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E-Waste Management in Ontario: Correcting Past Stumbles with Policy Lessons from the EU

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EXECUTIVE SUMMARY

Electronic waste (e-waste) presents a mounting economic, ecological, geopolitical, and humanitarian problem which will only worsen as electronic devices become increasingly ubiquitous in modern society, and the materials needed to produce them become more scarce. As Canada's largest province, Ontario is well-placed to be a policy leader for e-waste management in Canada. An examination of previous legislative initiatives has shown that early forays were fraught with problems including loose enforcement mechanisms, potential conflict of interest from industry-insiders, and poor communication to the public. While subsequent legislation has corrected these shortcomings, it is observed that even Ontario's latest regulations and sustainability targets fall short when compared to the standards established by the European Union (EU) more than a decade prior. By contrast, the EU has spearheaded a number of policy directives aimed at reducing e-waste and its harmful effects on the environment by setting strict collection, reporting, and recycling targets for producers, banning the use of a variety of hazardous materials used in electronics manufacturing, and compelling manufacturers to adhere to eco-design principles which promote energy efficiency, recyclability, and repairability at the design stage of the product life-cycle. Most recently, as part of their broader transition to a more circular economic model, the EU has passed landmark "right-to-repair" legislation for a number of consumer electronic devices, which extends the useful life of each product covered and ultimately reduces demand for mined raw materials. Thus, the EU has become a world-leader in e-waste management precisely because the EU successfully leveraged its tremendous normative and market power in order to ensure compliance from producers and importers. As such, it is recommended that Ontario legislators take cues from the EU and implement eco-design and right-to-repair legislation in-line with those standards already established by the EU, which precludes the need for Ontario to rely on its comparatively smaller market power in order to achieve the same level of compliance. Moreover, adoption of EU standards would allow Ontarians access to the same sustainably designed goods already widely available in the EU market, and provide much-needed competition within the

Introduction

Electronic devices have become inextricably linked with modern society. From large household appliances to the smallest of gadgets, it is easy to take for granted how much we rely on electronics in our day-to-day lives. However, once these products reach the end of their useful lives, little thought is given to how these items are disposed of. Electronic waste (e-waste) is one of the fastest-growing waste streams globally, and over 90% of e-waste is either discarded in landfills or sent to a developing

nation to be burned or otherwise improperly treated.[2] Moreover, while e-waste represents roughly 2% of solid waste generated worldwide, it also accounts for approximately 70% of all hazardous waste in landfills today.[3] As well, the industrial processes behind the extraction of rare earth elements (REEs) and precious metals are extremely polluting to the environment, which will only increase in severity as global demand for Internet of Things (IoT) and other electronic devices rises. This also presents a number of humanitarian and geopolitical challenges since the vast majority of such mining operations take place in some of the world's poorest nations, which often have a record of human-rights abuses, dangerous working conditions, substandard workers' rights, employ child or slave labour, and often use the funds from the sale of these materials to fund destructive wars or lavish lifestyles for elites within an authoritarian regime.[4] All of the aforementioned challenges will only compound in severity as the global demand for electronic devices increases, and the materials needed for their production become increasingly scarce.

Addressing the negative externalities associated with the generation of e-waste presents a number of challenges for legislators who must constantly navigate a fine balance between what is good for the environment and what is good for the economy. In the long run, global commodities prices for REEs and precious metals are projected to increase as demand for these materials outpaces their supply. Fortunately, economic projections show that if e-waste is recycled properly, not only would global reliance on mined materials decrease, but the economic activities associated with the recycling and recovery process could add an approximate $62.5 billion to the world's economy annually.[5] However, in the short run, recycling e-waste is far too costly, the yields far too low, the range of targeted materials far too narrow, and the environmental impact from the industrial waste byproducts generated during the recycling process are too great to ignore. As well, since much of the world's e-waste is exported to developing countries, recycling has become a source of income in the informal sector, wherein women and children make up approximately 30% of the workforce. This is especially problematic since these vulnerable populations are exposed to a host of toxic chemicals and unsafe working conditions. Studies have shown an increased rate of birth defects, infant mortality, spontaneous miscarriages, still and premature births, and higher rates of cancer among exposed workers.[6] Thus, it is imperative that the world's most developed nations institute policy solutions to the negative externalities associated with e-waste, and not simply rely on existing recycling technologies and processes to improve organically.

