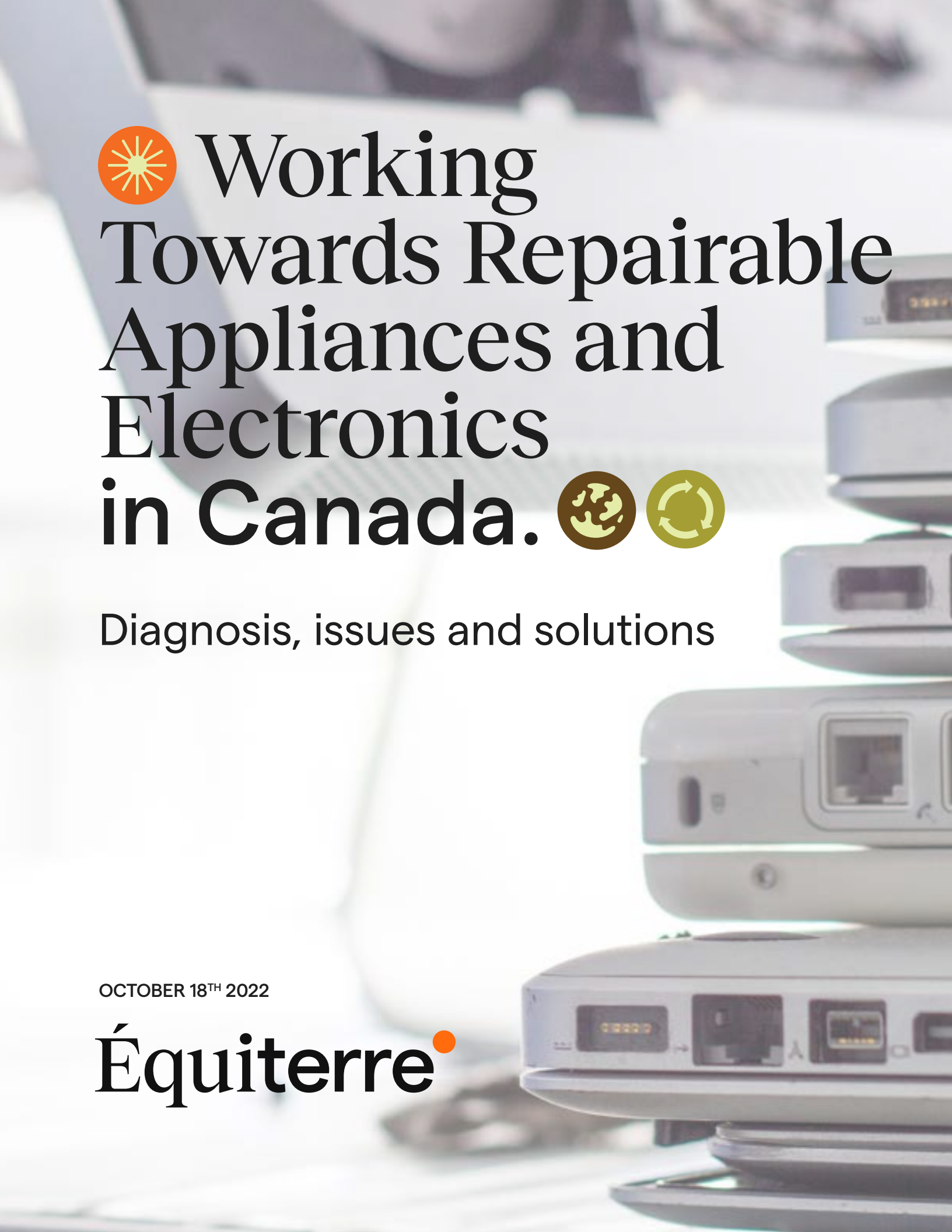
Working Towards Repairable Appliances and Electronics in Canada.

Diagnosis, issues and solutions



OCTOBER 18TH 2022

Équiterre

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FINANCIAL SUPPORT

To carry out this research, Équiterre received funding under the Contributions Program for Non-Profit Consumer and Voluntary Organizations of Innovation, Science and Economic Development Canada. The opinions expressed in this report are not necessarily those of Innovation, Science and Economic Development Canada.

With funding from

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Équiterre also wishes to acknowledge the contribution of RECYC-QUÉBEC in carrying out interviews with Quebec repairers.

RECYC-QUÉBEC
Québec

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List of acronyms and symbols used

AGEC	*Loi anti-gaspillage pour une économie circulaire* [Anti-waste law for a circular economy] [Translation] (France)
CPA	Consumer Protection Act
HAE	Home Appliances and Electronics
EPR	Extended Producer Responsibility
E-Waste	Waste from Electrical and Electronic Equipment
CO_2 eq	Carbon dioxide equivalent
GHG	Greenhouse Gases
kg	Kilogrammes
km	Kilometers
TPM	Technical Protection Measures

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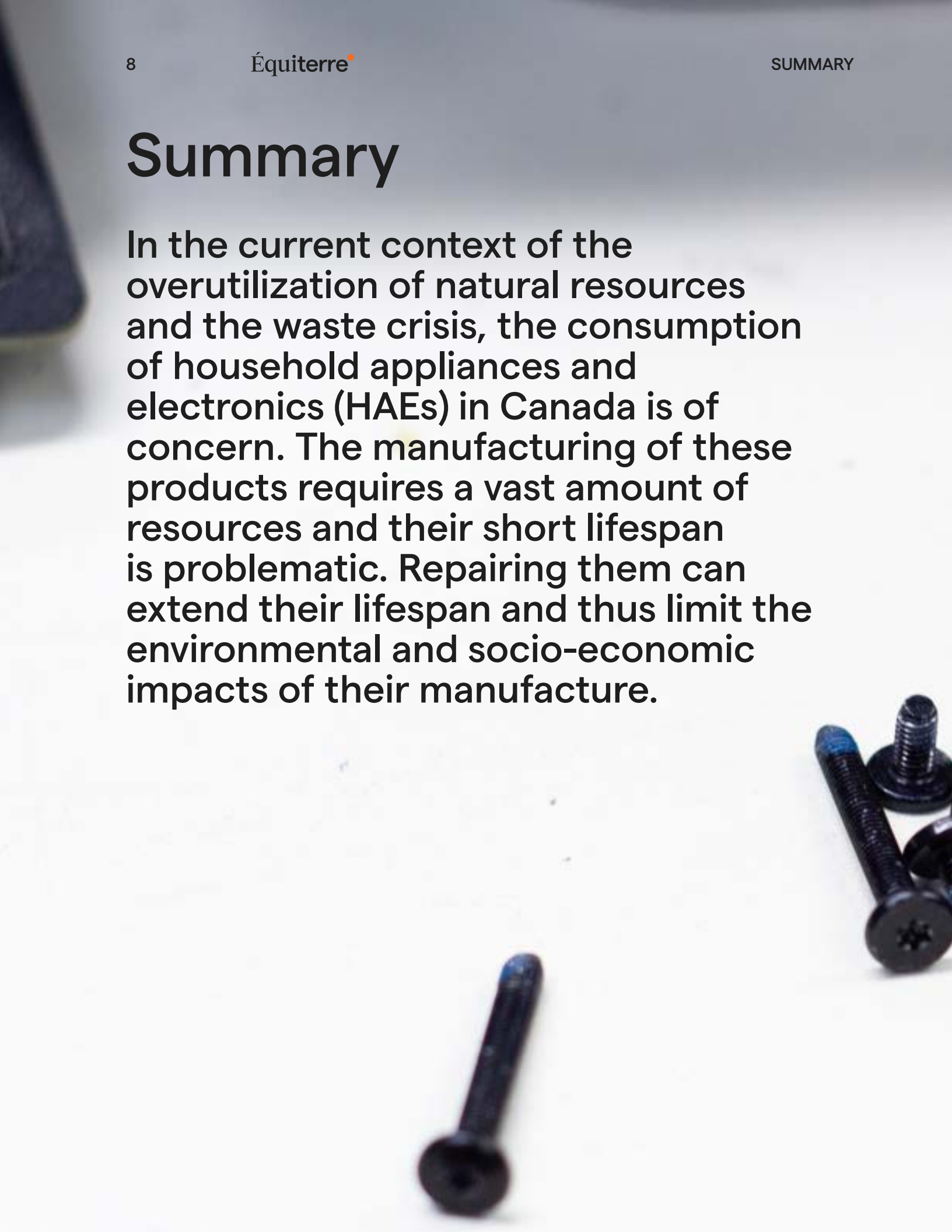
About Équiterre

Équiterre's mission is to work to make tangible, accessible and inspiring steps towards transition to an equitable and environmentally sound future. Between now and 2050, Équiterre's goal is to contribute to the emergence of solutions, the transformation of social norms and the adoption of public policies that will make it possible to establish new principles for how we feed ourselves, how we produce, how we consume and how we get around that are low in carbon, respectful of our ecosystems, in line with social justice, and designed to apply on a territorial and community scale. Recognized for its credibility and pragmatism, Équiterre brings together experts in advocacy, mobilization and public policy. It works to influence the decisions of citizens, organizations and governments in order to accelerate a just and environmentally friendly transition to a more resilient society. It proposes solutions to demonstrate, rally and influence in order to achieve tangible results toward the desired social transformation. Équiterre's expertise, achievements, network and its reach make it a key player in the climate and environmental movement. With 30 years of experience, Équiterre is one of the most influential environmental organizations in Quebec and in Canada, with over 126,000 supporters and 23,000 members.

One of Équiterre's guiding principles is to accelerate the transition to a sustainable and circular economy that focuses on the collective well-being and internalizes the impacts on humans and the environment. Reduction at the source has therefore been identified as one of the organization's priorities in moving towards a more sustainable form of consumption. With this in mind, in 2018 Équiterre conducted the first Canada-wide study on the obsolescence of household appliances and electronics in order to propose alternatives for reducing their consumption and premature replacement. This research identified repair as one promising solution for extending the lifespan of these products, and thereby limiting the resources used to manufacture them.

Summary

In the current context of the overutilization of natural resources and the waste crisis, the consumption of household appliances and electronics (HAEs) in Canada is of concern. The manufacturing of these products requires a vast amount of resources and their short lifespan is problematic. Repairing them can extend their lifespan and thus limit the environmental and socio-economic impacts of their manufacture.



This research examines the barriers and incentives to HAE repair in Canada through a review of the literature, a documentary research, interviews and survey of repairers and consumers, and an analysis of existing legislation.

The key findings from this Canada-wide research are as follows:

→ Just **18.6%** of those surveyed had had their most-recently broken HAE repaired.

→ The primary obstacles perceived by repairers are access to replacement parts and product design. The solutions favoured by these players are regulatory measures governing the right to repair and financial incentives.

→ The two most significant barriers to repair for customers are related to their perception of the irrepairability of products and the cost of repair. The levers considered are also related to these two factors and the responsibility for these actions is shared relatively among manufacturers and/or retailers and governments.

→ Current federal and provincial consumer protection legislation presents numerous barriers to repair, but both can be modified to support this practice.

→ There are several initiatives in various other countries that encourage repair and could be adapted to the Canadian context.

In the light of these findings, a number of recommendations were developed that could support repair in Canada:

→ Governments need to develop a variety of measures, including mechanisms to reduce the cost of repair for the consumer, making it easier to find experts through a directory of repairers, and implementing a mandatory durability index on HAEs. Increasing consumer awareness regarding maintenance, repair and reuse is also essential.

→ The right to repair must be defined and regulated. Certain federal and provincial consumer protection laws need to be amended accordingly.

→ Manufacturers must prioritize ecodesign of their appliances to make them more durable and repairable, and facilitate their repair by ensuring access to parts and manuals.

→ The public needs to prioritize reuse and durability, become informed, maintain their HAEs and, above all, bring back the habit of seeking device repair as part of their everyday habits. They can also engage with stakeholders who are calling for improved access to repair.

Finally, DIY repair is one consumer action lever that should be encouraged and supported, both legally and logistically (such as through access to parts and support for DIY repair activities). Rebuilding repair know-how will help develop a culture of maintenance and repair and help prolong the lifespan of HAEs.

1. Why the interest in Home Appliances and Electronics (HAEs) repair?

The manufacture of home appliances and electronics (HAEs)* generates a number of negative environmental and socio-economic impacts and Canadians are large consumers of these products.

HOME APPLIANCES AND ELECTRONICS (HAE)

A broad range of products equipped with an electrical circuit or components that include a power supply or battery (1). Examples: washing machine, computer, coffee machine, camera, microwave, etc.

Repairing HAEs provides countless benefits to the community, such as savings and the creation of local jobs.

1.1 IMPACTS FROM CONSUMING HAES

Vast amounts of raw natural resources are required to manufacture home appliances and electronics. The total weight of resources required to produce a household appliance is 15 to 100 times greater than its final mass (3). In the case of electronic devices, the total weight of all resources required is 50 to 350

REPAIR

Operation that aims to put a product in working condition for the same function in order to extend its lifespan (2).

* All definitions are also presented in Annex 1.

times greater than that of the final product (4), except for a smartphone, which requires up to 600 times its weight in raw materials (5). This huge demand for raw materials could deplete the reserves of certain critical and strategic minerals used in manufacturing our HAEs by 2050 (6).

The extraction and processing of these resources emits huge amounts of greenhouse gasses (GHGs): these account for between 25% and 50% of all GHGs emitted during the **life cycle** of a household appliance (7) and up to 78% in the case of an electronic device (6). For example, the process of manufacturing a washing machine can emit up to 275 kilograms of **carbon dioxide equivalent** (kg CO_2 eq) (3), or almost as much as a round-trip flight between Winnipeg and Toronto (9). Manufacturing a 30"-49" television screen emits 320 kg of CO_2 eq (10), or as much as a car traveling 1,277 kilometers (km) (11).

