product standards and certification programs such as the Forest Stewardship Council (FSC), has dominated the research. The governance of EPR programs has not received such scrutiny, in part due to, as Lane and Watson (2012) assert, that producer responsibility derives legitimacy from government rather than non-governmental organizations. However, extended producer responsibility occupies a hybrid governance structure or "mixed regime" as conceptualized by Falkner (2003). Under an EPR policy regime, a legislative body or regulatory authority imposes financial and often performance obligations on producers for the collection and recycling of products but the program design and management is conducted by producers, often realized through producer responsibility organizations (PRO), an illustration of the model of self-organization by producers. Despite the hybrid nature of governance for EPR programs, an analysis of the role, function and challenges facing producers in EPR regimes borrow heavily from the literature of private environmental governance.

The analysis examines the role of private governance within EPR and develops a typology for characterizing differing governance models under EPR. The paper outlines the allocation of

responsibilities often assumed by principal parties under an EPR regime and follows with a discussion of how "private governance" is illustrated within EPR and identifies how this departs from the prevailing municipal service model. Finally, a structure and recommendations for evaluation and future research are suggested.

2. Overview of producer responsibility

Extended producer responsibility is a policy tool that extends up and down the product chain and is intended to internalize the environmental costs of products and materials thus spurring the design for greener products with a smaller environmental footprint (Dubois, 2012). EPR seeks to embed within private enterprise the responsibility for the design and implementation of strategies for the collection, transportation and processing of discarded products. By transitioning the 'end-of-life' management costs to producers from municipalities, an incentive is created for producers to achieve greater economic efficiencies throughout the life-cycle of their products from product and service design through the 'end-of-life' management system. This enhanced efficiency in the context of 'end-of-life' management can be achieved through greater consistency across jurisdictions, product design changes to facilitate end-of-life management and investments in infrastructure and technology as well as via public outreach and education efforts.

Extended producer responsibility can be characterized as embracing an innovative strategy that is a public policy strategy that builds on corporate social responsibility (CSR) activities while recognizing the institutional barriers that create limitations for the local governmental model.

Extended producer responsibility functions as a remedy for the ineffectiveness of government, either actual or perceived to address problems with significant economic and social features (Buclet and Godard, 2001). Specifically, EPR is a policy reaction to the limitations of local government funded and administered recycling initiatives to achieve sustained and effective programs and as well as the inability of these efforts to spur producers to implement design for environment activities and product service strategies. As Kroepelien (2000) noted, EPR through the engagement of direct market actors may result in a fundamental rearrangement of the institutional relationship between public authorities and producers.

Extended producer responsibility is promoted as a market-based, life-cycle-oriented instrument that is positioned to be more effective than traditional "command and control" regulatory measures to address the environmental impacts, including end of life management, posed by the product chain in today's globalized economy. While the traditional regulatory model often has limited capacity to address environmental externalities (Esty, 1999), market-based instruments are designed to promote the internalization of these externalities (OECD, 2007). By engaging in the marketplace, EPR often results in the institutional realignments of both private and public sector actors (Kroepelien, 2000). The policy emphasis on mitigating externalities as well as the engagement of non-state actors in governance falls within the ecological modernization theoretical framework (Sonnenfeld and Mol, 2002).

Producer responsibility, while instituted in policy measures in Europe starting in the early 1990s, most recognizably with the German Packaging Ordinance in 1991, is now embraced globally, particularly for packaging and waste electronics (Sachs, 2006). Typically, producer responsibility regulatory measures are implemented by one or more producer responsibility organizations (PROs), often referred to, as stewardship organizations in the North American context, that are the organizational vehicles for producers to execute the regulatory requirements. However, the formation and operation of PROs has garnered scrutiny from competition authorities and often necessitated a legislative response,

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particularly in the U.S., to facilitate their functioning through exemption from state competitive conduct laws.

While EPR is premised on the integration of financial responsibility for managing products at end of life into a firm's business model, it also invites a systematic reframing as to the specific allocation of roles and responsibilities, not only between producers and municipal government but also between producers themselves, principally through the participation in PROs. Despite the common thread of financial responsibility, albeit varying levels, borne by producers, EPR policies differ dramatically in terms of the level of prescription and role for various actors along the product chain.

3. Common allocation of responsibilities within EPR

Roles and responsibilities are typically assigned to brand owners and others along the product chain through EPR regulatory instruments. Typically, the regulatory action occurs at the national level with the exception of the United States and Canada wherein state and provincial policymaking are dominant. While EPR shifts the financial responsibility, either wholly or partially, for end of life management of products to producers, the regulatory regimes often acknowledge, and in some cases directly codify, a role for other entities including municipalities to achieve public policy outcomes. This allocation of responsibilities directly impacts the decision-making structure and thus governance of EPR programs.

A fundamental tension often present within the allocation of responsibilities within EPR is the desire of producers to operate with more programmatic authority but being simultaneously cautious about assuming the full financial responsibility that such authority often demands. Despite the broad acknowledgement of the imperative for programmatic flexibility for producers (Ontario, 2009; Massarutto, 2014; Nash and Bosso, 2013), this is often hampered by local political circumstances and existing relationships among key institutional players such as waste management firms and commodity processors.

The following section offers a brief synopsis of the roles and responsibilities that can be assumed by the principal parties under an EPR regulatory regime. The description illustrates the diversity of requirements within and among EPR programs and their prescribed interaction between these relevant parties.

3.1. Producers

Producers, sometimes defined as brand owners, serve as the entities charged with the primary, if not sole, responsibility for financing the collection, transportation and recycling of discarded products. The operational responsibility, also referred to as functional responsibility, refers to the programmatic tasks for which the producers are responsible (Kalimo et al., 2012). These tasks may be fulfilled by individual companies, if an individual compliance option is available through the regulatory model, but are generally fulfilled through participation in a PRO. In many cases, the regulatory mechanism allows for either individual responsibility or to facilitate producer cooperation, collective responsibility.

3.2. Retailers

Retailers may have specified responsibilities within EPR programs such as serving as collection entities for discarded products. For example, such collection is required by the European Union's WEEE Directive (Khetriwal et al., 2011) or for home appliances in Japan (Wagner et al., 2013). Even if not a regulatory requirement, voluntary retail collection efforts for products addressed under EPR are expanding, often reinforced by the firm's broader sustainability initiatives (Dauvergne and Lister, 2012).

In some jurisdictions, such as in several of the Canadian Provinces, retailers when serving as a "first importer" for products may serve as the obligated entity on behalf of producers (Quinn and Sinclair, 2006). Retailers, particularly in the context of EPR in the U.S. often play an important compliance function through implementation of a "do not sell" provision that stipulates that only products offered by compliant producers may be sold (Hickle, 2013a). Retailers may also be required to provide information to customers with regard to the available collection opportunities for a particular product.

3.3. Regulatory authority

The regulatory authority, at the national or, as in the case in the United States and Canada, the sub national level, is charged with providing overall oversight of the program including responsibility for ensuring compliance and, if warranted, initiating enforcement actions.

Additional responsibilities may include registration of participating producers, review and approval of a program plan submitted by individual producers or a PRO. In a few examples, the regulatory entity assumes a more substantive role that may include selection of vendors as well as setting of fees. In some instances, the authority may be actively engaged in establishing the financial terms for the program. For example, the Connecticut Department of Environmental Protection is charged with the selection of eligible recyclers and authoring acceptable rates (Connecticut Legislature, 2007).

3.4. Municipalities

Municipalities, the organizational actors that have traditionally organized, managed and often directly provided recycling service, have historically been presumed to serve a "crucial" function in EPR programs frequently continue in that role under EPR programs (OECD, 2001). As noted by Cahill and Grimes in their analysis of the role of local authorities in EPR programs in the European Union, there is a significant diversity as to whether the municipalities retain physical and, in some cases, some degree of financial responsibility for household generated packaging and waste electronics (Cahill et al., 2011).

The municipal role in service provision, depending upon the jurisdiction and the product, is sometimes mandated under the regulatory regime as in Spain where the collection of WEEE in cities with 5000 or greater residents is the responsibility of the local authorities (Queiruga, 2012). Under the legislation in France implementing the EU Directive on Packaging and Packaging Waste, while producers are responsible for 80% of costs borne by local authorities, the authorities are designated as providers of collection services for waste packaging (da Cruz et al., 2013).

The EPR regulation for the packaging program in Quebec retains the municipal role of providing service with the producers compensating the municipalities for collection. Similarly, the EPR statute for waste electronics in the State of Maine assigns municipalities with the responsibility to provide for the collection and transport material to consolidation points (Wagner, 2009). In other circumstances, municipalities may choose to participate on a voluntary basis as well as serve as an important in providing information to residents regarding available collection opportunities. In recognition of the traditional role of municipalities for providing education to constituents about waste management, EPR regulatory mechanisms, such as the law for waste electronics in the State of Washington, specify that municipalities continue to provide that education (Gui et al., 2013).

3.5. Consumers

Consumers, while generally not subject to specific legal requirements under *EPR*, are instrumental to the effectiveness of the program. In a few instances, such as the Act for Recycling of Specified Kinds of Home Appliances in Japan, consumers pay a fee when the product is collected for recycling (Aizawa et al., 2008). If a ban on the disposal of a particular product or material is in place, consumers are to ensure that these products or materials must be collected for recycling or otherwise managed outside of the waste destined for disposal.

While the specific legal requirements assigned to the producers, retailers and local authorities vary widely depending upon the particular jurisdiction and the circumstances of the product, the producer's assumption of responsibilities under *EPR*, both financial and operational, requires the development of self-organizational strategies, many of which are prominent within the conceptual framework of private environmental governance.

Fundamental to the transference of decision-making and operational responsibilities from the public sector to private actors is the direct impact on the existing institutional relations and entities including how to address existing infrastructure, contracts and ultimately, the loss of control and potential employment built on the prevailing system.

4. Description of the current governance model for residential recycling

Intrinsic within the policy rationale for *EPR* is not only an acknowledgment of market-based instruments as a strategy for achieving improved environmental outcomes, but also that transforming the governance of collection and recycling programs may be necessary to achieve significant advances in material recovery. This, of course, departs from the current role of municipalities in ensuring collection and recycling services, a historical outgrowth of the responsibility for ensuring sanitation (Vergara and Tchobanoglous, 2012) and then an emphasis on diverting materials from landfills, varies but generally falls within two options, either directly providing collection or contracting for service with a waste management company (Kollikkathara et al., 2009).