As one of the world's wealthiest and most developed countries, and as one of the largest per-capita consumers of electronic devices and therefore producers of e-waste, Canada is well-positioned to tackle the e-waste problem head-on. However, progress on this front has been slow due in-part to one of the quirks of Canadian federalism: whilst the federal government generally has jurisdiction

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[2] World Economic Forum, "A New Circular Vision for Electronics: Time for a Global Reboot." January 2019. Retrieved 10 February 2022, from: https://www3.weforum.org/docs/WEF_A_New_Circular_Vision_for_Electronics.pdf, 9.
[3] *Ibid.*, 7.
[4] *Ibid.*, 11.
[5] *Ibid.*, 15.
[6] *Ibid.,* 13.

over the provinces when it comes to environmental, trade, and import/export policy, they are limited to setting standards and promoting harmonization between provinces; therefore, it is ultimately up to the respective provincial governments to draft, implement, and enforce specific legislation which will bring them into compliance with federal standards.[7] Thus, when federal standards for specific issues are lax (as is the case with e-waste), corresponding legislation at the provincial level (which varies from province to province) is more often than not lax as well. However, this does not preclude the possibility of provinces taking the initiative to craft legislation of their own, so long as it meets or exceeds federal standards (such as programs in Quebec). Thus, for the purposes of this analysis, the discussion will predominantly centre around Ontario, Canada's largest province in terms of population and GDP (and hence, by far the largest producer of e-waste, as just over 43% of all e-waste in Canada is generated in Ontario).[8] As such, the policy recommendations outlined at the end of this paper are intended for the Legislative Assembly of Ontario for three reasons; first, Ontario's Parliament has full jurisdiction over the implementation of constructive e-waste policy and the legal authority to enforce regulations; second, substantive reductions in e-waste in Ontario would have the greatest positive impact on the environment and the economy compared to any of the other provinces in Canada; and third, where Ontario leads, other provinces may follow — Ontario could serve as a valuable case study for other provinces that wish to implement similar legislation.

Background

Legislators in Ontario have long been aware of the negative externalities associated with e-waste, and have been experimenting with a number of policy avenues meant to address the problem. One of the first major initiatives in this regard was O. Reg. 393/04: Waste Electrical and Electronic Equipment (WEEE), introduced as part of the Waste Diversion Act (WDA) in December 2004. WEEE broadly defined e-waste as "a device that is waste, [and] required an electric current to operate." As well, it listed examples of specific devices that adhere to this definition within separate categories of goods, such as household appliances, information technology, audio-visual, and communications equipment, as well as electrically powered tools and navigation instruments.[9] WEEE was expanded in July 2008 to name the Ontario Electronic Stewardship (OES) as the not-for-profit organization responsible for devising a waste diversion program for waste electrical and electronic equipment.[10] Interestingly, the 2008 legislation also determined the necessary qualifications for the OES' board of directors; in addition to being a resident of Canada and at least 18 years of age, an individual may be appointed as a member of the board of directors only if he or she "is a director, officer or employee of a

[7] Schroeder & Schroeder, "White Paper: E-Waste Management in Canada." Retrieved 11 February 2022, from: https://schroeder-inc.com/white-papers/e-waste-management-in-canada/
[8] Statistics Canada, 2021b. Table 38-10-0138-01: Waste materials diverted, by type and by source. Retrieved 27 January 2022, from: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810013801
[9] Government of Ontario, 2004. O. Reg. 393/04: Waste Electrical and Electronic Equipment, under Waste Diversion Act, 2002, S.O. 2002, c. 6. (1.1)
[10] Government of Ontario, 2008. O. Reg. 393/04: Waste Electrical and Electronic Equipment, under Waste Diversion Act, 2002, S.O. 2002, c. 6. (3.1)

corporation that supplies a product from which waste electrical and electronic equipment is derived."[11] In other words, industry insiders were tasked with devising, managing, and administering a waste diversion program for goods which they themselves produced, which presents a potential conflict of interest. Furthermore, an August 2009 revision to WEEE revoked the voting rights of board members appointed directly by the CEO of OES (which did not meet the aforementioned criteria), and barred them from attending board meetings, thus precluding the possibility of outside influence from non-industry figures.[12]