LIFE CYCLE

All the stages that a product goes through, from design to disposal (extraction of raw materials, manufacture, transport, purchase, use, repair, refurbishing, recycling, disposal).

The manufacture of HAEs also places pressure on water reserves: 12,760 liters of water, the equivalent of 85 bathtubs, are used to extract the minerals contained in a smartphone. The extraction phase also generates huge amounts of toxic waste, such as acidic wastewater and radioactive tailings. (13)

CARBON DIOXIDE EQUIVALENT (CO_2 EQ.)

A unit of measurement used to compare various greenhouse gas emissions on the basis of their global warming potential. The global warming potential of CO_2 is used as a reference point. For example, according to the Intergovernmental Panel on Climate Change (IPCC), the global warming potential of methane is about 25, while that of CO_2 is about 1, which means that emissions of one million metric tonnes of methane are approximately equivalent to 25 million metric tonnes of CO_2 (12).

In addition, the health of workers in the mining industry is at risk: cobalt levels in their blood have been found to be 43 times higher than normal, and abnormally high levels of radiation and cancer mortality have been seen. Mineral deposits are often controlled by armed groups who do not respect the basic human rights of workers in these mines and who sometimes use forced child labour. (14)

After they are no longer being used, HAEs often end up in landfills and can contain toxic metals that contaminate the environment and threaten human health. **Waste from Electrical and Electronic Equipment (E-Waste)** accounts for 70% of the hazardous waste found in disposal sites worldwide (15). With 20.2 kilograms (kg) of E-Waste generated per person per year, the Canadian population generates almost three times more E-Waste than the global average of 7.3 kg per person (1).

These devices also pose health risks to the workers at recycling facilities: the stripping and sorting of electronic devices can result in significant exposure to toxic, carcinogenic and endocrine-disrupting substances (16).

Finally, given their sometimes high cost, the frequent replacement of HAEs results in financial losses for Canadian households. These expenses have increased over the years: in 2010, the average household spent approximatively $1235 on HAEs, while in 2021 this amount was around $2177 (17). These increasing expenditures contribute to higher debt levels among Canadian households, which have been increasing over the last 20 years (18). HAEs that end up in the landfill also represent a collective financial loss because of the value of the critical rare minerals they contain that are never reused. In 2019, the value of these raw materials contained in E-Waste worldwide was estimated to be US$57 billion (1).

1.2 THE CONSUMPTION OF HAES IN CANADA

WASTE FROM ELECTRICAL AND ELECTRONIC EQUIPMENT (E-WASTE)

Waste from six product categories, i.e. cooling and freezing equipment, monitors and screens, lamps, large electrical appliances, small electrical appliances and small information technology and telecommunications equipment (1).

These products are very popular with Canadians, exacerbating the environmental and socio-economic consequences of their production. In 2019, 891 kilotonnes of HAEs were sold in Canada, which is equivalent to 23.8 kg per person or the weight of 88 Eiffel Towers, while the average in North America was 16.5 kg per person and 18.4 kg per person in Europe (19). Table 1 shows the consumption of these devices in Canada.

According to the 2018 Equiterre study, just 11% of Canadians surveyed had not purchased a new HAE, and most bought between one and two. These findings indicate a high acquisition rate for HAEs in Canada. In 2018, the most commonly purchased appliances were vacuum cleaners, coffee/espresso makers, toasters, microwaves and blenders. On the electronics side, the most purchased in Canada were smartphones, laptops, headphones, televisions and smart tablets. (20)

Few Canadians keep their HAEs for as long as the **lifespan** that they believe is reasonable, and this is especially true for electronic devices. For example, according to the 2018 Équiterre study, consumers felt that the reasonable lifespan of an appliance was 10 years, but only 15% of respondents had kept their old appliances beyond that length of time. In order of importance, the reasons for replacing an aging device are linked to three types of **obsolescence: economic, psychological and technological**. (20)

Table 1. Number of HAEs purchased by Canadians in 2016-2018 according to a Canada-wide study (20)

	None	1-2 devices	3-5 devices	5 devices or more
Home Appliance	16 %	35 %	30 %	19 %
Electronic Device	17 %	49 %	23 %	12 %[1]

Source : Équiterre 2018.

LIFESPAN

The period between the time a product is released from manufacture and when it becomes unusable. A distinction is made between a product's useful life, i.e. the period during which it is used, is in working order and is ready for use. (21 and 22) Accordingly, the lifespan of a product may not have been reached when the owner stops using it.

Repairing HAEs is still uncommon for most Canadians. In 2018, only 19% had a home appliance repaired, while 26% had an electronic device repaired (20). In 2019, three-quarters of respondents to a survey said they had replaced or stopped using an item that needed repair (23).

1. The total works out to 101% due to rounding.

OBSOLESCENCE

Premature depreciation of an item. There are several types of obsolescence:

- → **economic** obsolescence, which is a function of a product's quality/price ratio, its price reduction or the cost of repairs.
- → **planned** obsolescence, which is a deliberate strategy on the part of manufacturers to shorten the lifespan of a product.
- → **psychological** or **aesthetic** obsolescence, which is linked to image and the changing needs of consumers. This perception is partly influenced by advertising.
- → **functional** or t**echnological** obsolescence, which is linked to improvements in product features. For example, software obsolescence - which is related to the unavailability or malfunction of software - is a form of **technological obsolescence**.

Obsolescence can be absolute - if the product stops working - or relative - if the product still works.

1.3 THE IMPORTANCE OF REPAIR AS A CIRCULAR ECONOMY STRATEGY

In its 2018 study titled "Obsolescence of Home Appliances and Electronics: What is the role of the consumer?" Équiterre identified the repair of HAEs as one promising solution for combating obsolescence and mitigating the impacts arising from the use of such appliances. Repair fits well within the **circular economy** model rather than the **linear economy.** Figure 1 shows these various circular strategies within a hierarchical approach.

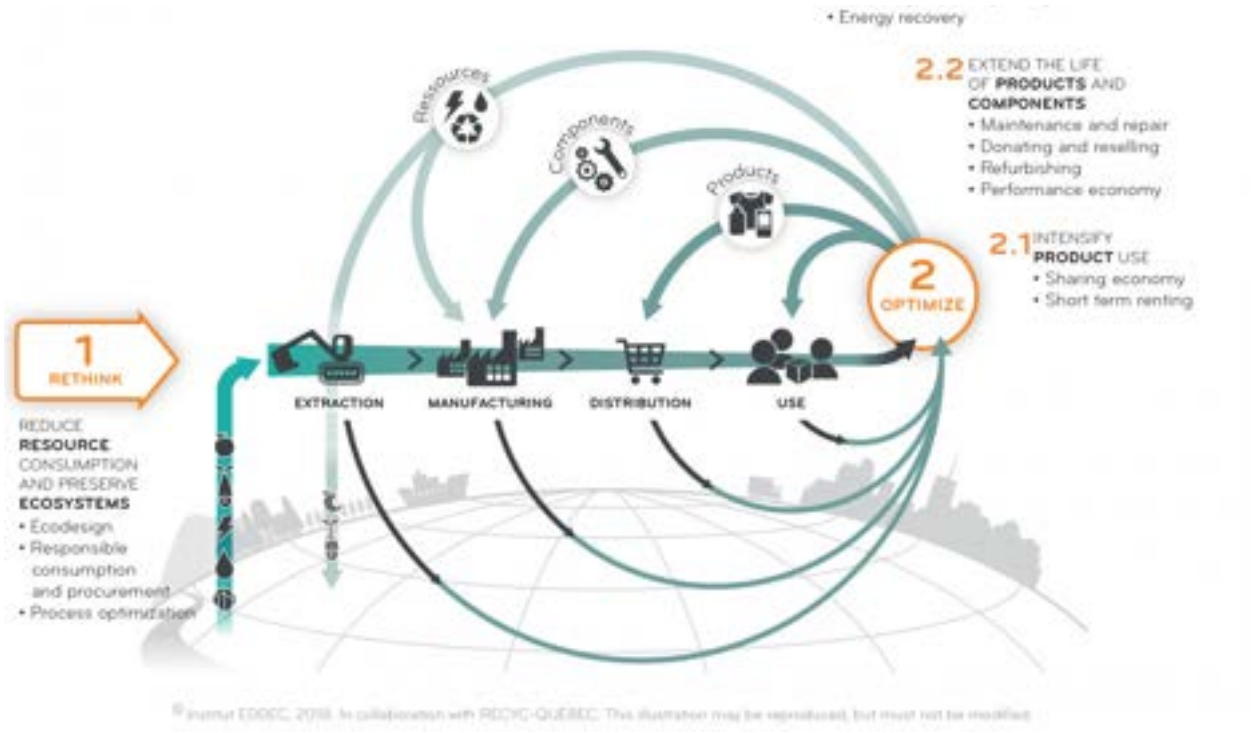
CIRCULAR ECONOMY

System of production, exchange and consumption designed to optimize the use of resources at all stages of a product's life cycle, while reducing its environmental footprint and contributing to the well-being of individuals and communities (24).

LINEAR ECONOMY

An economic model whereby the raw materials necessary for production are extracted, then transformed, consumed and finally disposed of (24).

Figure 1. Circular economy diagram (26)



The first strategies to be prioritized in this circular model are to "rethink" (1), notably through **ecodesign**, in order to reduce the amount of primary resources that are being used. Given the current intensification of resource consumption, the circular economy advocates a **reduction at the source** of the amount of resources being extracted. Strategies to "optimize" (2) by intensifying product use (2.1) or by extending their lifespan (2.2) are then favoured. Repair is part of this circular economy strategy. By extending the life of a product, repair reduces the consumption of material and energy resources inherent in its manufacture as well as the production of waste. Finally, the means of giving new life to resources (2.3) are the last strategies of this economic model.

ECODESIGN

A product design strategy where potential environmental impacts of a product's all life cycle are taken into account by seeking to minimize them (27).

REDUCTION AT THE SOURCE

Action that prevents or reduces the generation of waste during the design, manufacture, distribution and use of a product (24).

Although Canadians do not often choose to repair their HAEs, 75% support legislation that promotes the **right to repair** (23) and more and more people are trying to repair their devices. In addition, there have been numerous recent initiatives across Canada in support of repair. A number of British Columbia municipalities have joined together to call for a right to repair at the provincial level, and bills in support of this right have been introduced in Quebec, Ontario, Manitoba and at the federal level. More and more online tools facilitating **DIY repair** have been developed and repair workshops have also multiplied: the number of Repair Cafés in Canada increased from 15 to over 50 between 2016 and 2022 (28 and 29).

RIGHT TO REPAIR

The right to have items repaired or to repair them oneself, within a short time and at reasonable cost. It generally requires the implementation of regulations requiring manufacturers to design their products to be repairable and to make available, for a specified period of time, the manuals, diagrams, parts, software and tools needed to carry out repairs at a reasonable cost.

DIY REPAIR

The act of repairing a defective device oneself. It can be done in repair shops or using online resources. It can also be called "self-repair".

1.4 THE BENEFITS OF EXTENDING THE LIFESPAN OF HAES AND OF REPAIR

According to a study done in France, a household that extends the **useful life** of 11 appliances (television, computer, smartphone, printer, washing machine, dryer, refrigerator, dishwasher, oven, microwave and vacuum cleaner) by one year would avoid emitting 184 kg of CO_2 eq. (30), or almost as much as a round trip flight between Québec City and Toronto (9). An extension of two years would avoid emitting 374 kg of CO_2 eq. (30), which would be equivalent to 1,493 km driven by car (11).

USEFUL LIFE

The period during which a product is used, is in working order and is ready for use. (21 and 22)

Buying a **refurbished** smartphone would have an environmental impact between 77% and 91% smaller than buying a new device, would avoid the extraction of 82 kg of resources and the emission of 23 kg of GHGs over one year (31). Using a tablet or computer for four years instead of two would improve its environmental impact by 50% (4). In Canada, the entire

HAE repair sector prevents the emission of 364 kilotonnes of CO_2 eq. per year (33).

REFURBISHING

Returning a product or component to new condition with a warranty equivalent or close to that of new (32). Complete reconditioning typically includes collection, data erasure (in the case of electronics) and upgrading, followed by repairs to restore functionality and, lastly, cosmetic touch-up (33).

Repair and maintenance can also be cost-saving for households in the long run. In France, a study concluded that a household that extends the useful life of the 11 items listed above by one year would save the equivalent of CAN$1,350. The savings from a two-year extension would be $2,170 and for three years, $2,790. (30) One american study found that using the repair option could reduce household spending on HAEs by 22%, saving a household approximately US$330 per year (34).

The repair sector has significantly greater potential for local job creation than other waste management sectors. Table 2 shows the results of a study carried out in 16 European countries, indicating the number of jobs created based on the intended use of items and the way they are managed (repair, recycling, refurbishment or disposal).

Data provided by members of the European RREUSE network highlight even greater job creation. In fact, preparation for reuse - including the collection, storage, repair and sale of appliances - creates between 60 and 140 jobs per 1,000 tonnes of HAEs collected. The

Table 2. Job creation by sector per 1,000 tonnes of materials (35)

Sector	Average Number of Jobs Created per 1,000 tonnes
Repair	40.4
Recycling	11.5
Refurbishment	5.5
Disposal	0.2

Source : Gaïa 2021.

job intensity per 1,000 tonnes is greater for electronics than for household appliances because of the relative difference in weight between these product categories. (36)

One 2019 Canadian study found that there were an estimated 3,300 jobs involved in the reuse, repair, refurbishment and remanufacturing of household appliances. In the case of electronics, these same activities generated between 3,800 and 3,900 jobs. According to this study, employment in these two sectors could reach between 11,400 and 18,400 jobs in 2030. (33)

Finally, improved access to repair could also benefit various marginalized groups living in precarious circumstances or subject to discrimination (social, racial, sexual, etc.). For example, in the United States, many independent repair businesses are owned by people from racialized or ethnoculturally diverse communities. Low-income households would also benefit from improved access to this type of service, as they are more likely to turn to repair. (37)

The significant gap observed between the limited use of HAE repair by Canadians and the growing popularity of repair as well as its potential benefits has prompted Équiterre to undertake an examination of access to HAE repair in Canada.