Reflecting upon the historical role of municipalities in solid waste management, local and regional governmental entities may also operate facilities for processing of collected products and commodity materials. As Louis (2004) notes, the emphasis on locally centered decision-making is essentially the same since its waste management originated. Local governments are responsible for not only arranging recycling opportunities for their citizens but also providing education, program analysis, evaluation and proper reporting for that jurisdiction.

Residential recycling in the U.S. is marked by a pronounced level of decentralization as evidenced by 9000 curbside programs for packaging and paper materials (U.S. EPA, 2013). This scenario contributes to a disaggregated system that has resulted in a lack of coherence in the collection and processing system for recyclable materials and has resulted in significant variability of recycling rates. Specifically, a collection and recycling system premised on local governmental decision-making results in a significant variability of materials being collected in programs across the U.S. thus rendering a cohesive public education strategy virtually impracticable. This localized decision-making persists despite the overall globalization, concentration and privatization that has dominated the waste management industry over the past several decades (O'Neill, 2001). This disaggregation results in a significant fragmentation of markets and poses significant challenges for the ability to collect data and permit the meaningful comparisons of programs (Tonjes and Greene, 2012).

While some U.S. states, for example, may provide some financial support for local government recycling activities as well as, in some cases require specific requirements such as "opportunity to recycle" and reporting, the financing and governance of recycling is diffuse with decision-making seated at the community level (Folz, 1999). However, given that municipal provision of curbside recycling is often motivated by constituent demand rather than by economic decision-making, assessing the full costs of municipal waste management is often challenging (Bohm et al., 2010).

Local governments, while providing critical services that cannot be performed by private actors, have been characterized as non-rational economic actors thus inhibiting the most efficient approach to reducing the environmental impact of products and in creating circumstances to achieve a truly closed economic model. This is, in part, driven by the local political overlay that is infused in the decision-making process and often trumps establishment of program that prioritizes commodity supply and demand.

The reliance on municipal funding mechanisms often results in an undercapitalized system with a generally stable financing system that does not reflect the dynamism in the marketplace and is unable to deploy technology for enhanced collection, sorting and processing. The outcome of the current approach is reflected in stagnant recycling rates and lack of incentives for internalizing externalities and ensuring that end of life considerations are firmly embedded in design choices.

As Bulkeley et al. (2007) concluded, as municipal waste management has migrated from an early emphasis on disposal to diversion to broader conceptual frameworks as resource conservation, the number of system actors has multiplied thus challenging the mode of governance dominated by local authorities. A particular challenge facing the prevailing decentralized system is the lack of ability to broadly spur waste prevention and, ultimately, product design choices by producers (Deutz et al., 2010).

Extended producer responsibility offers a potential pathway, but not the sole strategy, if the intent of policymakers is to "rationalize" the current system of locally-managed programs and consolidate decision-making. This consolidation is necessary to promote greater uniformity of practices and achieve greater environmental outcomes.

5. Private environmental governance

While there is no consensus definition or firm typological categorization of private governance, the maxim of "governance without government" is often applied to decision-making and implementation activities assumed by non-state actors (Vogel, 2008). Roberts (2011) offered a typology of private governance institutions that illustrate many characteristics that are often at play with producer responsibility.

The framework of private environmental governance builds on the description of environmental governance as a broad suite of political, economic and social factors that determine the relationship among actors and the environment (Levy and Newell, 2005). Private environmental governance recognizes that the state is not the sole entity responsible or functionally able to address societal challenges and the imperative to broaden the scope of organizations engaged in governance (Trubek and Trubek, 2007) and, in particular, the operative role of non-governmental organizations (Driessen et al., 2012).

Private environmental governance emerged in tandem with the consideration of market-based instruments in 1980s and 1990s that represent a broad range of strategies such as taxes, subsidies, standards and certification tools, tradable credits as well as voluntary agreements (Jordan et al., 2003). Support for private environmental governance has also increased due to fiscal pressures facing traditional governmental actors (Lemos and Agrawal, 2006).

However, as Cramer (2013) indicated, the transition to governance from the traditional hierarchical model is less prevalent than often cited.

Private environmental governance is often reflected in environmental standard and certifications and other private rulemaking initiatives. In the context of global activities, Vogel (2010) asserts that a form of private governance, civil regulation or private rule-making, is established norms that are distinct from traditional self-regulatory action. However, as Vogel (2010) observed, these private regulatory measures may be integrated into regulatory measures. As Falkner (2003) observes, policymaking when applied to EPR will be increasingly defined by a “public-private nexus.” Baron and Lyon (2011) recognized that there is a growing role for corporate partnerships with non-governmental organizations in environmental governance and for related efforts to support reputational goals.

The emergence of private environmental governance can be traced to a range of contributing factors such as CSR as well as recognition of the failure of government to act or adequately fulfill their responsibilities and broader dissatisfaction with regulatory approaches (Jordan et al., 2003). As Lemos and Agrawal (2006) have noted, a broadening of the actors executing governance beyond the state is characterized by a decentralization of environmental governance. New governance models have emerged in tandem with recognition of complex, interrelated and, often global, environmental challenges (Giljum et al., 2005).

Significant attention has been devoted to private environmental governance structures in the international context, particularly regarding transnational firms (Pattberg, 2004). More specifically, the governance of carbon offsets (Bumpus et al., 2010) and product standards and certifications, with most, an examination of the certifications of forest practices (Pattberg, 2005).

In contrast to the voluntary market efforts that rely on individual participation by motivated firms and that operate generally without legal sanctions, with a few exceptions, EPR functions as a policy hybrid that is underpinned by regulatory measures that is built upon features of a market-based instrument with producers assuming responsibility and thus management for achieving the goals and objectives. This hybrid, framed by Boons (2008) as an interaction between self-government and external control, is embedded within EPR. While the degree of financial responsibility varies according to individual jurisdiction and product or material addressed by the EPR regulation, the question of the nexus between financial responsibility and programmatic authority is increasingly being raised as EPR matures. The analysis of the question is being broadened to determine how EPR can more broadly achieve the environmental goals beyond simply increasing collection and recycling of certain products and materials.

Several examples of nominally regulated environmental governance mechanisms have emerged in the context of EPR. Most notably is the collaborative nature of voluntary agreements or covenants as notably demonstrated by the Dutch Packaging Covenants that implemented producer responsibility for packaging waste from 1992 to 2005 (Rouw and Worrell, 2011) or the voluntary and co-regulatory measures envisioned under the Product Stewardship Act in Australia (Lane and Watson, 2012).

6. Intersection of private governance and EPR

The governance of a particular EPR program reflects the policy intent and, specifically, the allocation of responsibilities among the various actors embedded in the regulatory mechanism. The approach to governance is usually determined by the political context of a particular jurisdiction. By aligning with the conceptualization of governance as a multi-actor approach, EPR functions

within the market as an agent focused instrument (Lemos and Agrawal, 2006). Despite the emphasis on the role of brand owners in EPR programs, the role of government and, in particular municipalities, as market participants varies significantly across the globe and, in some instances, is central to the functioning of the program (Cahill et al., 2011). In an analysis of environmental governance in the Netherlands, Driessen et al. (2012) observed that EPR can be construed as a public-private partnership. Jacobs and Subramanian (2012) argue that a sharing of responsibilities might lead to improved program outcomes.

With the assumption of financial responsibility for brand owners and the corresponding acknowledgement of need for integration into the business model that is inherent in the EPR policy model, this internalization of costs requires a flexible, non-prescriptive set of operational requirements. Further, this imbedded financial obligation naturally leads to brand owners assuming programmatic responsibility, although the degree of their responsibility may be circumscribed by regulatory requirements that, for example, impose obligations on other parties such as retailers or engage public authorities as a direct market participant in the program as illustrated by several examples in Section 8.

Extended producer responsibility may result in a direct transfer of some specific roles of government to private entities. This “blurring of boundaries” either implicitly or as a regulatory requirement recognizes that a variety of actors may be better positioned to perform certain tasks (Solomon, 2010). While this is generally conceived of solely in terms of financing and program delivery, program analysis and other responsibilities typically reserved for governments are being assumed by PROs. For example, PROs, while not carrying the enforcement authority of state actors, do directly solicit and encourage participation in the organization in an effort to discourage “free-riders” (Fleckinger and Glachant, 2010). Legislation for products, most specifically for batteries, in the U.S. has also been considered that provides for a “private right of action” that would enable a PRO to take legal action against non-compliant brand owners to recoup funds for properly managing their products (Nash and Bosso, 2013). Other functions that are typically assumed by government include program reporting and “soft” tasks such as education and outreach and program evaluation as well as the development of recommendations for regulatory changes.

For those EPR regulations that stipulate development of a program plan, producers are frequently required to conduct a consultation process to receive input from diverse stakeholders as to how the program should function. Such producer-led stakeholder engagement efforts are often designed to mirror the administrative rulemaking function of state actors (Hickie, 2013b).

The assumption of responsibility for what were historically government roles departs from the purely non-regulatory inspired governance schemes that exist with product standard and certification efforts (e.g. FSC, USGBC) and they more closely resembles other hybrid examples of regulatory measures governed by market actors such as the governance of carbon offsets.

The transition of responsibilities from government to producers is most often considered through the assumption, either fully or partially, of financing of collection and recycling activities. While the internalization of costs is argued to support enhanced environmental outcomes throughout the product’s lifecycle, the consolidation and streamlining of decision-making, and thus of governance, may support the more effective and efficient achievement of those environmental objectives of the program.

By shifting the locus of financing and program management from municipalities to producers, it marks the recognition that in response to the increasingly global scale of the supply chain, product design, production and sale requires governance structures that are reflective of that scale. Through the engagement of producers,

EPR is intended to ensure that enhanced economic efficiencies will result and overall system costs will be lowered compared with the prevailing locally government financed and managed approaches. Extended producer responsibility, when operationalized through individual producer responsibility (IPR) models, is predicated upon the premise that competition will emerge individual producers (Dempsey et al., 2010).

In summary, under an EPR policy regime, the role of government is often fundamentally shifted from an active market participant that may provide and finance collection and recycling activities to a role of establishing and enforcing rules such as ensuring program participation and conducting program evaluation.