At its core, the WEEE legislation was Ontario's attempt to manage e-waste by adopting a collective extended producer responsibility (EPR) policy framework, which required producers to take financial responsibility for the proper disposal and recycling of their end-of-life (EoL) electronic devices. Ostensibly, the e-waste diversion scheme devised by OES was supposed to be industry-financed, but there were no mechanisms in place to prevent producers from passing on these costs to consumers. As well, it was not adequately communicated to the public whether manufacturers were expected to absorb these costs to begin with. As a result, the environmental handling fees (EHFs) which funded OES operations were implemented in such a way that they appeared as a separate line-item on purchase receipts at the retail-level. Despite the fact that OES claimed that the EHFs were collected from producers, the reality was that consumers were bearing this cost. However, because the flow of funds travelled from consumer to retailer to producer before finally ending up on OES' balance sheet as revenue, it was not entirely untrue to claim that the stewardship program was industry-funded. What is more, even though OES boasted that over 99% of Ontarians had access to an official e-waste drop-off site within a 10km radius of their homes, the success of the program still relied on the prevailing assumption that everyone had access to an automotive vehicle which was suitable for transporting large-screen televisions or printers (two of the most common devices collected). As such, consumers were implicitly asked to sacrifice their own time, effort, and transportation costs — in addition to the EHFs they were already paying at the retail level — in order to more safely and sustainably dispose of their old electronics. One must ask whether it was at all considered to outsource the entire process to the many trained professionals already employed by municipal waste collection services across Ontario; it might have sufficed to have regularly scheduled e-waste pickups on a monthly or even quarterly basis in order to partially alleviate the burden placed on individual Ontarians.

These facets of the program took place much to the benefit of industry, which was successfully able to externalize the cost of recycling and waste-diversion initiatives (such as electronic take-back drives) onto consumers, whilst also engaging in reputational-laundering (otherwise known as "greenwashing") via the perception that they were funding these operations.[13] To compound matters further, press sources failed to disentangle the legal terminology used such that it was abundantly

[11] Government of Ontario, 2008. (7.1)
[12] Government of Ontario, 2009. O. Reg. 393/04: Waste Electrical and Electronic Equipment, under Waste Diversion Act, 2002, S.O. 2002, c. 6. (6.1)
[13] Josh Lepawsky, email message to author, 28 April 2022.

clear to the public that the EHFs were a levy and not another tax on consumer goods.[14] Naturally, this came at the expense of government vis-à-vis negative public perception of the program, despite the fact that EHFs were never collected by government nor incorporated into public revenue streams (although EHFs were still subject to sales taxes). Thus, the collective EPR framework administered by OES was a great success for industry, which was able to divert revenue streams from the public in order to fund recovery and recycling initiatives, whilst bearing none of the costs themselves. All the while, the provincial government was made into a scapegoat for mandating the collection of EHFs, and producers took advantage of the situation by updating their marketing materials to reflect their willing participation in green-initiatives aimed at reducing e-waste.

In addition, a common theme which emerged during the process of compiling research for this document was that it appears as though there is a general lack of transparency on the part of the Ontario Government and the OES in the sense that the documents available to the public are not exactly easily accessible to the average reader. For instance, whilst WEEE, WDA, and subsequent pieces of legislation are published online, the built-in search function on the Government of Ontario website is cumbersome to use and somewhat difficult to navigate if one is new to the user interface. Moreover, the legislation itself is written in such a way that it is rather impenetrable to all but those who are already well-versed in legalese. As well, official communications from the Government of Ontario regarding changes to WEEE or the implementation of the EHFs is decidedly absent. In lieu of this, the public relies on the fourth estate to bridge this gap. However, it was discovered that there was a great deal of contradictory information available to the public via press sources regarding exactly when the EHFs were reintroduced, which products would be subject to the levy, and how the fee varied from product to product. For example, an examination of OES' annual reports indicate that EHFs were collected from 2009 to 2019, and this is corroborated by an article published by *CTV News Toronto* which discloses that the electronics recycling fee was introduced in April 2009. However, it is sorely lacking in details and primarily lists televisions and desktop computers as being subject to the new fee. Granted, the article does mention that there was a provision to extend the fee program to cell phones and other electronics the following year, but does not provide information to consumers regarding exactly which devices would be covered in this definition, nor provide a breakdown of the fee structure.[15]