2. Research question, objectives and methodology

The purpose of this research undertaken by Équiterre is to address the following question: What levers and tools - economic, political and legislative - could Canada and its provinces adopt to encourage and facilitate the repair of HAEs?

The study's objectives are to:

- → Establish a better understanding of the issues related to repair in Canada;
- → Better document the constraints and barriers to repair for repairers and consumers;
- → Propose measures promoting repair appropriate to Canada; and
- → Inform governments of the proposed measures.

To accomplish this, a review of the literature was carried out to identify the impediments and incentives to repair in Canada and elsewhere, along with an analysis of measures being used around the world to promote repair. Interviews and a survey were conducted with repairers in Quebec and British Columbia, since these two provinces have been more proactive than others around the right to repair. A survey and interviews with consumers in Canada were also completed. Finally, an analysis of the Canadian legislative context was conducted. To explore the issues experienced by Indigenous peoples in Canada as they relate to the repair of HAEs and to take these into account when making recommendations to governments, three meetings with five Indigenous communities and Northern villages in Quebec were held. A summary of the various research phases is shown in Table 3.

Table 3. Summary of the methodology used in each phase of the research

Research Method	Details of the methodology used
Review of the literature	⊕ A selection of 99 recent relevant academic papers (2011-2021) in various disciplines: design, environment, law, engineering, economics and consumer science, etc.
Survey and analysis of structural measures from around the world designed to promote repair	⊕ Non-academic documentary research on different measures (political, legal, commercial, citizen, etc.): newspaper articles, government and legislative documents, reports and websites of organizations, companies, citizen groups or bodies, scientific articles, etc.
Interviews with Quebec-based repairers[2]	⊕ 30 semi-structured interviews held in October and November 2021 → 13 repairers of household appliances and 17 of electronic devices → 23 individuals working in an urban setting and 7 in a regional/rural setting
Survey of BC-based repairers	⊕ 19 repairers surveyed in January and February 2022 → 7 repairers of household appliances, 10 of electronic devices and 2 individuals working on both categories → 1 person working in a regional/rural setting and 18 in an urban setting
Cross-Canada consumer survey	⊕ Online survey of 2,080 Canadians conducted in November 2021 ⊕ Application of criteria to ensure a representative sample of the Canadian population: age, gender, language, province, education, income, household size, occupation, civil status, place of birth and ownership status

2. The full report of the interviews conducted in Quebec can be viewed here (only available in French).

Consumer interviews	⊕ Recruitment of survey participants via a question on their interest in being interviewed ⊕ Selection of 25 individuals using criteria designed to provide a representative sample of the Canadian population: age, gender, language, province, education, income, household size, occupation, civil status, place of birth and ownership status ⊕ Semi-structured interviews held in February 2022
Analysis of legislation	⊕ Approach based on Alexandre Flückiger's material logistic theory ⊕ Exhaustive survey and research of international legislation on the right to repair—from Quebec, British Columbia, Canada, Europe and the United States ⊕ Discussions with various stakeholders involved in the right to repair ⊕ Participation in a webinar on the right to repair ⊕ Identified measures of interest to Canada and the provinces

The most significant limitations on this research were as follows:

- → The interviews with repairers included only individuals working in repair businesses, thereby excluding other players in the field (DIY repairers and DIY repair workshops, work placement businesses or organizations, spare parts stores, manufacturers, etc.);
- → Only two provinces were studied as part of the interviews with repairers;
- → The cross-Canada survey was conducted during the COVID-19 pandemic, which may have influenced the results (e.g. changes in buying patterns and household spending).

Details of the methodology of each of the research phases and their specific limitations are presented in Annex 2.

3. Results

The following sections provide the results of the various research methods, beginning with a review of the literature and existing measures in other countries, followed by the perspective of repairers and consumers, and ending with an analysis of existing legislation. A summary of the discussions with the Indigenous communities and Northern villages is presented in Annex 3.

3.1 REVIEW OF THE LITERATURE AND STRUCTURAL MEASURES IN SUPPORT OF REPAIR

A myriad of obstacles can make repairing HAEs difficult, and consumer attempts to have a product repaired can meet barriers at various points throughout the process. Some of these difficulties are caused by the individuals themselves, others are linked to practices of repairers or manufacturers, and a number of obstacles stem from a lack of action on the part of governments. However, the literature does indicate various incentives that can be applied by these same players to counteract these barriers to the repair of HAEs.

The obstacles identified in the literature are presented in the next section. They have been classified into six categories and are complemented by examples of incentives and structural measures to promote the repair of HAEs (political, legal, business, citizen, etc.). The details of these various measures and an analysis of their impact are presented in Annex 4. The resources consulted for these two stages of the research are listed in Annexes 5 and 6.

3.1.1 Cost of repair

The inexpensive price of a new product, compared with the cost to repair: The cost of some entry-level products can be less than the cost of repairing them. In order to meet the demand for more affordable goods, manufacturers use cheap materials and parts. Manufacturing costs and the cost of off-shore labor to produce these HAEs can thus be less than the cost of repair in Canada (e.g. wages and parts). Buying a new appliance may therefore seem more attractive than repairing a defective one, even though this type of product will need to be replaced more often in the long run, resulting in higher expenses for the consumer. For example, in France, a study shows that consumers choose repair if the cost is not more than 30% to 50% of the cost of buying new (38).

→ Levers
✓ Examples of structural initiatives

→ **Reduce or eliminate taxes on repair services**

→ **Establish consumer subsidies to support the repair of HAEs**

✓ In Europe, several countries, cities and states or provinces offer subsidies to cover part of the costs of repairing certain HAEs. France has established an industry-financed repair fund (Annex 4 - Measure 1).

✓ DIY repair facilities and workshops can help lower repair costs for consumers when they take advantage of the help and expertise of volunteers (Annex 4 - Measure 2).

Uncertainty regarding the final repair cost: Repair costs vary and are difficult to assess before a repair is made. For example, the cost of spare parts can vary greatly. There are also non-financial costs, such as shipping to the repair site and waiting time.

→ Levers
✓ Examples of structural initiatives

→ **Set a maximum price on replacement parts, tools and repair manuals and/or repair activities.**

✓ The European Union stipulates that fees charged for access to repair manuals must be reasonable and proportional (Annex 4 - Measure 3).

✓ *Groupe SEB* offers fixed-price repair packages and sells parts at cost (Annex 4 - Measure 4).

3.1.2 Consumer behaviours and concerns

Psychological obsolescence: A type of obsolescence where consumers are eager to own the newest and most innovative product, even though their existing product still works. This desire is influenced, among other things, by marketing and certain other business practices, such as the routine replacement of a product with a new one rather than repairing it.

→ **Levers**
✓ **Examples of structural initiatives**

→ **Communicate the negative impacts of HAE consumption and the benefits of repair**

✓ The French government has developed an awareness campaign to inform the public of repair and reuse possibilities available under the new Anti-waste law for a circular economy (AGEC) that was passed in 2020. The campaign includes public service announcements and a website to provide information to the public (Annex 4- Measure 10).

✓ Fairphone has a number of resources on its website to inform the public of the impacts associated with the manufacture of smartphones (Annex 4 - Measure 5).

→ **Limit the amount of advertising or regulate its content**

→ **Require manufacturers to prioritize repair over replacement**

Practices that shorten product life : Maintenance, proper use and compliance with instructions for product use are not always followed by the owner, and this can accelerate the deterioration of goods, shorten their lifespan and make repairs more difficult.

→ **Levers**
✓ **Examples of structural initiatives**

→ **Develop design strategies that will help facilitate maintenance**

✓ Companies such as *Groupe SEB*, Fairphone and Framework offer products that can be easily disassembled, making them easier to maintain (Annex 4 - Measures 4, 5 and 6).

→ **Educate the public on the importance of maintaining their appliances**

✓ Online resources such as IFixit and Youtube offer a number of tutorials on how to properly maintain various appliances. The Quebec magazine *Protégez-Vous* in partnership with *RECYC-QUÉBEC* has published a guide: "*100 trucs pour faire durer vos appareils domestiques*" (only available in French) aimed at the general public. Insertech Angus has also published a guide on how to maintain your computer (Annex 4 - Measure 7).

✓ DIY repair facilities and workshops help educate consumers on the proper maintenance of their HAEs (Annex 4 - Measure 2).

Lack of trust in the act of repair and in repair professionals : The short warranty period on repairs can make people reluctant to have their HAEs repaired. For example, in Quebec, warranties on HAE repairs are for three months, and only cover repairs costing $50 or more.

→ **Levers**
Examples of structural initiatives

→ **Promote and enhance the repair sector**

"*Répar'acteurs,*" the French national directory, provides a listing of repair companies that have met certain criteria. The Austrian cities of Graz and Vienna also have similar directories where companies are verified against certain criteria (Annex 4 - Measure 8).

→ **Extend the warranty on repairs**

French law (AGEC) requires that a product repaired under the **legal warranty** receive a six-month extension of the warranty (Annex 4 - Measure 9). *Groupe SEB* offers the same extended warranty on repaired products (Annex 4 - Measure 4).

LEGAL WARRANTY

The minimum protection provided by law and automatically applicable on the purchase of an item. It provides for a refund or replacement of the item if it is not of good quality, durable, safe or if it fails to meet the expectations created by the seller's representations. It also protects against hidden defects. (39)

Uncertain repair times: The time it takes to have repairs done or obtain spare parts is uncertain and can be long, preventing the owner of the goods from being able to use them during that time.

→ **Levers**
Examples of structural initiatives

→ **Limit repair and/or spare parts delivery times**

France and the European Union limit the delivery time for parts of some HAEs to 15 days (Annex 4 - Measures 3 and 9). Three U.S. states also have limits on these times (Annex 4 - Measure 10). *Groupe SEB* and Fairphone limit delivery times to a few days (Annex 4 - Measures 4 and 5).

→ **Implement courtesy loans or equipment rental systems**

3.1.3 Access to information for consumers

Difficulty finding a repair specialist : The search for a qualified repairer can be a barrier to having something repaired because of the lack of visibility of repair services and facilities and the lack of information about how well they are rated by customers.

→ Levers
✓ Examples of structural initiatives

→ **Create a directory of repair businesses**

✓ France's national directory, known as *Répar'acteurs*, lists repair companies that have met a number of specific criteria. In Austria, the cities of Graz and Vienna also have similar directories, which are verified against specific criteria (Annex 4 - Measure 8).

✓ In Quebec, there are a number of regional listings of repair shops and the magazine *Protégez-Vous* has published a map f appliance, air conditioning and electronic repair businesses. *The Corporation des Techniciens en Électroménagers du Québec* has a list of its members on its website and *Élexpertise* has a list of certified appliances repair companies (Annex 4 - Measure 9).

✓ In British Columbia, Metro Vancouver also has an online directory of repair businesses and DIY repair workshops for a variety of products, including HAEs (Annex 4 - Measure 9).

Lack of available information on the **repairability** or **durability** of HAEs at the time of purchase: Information on the energy and technological performance of appliances is provided at the time of purchase, but little or no information is provided on their repairability or durability.

+ REPAIRABILITY
Characteristics of a product that can be repaired relatively easily.

+ DURABILITY
The quality of a product that has a long lifespan, in order to optimize the use of resources that are used to produce it.

→ Levers
✓ Examples of structural initiatives

→ **Develop a repairability and/or durability index**

✓ In France, the law requires that a repairability index be displayed for five product categories. Effective November 4 2022, it will be extended to four more product categories. A durability index will be required starting in 2024 (Annex 4 - Measure 10).

✓ In Québec, *Protégez-Vous*, in partnership with *RECYC-QUÉBEC*, has developed a repairability rating.

✓ The website IFixit gives a repairability mark for three product categories and provides a number of main-

tenance tutorials (Annex 4 - Measure 7).

→ **Educate the public on the importance of proper maintenance and the need to follow operating instructions in order to ensure that their appliances will continue to last**

The "*100 trucs pour faire durer vos appareils domestiques*" guide (only available in French) from *Protégez-Vous* and *RECYC-QUÉBEC* is helpful in informing consumers on how to maintain and clean their appliances, as well as Insertech Angus' guide to computer maintenance (Annex 4 - Measure 7).