7. Producer responsibility organizations

Producer responsibility organizations (often referred to as stewardship or third-party organizations) may be either for profit or non-profit entities are a central feature of implementation of producer responsibility regimes and serve as the organizational construct for the transition to private governance. PROs as commonly understood in producer responsibility programs have historical roots in the formation of *Duales System Deutschland* (DSD) with enactment of the German packaging ordinance in 1991 (Nakajima and Vanderburg, 2006). The principal responsibilities of the PRO include overall program management that includes fee setting that is generally assessed on sales of products into a particular jurisdiction, selection of vendors, public outreach and education and in some cases, instituting environmentally-sound management standards (Mayers, 2007).

As Kroepelien (2000) noted, EPR creates a new entity that is inserted between the individual producer and the government. While collective compliance organizations are permitted if not, in some instances, required by the policy instrument, PROs are generally created voluntarily by the brand owners to fulfill the regulatory obligations and achieve cost efficiencies (Fleckinger and Glachant, 2010). This efficiency is, in part, attained through migrating from a system operated locally or regionally to an emphasis on a multi-regional, national, or in some cases, an international scale (Mayers and Butler, 2013). It is important to recognize that PROs are often distinct from producer compliance organizations that may be operated by waste management or logistics companies and serve a functional compliance role on behalf of the producers.

PROs operate on behalf of the designated brand owners when collaborative activity is most efficient such as collection of discarded products or when individual responsibility models are inefficient or discouraged (OECD, 2001). In effect, PROs are the administrative vehicle to move from a largely competitive relationship to one that requires collaboration. PROs may function as a monopolistic compliance option or, in some cases, some of the EPR regulations provide for multiple or competitive PROs. The role of competitive schemes is often debated with an organizational monopoly suggested for jurisdictions lacking sufficient infrastructure and competition encouraged as the system matures (Antonoli and Massarutto, 2012). In some cases, as noted by Niza and colleagues (2013), collective approach is viewed as easing the implementation timeline. However, Toyasaki and colleagues (2011) argued that competitive approaches leads to lower prices of products and thus increased profits for manufacturers. It is argued that multiple PROs, while supporting a competitive landscape of compliance options, may inhibit the operational efficiencies that can be achieved within one PRO (Atasu and Wassenhove, 2012).

Critical to the construction of EPR programs, at least those that are premised on a large degree of collective action by producers, is the implementation of cooperative measures such as

organizational governance and decision-making. Creating a non-state responsibility for consolidated decision-making regarding many aspects of financing and service provision is arguably the most notable feature of EPR that results in the realization of many of the intended aims of the policy tool. This support for PROs with recognition that program efficiency and interface for consumers and service providers is critical.

As individual PROs become more entrenched and functioning across multiple jurisdictions, an example PaintCare that, as of 2013, implementing unwanted paint management programs in seven U.S. states, able to accrue authority and responsibility that otherwise has been assumed by public authorities (Hickle, 2013b). Cross-jurisdictional organizations are particularly prominent in the European Union such as the European Recycling Platform (ERP) that addresses WEEE (Atasu and Wassenhove, 2012) as well as batteries. However, organizational actors such as the WEEE Forum in the EU and the Canadian Shares Services Alliance (CSAA) in Canada serve a coordination, reporting, and support function role for multiple PROs. As Bury (2013) noted, the producers are steering efforts to promote program consistency across jurisdictions and operate programs with a national perspective.

The actual governance mechanism of the organization, such as the composition of the board of directors or other administrative body, is determined by the obligated brand owners. In some instances such as the Rechargeable Battery Recycling Corporation in the United States, two board seats are reserved for independent directors with no organization affiliation with producers of batteries. The Carpet America Recovery Effort (CARE), the organization executing the brand owner obligations required by the producer responsibility measure enacted in California in 2010, has representation on the board from independent processors of collected carpet. PROs that have been created for compliance with packaging regulations typically have a diversity of producers, including those representing different materials, represented in the governance structure of the organization.

PROs are often formed and initially housed within traditional industry trade associations. Examples of this pattern of origination include PaintCare that was created by the American Coatings Association in the U.S. and Multi-Material British Columbia (MMBC), an entity formed by several trade associations representing retailers and brand owners in Canada. The genesis and arrangement of PROs is often diverse, as Hage (2007) states in an analysis of the producer responsibility system in Sweden, producers initiated four separate organizations by commodity type.

Despite the emphasis on flexibility for program implementation within the EPR conceptual framework, certain EPR regulations require obligations to be executed by a PRO and compel individual producers to join the organization. For example, the architectural paint producer responsibility law in the State of Connecticut (Connecticut Legislature, 2012) requires mandatory participation by producers in a PRO. In some case, such as is the case with the statute for EPR for carpet in California, the Carpet America Recovery Effort is explicitly identified in the statute (California Legislature, 2010). In some instances, the management organization may be actually created by the legislation as exemplified by the Washington Materials Management Authority Washington Materials Management Authority (WMMMA), an organization specifically created by the authorizing statute (Gui et al., 2013). The WMMMA performs many of the functions of a traditional PRO with a board predominantly composed of brand owners but also has the state regulatory authority serving in an ex officio capacity. As of 2012, no brand owners are operating an independent plan.

While many programs are premised on producer collaboration, concerns regarding monopolistic behavior have been present with PROs since their inception. For example, several of the state statutes in the United States instituting producer responsibility measures

contain an anti-trust exemption from state competition laws to facilitate brand owner cooperation (Hickie, 2013a).

8. Responses to changing governance under EPR

While the primacy of private entities in an EPR-based policy approach is generally welcomed, the several concerns have arisen. Many of the articulated challenges to producer responsibility are similar to those voiced for private environmental governance such as lack of transparency in decision-making, concentrated authority with limited opportunities for public participation of more fundamentally that market-based initiatives simply codify the existing trends of environmental degradation (Lemos and Agrawal, 2006). Of most consequence is the potential for the concentration of market influence by brand owners and their designated organizations with potential implications for competition (Heyes, 2009). As Lehmann (2004) notes, antitrust concerns were voiced soon after the creation of *Duales System Deutschland* (DSD) in Germany, the PRO created to fulfill the producer's obligations under the German Packaging Ordinance. It is assumed that even with multiple PROs operating within a particular jurisdiction, the competitive landscape will be curtailed and lowest cost service providers will prevail. In essence, it is argued that EPR may result in "policy generated monopolies" that will reduce the number and viability of the downstream processors of commodities.

Much of the criticism directed at the changing governance inherent in EPR is the concern that local environmental, economic and other values will be displaced. With the shifting of responsibility to the producers from local governments under EPR, other community values that may be infused within municipal policies and programs such as prevailing wage requirements and a preference for local end markets for processing materials may be de-emphasized or omitted as a consequence of the transition. This is often expressed most directly with the potential for aggregation of commodities and with reduction of locally owned waste management companies and processors and the displacement of economic development opportunities. Despite the increasingly globalized nature of recycling commodity markets, municipal recycling is often viewed as an exponent of the "localism" movement (Hess, 2008).

Other critiques include the potential for existing public recycling infrastructure to be neglected, referred to as "stranded assets" and the potential for communities with high performing recycling efforts to see a decline in service and environmental outcomes. The need to address the fate of the present infrastructure and the interests that may be omitted by a transition to EPR is often recognized by policymakers as a critical aspect of program development (Ontario, 2013).

Another argument often articulated against private governance is the lack of formal public input in decision-making that often occurs with traditional legislative and administrative processes. This perceived lack of transparency and institutionalization of private rulemaking activities has led to concerns about further privatization of services and diminishment of the capacity of the public sector.

A recent report on the proposed implementation strategies in British Columbia for packaging and printed-paper offers the perspective of municipalities (Columbia Institute, 2013). In an attempt to address this and reflecting on the transition of a public role to a private governance structure, many EPR regulations require a consultation process to solicit input from various stakeholders. However, government is often positioned as a more neutral arbiter and can play an important role in dispute resolution and convening of stakeholders.

9. Examples of governance within EPR

Recognizing the variety of EPR policies and program implementation scenarios that illustrate the differing apportionment of responsibilities between public and private actors, the following section describes several of the prevailing models in the North American context. The examples are drawn from North America due to the array of models that demonstrate this diversity but also that the policy debate regarding the allocation of responsibility is evolving, particularly in the United States. Table 1 illustrates the products that are subject to statutory or regulatory requirements in the United States and Canada. While the apportionment of financial or operational responsibilities may be specified in regulatory instruments, in many cases it may not be articulated and formulated during the program planning and or implementation phase.

While not being an exhaustive list of the allocation of responsibilities between producers and government, the following categories outline the models that range from producers that assume full financial responsibility and operational authority for achieving the desired outcomes of the policy to models that stipulate defined roles for public authorities in program implementation.

9.1. Full producer financial and management responsibility

The British Columbia Ministry of the Environment issued a regulation in 2011 that stipulated full financial responsibility for producers of packaging and printed paper with significant flexibility as to how to achieve the outcomes of the program.

In the United States, starting with the State of Oregon in 2009, seven states have enacted an EPR approach for unwanted architectural paint. While the statutes do not specify that the producers of architectural paint are to assume the full financial responsibility for the program, there are no defined collection responsibilities or financial obligations imposed on local authorities.

9.2. Full producer financial responsibility with public management responsibility

The second category is illustrative of EPR programs whereby the functional program responsibilities remain with the municipalities although the producers have the responsibility to fully finance the system.

In the EPR regulation issued in 2005 for packing and printed paper in Quebec, the traditional municipal collection role for recycling is maintained. Initially a shared financial responsibility model with producers and municipalities assuming 50% of the net costs for municipal recycling, the regulation was amended in 2011 to increase the share paid by producers. Starting in 2013, the producers through the PRO, *Éco Entreprises Québec* (ÉEQ), will be responsible for financing 100% of the municipal recycling net costs.

9.3. Shared producer financial responsibility with public management responsibility

Following the model established for residential recycling in Ontario with passage of the Waste Diversion Act in 2002, whereby producers of packaging and printed paper are required to fund 50% of the net municipal costs for recycling, Manitoba enacted a regulatory measure that increased the producer's share to 80%. The regulation for packaging and printed paper regulation adopted in 2010 in Manitoba established a "shared" financial responsibility model with the regulated brand owner assuming 80% of the provincial residential recycling costs and the local governments assuming the remaining 20% (MMSM, 2012). Despite the financial obligation

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Table 1
Regulated EPR programs in North America.