The Ottawa Citizen, on the other hand, reported that the eco-fee program was introduced on 1 July 2010. The article also omitted mention of OES, reporting instead that the program was overseen by Stewardship Ontario (SO), a not-for-profit organization that works closely with industry to coordinate a variety of recycling initiatives. According to *The Citizen*, the program gave SO the authority to collect EHFs from consumers making purchases of electronic devices at the retail level, which would be charged on a range of products including cell phones and light bulbs. Further, the article omits mention of industry altogether, claiming that the funds were to be collected by retailers on behalf of SO, and then disbursed and used to fund recycling programs at designated non-profit firms. Interestingly, it is also reported that, due to a failure of the Ontario Government and SO to

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[14] *CTV News Toronto*, "Ontario to Put Recycling Fees on Electronics." Retrieved 22 November 2021, from: https://toronto.ctvnews.ca/ontario-to-put-recycling-fee-on-electronics-1.307816

[15] *Ibid.*

embark on a public education campaign to explain the new levy, the program was met with considerable public outcry and largely scrapped less than three weeks later on 20 July. Finally, *The Citizen* claimed that the program was so poorly implemented that it remained unclear how much money was collected in the time that the fees were in effect and what was to be done with the funds in the aftermath.[16] Corroborating information for any of these claims was not forthcoming from any of the sources consulted during the research process.

On a related note, *CBC News* reported that the EHF program was cancelled in 2019 because the fund had generated a surplus of $109.8 million.[17] An analysis of OES' audited financial statements from 2009-2020 has revealed that this statement is misleading: while it is true that the contingency reserve fund had accumulated $109.8 million in 2018 on account of a favourable tax ruling,[18] OES reduced EHFs to $0 on 1 February 2019 due to legislative changes made by the Legislative Assembly of Ontario which made WEEE redundant.[19] As well, in February 2018, OES was directed by the Minister of the Environment to develop a wind-up plan by 31 December 2018, submit it to the Resource Productivity and Recovery Authority (RPRA), and cease all operations by 30 June 2020.[20] However, because the OES was projected to still have surplus funds available by this date, their last day of operations was extended to 31 December 2020.[21] In fact, OES continued to fund recycling operations beyond 31 December 2020 despite the loss of revenue from EHFs by utilizing the rest of the reserve fund as an alternative source of financing.[22] Following this, with the aid of a liquidator from Deloitte Restructuring Inc., the OES was finally dissolved as a corporate entity in accordance with the Corporations Act.[23] However, as a consequence of this lengthy process, there were no fundamental changes to how WEEE was handled until the RPRA took over their mandate on 1 January 2021,[24] by which time a new set of legislation was in full effect.

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[16] Lee Greenberg. "Collected Eco Fees Stuck in Limbo," *The Ottawa Citizen*. Retrieved 22 November 2021, from: https://ottawacitizen.com/news/collected-eco-fees-stuck-in-limbo

[17] Angelina King. "Ontario's New Electronics Recycling Fees Causing Confusion for Some Customers." *CBC News*. Retrieved 23 November 2021, from: https://www.cbc.ca/news/canada/toronto/ontario-s-new-electronics-recycling-fees-confusion-customers-1.5917581

[18] Ontario Electronic Stewardship, 2020. "OES 2019 Annual Report," 36.

[19] Resource Productivity & Recover Authority, 2019. "Electronics Recycling Fee Reduced to $0." Retrieved 1 May 2020, from: https://rpra.ca/2019/02/environmental-recycling-fee-reduced-to-0/

[20] Chris Ballard (Minister of the Environment and Climate Change). Letter dated 8 February 2018 to Glenda Gies (Resource Productivity and Recovery Authority).