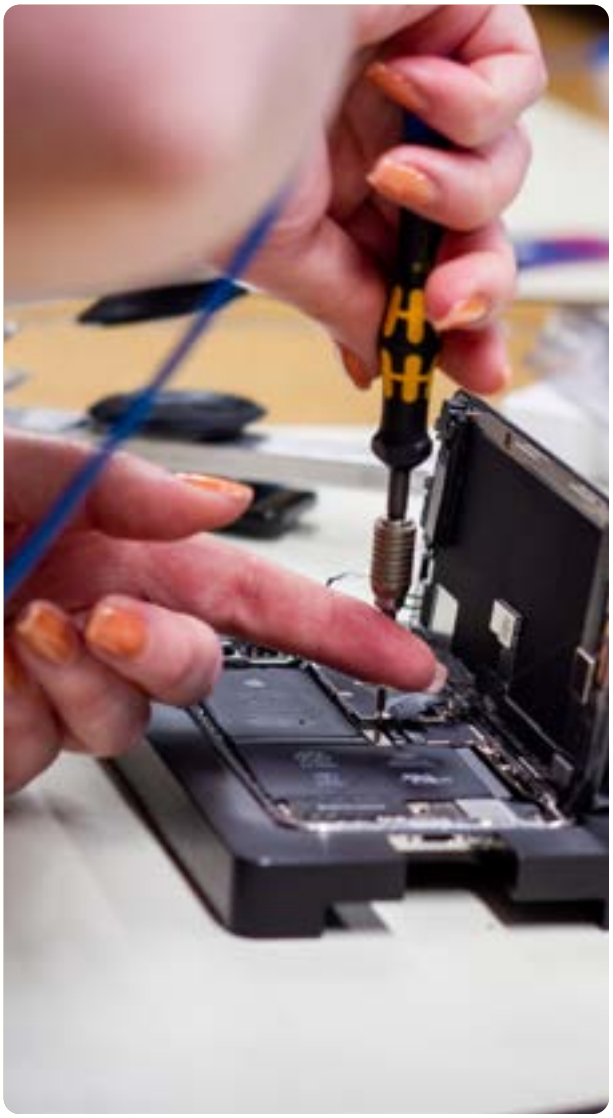
3.1.4 Access to equipment needed to perform repairs

Problems accessing replacement parts, schematics, manuals, software, hardware and proprietary tools: Manufacturers are not compelled to make these components available and may not have the resources to produce and warehouse them. Even when these components are available, access may be restricted to selected repairers and they may be removed from the market if the product is discontinued.

Copyright and patent legislation and licensing agreements may also limit access to parts. A number of actions are prohibited, such as reproducing original parts, circumventing software or **technical protection measures (TPMs)**, modifying or disassembling a product, etc.

TECHNOLOGICAL PROTECTION MEASURES (TPM)

A set of processes put into place on a product that are designed to reduce copyright infringement. They use different types of technology to control access to copyrighted digital content or prevent users from copying or sharing it.



→ **Levers**
✓ **Examples of structural initiatives**

→ **Develop products that are designed to be easily repairable using commonly available tools (e.g. Phillips screwdriver)**

✓ *Groupe SEB*, Fairphone and Framework provide disassembly instructions and sell various spare parts (Annex 4 - Measures 4, 5 and 6). IFixit sells parts from numerous brands and publishes repair diagrams and manuals (Annex 4 - Measure 7).

→ **Amend legislation to limit restrictions on repairs that protect intellectual property**

✓ In France, there is legislation that allows the use of 3D printing while protecting the manufacturers' intellectual property rights (annex 4 - measure 10).

→ **Amend legislation to require availability of the necessary repair components**

✓ The French legislation prohibits practices that prevent repair or limit the access of independent businesses to certain parts essential for repair. Certain parts must remain available for at least five years and information on their availability/non-availability must be displayed at the point of sale (Annex 4 - Measure 10).

✓ For five HAE categories, the European Union requires that parts be available for 7 or 10 years after a product enters the market and that they can be replaced using commonly available tools (Annex 4 - Measure 3). Three U.S. states have rules requiring the availability of certain parts (between three and seven years) (Annex 4 - Measure 11). In Europe and in some of these U.S. states, certain essential elements, such as repair manuals, must be available to independent businesses (Annex 4 - Measures 3 and 11).

✓ New York State is the first U.S. state to have passed a right to repair law. It requires electronics manufacturers to make the documentation, parts and tools needed for diagnosis, maintenance and repair available to independent repairers and consumers (Annex 4 - Measure 12).

✓ Some DIY repair facilities have 3D printers to reproduce parts for the repair an AEE (Annex 4 - Measure 2). Tool libraries have tools for rent that may be useful in making repairs (Annex 4 - Measure 13).

Reluctance on the part of repairers to install used replacement parts: Some repairers are reluctant to install parts that have been previously used. But this could facilitate access to the necessary parts and reduce the time and cost of repairs. They do not want to be held responsible for potential problems arising out of the use of these parts.

→ **Levers**
✓ **Examples of structural initiatives**

✓ In the case of certain products, French law (AGEC) requires repairers to offer used or refurbished parts (Annex 4 - Measure 10).

✓ Murfy, a French repair company, offers its customers the option of choosing used spare parts at a lower price and with a six-month guarantee (Annex 4 - Measure 14).

3.1.5 Product design

Technological or functional obsolescence: This refers to the premature end of life of a product due to its technological performance (slow operation, poor battery performance, graphic quality, technological incompatibility, etc.). The problem is exacerbated by the marketing of new devices that are ever more advanced and can therefore contribute to psychological obsolescence in the eyes of consumers.

→ **Levers**
✓ **Examples of structural initiatives**

→ **Develop products that are easily repairable and sustainable**

✓ *Groupe SEB*, Fairphone and Framework all offer products that are easily repairable and therefore more sustainable. These companies sell replacement parts for a number of their products and some publish repair tutorials (Annex 4 - Measures 4, 5 and 6).

→ **Encourage the refurbishing of appliances**

✓ *Groupe SEB* has a workshop where it refurbishes appliances and resells these refurbished products (Annex 4 - Measure 4). Murfy, a French company, also offers refurbished household appliances (Annex 4 - Measure 14).

✓ In Quebec, Insertech Angus sells refurbished electronic devices. *Électroménagers Ste-Foy* sells a number of appliances that have been reconditioned by specialists. (Annex 4 - Measure 14) This type of second-hand market provides access to HAEs that have already been produced and therefore extend their lifespan.

→ **Promote the functional economy**

✓ Commown offers rental of durable and repairable electronics rather than the purchase (Annex 4 - Measure 15).

Increasingly complex systems and practices and lack of parts standardization: New practices are making repairs more complex: miniaturization, multiple technologies in the same product, **embedded systems**, glued joints, chips, new battery technologies, etc. The lack of standardization and compatibility of parts between different brands or within a given manufacturer greatly increases the possible number of parts.

EMBEDDED SYSTEM

An embedded system is the addition of a system consisting of a computer and software to a product in order to perform a specific function(s) and to control the product (40).

→ **Levers**
Examples of structural initiatives

→ **Develop products that are easily repairable and durable**

Groupe SEB, Fairphone and Framework offer products that are easily repairable (Annex 4 - Measures 4, 5 and 6).

→ **Make information available for repairing these complex products**

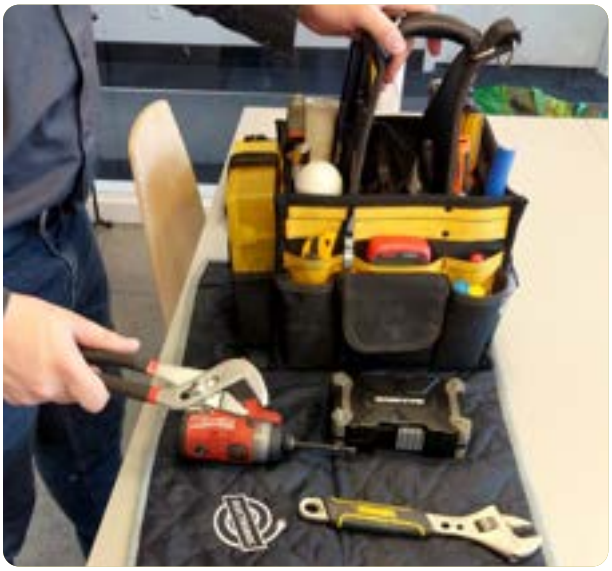
IFixit publishes repair schematics, manuals and tutorials for a number of products (Annex 4 - Measure 7).

In the case of some HAEs, the European Union and three U.S. states require that certain repair-related information be available for a specified period. In Europe, parts must be replaceable using readily available tools. France prohibits limiting access to certain items that are essential for repairs for example manuals, repair instructions or certain software updates (Annex 4 - Measures 3, 10 and 11).

→ **Standardize components to reduce the number of different parts on the market**

3.1.6 Enhancement of the repair sector

Lack of vocational training and lack of skills transfer: The repair trades are not well developed or encouraged. The electronics field attracts a certain number of new entrants, but the home appliance sector is struggling to recruit new people. The lack of public vocational training in this field may explain the lack of available new recruits.



→ Levers
✓ Examples of structural initiatives

→ **Place a greater value on repair jobs and encourage training in repair**

✓ *Groupe SEB* has created *RépareSEB*, which provides repair training for people in professional (re)insertion (Annex 4 - Measure 4). Murfy in France and Insertech Angus in Quebec offer similar repair training programs for those who have difficulty finding employment (Annex 4 - Measure 14). Members of the *Corporation des Techniciens en Électroménagers du Québec* have access to a number of training courses (Annex 4 - Measure 9).

→ **Update public and private vocational training**

Low rates paid by manufacturers to repair companies for repairing products under warranty: These amounts are not reflective of the time spent, as they are often a fixed lump sum, which excludes time spent on transport and training, for example.

→ Levers
✓ Examples of structural initiatives

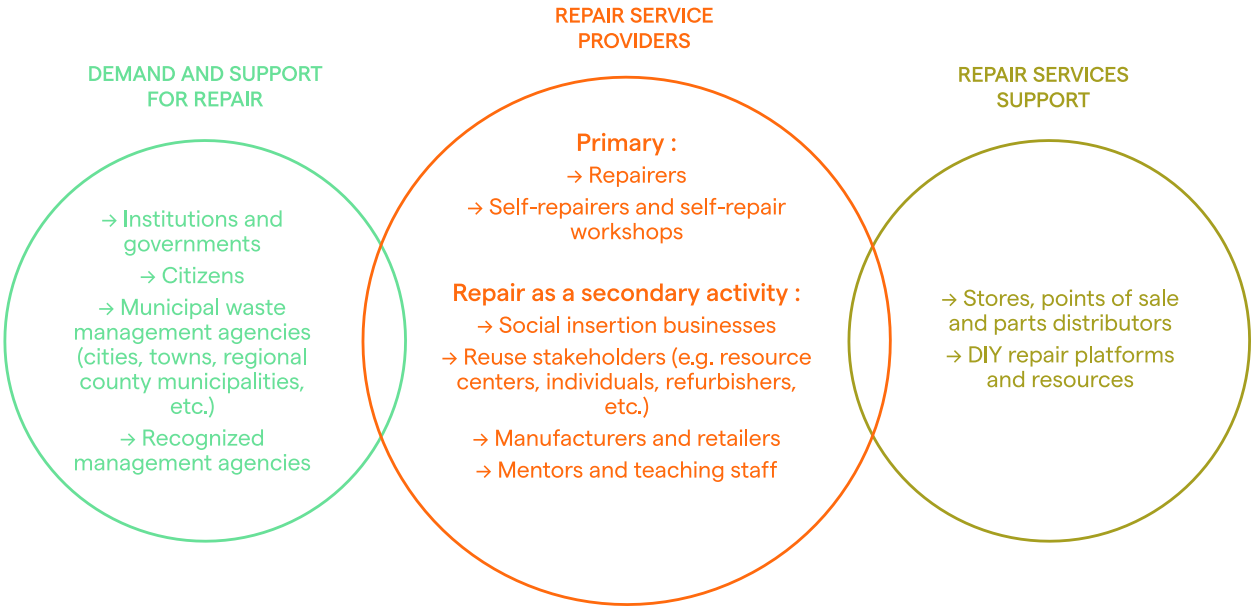
→ **Review the flat fee rates or pass legislation to ensure that the amounts paid are representative of the work done by the repair technician**

✓ Repairs and training in repairs are at the heart of *Groupe SEB's* business model. Its 6,000 repairers are employed by *Groupe SEB* and are therefore paid a wage that is reflective of the work they do (Annex 4 - Measure 4)

3.2 Repairers' perspective

From two surveys of repair technicians working in companies in Quebec and British Columbia (30 interviews in Quebec and a survey of 19 individuals in British Columbia), barriers to the repair of HAEs and possible incentives that could be used to encourage repair were identified. These phases of the research also provided a better understanding of the various stakeholders in Canada's repair community. Figure 2 shows the various players in the repair ecosystem. It also shows that professional repair can happily coexist with the DIY repair community. Details of the methodology used for this section of the research can be found in annex 2.

Figure 2. Canada's repair ecosystem



3.2.1 Obstacles observed by repairers

3.2.1.1 Product design

One of the main observations was that HAE design greatly influences repairability. This was raised by most of the respondents in both Quebec and British Columbia. Frequent technological changes, the fact that the parts are glued or welded together and the miniaturization of certain components were identified as factors that could limit product durability and repairability. In British Columbia, electronics repair specialists were more likely to identify product design as a repair challenge than those who repaired household appliances.

3.2.1.2 Replacement parts

Another major repair obstacle mentioned by repairers in both provinces was the lack of availability, or prohibitive cost, of replacement parts. The time it takes to take delivery of parts was mentioned by some repairers in Quebec as a factor in the customer's decision whether or not to proceed with repairs. In British Columbia, most of those surveyed said that spare parts were "rarely" or "sometimes" readily available. Most of the respondents in British Columbia also indicated that the most common reason for a repair request was a broken part. This heightens the importance of access to parts so that repairs are not technically difficult or overly expensive for the customer.

3.2.1.3 Access to tools and information

Quebec repairers, especially those without manufacturer certification, indicated that product manuals are difficult to access. Nevertheless, online platforms and support from colleagues can enable them to get around this lack of information. For their part, customers receive little if any information

on their product's repairability, maintenance and intended use at the time of purchase. In British Columbia, only repairers of electronics identified the difficulty accessing tools and manuals, as well as the possible impact of repair on the manufacturer's warranty, as barriers. Indeed, for devices still under warranty, repair by someone not certified by the manufacturer could undermine or even void the warranty.

3.2.1.4 Repair costs and profitability

In Quebec, repairers indicated that repair costs can also pose an obstacle for customers. The difference between the repair cost and the cost of a used or new device is a good indicator of what the customer will choose to do. From the repairer's vantage point, repair work profitability can sometimes be an issue.