Product category	U.S. States	Product category	Canadian Provinces
		Anti-freeze (glycol)	British Columbia, Manitoba, New Brunswick, Ontario, Prince Edward Island, Saskatchewan
Architectural paint	California, Colorado, Connecticut, Maine, Minnesota, Oregon, Rhode Island, Vermont	Architectural paint	British Columbia, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Quebec
		Automotive batteries	British Columbia, Manitoba, Prince Edward Island
Batteries (rechargeable)	Florida, Maine, Maryland, Minnesota, Iowa, New York, New Jersey, Vermont (rechargeable and single-use)	Batteries	Alberta, British Columbia, Manitoba, Ontario, Quebec
Carpet	California		
Electronics	Connecticut, Hawaii, Illinois, Indiana, Maine, Maryland, Michigan, Minnesota, Missouri, North Carolina, New Jersey, Oklahoma, Oregon, New York, Pennsylvania, Rhode Island, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, California, Connecticut, Rhode Island	Electronics	British Columbia, Manitoba, Ontario, Quebec, Prince Edward Island, Nova Scotia
Mattresses			
Mercury-containing lamps	Maine, Vermont, Washington	Medical sharps and syringes Mercury-containing lamps and other mercury-containing products	Manitoba, Ontario, Prince Edward Island, British Columbia, Manitoba, Quebec, Prince Edward Island
Mercury auto switches	Arkansas, Illinois, Iowa, Massachusetts, Maine, Maryland, New Jersey, Rhode Island, Utah		
Mercury thermostats	California, Connecticut, Illinois, Iowa, Maine, Montana, New Hampshire, Pennsylvania, Rhode Island, Vermont		
		Mobile phones	British Columbia, Manitoba, Ontario, Newfoundland, Nova Scotia, Prince Edward Island, Quebec
		Oil, oil containers and filters	British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan
		Packaging and printed materials	British Columbia, Manitoba, Ontario, Quebec, Saskatchewan
		Pesticides, fertilizers and containers	British Columbia, Manitoba, Ontario
		Pharmaceuticals	British Columbia, Manitoba, Ontario, Prince Edward Island
		Tires	British Columbia, Manitoba, Ontario

Sources: Nash and Bosso (2013), Hickle (2013a), Canadian Council of Ministers of the Environment (2014).

Notes: The Table illustrates products for which EPR statutes or regulations have been enacted. The Table does include those that are shared financial responsibility but does not include voluntary programs or those that utilize a deposit funding mechanism.

for brand owners, the system essentially retains the centrality of local governments.

9.4. Producer responsibility with a government compliance option

The final classification is an EPR program that offers a compliance option with significant public authority management. For example, the Vermont waste electronics law enacted in 2010 established a government administered “standard” plan whereby the state regulatory authority, the Vermont Department of Environmental Conservation, contracts for waste electronics recycling services (Vermont Legislature, 2009). Although funded by brand owners according to their market share, the decision-making and management responsibilities rest with the state regulatory authority.

A provision in the statute authorizes an “opt-out” option for producer seeking an alternative to the standard plan. For the first time in the program, the state regulatory authority authorized an “opt-out” plan to begin operating on October 1, 2013 on behalf of five producers (Elliot, 2013).

Table 2 displays the examples of governance common within EPR programs in North America as identified above with articulated roles and responsibilities for principal actors as identified in Section 3.

10. Evaluation of governance mechanisms of EPR programs

Given the primary policy objectives of EPR programs, the evaluation of programs has tended to emphasize the environmental outcomes such collection and recycling performance and to a lesser extent, the design for environment activities undertaken as a result of EPR. In some instances, the economic efficiency of the programs has been measured. However, the structure of program governance and the allocation of responsibilities within EPR regimes has received little attention regarding their influence on the overall efficiency and effectiveness of EPR policies.

Given the breadth of governance models, and specifically the balance of responsibilities and functions between producers and public authorities, with existing EPR programs, an evaluative framework is critical to the assessment as to the relationship between program governance and achievement of the desired outcomes of the program. Specifically, is the balance of responsibilities allocated between the producers and government actors at all levels determinative of the environmental and economic efficiency of the program? This question is of particular relevance for those programs, as defined in Section 9, with a Government Compliance Option or with Public Management Responsibilities that broaden the scope of actors engaged in governance of the program. Addressing the question of whether producer centered governance models that place greater financial and programmatic

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Table 2
Comparison of examples of governance within EPR with roles for specific actors.

	Full producer financial and management responsibility	Full producer financial with public management responsibility	Shared producer financial with public management responsibility	Producer financial responsibility with government compliance option
Producers	1. Finance, develop and operate program 2. Contract with vendors for services	1. Finance program 2. Select post-collection vendors	1. Finance a defined portion of program costs 2. Select post-collection vendors	1. Finance program either fully or partially 2. Report on program outcomes
Retailers	1. May serve as collection sites (mandatory or voluntary) 2. May be an obligated as "first importers" 3. Comply with "do not sell" requirement	1. May serve as collection sites (mandatory or voluntary) 2. May be an obligated as "first importers" 3. Comply with "do not sell" requirement	1. May serve as collection sites (mandatory or voluntary) 2. May be an obligated as "first importers" 3. Comply with "do not sell" requirement	1. Serve as collection sites (mandatory or voluntary) 2. May be an obligated as "first importers" 3. Comply with "do not sell" requirement
Regulatory authority	1. Provide oversight 2. Ensure participation 3. Review and approve plans 4. Conduct overall program evaluation	1. Provide oversight 2. Ensure participation 3. Review and approve plans 4. Conduct overall program evaluation	1. Provide oversight 2. Ensure participation 3. Review and approve plans 4. Conduct overall program evaluation	1. Solicits, plans or bids from vendors 2. Select eligible vendors 3. Approve rates to be paid by producers to vendors
Municipalities	1. May serve as vendors for producers for collection services 2. May have defined collection obligations 3. Provide education to residents	1. Continue as collection service providers 2. Provide information to residents on the program	1. Finance a defined portion of program costs 2. Continue as collection service providers 3. Provide education to residents on the program	1. May have defined collection obligations 2. Provide education to residents on the program
Consumers	1. Abide by disposal bans if applicable 2. Participate in the collection program	1. Abide by disposal bans if applicable 2. Participate in the collection program	1. Abide by disposal bans if applicable 2. Participate in the collection program 3. Contribute to the program funding through fees or taxes	1. Abide by disposal bans if applicable 2. Participate in the collection program 3. Contribute to the program funding through fees or taxes

responsibility on producers result in higher program performance relative to those with mixed governance is essential for the construction of EPR policy going forward.

It is also important to investigate whether the differing governance models are appropriate for different products given that the attributes of products and methodologies for collection and processing may vary greatly. The differentiation of governance models by product is of particular importance for those products and materials that have an existing collection and recycling infrastructure as well as entrenched interests that may constrain the governance models available to policymakers.

Several factors will need to be addressed to conduct robust evaluation of the interplay between the governance regime of the EPR program and the program outcomes. Of particular importance is, given the array of existing governance structures, is further refinement of the typologies identified in this paper and applying those to existing EPR programs.

An identification of the degree of programmatic flexibility allotted to producers for program design. This is particularly significant regarding the autonomy to develop a collection network and solicit demand for collected material.

It is also essential to isolate the producers' actual financial responsibility and costs as well as those costs borne by other parties to develop a gauge of economic efficiency. Finally, data regarding the amount or volume of products collected and managed at end of life as a result of the EPR program will need to be identified. These two categories of data can then be applied to the governance typologies to determine the optimum governance mechanisms.

11. Conclusion and recommendations

The analysis suggests that as EPR matures, the evaluative measures typically utilized to assess EPR may need to transition from an emphasis on initial policy designs to an investigation of

governance strategies and other factors that influence the environmental outcomes of the programs. However, the optimal allocation among producers and other entities, including regulatory bodies and local authorities, to achieve an effective program that results in high performance in an economically efficient method is far from resolved. With the maturation of EPR as a regulatory mechanism and enters a phase of increasing performance, as demonstrated by the recast WEEE Directive (Torretta et al., 2013) with aggressive target and expanded requirements on producers, the interplay with emphasis on increasing performance metrics and thus upon greater accountability and authority for producers.

As EPR becomes further embedded within the business models of producers and the need for jurisdictional harmonization becomes more acute, will producers seek greater program flexibility and authority under EPR programs and in what form? As EPR policy is further linked to the fulfillment of sustainable or "green" global supply chain objectives such as an overall reduction of environmental impacts or securing a stable supply of post-consumer commodity material and the global context for achieving these objectives, these question of the optimal role for producers and public authorities (Vermeulen and Ras, 2006).

Although within the context of EPR policy, producers are functioning under a regulatory umbrella, the self-organization and relative operational autonomy is closely aligned with private environmental governance structures. The strengthening and expansion of producer-led program development and autonomy in EPR policy is arguably necessary to truly fulfill the intent of integration of EPR into the business model of firms.

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Chapter 8: Exploring the Nexus between Corporate Social Responsibility and EPR

Introduction

Chapter 8 addressed research question 4 (*How do individual firms view EPR as a component of their CSR strategy?*)

Following the analysis of governance of EPR programs and the assertion that for EPR to achieve the desired outcomes more fully than is presently realized, EPR policy may need to allow for greater individual producer responsibility and the development of more fully integrated EOL product management activities within firms that can be characterized CSR profiles of companies

If the assumption that EPR policy that is premised on producer developed and managed programs may be more effective in attaining the broad suite of goals for EPR, not only for achievement of public objectives but for those of producers as well. This blending of public and private benefits is not well explored or documented within the research on EPR. The following paper examined the role that EPR occupies within the CSR profile of firms. Relying on an analysis of individual corporate social responsibility reports, the paper characterizes how firms do or do not embed EPR legal requirements or EOL product management activities as a demonstration of reported CSR activities. This analysis was designed to identify companies that viewed EPR as an important CSR function that demonstrates EOL management activities provide strategic advantages.