[21] Jeff Yurek (Minister of the Environment, Conservation and Parks). Undated letter (presumed May/June 2020) to Nick Aubry (Ontario Electronic Stewardship) and Glenda Gies (Resource Productivity and Recovery Authority).

[22] Ontario Electronic Stewardship, 2021. "Appendix E: 2020 Annual Report," 179.

[23] Deloitte Restructuring Inc. "Insolvencies: Ontario Electronic Stewardship." Retrieved 2 May 2022, from: https://www.insolvencies.deloitte.ca/en-ca/Pages/OntarioElectronicStewardship.aspx?searchpage=Search-Insolvencies.aspx

[24] Ontario Electronic Stewardship, 2019c. "OES Wind Up Plan," 11.

Current Legislation

Despite the inroads made by the OES to divert over 646,000 metric tonnes of e-waste (over the course of ten years) from landfills to recycling and safe-disposal facilities,[25] the various shortcomings described above necessitated serious revisions to Ontario's approach to e-waste management. Thus, as a part of the Waste Diversion Transition Act, 2016 (WDTA), the WEEE legislation which provided OES with its mandate was revoked on 30 November 2016 and superseded by the Resource Recovery and Circular Economy Act, 2016 (RRCEA).[26] The RRCEA created a new legislative framework by which e-waste would be managed in Ontario. One of the key benefits was a gradual transition towards an individual producer responsibly (IPR) framework, within which producers would be under greater pressure to accept responsibility for the life-cycle of their products, implement new waste diversion programs, and meet more stringent recycling targets[27] and other policy objectives that would aid in the transition to a circular economy.[28] This approach differed dramatically from the collective EPR framework administered by OES in that it forced individual firms to take concrete steps towards meeting newly established and steadily increasing sustainability targets. Moreover, RRCEA gave the RPRA a number of legislative tools and enforcement mechanisms in order to ensure that producers were acting in compliance with the legislation,[29] and gave them the power to impose administrative penalties[30] or even fines for non-compliance.[31] As well, in an effort to curb influence from industry insiders, RRCEA mandated that the Director of RPRA and all of the members of the Board of Directors be selected by the Minister for the Environment and Climate Change from a pool of public servants who work for the Ministry. Finally, the legislation made it mandatory for the Ontario Government to publish every new and amended policy statement on its website and in *The Ontario Gazette* well before they came into effect.[32] In sum, RRCEA attempts to correct many of the wrongs of it predecessor, and represents a major leap forward towards sustainability.

In September 2020, Ontario legislators passed O. Reg. 522/20: Electrical and Electronic Equipment (EEE) as a supplement to RRCEA, and came into effect on 1 January 2021. This piece of legislation codifies the responsibilities of producers, refurbishers, and waste collectors and processors with regards to EoL information technology, telecommunications, and audio-visual equipment (ITT/AV) as well as lighting products.[33] Moreover, EEE also targets both rechargeable and primary batteries, and

[25] OES 2021, 162.
[26] Government of Ontario, 2016. O. Reg. 393/04: Waste Electrical and Electronic Equipment, under Waste Diversion Act, 2002, S.O. 2002, c. 6.
[27] OES 2019c, 1.
[28] Government of Ontario, 2021a. Resource Recovery and Circular Economy Act, 2016, S.O. 2016, c. 12, Sched. 1. (2)
[29] *Ibid.,* (76-83)
[30] *Ibid.,* (89)
[31] *Ibid.,* (98.8)
[32] *Ibid.,* (7-8)
[33] Government of Ontario, Ministry of the Environment, Conservation and Parks, 2020b. "Regulations for Recycling of Electrical and Electronic Equipment (EEE) and Batteries under the