In Quebec, 5 out of 30 people interviewed indicated that repairs are not profitable due to the time spent and the exorbitant cost of the service, particularly for an item that is not worth much initially. In British Columbia, 7 out of 19 respondents found performing repair work to be profitable half the time and 4 found it occasionally profitable. Profitability came up most often among repairers of electronic devices.

3.2.1.5 Other obstacles

In Quebec, respondents indicated that manufacturers have an important role to play in terms of the practices and policies they deploy to incentivize the repair or, conversely, replacement of a device.

In British Columbia, repairers of both home appliances and electronic devices identified, in equal numbers, two other obstacles to repair:

- → poor product quality
- → the item reached the end of its life, being neither usable nor repairable.

It should be noted that the vast majority of respondents indicated that HAEs have become less repairable and durable over time, and eight respondents in British Columbia identified the lack of qualified staff as one of their primary challenges.

3.2.2 Incentives to support repair activities

3.2.2.1 Government measures

Legislative amendments supporting the right to repair as well as financial incentives to facilitate repair are supported by the majority of the repairers surveyed in both provinces.

In British Columbia, all of the repair incentives and legislative measures proposed were welcomed by the respondents, with certain distinctions drawn according to the type of product repair. Electronics repairers were generally more inclined to support the various proposed actions. Each measure received nearly identical support, and there were no significant objections, which suggests that the idea of proposing a range of solutions is a promising one for the repairers surveyed.

3.2.2.2 Profitability of repair

Although a few respondents cited repair profitability as an obstacle, it was viewed by and large as a positive factor, with a significant majority of Quebec respondents finding these activities profitable and half of the respondents in British Columbia finding them profitable half the time or most of the time.

3.2.2.3 Relationship between repairers and their customers

In Quebec, the interviews showed that customers' trust in repair businesses was crucial in encouraging them to have their products repaired. Repairers' role in providing purchase and maintenance advice contributes to this trust. This subject was not addressed in the British Columbia survey.

3.2.2.4 Environmental concerns

Repairers' environmental concerns emerged from the interviews in Quebec, particularly in terms of their motivation in practicing this trade and the lack of opportunities and information regarding appliances' end of life. Repairers' desire to repair a product and manufacturers' desire to sell a replacement may clash. This subject was not addressed in the survey in British Columbia.

Measures to facilitate repair proposed in the survey in British Columbia

- → Maintain the warranty in the event of a third-party repair
- → Require manufacturers to make parts, tools and manuals accessible for a set period and at a reasonable price.
- → Display a repairability index at the point of sale.
- → Penalize planned obsolescence
- → Require manufacturers to remove electronic devices that prevent diagnosis (for example: security lock, software or other security-related functions)
- → Government subsidies for repair
- → Organize a repair education and promotion campaign
- → Promote the repair trades
- → Support repair training programs
- → Create a directory of repair services by region
- → Implement right-to-repair legislation

To sum up, the repairers surveyed identified two main obstacles: access to replacement parts and product design. In addition, customers are sensitive to the cost of repair based on the value of the new or used product. Other obstacles were also identified to varying extents, including access to tools and manuals, lack of information on repair, product's maintenance and proper use, the importance of a trusting relationship between repairs and their customers, and profitability of repair activities.

As for possible solutions, the legal entrenchment of the right to repair is sparking interest in the repair community. Most of the respondents identified a series of regulatory measures and financial incentives that could help facilitate repair. No one solution emerged from the surveys, highlighting the fact that to eliminate the multiple obstacles to repair, a series of measures need to be adopted.

3.3 CONSUMER PERSPECTIVES

The Canada-wide survey provided an understanding of the public's purchasing and repair habits and gauged their support for specific measures to promote HAE repair. A total of 2,080 individuals responded to the survey. Since the survey was conducted in November 2021, and the questions referred to items acquired in the last two years, the data presented are valid for 2020 and 2021.

Whenever possible, the results were compared with those from the 2018 Équiterre survey conducted as part of the Pan-Canadian Obsolescence Study (20), which covered consumer practices for the period 2016-2018. Some of these comparisons with 2016-2018 should be viewed with caution, however. Indeed, the sample size is different, the HAEs included are not exactly the same (some were added while others have been removed in order to better respond to current changing consumption trends) and the pandemic situation has reconfigured consumption practices and modified certain household budget items, notably purchases of HAEs.

Interviews with 25 Canadians who participated in the survey explored the repair experience in greater depth. Those who volunteered for these interviews used repair to a greater extent than those surveyed (22/25). Details of the survey and interview methodology can be found in Annex 2.

3.3.1 HAE PURCHASE AND USE HABITS

3.3.1.1 Snapshot of HAE acquisition in Canada

In 2020-2021, 90.7% of the respondents purchased one or more HAEs. This proportion is more or less the same as what was observed in the 2018 survey, when 89 % had purchased one or more HAEs(19). Table 4 shows that home appliances remain the most popular, especially small ones, although electronic devices have gained in popularity over the last two years.

Table 4. Types of HAE acquired by respondent of pan-canadian studies - 2016-2018 VS 2020-2021

2016-2018		2020-2021	
Home appliances	Electronics	Home appliances	Electronics
61.3 % Small home appliances: 68.4% Large home appliances: 31.6%	38.7 %	55.9 % Small home appliances: 63.9% Large home appliances: 36.1%	44.1 %

There has been little change in Canadians' HAE purchase habits, as evidenced by the fact that the 10 most purchased appliances in 2020-2021 remain nearly the same as those in 2016-2018. Only three appliances are different, and a few simply shifted position in the rankings. The smartphone is by far the most popular device, with nearly half of those surveyed reporting they bought one over the past two years. Table 5 lists the top 10 HAEs purchased in 2016-2018 and in 2020-2021.

Table 5. Most purchased HAEs in Canada - 2016-2018 VS 2020-2021[3]

2016-2018		2020-2021	
Product	Respondents having purchased one (%)	Product	Respondents having purchased one (%)
1. Smartphone	53.7%	1. Smartphone	48.2%
2. Computer	39.3%	2. Vacuum cleaner	28.3%
3. Vacuum cleaner	34.7%	3. Television	26.6%
4. Coffee maker/ espresso machine	34.3%	4. Headphones	25.4%
5. Toaster	29.8%	5. Smart tablet	24.3%
6. Microwave	26.9%	6. Toaster	24.0%
7. Headphones	24.5%	7. Coffee maker/ espresso machine	23.9%
8. Television	24.0%	8. Refrigerator	22.1%
9. Mixer	21.9%	9. Microwave	21.7%
10. Electric kettle	21.6%	10. Printer	20.9%

3 These rankings were made based solely on the same devices in both surveys.

3.3.1.2 Purchase and use behaviors

The vast majority of the respondents (82.2%) who experienced a broken appliance had bought it new, versus only 7.9% who had bought it used. The others had either received it as a gift (8%), rented it (1.5%) or borrowed it (0.3%). In 2018, 80% had bought their last HAE new, which means that reuse of these devices is not gaining much in popularity and remains uncommon.

At the time of purchase, 17.3% of those surveyed said they had opted for an **extended warranty** and 76.8% had not[4]. The main reasons given for buying an extended warranty were that it was offered at the time of purchase and seemed like a good way to protect oneself in the event of breakage or defects. It should also be pointed out that half of the respondents did not know of any other means of protecting themselves if the product were to break down, when in fact there are other ways (e.g. legal warranty and **manufacturer's warranty**). Figure 3 displays the reasons why consumers purchased an extended warranty.

The main reasons cited for not purchasing an extended warranty were the excessive cost and the purchaser's confidence in the product's durability. Half of these individuals also expressed a certain mistrust of the

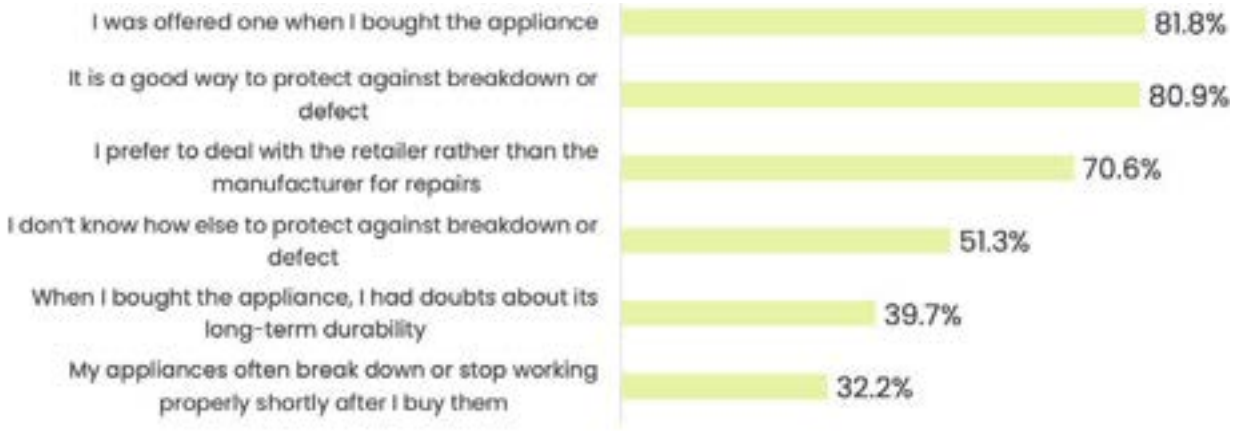
EXTENDED WARRANTY

A fee-based warranty offered by the retailer that extends the manufacturer's warranty already included with the purchase

MANUFACTURER'S WARRANTY (OR CONVENTIONAL WARRANTY)

Offered by the manufacturer with the purchase of an item and defined according to certain terms and conditions that may include the possibility of having the item repaired, a warranty to replace parts or the entire item for a defined period of time, etc. A fee may or may not be required to take advantage of this warranty. (41)

Figure 3. Reasons for purchasing an extended warranty

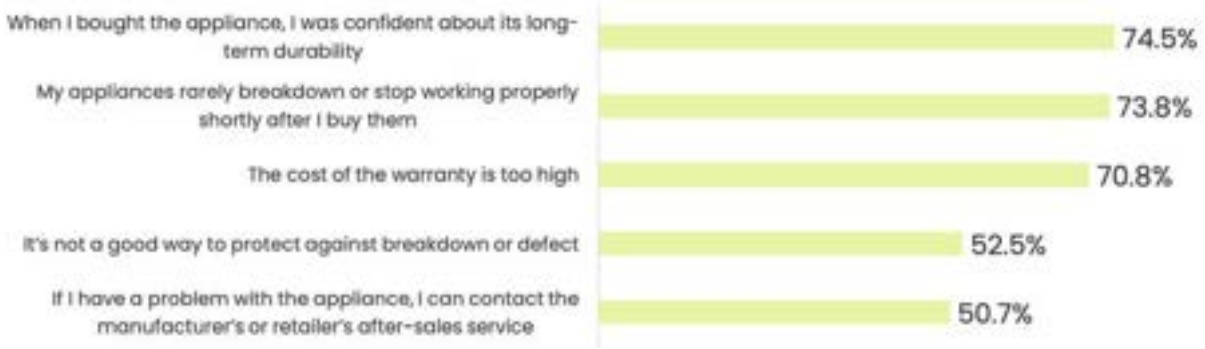


4 Note that 5.9% of respondents do not recall whether or not they purchased the extended warranty.

extended warranty as an adequate means of protecting themselves against breakage. Figure 4 displays the various reasons for not purchasing an extended warranty.

As for the factors taken into account at the time of purchase, only repairability was considered. It was important for more than one out of two respondents (55.4%), whereas only 15.9% found it unimportant.

Figure 4. Reasons for not purchasing an extended warranty



As for HAE use, a majority of the respondents (76.3%) believed that they were properly following the manufacturer's instructions on use and maintenance. Only 7.3% said they did not follow these instructions.

3.3.2 Status report: Canadian population and HAE repair

3.3.2.1 HAE failures and breakdowns

A majority (63.4%) of the respondents had experienced a failure or breakdown of one or more of their HAEs over the preceding two years. According to the survey, the most commonly reported failures occurred among home appliances, especially small ones.

The similarity of the ranking on the right with that for the most often-purchased items could suggest that consumers tend to buy a new HAE to replace their broken one. However, the data are insufficient to reach a definitive conclusion. It may be that the

The 10 appliances or devices that experienced the most defects in the previous 2 years are as follows:

1. Smartphone
2. Vacuum cleaner
3. Coffee maker/espresso machine
4. Microwave
5. Toaster
6. Refrigerator
7. Washing machine
8. Dryer
9. Television
10. Electric kettle

most often-purchased appliances are also the most used, so logic would dictate that they are the ones that break most often. Additional research is needed to examine the reasons why these HAEs tend to break down and why consumers routinely purchase them.

HAEs clearly have a short useful life, as evidenced by the fact that the average age of a broken down appliance was 2.6 years. Most (63.4%) of the appliances that broke down were less than three years old, and only 14.2% of HAEs were more than seven years old. Respondents, however, felt that the reasonable lifespan of HAEs needs to be much longer, averaging 8 years for small electric appliances, 13.5 years for large home appliances and 7 years for electronic devices.

The interviews with consumers identified three main reactions to an appliance breakdown or failure. The leading reaction – by far – was to quickly seek a solution. General stress related to the breakage of the device was the second leading reaction, especially among women, and worrying about repair costs was the final reaction cited.

3.3.2.2 Opting for repair

When their HAE breaks down, Canadians rarely opt to have it repaired. In 2020-2021, only **18,6 %** of respondents with a broken appliance went the repair route. Of the 81.4% who did not have their product repaired, the majority (61.2%) had not even considered repairing it.