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Extending the Boundaries: An Assessment of the Integration of Extended Producer Responsibility Within Corporate Social Responsibility

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ABSTRACT

The paper examines how extended producer responsibility (EPR) as an environmental policy approach and, more broadly, product management strategies are characterized within corporate social responsibility (CSR). The author summarizes the key concepts and arguments for sustainable product management strategies with an emphasis on the collection of discarded products at end of life, and identifies primary tools for recognizing and advancing product management strategies within CSR such as sustainability reporting and product standard and certification programs. The article analyzes 121 CSR reports for references to EPR and, more broadly, end-of-life management strategies for discarded products. It concludes with recommendations as to how CSR practices can more effectively recognize product management strategies as well as how EPR policy can be enhanced to further embed product end-of-life management strategies and activities within the CSR activities of firms. Copyright © 2015 John Wiley & Sons, Ltd and ERP Environment

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Introduction

AS CORPORATE SOCIAL RESPONSIBILITY (CSR) BECOMES AN INCREASINGLY PROMINENT PRACTICE IN THE GLOBAL BUSINESS context, the boundaries of CSR strategies and initiatives continue to expand. Hahn *et al.*, recognize that CSR engages firms to account for environmental, social and economic factors in a 'new' way (Hahn *et al.*, 2014). This extension of boundaries is realized in the growing field of sustainable supply chain management (SSCM), including a growing emphasis on responsibility for downstream impacts of a producer's products. However, little research exists that examines how product end-of-life (EOL) activities and extended producer responsibility (EPR) regulatory requirements, in particular, are characterized within the CSR activities of individual companies.

With downstream responsibility becoming more entrenched within firms as a demonstration of CSR and is an important business strategy in a materially constrained world, the question of the appropriate approach to product recovery and management becomes critical. Given the challenges facing an individual firm with establishing an effective and economically efficient product recovery system, a regulatory requirement may be sought to require joint

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industry initiatives and to promote a level playing field. Toffel argued that EOL product management activities can serve as a key market differentiator and serve to support a firm's strategic objectives, and Carbone linked SSCM to EPR (Toffel, 2003; Carbone, 2012).

EPR regulatory mechanisms have been expanded during the past two decades; OECD has reported that there are now more than 380 EPR policies globally (OECD, 2014). Many producers, particularly with regard to waste electronics and packaging, are subject to regulations imposing EPR obligations that stipulate producer financing of the management of unwanted products at EOL, thereby providing an incentive to reduce the environmental impacts throughout the product's life-cycle.

Despite the increasing visibility of SSCM as a strategy for CSR, there is minimal literature focused on a firm's or industry sector's establishment of downstream product collection systems for unwanted products as a manifestation of CSR.

This article evaluated how product recovery efforts are characterized within an individual firm's CSR activities through examination of the prevailing sustainability tools, including product standards and certifications, as well as through their sustainability or CSR reporting. This is of particular relevance as EPR matures as an environmental policy approach and, in some instances, is a principal strategy for achieving a firm's CSR goals and objectives. Given this dynamism, a key question is how EPR regulatory tools might be bolstered to foster the further embedding of EPR within CSR.

The author of this research utilized the Newsweek Green Rankings of companies with commitment to CSR to analyze how EPR is reflected in publically available CSR and corporate sustainability reports. The paper concludes with a discussion of how existing CSR strategies can be more fully used to guide EOL management strategies for products as well as how EPR policy development can be more aligned with CSR approaches and tools.

Overview of CSR

While there is not a consensus definition of CSR, it is generally understood to represent a broad range of themes from a firm's environmental and labor practices to its philanthropic activities (Wan-Jan, 2006). However, Lozano asserted that, while CSR could significantly advance sustainability, the lack of clarity regarding its definitions limits its influence (Lozano, 2012).

CSR overlaps with other concepts, including corporate citizenship and corporate sustainability, and more recently with 'shared value' (Porter and Kramer, 2011). Eberhard-Harribey asserted that CSR can be characterized as 'beyond compliance' behavior that transcends legal requirements (Eberhard-Harribey 2006). Laudal stated that CSR activities, either voluntary or as a result of regulatory action, internalize and institutionalize externalities (Laudal, 2012).

CSR has emerged as a core activity of businesses, and Horrigan observed that there is acceleration in the evolution of CSR as firms grapple with how to implement CSR practices rather than debate why to do so (Horrigan, 2007). A core feature within CSR is an emphasis on stakeholder engagement with, in particular, non-governmental organizations (Lyon and Maxwell, 2008).

Scherer *et al.* suggested that CSR, in part due to globalization, frames the contribution to the achievement of 'public goods' by firms (Scherer *et al.*, 2014). Porter and Kramer identified the competitive advantage of embracing CSR throughout the value chain (Porter and Kramer, 2006). Phillips and Caldwell observed the broadening of responsibility as firms are increasingly required to address both the upstream and downstream activities of their value chain, including how the products are used and their ultimate fate (Phillips and Caldwell, 2005).

CSR and Public Policy

To interpret the relationship between EPR and CSR, the treatment of policy and regulatory activity within CSR is helpful. CSR is frequently characterized as a form of self-regulation and is often embraced as a strategy to preempt regulatory threats (Lyon and Maxwell, 2008). Other authors observed that an essential impact of CSR is its

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influence on incentivizing and shaping governmental regulatory activities (Moon and Vogel, 2008; Knudsen and Brown, 2015).

Gond *et al.* argued that CSR and related regulations are actually intertwined (Gond *et al.*, 2011). In some jurisdictions, most notably in the European Union (EU), the promotion of CSR through regulatory measures as well as recognition and technical assistance activities are emerging (Matten and Moon, 2008). Middttun furthered argued that, in the context of a globalized economic structure, CSR implements ‘partnered governance’ that incentivizes CSR through tools such as procurement policy and recognition programs (Middttun, 2008).

However, in an examination of the shortcomings of CSR, Sjaafel argued that CSR alone cannot result in the internalization of environmental externalities (Sjaafell, 2008). Furthermore, Garriga and Melé argued that broader social objectives could only be achieved through legal requirements imposed by formal government action (Garriga and Melé, 2004). CSR is also challenged due to its emphasis on firm-specific activities rather than broader industry initiatives, thus not adequately addressing the problem of ‘free-riders’ and the subsequent uneven playing field.

Sustainable Supply Chain Management

An increasingly prominent element of CSR is SSCM (Carter and Easton, 2011; Amaeshi *et al.*, 2008). Gupta and Palsule-Desai emphasized that SSCM encompasses a broad range of decisions that impact the life-cycle of the product and offers an integrative framework (Gupta and Palsule-Desai, 2011). The application of SSCM has accelerated due to the fact that globalization has necessarily expanded the boundaries of the firm (Boström *et al.*, 2014). Sustainable supply chain management broadens the system boundaries for the firm to engage suppliers along the supply chain to address a broad array of environmental and, increasingly, social impacts (Andersen and Skjoett-Larsen, 2009; Cramer, 2008; Vermulean, 2013).

van Bommel identified three factors that are central to the motivation of companies to develop SSCM strategies; (1) external demands from stakeholders, (2) threats posed by suppliers and (3) opportunities to create new products (van Bommel, 2011).

Embedded within a framework of sustainability, SSCM fosters an emphasis on long-term value and identifying and managing global risks (Closs *et al.*, 2011). Carter and Rogers argued that SSCM encourages companies to implement comprehensive strategies to improve environmental, social and economic performance and to mitigate risks (Carter and Rogers, 2008). SSCM encompasses a wide range of activities, such as the transition from goods to services or reverse logistics. By fostering collaboration among companies, SSCM also spurs firms to address other supply chain objectives (Fiksel, 2013).

Despite the emergence of the sustainable supply chain concept, Pagell *et al.* asserted that many supply chains do not implement features of sustainability as they are perceived as not being financially beneficial (Pagell *et al.*, 2007). For example, EOL management activities are perceived by corporate managers firms as a cost to be minimized, and consequently they subsequently contract with the lowest cost service provider. Furthermore, Pagell *et al.*, in their consideration of four options for implementing EOL management responsibilities, asserted that active engagement in the development and operation of EOL product management activities may lead to strategic opportunities for firms and methods of competition (Pagell *et al.*, 2007).

Closed Loop Supply Chains

A growing strategy within SSCM is the implementation of closed-loop supply chains (CLSCs), which emphasizes product management following use by the consumer (Andersen and Skjoett-Larsen, 2009). With increasing focus on producers’ responsibilities for their products, including the use phase, firms’ downstream SSCM activities are receiving increased scrutiny (Phillips and Caldwell, 2005). Defee *et al.* observed that firms are realigning their supply chains not only to embrace sustainability but also to demonstrate CLSC practices (Defee *et al.*, 2009). CLSCs extend the boundary of sustainable supply chains to include the consumer or end user of the product. CLSCs offer an avenue to promote differentiation among firms in the marketplace (Defee *et al.*, 2009). However, as noted by

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Quariguasi Frota Neto *et al.*, EPR regulatory requirements have prompted the enhanced emphasis on CLSC (Quariguasi Frota Neto *et al.*, 2010).

Sarkis *et al.* suggested that reverse logistics not only supports economic and environmental objectives but also results in social benefits such as employment stability and capacity development for firms (Sarkis *et al.*, 2010).

Downstream Collection Activities

Within the broad context of SSCM, the downstream collection of EOL management is arguably the most complicated aspect of supply chain management but may offer value to firms if these activities are integrated within their CSR objectives.

Toffel outlined many of the strategic benefits associated with product recovery activities, including elevating customer goodwill, increasing brand identity, customer retention and enhancing the responsibility of the firm (Toffel, 2004). Product recovery initiatives may also result in indirectly benefiting the firm through an increase in the availability of commodity materials, and by reducing costs through use of reusable and refurbished components. In the case of retail-based collection efforts, an increase in store traffic may result. While retailers are not generally obligated to offer collection of post-consumer products, the Waste Electrical and Electronic Equipment (WEEE) Directive in the EU is a notable exception due to a provision that requires retailers to accept unwanted products when a new product is sold (Ylä-Mella *et al.*, 2014).

The expansion of EOL product collection opportunities through retail locations is often implemented as part of a broader sustainability strategy (Dauvergne and Lister, 2012). Kant Hvass's study of post-consumer collection of textiles by clothing companies documented that companies directly linked the collection activities to their CSR strategy, which provides opportunities for these firms to develop new business models and to deepen customer loyalty (Kant Hvass, 2014). Wagner *et al.* asserted that collection of products at retail locations offers several benefits, including expanding the number of collection opportunities available to consumers as well as economic benefits that result from increased store traffic (Wagner *et al.*, 2013).