the definition used to describe ITT/AV product categories is applied broadly to cover a variety of consumer electronic devices. Interestingly, the legislation does not cover motor vehicles (which are becoming increasingly electrified) or power tools (which often employ high-voltage batteries),[34] which presents an opportunity to amend the legislation in the future as electric vehicles (EVs) gain in popularity amongst consumers. Regardless, EEE requires producers of ITT/AV, lighting, and battery devices to establish a collection system for their products anywhere that they are sold, organize take-back drives,[35] educate the public on the various collection methods offered,[36] and provide consumers with the option to return their EoL devices in the same manner in which they were delivered and at no cost (including packaging materials).[37] In order to ensure compliance with the legislation, EEE requires producers,[38] e-waste processors,[39] and refurbishers[40] to submit detailed annual reports to the RPRA for their review. Moreover, these entities must retain paper or electronic records in Ontario (for auditing purposes) for a period of five years from the date of their creation.[41]

Aside from these and other provisions in the legislation, EEE represents a landmark achievement towards sustainable e-waste management in Ontario via an IPR framework which sets concrete and gradually escalating targets for collection and recycling efficiency rates. For example, for 2021 and 2022, producers of ITT/AV devices are required to collect 55% of the average annual weight of goods supplied throughout Ontario over the last three years. For 2023 and beyond, this target increases by 5% each year until it peaks to 70% in 2025. Similarly, producers of lighting equipment are required to collect 30% from 2023 to 2025, and thereafter the target increases by 10% per year until 2027, for a total of 50%.[42] Moreover, processors of e-waste are obligated to achieve an average recycling efficiency rate (RER) of at least 80% for ITT/AV by 2023, and 50% for lighting equipment by 2025.[43] Finally, battery processors must achieve an average RER of 70% for rechargeable batteries and 80% for primary batteries by 2023.[44] However, despite the progress encapsulated by EEE and RRCEA, Ontario's best efforts are still lagging woefully behind other advanced economies.

Resource Recovery and Circular Economy Act, 2016." Retrieved 29 March 2022, from: https://ero.ontario.ca/notice/019-0048

[34] Government of Ontario, 2020a. O. Reg. 522/20: Electrical and Electronic Equipment, under Resource Recovery and Circular Economy Act, 2016, S.O. 2016, c. 12. (1-2.2)

[35] *Ibid.,* (9)

[36] *Ibid.,* (19.1-19.2)

[37] *Ibid.,* (12.4)

[38] *Ibid.,* (25.1-25.2)

[39] *Ibid.,* (28.1)

[40] *Ibid.,* (29.1)

[41] *Ibid.,* (30)

[42] *Ibid.,* (14)

[43] *Ibid.,* (17.4)

[44] *Ibid.,* (17.5)

Room for Improvement

By contrast, the European Union (EU) has a comparatively long history with e-waste management. Recognizing the problem early on, the EU passed a pair of regulations in 2002 which came into force in 2003. The first regulation was the Waste, Electrical, and Electronic Equipment (WEEE) directive, which gave all manufacturers (including small businesses) five years to organize and finance the treatment, recovery, and disposal of 60-80% of their own waste (depending on the product). As such, any firm that wished to sell their products within the EU market would have needed to provide proof at import that they were in compliance with this regulation, and that they had paid all necessary fees.[45] The second regulation passed was the Restrictions on Hazardous Substances (RoHS) directive, which gave manufacturers five years to completely eliminate heavy metals such as lead, mercury, cadmium, and other toxic substances from their current fabrication processes, and replace them with far less harmful substitutes.[46] RoHS proved to be particularly successful, in part due to the EU's normative power, and in part due to the investment required to re-tool and re-engineer certain production processes, such that RoHS became the de-facto world standard for electronic devices sold on the global market to this very day.[47]

Following the initial success of WEEE and RoHS, in 2009 the EU passed their first iteration of the Eco-Design Directive (2009/125/EC), which established an eco-design framework by which manufacturers of electrically-powered devices are compelled to adhere to if they wished to have access to the European market. For example, manufacturers are required to construct and make available to the public an ecological profile of their products, which considers the various environmental aspects from each stage of a product's life: from raw materials, manufacturing, packaging, distribution, installation, maintenance, and use and end-of-life. Included in this assessment is an evaluation of the energy consumed and expected CO_2 emissions as a result of the production process, as well as the potential for the materials used to be reused, recycled, or recovered. The directive was amended in 2012 to establish targets for energy efficiency which steadily reduced the amount of electricity consumed by 1.5% per year until December 2020, and mandated independent energy audits for large firms beginning in 2016.[48] Concurrently, RoHS was expanded to include three more hazardous materials and reintroduced as RoHS 2 in 2011,[49] and WEEE was recast