Compared with 2018, there has been a decline in the use of repair. Looking at only the first failure cited by respondents and not all HAE failures mentioned, 19.4% had their appliances repaired within the past two years, whereas the corresponding figure for 2018 was 22.7%[5].

Those who opted for repair usually sought out a professional (55.3 %). DIY repair is fairly popular, however, with nearly one in three opting for this. Repair workshops remain a rarely-used resource. Figure 5 presents the various repair methods chosen.

Among those opting for repair, certain trends emerged:

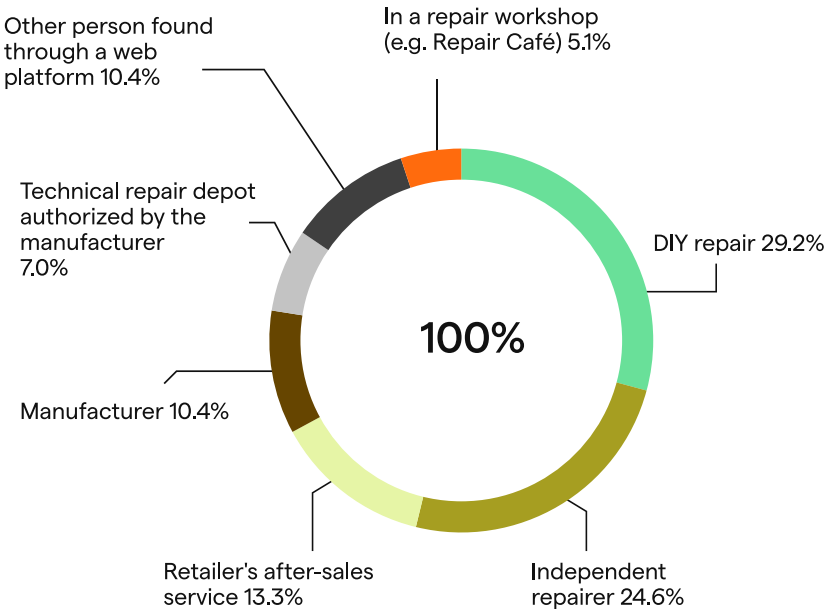
- → This practice is fairly evenly spread across age groups. Young people (18-24), however, were more likely to have their item repaired in a repair workshop or by someone else, whereas older individuals and/or retirees tend to deal with manufacturer-certified technical centers.
- → Landlords tend to have their items repaired more than renters, and single people or childless couples are more likely to opt for repair.
- → Half of the respondents who had their HAE repaired (52.9%) have a university degree.
- → No gender distinction was noted among those opting for repair, but DIY repair was slightly more popular among women.

The average repair cost for the last HAE to have broken down was $193.
Repair satisfaction was fairly high: 81.5% of respondents were satisfied, while a mere 7.1% were not satisfied with their item's repair. Interestingly, interview participants reported overall disappointment with professional repair services. In contrast, when people practiced DIY repair, the level of satisfaction was higher.

Before having their product repaired, a number of people sought information on this. The information sought varied greatly, but Figure 6 shows that it had to do mainly with financial concerns and DIY repair. The environmental

5. In the survey, respondents could report up to three different HAE failures, which explains why the total proportion of those making use of repair is lower (18.6%).

Figure 5. Chosen repair method



impacts of purchasing a new appliance did not figure among the respondents' top priorities. According to the interviews, the search for information was intended mainly to determine whether the problem encountered was common.

The consumer interviews also showed that it is rare for people to quickly abandon the repair process or to do no research on the subject. Generally speaking, people did not replace their HAE without first seeking to understand where the problem originated or assessing the scope of the necessary repair.

For the most part, those who did not have their HAE repaired kept it at home, took it to a specialized recovery center or depot, or threw it in the garbage. Figure 7 shows once again that reuse is not the most popular option for disposing of HAEs, although 13.4% of the respondents who did not have their item repaired did choose this option (they donated or sold it).

Canadians' behaviours regarding their HAEs' end of life have not changed much since 2016-2018, given that most of the respondents had also kept the item at home or threw it away. People are now significantly more likely, however, to bring the appliance to a depot. Donations to organizations are up slightly, but far fewer people are giving away their items to those in their circle, compared to 2016-2018. Resale is another behaviour that is down slightly.

3.3.2.3 Perceptions on repair and planned obsolescence

Canadians' image of the repair sector is fairly mixed. While just over one in three (35%) has a positive image of the repair field, 21.3% of the respondents have a negative one and 36.3% a neutral one. Respondents' confidence in the repair sector is moderate: 3.2/5, where 5 is the highest level of confidence. The level of confidence varies according to the actors. Manufacturer-certified technical centres enjoy

Figure 6. Searches for repair information

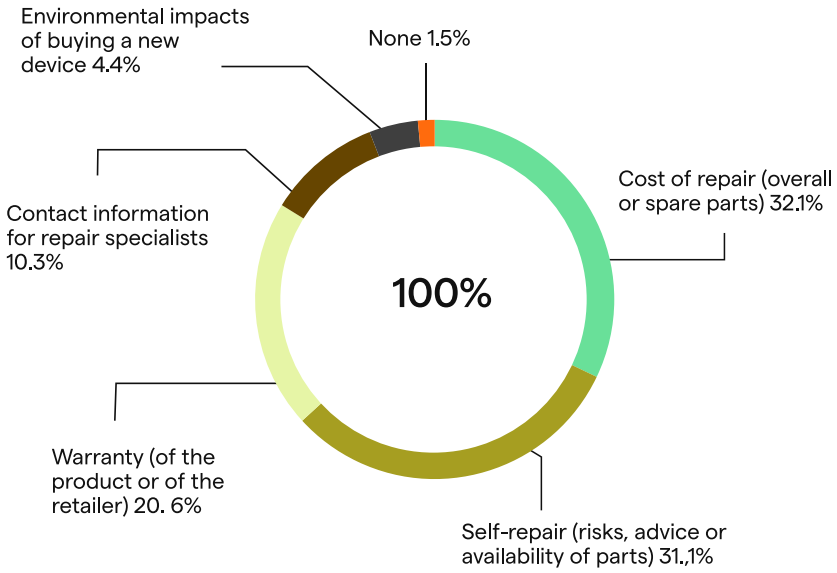
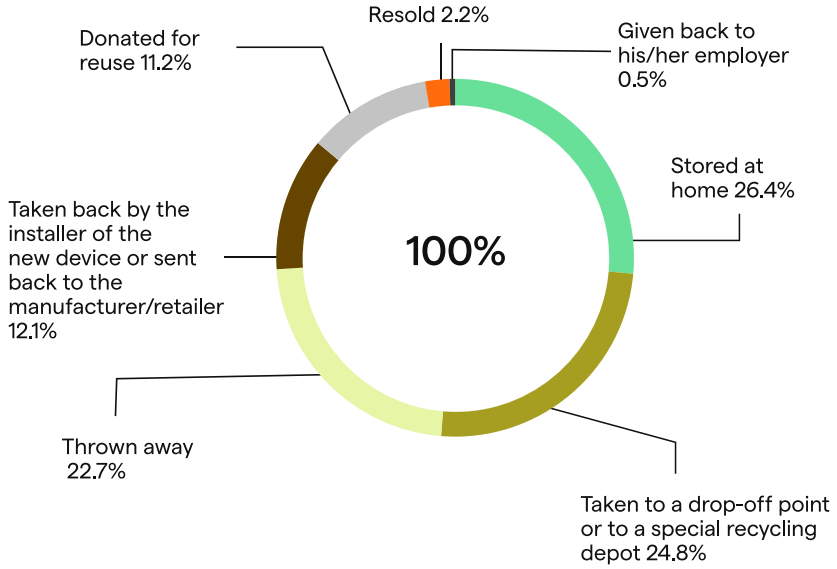


Figure 7. Disposal of the device



the highest confidence level (52.1% of respondents have confidence in them), while an individual practicing DIY repair occupies the bottom rung on the ladder (35.4% of respondents are confident in them). That said, a large majority of respondents agree that repair is a smart consumption habit (71.7%) and one that has a future (65.6%).

Many respondents indicated that repair has become easier thanks to the internet (60.9%),

but only a quarter feel that repair is being made easier by manufacturers. In fact, 46.4% of those surveyed believe that in the majority of cases, HAEs are designed not to last, and 38.6% believe that they are designed this way only in some cases. This belief is as entrenched now as it was in 2018. This could explain why so few people opt for repair, because not many people will attempt to have their objects repaired if they are convinced that it is made not to last.

3.3.3 Respondents motivations to repair ther HAE

Although few Canadians are currently opting to have their HAEs repaired, the potential benefits of the repair option seem well known. Of 10 statements relating to the benefits of repair, those referring to the environmental benefits of such a practice received the highest level of support from respondents, with an average support of 78.8%. Table 6 shows the level of support for various statements related to this theme.

Table 6. Levels of agreement with the environmental benefits of repair

Repair helps extend the lifespan of appliances.	81.0%
Repair helps reduce waste.	80.4%
Repair has a positive impact on the environment.	75.0%

The economic advantages of repair are the second leading motivation, with an average of 60.8% of respondents agree with the statements presenting repair's potential benefits for the economy and their personal finances. That said, interviewees attached greater importance to these benefits than to the environmental benefits. Table 7 shows the respondents' support levels for various statements relating to this theme.
Personal benefits, mainly linked to DIY repair,

Table 7. Levels of agreement with the economic and financial benefits of repair

Repair helps me save money.	72.5%
Repair has a positive impact on the economy.	55.6%
Repair gives me more for less money.	54.3%

rank third. An average of 44.2% of those interviewed agree that repair is personally fulfilling. Table 8 shows the respondents' support for various statements.

3.3.4 Obstacles to repair

There are a variety of reasons why Canadians do not opt for repair. In order of importance, these are: perception that devices are irrepairable; financial obstacles; access to parts and tools; information obstacles; time/logistical obstacles; and various fears and apprehensions. Table 9 shows the respondents' level of agreement with various obstacles.

The interviews showed that other factors come into play in the decision on whether or not to have an appliance repaired, although repair or parts cost – often viewed in relation to the price of a new appliance – is the leading factor. The frequency of use and attachment to the appliance, as well as the complexity of the repair may also influence the decision whether or not to have the item repaired.

Table 8. Levels of agreement with the personal benefits of repair

Repair gives me a feeling of personal accomplishment.	57.5%
Repair makes me feel that I am making full use of my personal abilities.	48.4%
Repair makes me feel like I was made for these activities.	40.2%
Repair helps set me apart from others.	30.7%

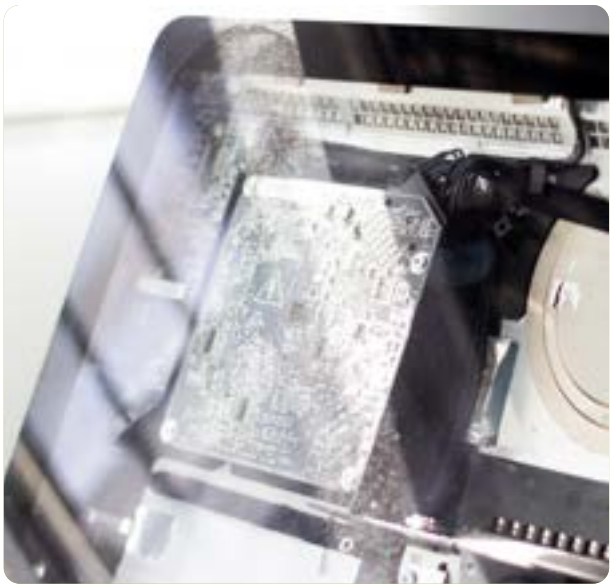


Tableau 9. Levels of agreement regarding obstacles to repair

Category of obstacle	Specific obstacle and respondents in agreement (%)		Average agreement (%)
1. Perception of product irrepairability	Appliances are increasingly irrepairable.	69.8%	69.8%
2. Financial	Replacement parts are too expensive.	64.7%	57.6%
	The cost of repair is too high in relation to the price of a new product.	59.6%	
	There is a lack of transparency regarding repair costs.	59.1%	
	In the long term, it makes more financial sense to buy a new appliance than to repair the old one.	46.8%	
3. Access to parts and tools	Replacement parts are hard to find.	58.4%	50.2%
	The physical or logistical tools needed for repair are not made available by the manufacturers.	41.9%	
4. Informational	I don't have the knowledge to repair an appliance myself.	62.9%	44.8%
	I don't know where to find repair services.	37.2%	
	I don't know where to find information about manuals, replacement parts or assembly diagrams for the appliance.	34.4%	
5. Time/logistics	The repair process is too long.	45.8%	43.0%
	Repair turnaround times are too long.	42.5%	
	There is no accessible repair service nearby.	40.7%	
6. Fears and apprehensions on the part of consumers	I have no guarantee of the quality of the repair job.	56.7%	41.9%
	I have certain fears when it comes to having an appliance repaired.	45.0%	
	I find that repair services lack professionalism.	24.1%	

The age of the appliance at the time of the breakdown is also a key factor: older appliances are less likely to be repaired.

Finally, the appeal of having a new device was also mentioned by a number of interviewees as justification for choosing to replace it.

3.3.5 Incentives to repair

There is fairly strong support among Canadians for a variety of measures that could make it easier to repair their HAEs. According to those surveyed, responsibility for implementing such measures is divided between manufacturers and/or retailers and government authorities, although they supported measures involving the former a little more. This observation is consistent with the fact that a majority of the public blame planned obsolescence as a key barrier to repair, and a minority believe that manufacturers facilitate the repair of their appliances.

A "typical profile" emerges from among the respondents most supportive of solutions to facilitate HAE repair. The highest levels of support were found amongst women, residents of Quebec, and older age groups. The average support for possible actions by manufacturers and/or retailers is 60.8%. Table 10 shows respondents' support levels for various proposed solutions that could be implemented by these players.