Several companies have implemented individual firm level initiatives to collect and recycle post-consumer products. These include the Nike 'Reuse a Shoe' program, whereby Nike retail stores offer collection opportunities for discarded athletic shoes (Sharma *et al.*, 2012). Patagonia's 'Common Threads Initiative' provides consumers with several avenues for extending the life of clothing or recycling by offering collection opportunities at their retail stores (Hoffman, 2012). H&M also offers in-store collection opportunities for unwanted textiles (Ho, 2014). While the aforementioned examples were premised on firms with a retail footprint to facilitate collection initiatives, several manufacturers without an integrated retail infrastructure rely on retail partners to provide recovery options.

Interface, a manufacturer of modular carpet tiles, is well recognized for its sustainability initiatives, one of which is a program to recycle post-consumer modular carpet (Lampikoski, 2012). Mobile phone collection activities operated by manufacturers, as well as by others along the product chain, also illustrate such voluntary EOL management programs (Ongondo and Williams, 2011).

Challenges Facing Collection of Products

As underscored by Boons, the collection and recycling of products is often a very challenging activity (Boons, 2002). Product recovery is often predicated on the direct engagement of the final user, and in the case of consumer products is dependent upon the nature of the consumer's purchasing, use and disposal habits.

A key dynamic that influences the collection of products is the high degree of variability that, depending upon the specific product category or material, may exist for each stage of collection activity. For example, given the numerous factors that contribute to EOL product management behaviors, significant uncertainty exists regarding the timing and quantity of products that may be available for recovery (see, e.g., Toffel, 2004; Wright *et al.*, 2011). Sarkis observed that, while waste flows may stimulate reverse logistics and other strategies to reduce disposal, many variables and actors along the product chain participate in decisionmaking, often complicating the process (Sarkis, 2012). These factors contribute to the perception that the costs of implementing firm based product recovery initiatives are high (Fleckinger and Glachant, 2010).

Of course, other factors may serve as disincentives to collection, including regulatory requirements, particularly for those products that may contain toxic or hazardous constituents that may restrict how products may be collected

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or impose paperwork requirements. Also, while retailers can provide essential infrastructure for products, retailers may lack adequate space to collect and store products at EOL.

Overview of EPR as a Policy Approach

EPR is a policy approach generally implemented through regulatory instruments that extends up and down the product chain for specific products or product categories, most prominently for WEEE, packaging and those products considered to be household hazardous waste (HHW). Despite the emphasis on product producers in the construct of EPR, as Kalimo *et al.* noted, other entities such as local governments, waste management firms and others often assume prominent roles in implementing EPR programs (Kalimo *et al.*, 2015).

Through the producer's assumption of financial responsibility to manage products at the EOL, the presumption is that producers are then incentivized to implement Design for the Environment (DfE) strategies that facilitate reuse and recycling (Albino *et al.*, 2009). Furthermore, Opoku suggested that EPR results in waste reduction and prevention benefits during the production phase by tying together the stages of the product's life-cycle and facilitating actions for product optimization (Opoku, 2004).

To what extent EPR has resulted in the projected outcomes, particularly in its role in incentivizing product DfE practices, is debated. However, the relationship between EPR and DfE activities may be significantly predicated on EPR policy design (Mayers *et al.*, 2013). For example, producer responsibility organizations (PROs), which operate on behalf of producers to collectively fulfill their compliance obligations, may contribute to the lack of incentives for individual companies to engage in DfE activities, given that these actions are not perceived to accrue to the benefit of the firm (Kalimo *et al.*, 2015).

Defining EPR within CSR

While CSR is generally portrayed as dominated by voluntary initiatives, policy measures are often integral to the achievement of CLSC objectives.

A fundamental argument for EPR is the extension of a regulatory framework across all firms to provide a level playing field that then enables firms to implement sustainability activities in more proactive fashion (Moon and Vogel, 2008). A primary objective of EPR is to promote the internalization of environmental externalities. A consequence of this internalization is that, as argued by Massarutto, EPR results in a more structured market with a reduction in transaction costs and achieves greater consistency (Massarutto, 2014). Rizzi *et al.* found that the success of EPR is dependent not only upon intra- but also inter-company innovation (Rizzi *et al.*, 2013).

EPR policies that require sharing may result in increased profits for all parties along the supply chain (Souza, 2013). As Sarkis observed, the expansion of EPR regulations globally is anticipated to incentivize the development of reverse logistics (Sarkis *et al.*, 2010). Furthermore, Fiksel credited EPR as prompting changes throughout the product development process and engaging the actors along the supply chain in adopting life-cycle considerations (Fiksel, 2013).

EPR was found to stimulate the flow of information among actors along the product chain and to support collaboration to achieve sustainable supply chain objectives (Hoffman *et al.*, 2014).

Lozano and Huisinigh among others, have identified EPR as a 'support tool' to stimulate social responsibility (Lozano and Huisinigh, 2011). Massarutto stated that EPR is a strategy to implement CLSCs and support strategies such as reverse logistics (Massarutto, 2014). Furthermore, Defee *et al.* suggested that EPR supports CLSC management strategies that reinforce CSR objectives (Defee *et al.*, 2009).

As noted by Bush *et al.*, EPR is an example of CSR-oriented policymaking that enhances legitimacy but, as result of its regulatory nature, may also inhibit innovation by firms by restricting flexibility (Bush *et al.*, 2014). Furthermore, due to the increasing globalization of product supply chains, regulatory measures such as EPR that are premised on private actors but implemented in individual jurisdictions are unlikely to be sufficient for stimulating truly sustainable supply chain management (Boons *et al.*, 2012).

However, the policy choices underpinning an EPR program and the subsequent implementation strategy may have implications for how individual producers establish product management scenarios and spur characterization of the scenarios within the corporate sustainability profile.

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The Corporate Characterization of EPR

While many firms prominently build upon EPR within their broader CSR initiatives, there is no cross-industry research that offers a corporate perspective on EPR. Most examination of EPR from the corporate view has investigated individual firms or industry sectors implementing EPR in response to regulations in a particular jurisdiction (Yu *et al.*, 2008; Gerrard and Kandlikar, 2007; Wilson *et al.*, 2011; Gui *et al.*, 2013).

Given the absence of a comprehensive assessment, publically available CSR reports and public policy statements provide some insight into how EPR is positioned within the broader CSR agenda. For example, Electrolux and Nestle Waters North America (Nwana) directly linked regulated EPR to their CSR objectives. Both companies have engaged in leadership on public policy for EPR. Electrolux supported individual producer responsibility (IPR) in the development of the WEEE Directive in the EU and is one of the founding companies of the European Recycling Platform, a PRO (Mayers and Butler, 2013). Nwana has taken a leadership role in advocating for EPR for packaging in the United States through supporting the creation of a new organization devoted to this effort (Jeffery *et al.*, 2014).

Several companies have instituted EOL collection programs for consumers that are linked to broader CSR objectives. For example, Best Buy, the large retailer of electronic items and appliances, instituted a retail collection for waste electronics in 2008 and articulated specific numerical goals for product collected at its store locations (Zentes *et al.*, 2012). In 2014, Best Buy reported meeting a goal of collecting one billion pounds of unwanted products for recycling by one of its contracted vendors during the six years of the program, and established a goal for a subsequent two billion pounds of collection by 2020. The company does not charge consumers to recycle old products, with the assumption that the service increases customer traffic.

Tools to Implement CSR

While numerous broad sustainability frameworks such as the Natural Step or Cradle to Cradle exist to guide corporate engagement on sustainability, CSR in the context of product management is often implemented through the use of product standards and certifications and documented and evaluated through the use of annual CSR reporting.

Product Standards and Certifications

Sustainable product standards and certifications are becoming increasingly common in the marketplace with over 400 eco-labels that apply to products or food categories and are illustrative of the enlargement of CSR (Castka and Corbett, 2014). Often referred to broadly as eco-labels, these evaluative tools typically establish a ratings system that is focused on one or more product attributes and is designed to transmit information to the purchaser on the sustainability profile on the product. Product standards and certifications are cited as important tools to help consumers to differentiate among products in the marketplace, thereby encouraging sustainable product investment and development (Darnall and Aragón-Correa, 2014).

Several of the product standards, certifications and eco-labels are focused upon improving EOL management activities. For example, the Electronic Product Environmental Assessment Tool (EPEAT) standard has a category on take-back service. However, Lee and Nasr suggested that the requirements in the EPEAT tool are not sufficiently robust to enhance the effectiveness of EOL management (Lee and Nasr, 2010).

Other standards, such as the Leadership in Energy and Environmental Design (LEED) Green Building Rating System version 4, contain an explicit reference to EPR in the context of sourcing of raw materials (Rajagopalan *et al.*, 2012). The Sustainable Apparel Coalition's Higg Index 2.0 also has a category for EOL management activities for apparel (Radhakrishnan, 2015).

The Sustainable Assessment for Carpet (NSF-140) contains a category for post-consumer reclamation and EOL management, but does not require the producer to take back or directly arrange for the collection and recycling of discarded carpets (NSF, 2006).

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The most recent version of the Cradle to Cradle Certified Product Standard includes an externally managed components (EMCs) section that introduces the requirement for components to be returned to suppliers for recycling, but does not specifically require the producers to facilitate this activity.

While EOL management activities are being recognized within product standard and certification programs, few explicitly distinguish between overall recovery efforts and those that are directly facilitated by manufacturers either through regulated EPR efforts or through voluntary initiatives.

Critical to the evaluation of the corporate response to EPR and the embrace of CSR more broadly is the use of standardized reporting tools such as the Global Reporting Initiative (GRI). CSR reporting is almost universally embraced among the largest global firms, with 93 percent of the largest 250 companies engaging in the practice in 2013 (KPMG, 2013). However, as noted by Tate *et al.*, there is little research that directly addresses how CSR reports specifically address SSCM activities (Tate *et al.*, 2010).

The GRI reporting framework is generally considered to be the de facto framework for CSR reporting (Fernandez-Feijoo *et al.*, 2014). As supply chain management is receiving greater attention in CSR activities, the GRI reporting framework is incorporating EPR into the guidelines. For example, the GRI subcategory on product responsibility (G4-E28) is structured for reporting on the percentage of products sold by the firm that are reclaimed either by the firm itself or by actors on behalf of the firm such as PROs. Moreover, this subcategory acknowledges that, for those firms facing legal requirements, this disclosure offer opportunities for market differentiation (GRI, 2013).