[45] Lynn Schenkman, "EU Government to Enforce E-Waste Recycling." Retrieved 16 December 2021, from: https://www.waste360.com/mag/waste_eu_government_enforce

[46] European Commission, "Restriction of Hazardous Substances in Electrical and Electronic Equipment." Retrieved 27 January 2022, from: https://ec.europa.eu/environment/topics/waste-and-recycling/rohs-directive_en

[47] Josh Lepawsky, "Legal Geographies of E-Waste Legislation in Canada and the US: Jurisdiction, Responsibility and the Taboo of Production," *Geoforum* 43 (2012), 1204.

[48] Publications Office of the European Union, 2015. "Eco-Design for Energy-Using Appliances." Retrieved 7 February 2022, from: https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=CELEX:32009L0125

[49] European Parliament, 2011. Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011: "On the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment." *Official Journal of the European Union* 174(1.7)

in 2012 in order to clarify and consolidate the original legislation which had become muddled due to a series of amendments.[50] These efforts were undertaken in conjunction with the 2012 revisions to the Eco-Design directive in order to simplify reporting requirements, acknowledge that these three pieces of legislation work in tandem, and authorize manufacturers which demonstrate compliance to label products with the newly-standardized Conformitè Europëenne (CE) logo.

Most recently, the EU has been working towards enacting comprehensive right-to-repair legislation for consumers of electronic devices. This initiative was first set in motion in 2019 following the successful delivery of all 54 actions recommended by the First Circular Economy Action Plan (FCEAP) drafted by the European Commission in 2015. The FCEAP covered a wide range of measures and concrete actions covering the whole product life-cycle, from production and consumption to EoL waste management, in an effort to "close the loop" and transition Europe away from the traditional "take-make-use-dispose" pattern of commerce and towards a more circular economic model.[51] As such, in March 2019 the European Commission drafted and adopted the New Circular Economy Action Plan (NCEAP)[52] which expanded upon the goals of the FCEAP, and added legally binding provisions to the Eco-Design Directive granting consumers the right to repair their electronic devices (in force as of 1 March 2021).[53] The EU rightly recognized that a serious barrier to sustainability and its overarching goal of a circular economy was premature obsolescence,[54] and thus used its regulatory power to compel manufacturers of washing machines, refrigerators, dishwashers, electric motors, light sources, and LED screens to improve both repairability and service life.[55] Moreover, manufacturers are required to supply spare parts for up to ten years, and they must be designed in such a way that they can be replaced using commonly-available tools.[56] Granted, there is still much room for improvement regarding right-to-repair, since smaller devices such as laptops, cell

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[50] European Parliament, 2012. Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012: "On Waste Electrical and Electronic Equipment (WEEE)." *Official Journal of the European Union* 197(24.7)

[51] European Commission, "First Circular Economy Action Plan." Retrieved 27 January 2022, from: https://ec.europa.eu/environment/topics/circular-economy/first-circular-economy-action-plan_en

[52] European Parliament, 2021. "Circular Economy: MEPs Call for Tighter EU Consumption and Recycling Rules." Retrieved 22 January 2022, from: https://www.europarl.europa.eu/news/en/press-room/20210204IPR97114/circular-economy-meps-call-for-tighter-eu-consumption-and-recycling-rules

[53] Elise Barsch, "Europe's First Repair Legislation is Going into Effect in 2021," *iFixit.com*. Retrieved 3 May 2022, from: https://www.ifixit.com/News/31252/europes-first-repair-legislation-just-went-into-effect

[54] Nikolina Šajn, "Towards a More Sustainable Single Market for Business and Consumers," Prepared for the European Parliament by the European Parliamentary Research Service (EPRS), November 2020, 1.