Table 10. Support for possible measures that could be implemented by manufacturers and/or retailers

Specific measures	Respondents in favour (%)
Lower repair prices.	78.4%
Higher HAE quality/reliability.	70.8%
Replacement parts that can be accessed over time (at least 10 years).	69.4%
Less expensive warranty extensions.	65.2%
Better after-sale services.	63.4%
Information on replacement parts availability.	62.2%
Information on how you can repair your HAEs (e.g. on the manufacturer's website, on the product label, etc.).	60.8%
Information on HAE life expectancy (e.g. on the manufacturer's website, on the product label, etc.).	60.5%
Three-month warranty on repairs.	60.4%
Easier take-back of HAEs at the end of their useful life by the manufacturers and/or retailers.	58.9%
Highlight environmentally responsible HAE design (e.g. environmental display/ labeling).	57.1%

Information on the environmental impacts generated by HAEs (e.g. on the label)	52.2 %
More refurbished products offered by retailers.	46.9 %
Insurance on repairs offered by retailers.	44.3 %

Regarding potential solutions to be implemented by the authorities, respondents' average level of support was 55.8%. Table 11 presents their level of support for various proposed solutions.

Table 11. Support for potential measures that could be implemented by the authorities

Specific measures	Respondents in favour (%)
A law that would hold manufacturers responsible for the entire life cycle of their products.	61.2 %
An incentive (e.g. tax credit) for manufacturers that design more durable appliances.	60.1 %
A tax break on appliance repair.	59.5 %
Information on professional repair services nearby (e.g. a repair directory).	58.9 %
A tax credit on repair costs.	58.5 %
A law against planned obsolescence that could be used to sanction companies that deliberately make their appliances obsolete.	58.3 %
An annual ranking of Canadian HAE manufacturers that deliberately make their appliances obsolete.	57.6 %
A repairability index that compares the various products on the market.	56.6 %
Information on how to repair your appliances yourself.	55.9 %
Information on how to dispose of your HAEs (e.g. donate them to associations, resell them on a classified ads site, paid or free pick-up, etc.).	54.6 %
A special logo/label to identify the most durable/repairable products.	53.0 %
Information on the environmental impact of HAEs at the end of their lifespan.	51.8 %
Information on used product networks to give your appliance a second life.	49.3 %
A tax on manufacturers to combat planned obsolescence.	46.1 %

These results show a low rate of HAE repair, but an appetite on the part of the public for easier access to this practice. All of the suggested measures received fairly strong support, which suggests an "all of the above" approach. It should be pointed out, however, that lower repair costs is the one solution that had the greatest support (nearly 8 out of 10 are in favour) and that the second obstacles are financial in nature. Therefore, the financial aspect of repair is definitely something that needs to be taken into consideration in order to improve access to this practice.

3.4 LEGISLATIVE ANALYSIS

An analysis based on the material legistic methodological approach and various discussions with experts has resulted in a better understanding of the legal incentives that can be used to promote development of the right to repair in Canada. The methodology used for this part of the research is detailed in Annex 2, and all the references consulted for this section can be found in Annex 7.

3.4.1 Overview of Canadian legislative framework

Jurisdiction over the environment is shared between the Government of Canada and the provinces, but certain sectors – such as consumer protection – fall more under provincial jurisdiction. Federal and provincial laws and regulations were analyzed to identify gaps that can be plugged to facilitate the right to repair.

Lastly, repair funding initiatives can be implemented at the municipal, provincial and federal levels. The analysis of measures implemented abroad shows that municipalities were often involved in funding repair activities.

3.4.2 Legal levers to facilitate access to repair

A legal framework that promotes access to repair helps remove a number of the obstacles identified in the literature, thanks in part to mandating the following measures:

- → Access to repair at a reasonable price.
- → Access to parts, tools and information facilitating appliance repair over a reasonable number of years following purchase.
- → Repair turnaround times that do not deprive the owner of the product for too

long, especially for items that are indispensable on a daily basis.

→ Options to acquire generic parts or to custom produce them (via 3D printing, for example). This would reduce repair costs and make repair more accessible. Furthermore, the price for generic or custom-produced parts is generally lower than for original or proprietary parts. This solution addresses the issues of limited (if any) access to certain parts.

→ Getting retailers and manufacturers to facilitate access to repair.

→ In the case of products containing electrical components, possible access to previous versions of operating software can help fix certain bugs or enable a lower-performance device to operate more effectively. Security updates also need to be made available to allow the safe use of earlier versions of software.

→ The possibility of DIY repair on certain appliances, taking account of potential safety issues (e.g. microwave or certain home appliances).

Devising a legislative definition of the right to repair is another important lever. This definition could include a prohibition on selling irrepairable products and on **intentional non-repairability**.

Prohibiting planned obsolescence is another lever to encourage manufacturers to sell durable and, by extension, repairable products. Planned obsolescence limits the possibility of repairing these appliances efficiently, which unduly reduces their lifespan. In France, the legal definition of planned obsolescence was updated and included in the *Loi sur l'empreinte environnementale du numérique* [Act respecting the digital environmental footprint] [translation] in November 2021.

INTENTIONAL NON-REPAIRABILTY

"any technique, including software-related, by which a producer purports to make it impossible to repair [...] an appliance or to limit restoration of the full functionality of such appliance outside its approved channels" (French consumer code - Article L441-3).

"The practice of planned obsolescence is prohibited. This practice is defined as the use of techniques, including software, by which the party responsible for marketing a product seeks to deliberately reduce its life expectancy." (42)

Lastly, economic incentives to repair can help ensure that these activities can be carried out at a reasonable cost for consumers.

The following sections lay out the issues impeding access to repair in provincial and federal legislation, as well as the pros and cons of the three **ecofiscal** measures identified to support repair activities.

3.4.3 Issus identified in federal legislation regarding right to repair

At the federal level, a number of laws have an influence on the right to repair. Table 12 sets out the issues associated with each of them.

ECOFISCALITY

The application of various fiscal measures intended to modify behaviour for the purpose of preserving the environment (e.g. carbon pricing).

3.4.4 Gaps in provincial consumer protection legislation to encourage the marketing of sustainable and repairable products

The findings in this section are based on an analysis of the Quebec Consumer Protection Act (CPA). Since each province has its own consumer protection legislation, the basic premise is that an in-depth study of the Quebec legislation will identify potential

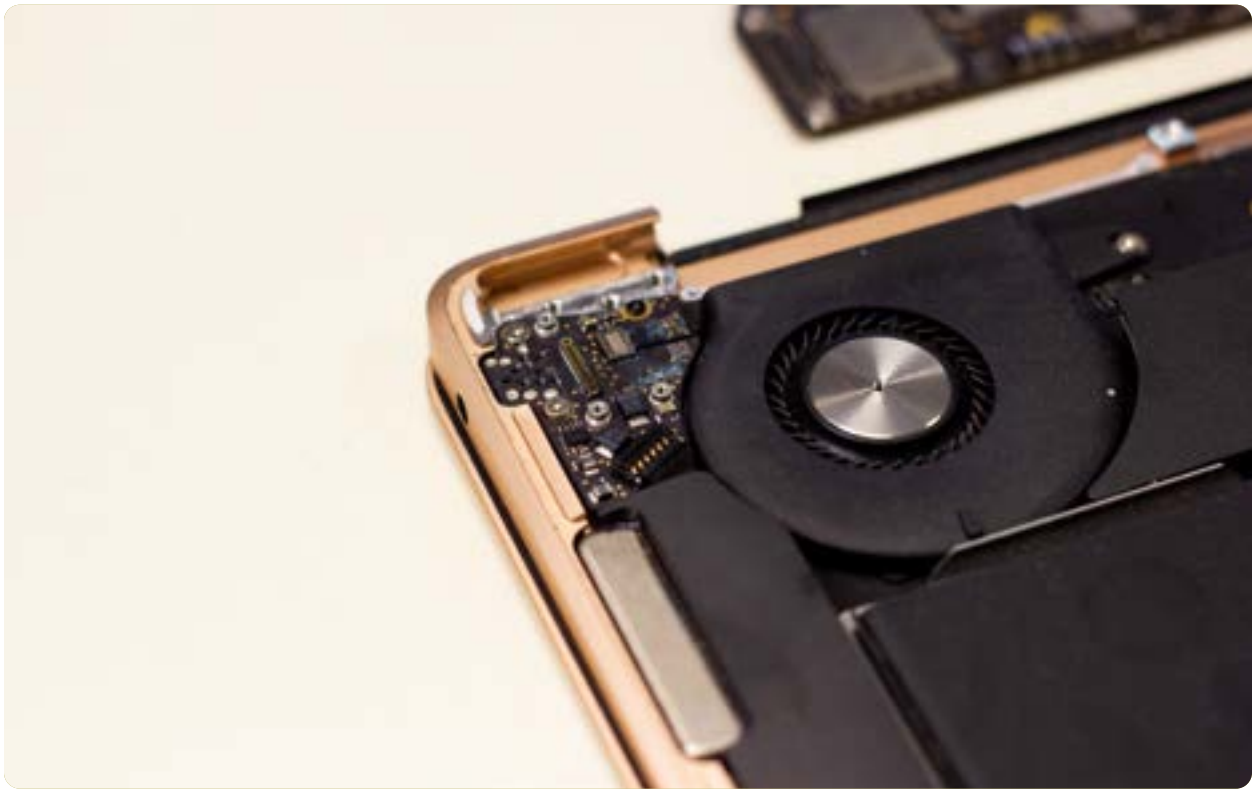
Table 12. Federal laws and issues regarding the right to repair

Act	Issues
Canadian Environmental Protection Act	→ No definition of the right to repair at the Canadian level. → No provisions regarding a reasonable price for parts and the length of time that parts, tools and manuals must remain available. → No provisions regarding the right to continue using the previous version of a software or the possibility of accessing such a version, including security updates. → No provisions regarding the possibility of DIY repair for HAE. → No definition of planned obsolescence or penalties for this practice.
Copyright Act	→ The prohibition on exceeding TPMs, even if the action is aimed at diagnosing the problem or repairing the product, constitutes an obstacle to repairing appliances containing electronic components. Circumventing TPMs without the manufacturer's express consent is currently prohibited. → Note that Bill C-244, An Act to amend the Copyright Act (diagnosis, maintenance or repair), received second reading in the House of Commons in February 2022 and Bill C-294, An Act to amend the Copyright Act (interoperability) received first reading in June 2022. The proposed legislative changes are intended to, among other things, encourage the repair of devices with TPMs.
Consumer Packaging and Labeling Act	→ The lack of information at the time of purchase about the product's durability and repairability means that Canadians cannot make an informed purchasing choice.

issues involving rights and access to repair across all consumer protection laws. A more in-depth province-by-province analysis would provide certain clarifications regarding the weaknesses observed in each relevant provincial act.

The following key issues were identified in Quebec's Consumer Protection Act:

- Lack of a definition of and penalties for planned obsolescence.
- Lack of obligation on the part of retailers or manufacturers to repair a defective product, as opposed to refunding the cost or replacing it.
- Lack of clear provisions allowing the consumer to have their goods repaired by a third party (e.g. independent repairer, DIY repair).
- According to section 39 of the CPA, "*Where goods being the object of a contract are of a nature that requires maintenance, replacement parts and repair service must be available for a reasonable time after the making of the contract. The merchant or the manufacturer may release himself from this obligation by warning the consumer in writing, before the contract is entered into, that he does not supply replacement parts or repair service.*" (43) However, the lack of requirements regarding the physical and financial availability of parts, tools and manuals limits the possibility of repair. Further, the fact that the section targets only some goods - those requiring maintenance - limits its scope.
- Section 39 also provides that a merchant may be released from their obligation to



provide parts or services by notifying the consumer in writing that these are not being provided. This section allows manufacturers to escape responsibility for the repair of their appliances that are sold.

→ The Act also lacks other requirements, such as:
  - The concept of a repair price that is reasonable in relation to the price of the product.
  - Guidelines for reasonable availability of parts from the time the product goes on sale.
  - Timeframes for delivery of parts to speed up the repair process and limit the loss of use of the device.
  - Measures to enable repairers to source alternative (or proprietary) parts to the original ones, or to produce them themselves.

→ Lack of regulation regarding the right to continue using the previous version of a software program or the possibility of accessing the previous version.

3.4.4.1 Various warranties and their impact on the lifespan and repair of products

In Quebec, the legal warranty stipulates that an object must be usable for its intended purpose for a reasonable period of time. This warranty automatically applies to the purchase of a product, and its legal definition leaves it up to the courts to interpret the concept of a reasonable period. It includes the warranty of durability, which is intrinsically linked to the object's lifespan. (39)

Legal warranties exist side-by-side with two other types of warranty:

→ The manufacturer's warranty, or conventional warranty, may be offered at the time of purchase and defined according to specific terms and conditions, which may include the possibility of having the object repaired, a guarantee to replace parts or the entire item for a specified period, etc. (41)

→ An extended warranty may be sold at the time of purchase and extends the manufacturer's warranty. It can often cost from 20% to 25% of the original purchase price.

A number of countries have defined the minimum length of legal warranties in legislation. For example, Sweden stipulates three years, while Norway stipulates five years for products with an average life of more than two years, and England, Wales and Ireland have set the term at six years. The Netherlands and Finland have opted for a more flexible approach, based on the product's average lifespan. (44) Even without a defined term, the legal warranty is generally superior to the extended warranty. In Quebec, case law has often determined longer lifespans than in the countries mentioned above. Table 13 summarizes a number of judgments on the application of the legal warranty to various HAEs in Quebec.