Research Methodology for Assessing EPR within CSR Reporting

In order to more fully characterize how EPR specifically, and EOL management of a company's products more broadly, was integrated within a company's CSR profile, it was essential to understand the firm's overall CSR profile.

Several researchers have examined the interface between CSR reporting and green product development. For example, Albino *et al.* utilized the Dow Jones Sustainability Index as the data set for screening companies for green supply chain activities; however, they did not specifically address EOL management activities for products (Albino *et al.*, 2009).

The 2014 Newsweek Green Ranking of the largest publically traded global companies was chosen as the data set for this thesis author's in-depth analysis. These rankings were selected due to the fact that they are (a) international in scope and (b) categorized by industrial sectors and (c) the rankings have been analyzed by researchers such as Lyon and Shimshack (2012) and Wang and Sarkis (2013).

The Newsweek Green Ranking evaluated 500 companies in eight categories including a combined waste and productivity score, but this category does not explicitly address EOL activities for products. The companies were ranked among industry peers in the Global Industry Classification Standard (GICS) to permit comparisons among firms in the same category.

Given that all of the companies in the Newsweek analysis were not subject to an EPR obligation, companies identified as producing a product or utilizing packaging were screened for likelihood of an EPR obligation. The evidence of EPR requirements was determined by analysis of publically available lists of members of EPR organizations and from lists of obligated or registered companies on public authority websites. This resulted in selection of 121 companies for further study.

It is important to note that several companies are subject to EPR requirements for multiple products, for example companies that are required to comply with both the WEEE and Packaging Directives in the EU (Table 1).

Following the identification of companies subject to legal obligations for EPR, the sustainability or CSR reports, published in either 2013 or 2014, as well as information on company websites was screened for statements regarding EPR or EOL management activities.

The reports were analyzed for evidence of the following.

1. *Statement of a preferred policy approach for EPR:* for example, a preference for EPR whereby a producer is responsible for the collection and recycling of its own or similar products placed on the market as opposed to a collective approach with manufacturers fulfilling EPR obligations through a representative organization.

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Product category	Source for identification of regulated firms
WEEE	WEEE Registry (UK) New York State Department of Environmental Conservation
Pharmaceuticals and medical sharps	HealthStewards (Canada)
Packaging	Fost Plus (Belgium) Éco Entreprises Québec (ÉEQ) (Canada)
Packaging and printed paper	Multi-material Stewardship Manitoba (Canada)
Automobiles	BL Sweden
Textiles	Eco TLC (France)
Household hazardous waste	Product Care (Canada)

Table 1. The product category and sources consulted to identify if the firms were subject to EPR regulatory requirements

2. *Reference to a specific goal for EOL management of products:* a quantitative goal to EOL management, which provided metrics and targets that illustrate a firm's commitment to product recovery strategies.
3. *Quantitative assessment of products or materials managed:* a quantitative accounting of EOL management activities, which illustrates that a mechanism was established to measure progress.
4. *Reference to an EOL product collection program such as collection at retail locations:* the institution of EOL collection programs by individual manufacturers is highly individualistic and favors those with a physical infrastructure footprint, such as retail locations.
5. *Design for environment considerations incorporated into the company's product design:* DfE practices are an important metric to indicate that producers acknowledge and are working to minimize downstream impacts of their products.

Results of the Data Analyses

The results of the review of 121 firms that published CSR reports are summarized in Table 2.

The WEEE Directive in the EU was the most commonly cited EPR regulatory instrument, with eight firms specifically referencing the directive. The EU's Directive on End of Life Vehicles was cited in four reports. In two cases, firms reported on the total amount of fees paid to a PRO to comply with an EPR regulation.

Only 14 of the companies identified specific goals for recovery and recycling of products. The goals were expressed using several different methodologies, with numerical targets for products to be recovered based on products placed on the market. In addition to those companies that identified a specific product recovery goal, two firms stated goals for increasing access to recycling opportunities at their firm's locations.

Of the 121 firms analyzed, 25 reported on weight managed through collection activities. The results documented that 35 firms directly facilitated and operated collection programs for their own or similar products. The collection pathways were either through mail-back programs or through retail collection options.

Analysis by Global Industry Classification Standard (GICS) Sector

The GICS sector of information technology, which includes companies in the hardware and equipment, software and services, and semiconductors and semiconductor equipment industries, referenced EPR or EOL management

Total number of firms analyzed	Reference to EPR, participation in a PRO or specific law	Reference to specific EPR policy approach	Reference to specific goal for EOL management of products	Report on weight of used product managed	Reference to EOL product collection program	Reference to Design for the Environment (DfE)
121	25	5	14	25	35	62

Table 2. Summary of review of CSR reports to identify EOL management activities

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activities in their reports to a greater extent than other industry groups. Of the companies in this sector, 17 were subject to EPR requirements for WEEE. However, it is important to note that firms in other GICS sectors, such as industrial or telecommunication services, are also subject to the WEEE requirements.

Of the company reports screened, 62 reports contained a reference to DfE activities as part of their product management activities.

Discussion of the Results of the Data Analysis

The study identified that, of the 500 largest global firms, more than 20 percent were subject to EPR regulations in at least one jurisdiction. This is particularly notable given that several GICS sectors such as financial services and energy that populate the 500 were not engaged in the manufacturing of products or packaging.

However, despite its pervasiveness as an environmental policy tool, EPR is frequently viewed as a legal compliance activity rather than a supply chain management strategy that is designed to help secure commodity supply or as an opportunity to develop customer relationships. The lack of prominence of EOL activities for products within CSR reports may also be representative of the higher priority devoted to other environmental matters, such as climate change, water conservation or internal waste reduction measures.

While CSR reporting by companies has expanded dramatically over the past decade, with 93 percent of the largest 250 global companies publishing such reports, fewer than 50 percent of these reporters provided specific goals or reported on any aspects of supply chain management (KPMG, 2013).

Over half of the companies stated that DfE considerations such as design for recycling energy efficiency or a reduction in packaging use were taken into account when designing products and packaging. This showed that pollution prevention activities are widespread within companies that issue CSR or sustainability reports, and revealed a greater emphasis or competency with intra-firm activities rather than inter-company activities, such as managing products at the EOL.

The lack of acknowledgement of EPR within CSR reporting may be, in many cases, due to a fundamental discomfort with the discourse of regulatory measures within CSR.

Limitations of the Research

The study may not have fully identified all of the those firms in the Newsweek Green Rankings subject to EPR requirements, given that evidence of compliance with an EPR policy may not be readily apparent if the public authority or PRO does not maintain publically available lists of members or registered firms.

Publically available documents may not reflect a particular company's stance on an EPR policy measure in a particular jurisdiction. Also, several companies included in the Newsweek Green Rankings did not publish a sustainability report. Finally, the scope of companies subject to an EPR regulatory requirement is, of course, much broader than those companies included in the Newsweek rankings. Companies that are not in the largest 500 companies or are privately held are excluded, which then precludes several firms that are considered leaders in sustainability from inclusion in the rankings. For example, Interface, Best Buy and Patagonia, firms with demonstrated leadership position in offering EOL collection programs for their products, are not included in the Newsweek rankings.

Recommendations

Supporting the concept of shared value, Porter and Kramer argued that regulatory efforts that stimulate innovation and robust reporting on performance, both of which are objectives of EPR policy, could support a firm's CSR activities (Porter and Kramer, 2011). However, as demonstrated by the data in Table 2, EPR or voluntary product management strategies have yet to be recognized as a core CSR activity by many firms. Many factors contribute to this situation, including the practical and financial challenges associated with product recovery, the perception of products as wastes that remain beyond the boundaries of direct control of the firm, and the higher prioritization of other CSR strategies for issues such as energy and water management and climate change impacts.

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EPR and the Practice of CSR

While the assumption of responsibility for products at the EOL is not yet recognized as a core CSR activity by many firms, opportunities for strengthening the firm–customer relationship exist, and ensuring and maintaining supply chain objectives are additional incentives for firms to be engaged in such activities. These drivers provide opportunities for them to design and implement tools for supporting EOL activities that fall within the broader context of CSR. CSR reporting frameworks such as GRI, for example, are well positioned to assist firms to recognize and quantify EOL management activities, either for those that are imposed by a regulatory mechanism or for those adopted voluntarily.

Product standard and certification programs also present a path for incentivizing and institutionalizing the development of product EOL management initiatives, and in particular those efforts that are implemented by individual firms to reclaim their own products.

EPR Policy Enhancements

Within the EPR policy dialogue, several opportunities exist to optimize the policy choices to more closely align EPR with CSR incentives, motivations and frameworks. EPR, as often implemented, has yet to broadly achieve the actualization of private benefit accruing to individual firms or effectively incentivize individual firm level collection and recycling activities for their products at EOL. It is often suggested that the prevalence of collective models of EPR implementation, while clearly facilitating compliance and offering operational efficiencies, not only fails to result in sufficient financial inducements for firm level DFE activities but also does not spur broader product management approaches such as product service systems or reverse logistics initiatives that more fully integrate EOL activities into a firm's business model.

EPR regulatory mechanisms that stipulate or encourage IPR measures supporting brand specific collection programs could be strengthened and be more broadly applied. By authorizing and, in some cases, incentivizing IPR, firms may have much greater motivation to integrate EPR within their CSR identity and capture the potential benefits of reverse logistics and collection programs for EOL products. IPR is generally assumed to increase EPR program compliance costs due to the implementation of brand identification and segregation activities, or perceived to be more feasible, for example, for those producers that also operate retail locations that can serve as locations for the collection of products (Atasu and Subramanian, 2012). However, several models of the implementation of IPR exist. As van Rossem noted, however, IPR may be implemented in conjunction with a collective organizations to more effectively align financial incentives with product decisions, but also facilitating collection and other activities that may be more accomplished more effectively when addressed in a collective fashion (van Rossem, 2008).

EPR policy can also incorporate the growing emphasis on the reuse and refurbishment for some product categories, as a strategy to not only achieve greater environmental benefits, but also support individual firm level CSR objectives. Regulatory efforts are demonstrated by the reuse targets contained in the EPR program for textiles in France (Palm *et al.*, 2014) or in the case of the EU's End of Life Vehicle Directive (Gerrard and Kandlikar, 2007).