[55] Tim Schauenberg, "The EU's Home Appliance Problem." *Deutche Welle*. Retrieved 3 May 2022, from: https://beta.dw.com/en/the-eu-declares-war-on-e-waste/a-51108790

[56] Roger Harrabin, "EU Brings in 'Right to Repair' Rules for Appliances." *BBC News*. Retrieved 3 May 2022, from: https://www.bbc.com/news/business-49884827

phones, and small kitchen appliances are not yet covered in the legislation.[57] However, given that large household appliances such as washing machines and refrigerators make up approximately 52.7% of e-waste collected annually in the EU,[58] the right-to-repair provisions within the NCEAP represent a landmark achievement which will significantly improve the useful life of these devices, thus ensuring that fewer REEs are mined in the future.

Right-to-repair is important and significant because it gives consumers agency with regards to the products that they buy — the choice to repair rather than to simply replace. As well, it circumvents what is commonly referred to as the "recycling trap", or the idea that recycling processes will one day become so efficient that they will preclude the need for other sustainability initiatives. The truth of the matter is that the laws of physics guarantee that recycling technologies cannot and will not ever reach the 100% efficiency required to extend our planet's existing supply of REEs to meet the needs of future generations without a significant reduction in living standards. Moreover, even if some future technology enables recycling efficiency rates above 95%, it may still be insufficient to meet future needs, the energy costs and resulting CO_2 emissions may be too great to bear, and it may come too late to make an appreciable difference. As such, right-to-repair legislation provides a clear pathway towards sustainability by ensuring that the products we buy last longer, thus reducing the number that need to be produced, the materials that need to be mined and consumed, and the amount of e-waste that will, despite our best efforts, be improperly disposed of in landfills or illegally shipped to developing nations. However, that is not to say that right-to-repair is without its problems. Currently, there is no framework in place preventing producers from engaging in rent-seeking behaviour by charging exorbitant prices for spare parts, nor from designing devices or parts which fail prematurely (yet still outside the prescribed warranty period) in order to facilitate more frequent repairs. Furthermore, there are no provisions protecting consumer devices from premature obsolescence via forced software or operating system upgrades which introduce software-bloat and resource-intensive features that ultimately lead to a degradation in the user experience by introducing slowdowns or other obstacles to normal enjoyment.

Recommendations & Conclusion

Nonetheless, right-to-repair represents a major step forwards for sustainability and reducing e-waste that is largely achievable in the short term. The province of Ontario is well within its rights, and it falls squarely within its jurisdiction, to enact wide-ranging right-to-repair legislation similar to the EU's either as a separate bill or as an amendment to the Consumer Protection Act. As well, Ontario could borrow other elements from the EU's Eco-Design Directive, such as manufacturer reporting requirements regarding the ecological profile of the products they sell, including an evaluation of how much energy is consumed during product production and transport, and how much CO_2 is

[57] Schauenberg, "The EU's Home Appliance Problem."
[58] European Parliament, 2020. "E-waste in the EU: Fact and Figures (Infographic)." Retrieved 6 May 2022, from: https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93325/e-waste-in-the-eu-facts-and-figures-infographic

emitted. Moreover, if Ontario were to force firms to design products with energy efficiency in mind, via steadily ramping annual targets, it would incentivize producers to invest in miniaturization technology and more effective materials in the electronics which they bring to market. These policy recommendations can be enacted and implemented in such as way as to preclude Ontario from having to rely on its own market power to ensure widespread acceptance and eventual compliance from producing firms; by bringing Ontario's regulatory standards more in line with the EU's, Ontario can successfully leverage the EU's tremendous market and normative power in order to gain access to the same sustainably designed goods already widely available in the EU market. Those producers who are already in compliance with EU regulations would be happy to have access to a new market, and existing producers in the current market would be faced with legitimate competition from more innovative firms, thus encouraging further innovation along sustainable lines. Thus, in the same way that the EU managed to turn RoHS and RoHS 2 into the de-facto world standard, so too can aspects of the Eco-Design Directive in the short term, and NCEAP in the long term. All it would take would be for Canada's largest province to take e-waste management more seriously, and the rest of the provinces would fall in line like dominoes.

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