Conclusion

As the concept of the circular economy, as articulated in the EU and in China, becomes more prominent as an operational construct for a firm's product management strategies, EPR offers a pathway for both policymakers and individual firms to implement the concept (Hill, 2014). The EU envisions EPR as a central policy strategy to promote the circular economy concept and may play an increasing role in helping to expand and institutionalize EPR not only in the EU but globally (EC, 2014). If EPR is to fulfill the expectations assigned to it as a strategy that supports SSCM, rather than simply a financing mechanism for municipal waste management, strategies that embed EPR within the broader context of CSR as well as policy approaches that truly promote closed-loop product cycles and economic value need to be elevated within the EPR dialogue.

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Chapter 9: Conclusions, Recommendations, and Topics for Further Research

9.1 Introduction

The inquiry as to how environmental policy, and in the case of this thesis, EPR in particular, can be shaped to effectively and substantively respond to the global challenges of resource constraints, increasing consumption, economic development and social equity is a perpetual necessity. Extended producer responsibility or any single policy approach cannot be expected to achieve the desired outcomes of sustainability but can be viewed as a brick in the path towards that goal. The implementation of EPR in the marketplace continues to evolve as an environmental policy tool that must be responsive to changes in product design, sales and use patterns while also recognizing the changes in the technology and processes to manage products at EOL. The state of constant change and innovation that is inherent with the life-cycle of products and the subsequent appropriate and flexible public policy responses is what renders EPR policy mechanisms, implementation, and results as an engaging topic for examination, and research.

9.2 Contributions of this Thesis

The thesis contributed to the limited but emerging field of research on the application of EPR in the United States. This examination of EPR was important for evaluative purposes that may assist and optimize future EPR developments in the U.S. With the context of the expanding scope of products and producers which are subject to EPR regulatory requirements in the U.S., the analysis may also prove useful for policymakers in other jurisdictions that may be interested in exploring EPR for those products with a record of policy and practice in the U.S.

Building on the evaluative framework employed in Chapter 5 that described the prevailing policy choices and implementation scenarios for EPR in the U.S., Chapter 6 analyzed three strategies to promote the consistency of EPR across states in the U.S. The lack of consistency among jurisdictions is not solely a hallmark of EPR in the U.S., but is also an ongoing challenge in the European Union and Canada as well. The experience in the U.S. and Canada illustrated that EPR policy instruments constructed to support significant engagement of producers in the program design are more likely to exhibit greater consistency across jurisdictions.

The thesis also offered the first attempt at research to characterize the governance of EPR with a particular emphasis on the allocation of responsibilities between producers and governments. This allocation of responsibilities is a prominent, and debated, characteristic of the policy dialogue for the majority of products currently subject to or under consideration for EPR.

With the emergence of sustainable supply chain management of EOL product management strategies within the rubric of CSR objectives, the thesis author addressed to what extent EPR is integrated into the CSR profile of firms. This research not only contributed to a greater understanding of the alignment between EPR and CSR but also underscored that the tools of CSR

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can be fine-tuned to expand the recognition and institutionalization of product management activities.

The thesis author deepened the contextualization of EPR within the theoretical framework of ecological modernization. While EM is most often associated with Europe, the adoption of EPR in the U.S. offers a rich context for examining the application of the theory of EM. For some product categories addressed by EPR in the U.S., most notably WEEE, the degree of implementation flexibility accorded to producers presents a regulatory approach that is in alignment with the framework of EM.

The research findings also suggested that EM could be further strengthened through recognition of the differing roles and motivations of governmental actors at the national, subnational and municipal levels. Existing power structures and interests among state actors may inhibit the embrace of policy and programmatic measures that are demonstrative of EM. As examined in Chapter 7, the effectiveness of EPR is predicated, at least in part, on the governance arrangement of a particular program. However, the allocation of responsibilities between governments and producers varies greatly depending upon the jurisdiction and product category. The roles of municipalities as principal actors in an EPR program in some cases diverge from the intent and stimulus for EPR held by national or subnational government entities and may interfere with EPR achieving the loftier expectations associated with it. Another challenge for deepening EM as a theoretical framework underpinning market-based policy instruments, such as EPR, is an expanded articulation of responsibility for private sector actors.

For EPR, this challenge is particularly relevant within the context of, in some cases, rapid technological advancement of products and materials. Due to technological innovation and intentionality of design, there are clear trends in the marketplace for some products and materials with an environmental footprint that is superior to their predecessors but the collection and processing infrastructure for these materials is sometimes lacking and piecemeal. This signals that opportunity exists for elaboration of EM in the context of technological advancement for new products while simultaneously developing the business models and product recovery infrastructure to accept both the legacy and newer products. This is of particular relevance within the discourse of the circular economy.

9.3 Recommendations

Extended producer responsibility, as an environmental policy approach continues to evolve as it is applied to rapidly changing product designs, emerging new sales channels and expanded product types and to a greater number of jurisdictions. Given this ongoing progression, this thesis researcher developed several recommendations of topics for consideration in the ongoing EPR policy dialogue.

The contextualization of EPR within the concepts of sustainable materials management and the circular economy will enable its further consideration within a broader framework that underscores how materials can be utilized and circulated more productively and sustainably. This

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framework will facilitate an increased emphasis on the how collected materials are managed at EOL to ensure the environmentally sound management of those materials such as the reuse and refurbishment of products. As characterized by Ghisellini et al., the conceptualization and definitions of the circular economy are diverse but many emphasize the reduction of externalities, the promotion of eco-design for products and achieving greater efficiency of materials, all of which align with EPR (Ghisellini et al. 2015). The consideration of EPR within the dialogue on the circular economy that is underway in the European Union, China and elsewhere, established a foundation for this work and set a precedent for other countries to follow. As noted by Hill, the concept of the circular economy is being manifested in several EU initiatives, most notably a package of policy measures introduced by the European Commission (Hill 2015). Of these policy measures, the Commission intends to further strengthen and clarify EPR as it is implemented under the Directives for certain product categories.

As identified in Chapter 5, the lack of consistency across jurisdictions continues to be a challenge of complexity for producers and regulatory entities and, as documented, may inhibit EPR policy from conveying cohesive and consistent signals for DfE and other sustainable supply chain optimization measures. This challenge is particularly acute in jurisdictions, such as the U.S. wherein EPR policy adoption is relegated to the subnational level. Despite the jurisdictional challenges, several product sectors have demonstrated that national regulatory consistency is possible. For EPR consideration in the future, policymakers will benefit from research and analyses that assess the economic and implementation benefits of greater policy consistency as well as the identification and characterization of the elements of an EPR regulatory measure that are of utmost importance for consistent application.

To address the theme of regulatory consistency, the consideration of cooperative regional policy dialogues will be a step towards identifying opportunities to promote consistency of policy measures. For example, building on ongoing cooperative measures on the environment between the U.S., Canada and Mexico could promote strategies for greater consistency of the application of EPR and simultaneously serve the interests of greater North American material recycling infrastructure development and environmentally sound management practices.

9.4 Topics for Further Research

While this thesis author explored several topics within the study of EPR, each is worthy of additional research to further expand the knowledge base for EPR policy design and program implementation. This further research is of particular importance globally as application of EPR continues to expand as an environmental policy tool.

The following topics proposed by this thesis author for further exploration represent both augmenting research based on the foundational research questions addressed in this thesis as well as additional research on the fundamental conceptual underpinnings of EPR.

- 1) It is of paramount importance that additional research and data analyses should be conducted to identify and assess best policy practices to ensure that EPR is implemented more effectively.

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Specifically, a robust economic assessment of the application of EPR will strengthen the comparison with other policy prescriptions and programs that address the environmental impacts of products. As noted by Lifset et al., inadequate data exists regarding the economic efficiency of EPR (Lifset et al. 2013). Such an analysis will contribute to a fuller understanding of how policy choices impact program performance. In particular, assessing the relationship between the outcomes of EPR programs and the various governance structures will enhance the EPR policy dialogue in the U.S. as well as contribute to EPR policy construction in other nations.

2) A research imperative from a broader evaluative perspective is the further investigation and definition of the relationship between EPR and producers' DfE activities. A more thorough definition of the activities associated with the design of products is necessary for a robust understanding of the relationship between EPR and design signals and incentives. For example, dematerialization and the use of post-consumer recycled content are variables that are germane for this analysis. Analyses that employ multi-product approaches and multiple jurisdictions will facilitate a more thorough understanding of which policy approaches provide more effective signals for DfE. As noted in a study of the existing EPR programs in the EU, very few quantifiable targets or indicators regarding eco-design have been developed (BIO by Deloitte 2014).

3) A structured case study research program on firm-level, product management activities, will further the identification and characterization of whether and under what circumstances EPR is influencing supply chain management and customer relationship initiatives to address the EOL management of products. This assessment can augment and further the research on how EOL product management should be strengthened within the discourse and practice of CSR. Such research should be aligned with the emergence of the circular economy framework and the consideration of which policy instruments may be appropriate to implement that broader framework.

4) While the term 'circular economy' embodies a breadth of definitions and actions, these center on a system centered on a cyclical loop approach (Murray et al. 2015). Within the European Union's circular economy policy package introduced in 2015, which recognized the conceptual framework of the circular economy and its linkage with EPR as a supportive policy mechanism, there exist significant opportunities to expand and deepen the research on the interrelationships between the circular economy and EPR as an implementing policy strategy. In particular, this extends to the identification of existing and potential materials loops and the opportunity for reuse, remanufacture and use in the production cycle of products as well as how EPR policy can be structured to promote this reframing of the use of materials.

9.5 Concluding Remarks

Despite its presence on the public policy landscape for more than two decades, EPR is still evolving and maturing as an environmental policy approach. Given EPR's role as a market-based tool that is applied to products and materials that are rapidly changing to meet consumer demands or business imperatives, such evolution is not unexpected. While EPR has resulted in significant

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positive environmental outcomes resulting from the collection and management of products at EOL, the conceptualization of EPR as transformational for product design and delivery has yet to be achieved. This is, due in part, to the policy choices underpinning many of the current EPR programs. However, as broader policy constructs such as the circular economy gain credence, the limits of the global commodity supply and their volatility are recognized and the market for environmentally preferable products expands, the opportunity exists for EPR to serve as an operative tool to extend product lifetime to promote reuse and other strategies to dramatically reduce the environmental impact of products.

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