Table 13. Examples of legal warranty judgments in Quebec

Device	Purchase Price	Duration of Use Before Failure	Judgment	Comments from Judgment on Reasonable Life Expectancy
Smartphone[6]	$600.00	Less than a month and a half	Refund of $730.00	A phone supplied on a two-year contract should work for that long and beyond.
Laptop Computer[7]	$787.57	14 months	Refund of $500.00	The computer functioned properly for about a quarter of its useful life.
Television[8]	$853.68	4 and a half years	Refund of $507.32	A manufacturer's representative stated that the useful life of this type of television is seven years.
Refrigerator[9]	$1,399.99	6 and a half years	Refund of $1,218.32	The lifespan of this refrigerator should have been at least 12 years.
Kitchen Stove[10]	$2,019.00	5 years	Refund of $1,690.58	This type of appliance has a life expectancy of 12 to 15 years.
Kitchen Stove[11]	$2,199.99	7 years	Refund of $748.41	This type of appliance has a lifespan of at least 15 years.
Washing Machine[12]	$2,639.00	2 years	Refund of $2,829.20	This type of washing machine has a normal lifespan of approximately 10 years.

6. Vincelli c. LG Électroniques Canada inc. 2017 QCCQ 11798
7. Boucher c. 9259-8531 Québec inc. (Ordi en gros) 2016 QCCQ 5667
8. Lapierre c. Samsung Electronics Canada 2019 QCCQ 3414
9. Claveau c. Samsung electronics Canada Inc. 2020 QCCQ 1017
10. Boudreau c. Electrolux Canada Corporation 2018 QCCQ 5258
11. Pouliot c. Sears Canada Inc. 2017 QCCQ 13461
12. Desfeux c. LG Electronics Canada 2019 QCCQ 1363

Table 14 compares the pros and cons of setting the length of the legal warranty period.

Table 14. Comparison of options regarding the length of the legal warranty

Option	Pros	Cons
Define the number of years for the legal warranty	→ The fixed-term warranty replaces the extended warranty in terms of length, and therefore makes the latter obsolete. → Ease of application because of uniformity for all products. → Clarity and simplicity of the message used in communication and awareness campaigns.	→ May have the perverse effect of limiting the life of an item whose reasonable life would be longer than that defined in the law. → Does not take into account the fact that the lifespan may vary, depending on the type of appliance.
Retain the concept of the legal warranty in its current form in the law	→ The legal warranty supersedes the extended warranty in terms of length, and therefore makes the latter obsolete.	→ Vagueness regarding the concept of reasonable lifespan, which could be corrected with more precise wording. → Harder to enforce in the absence of clear guidance for estimating the reasonable lifespan of items.

One major difficulty with the legal warranty in Quebec is its enforcement, for a number of reasons:

→ Some businesses and/or manufacturers do not honour it, namely by not mentioning it at the time of sale, despite the legal requirement to do so (art. 228.1). The lack of supervision over practices and enforcement of penalties reduces the effectiveness of the Act.

→ The lack of clear guidelines makes the concept of "reasonable duration" fuzzy.

→ It may be difficult for consumers to find out about and assert their legal rights, especially if they have to go to court to do so (39).

Also, the legal warranty does not necessarily always favour repair. If the manufacturer is required to rectify the problem, it may choose to refund or replace the item rather than repair it. Once a case ends up in court, repair by the merchant or the manufacturer is no longer a priority solution. In fact, the powers granted to the Small Claims Division

only allow it to order financial compensation, which means that the claimant cannot obtain a court order that the item be repaired.

3.4.5 Incentives to support the affordability of repair

The affordability of repair and ensuring it is cost competitive with the purchase of a new item is an important incentive in encouraging the use of repair. There are three possible options for financially incentivizing the use of repair by Canadians.

→ A federal tax credit[13], which reimburses a portion of the repair costs upon submission of an invoice when the taxpayer files their return.

→ The establishment of repair funds by the provinces or municipalities.

- A provincial fund could be financed through the **Extended Producer Responsibility (EPR)** systems. Under this arrangement, a separate dedicated funding scheme would allow affiliated repairers to offer reduced charges on repairs, thereby directly reducing the cost to the consumer. A detailed presentation of France's electric and electronic equipment repair fund is available in Annex 8.
- A municipal fund could be financed from municipal revenues. In the examples studied at the international level, the annual maximum amount and the devices covered are defined and as a result, individuals who use repair services can then claim reimbursement from their municipality.

EXTENDED PRODUCER RESPONSIBILITY (EPR)

An approach that seeks to transfer financial and organizational responsibility for managing the waste generated by the consumption of products to companies that originally marketed them (45)

In all cases, the funding of repair activities could be conditional on the use of government certified repair services, for example through a certification process or listing in a directory of repair providers. Table 15 presents the pros and cons of the two proposed measures.

13. A tax credit could also be introduced at the provincial level.

Table 15. Analysis of three options for supporting the affordability of repair

Measure	Pros	Cons
A repair tax credit	→ Rapid applicability to all Canadians possible through a single legislative amendment to the Income Tax Act	→ Time between paying for the repair and receiving a refund → Administrative complexity could possibly reduce participation (requirement to retain invoices in order to make a claim, etc.) → Funded by the government, rather than by industry
Provincial Repair Fund	→ Industry funding rather than government funding, through EPR already in place in all Canadian provinces → Opportunity to have the discount applied on the spot, at the time of repair → Incentive to use ecodesign to foster product sustainability and allow access to smaller components in order to lower repair costs. For example, the **ecofees** could then be adjusted, based on product design and repairability or durability rating.	→ Complexity associated with modifying EPR systems in all provinces and delays in implementation → Reluctance of industry to take on additional costs, resulting in limited funding risk → Potential for questionable governance if EPRs do not include other stakeholders (NGOs, repairers, independent experts, etc.)
Municipal Repair Fund	→ Faster implementation due to smaller scale → Possibility of applying the subsidy on the spot, at the time repairs are made	→ Instability of the fund if not tied to a binding legal framework → Local and limited in scope → Limited funds, which restricts the number of individuals who are able to benefit from a subsidy

ECOFEES

An environmental management fee paid by the affected consumer on the sale of an item that is regulated under an extended producer responsibility system. The fees are used to fund the costs of managing the program (providing collection points, transportation, recycling, etc.).

4. Recommendations

Based on the study's findings, there are a number of measures that could be implemented to improve access to and the right to repair in Canada. Given that repair involves a diversity of stakeholders, the following recommendations are aimed at three distinct stakeholders who all play a role in the access to repair in Canada: governments, manufacturers and retailers, and citizens.

4.1 GOVERNMENTS

4.1.1 Implement ecofiscal measures to encourage the use of repair

Given the fact that the cost of repair is the second greatest impediment for consumers, subsidizing a portion of it could have a significant impact on access to repair. In addition, there is strong support for ecofiscal measures, from both individuals (58.5 %) and repairers from Quebec and British Columbia.

Both options examined as part of the legislative analysis - a federal or provincial tax credit and a provincial or municipal repair fund - could be implemented in a complementary fashion and over a variable time frame.

Priority should be given to establishing an HAE repair fund at the provincial level, financed through EPR systems. Since there is just one **eco-organization**, the Electronic Products Recycling Association (EPRA), that manages all provincial EPR for electronics, a repair fund for these types of devices could also be established at the federal level.

Priority should be given to the establishment of a provincial repair fund for HAEs, to be financed through EPR systems.

- → The repair fund would make it possible to subsidize repair activities, with a discount for the consumer that could be directly applicable when paying the repair bill.
- → Following the example of what happens in France, the financing modalities of this fund should encourage manufacturers to change their practices by penalizing those who market goods that are not durable and not easily repairable. Therefore, it is recommended that ecofees be based on the durability and repairability of an item, with a view to encouraging ecodesign.
- → In order to encourage the establishment of a repair directory, the proposed funding arrangements could be made conditional on the use of the services of a certified repair person.
- → This cost reduction should be substantial enough to encourage the use of repairs and should also include all costs (labour, diagnosis, parts, etc.). The percentage of

ECO-ORGANIZATION

A non-profit organization representing manufacturers subject to extended producer responsibility requirements. These manufacturers pay a fee to the eco-organization to which they belong for each product they market, and the amount of the fee is based on the type of product and the cost of managing that product at the end of its life. These financial contributions thus make it possible to fund the full slate of the manufacturers' obligations (prevention, reuse, collection, sorting, waste recycling, awareness-raising, etc.). The contributions can be tailored according to the manufacturer's compliance with specific environmental criteria, such as the ecodesign of the products they market.

costs covered would have to be determined on the basis of further studies or results from other jurisdictions. In some countries, municipal subsidies cover between 30% and 50% of the repair costs.

The proposed changes to the EPR systems in all provinces represent a significant change with considerable and varying timeframes for implementation. For example, funding through municipal subsidies or a federal tax credit could be considered as a transition measure over the near term. As has already been done in other areas of shared jurisdiction, a federal tax credit could be applied while waiting for provincial funding or in provinces that do not provide any funding. HAEs that have a greater environmental impact, both in terms of their life cycle and their end-of-life management, could be given first priority.

There are other measures that could also be implemented to fund repair activities:

- → Reduce the taxes on repairs: This is done in some European countries, but not necessarily for repairs to HAEs.
- → Offer increased funding for repair shops or reuse projects (municipal or provincial funding). The lack of funding is one major barrier mentioned by a number of reuse stakeholders or organizations hosting DIY repair activities. This recommendation could take the form of subsidies for establishing Repair Cafés or other DIY repair workshops/events, as there are in Belgium and in Graz, or a recurrent budget that is increased each year to ensure that these operations are sustainable.

Finally, any new funding or repair credits should be accompanied by an advertising campaign to encourage the public to use this resource and contribute to consumer behavioural change.

4.1.2 Establish a directory of repair service providers

In order to make it easier for the public to find a repair provider and encourage local repair businesses, a national directory of certified repairers could be established. There is strong support (58.9%) among consumers surveyed for such a measure. In addition, just over one-third of respondents (37.2%) said that they did not know where to find repair services. The repairers interviewed also showed an interest in this type of directory. To make it easier for people to find repair

services, a search by region or postal code should be possible, and search filters (e.g., search by device, brand, year of manufacture, etc.) could also be included. It should also be updated on a regular basis.

To improve consumer confidence in repair businesses, the criteria for inclusion in such a directory could be established along the lines of existing directories elsewhere. For example, the directory could require a customer service rating. Nearly one-quarter of respondents (24.1%) said that repair services were unprofessional and their perception of the repair business was fairly mixed. Municipal and provincial governments could also create this type of directory for their own areas, as has been done in a number of European cities, and for ease of use they could be posted online.

4.1.3 Define and regulate the right to repair at the federal level

In order to frame the proposed legal provisions and formalize the right to repair and access to repair, it is critical that the right to repair be defined in the Canadian Environmental Protection Act. The right to repair could include a prohibition on the design and marketing of products that cannot be repaired. It could also address practices that limit the possibility of having a device repaired by a third party, such as intentional non-repairability.

Since the most important obstacle to repair is the irrepairable nature of products perceived by consumers, it is essential that certain practices be regulated in order to ensure that consumers are able to repair their devices.

This definition should be accompanied by terms and conditions for enforcement and associated sanctions:

→ Include in the right to repair access to tools, parts and manuals within a reasonable time frame and at reasonable cost.

- For example, the charge could be related to the cost of a new item, bearing in mind that the literature points out that if the repair cost is more than a third of the price of a new device, the consumer will more likely opt to replace it.
- The period in which parts and tools are available should be the same. While France, the European Union and three U.S. states have defined a reasonable period of time as three to seven years following the sale of a device, failing to specify the number of years would allow for greater latitude of interpretation, since a reasonable time frame could actually be longer than this defined period.
- Parts, tools and manuals should be made available to both independent repair service providers and to consumers. The survey of repairers found that access to parts was a major hindrance to repair, and that access to information and tools could also be a barrier. The consumer survey found that more than half believe that parts are hard to find and 4 out of 10 believe that manufacturers do not provide the tools needed for repair. Nearly 70% of those surveyed support access to parts over an extended period of time and 6 out of 10 want information on the availability of parts.

- Based on European legislation, a reasonable delivery time for parts should be a maximum of 15 days. It is important to limit the length of time it takes to complete a repair, as 42.5% of respondents in the pan-Canadian survey identified this as one of the barriers to getting their HAEs fixed.

→ Establish the right conditions to allow for DIY repair, based on what is provided for in the French legislation, where the manufacturer is not held responsible for damage or injury resulting from DIY repair, provided proper instructions have been supplied. DIY repair seems to be an important driver, as nearly one-third of those who have seen their devices repaired have done the repairs themselves, and just over half of those surveyed want more information on how to repair their own devices.

→ Make access to earlier versions of software mandatory, including security updates, in order to prevent software obsolescence caused by the induced slowdown of devices equipped with electronic components.

→ Define planned obsolescence and set deterrent penalties for violators. Planned obsolescence practices affect the durability and repairability of goods, and infringe upon the right to repair. Strong support for such a measure was found among those surveyed: 58.3% were in favour of bringing in a law to combat planned obsolescence.

→ Delegate enforcement of the right to repair to a federal agency or provincial bodies, and ensure adequate funding.

These proposed changes would ideally be made at the federal level, but many of the measures (access to tools, parts and manuals at reasonable cost and within a reasonable time frame, terms and conditions governing DIY repair, etc.) could also be included in reforms to provincial consumer protection legislation. The same is true for the tax credit that could be implemented by provincial governments.

To support the right to repair, the federal Copyright Act should also be amended. It should be allowed to circumvent TPMs in the case of repairs in order to prevent these activities from being deemed illegal.

4.1.4 Reform provincial consumer protection legislation to provide a framework for access to repair

Amendments to provincial consumer protection legislation should include, among others:

→ Arrangements for the financial and physical availability of tools, parts and manuals, access to previous versions of software and implementation of a durability index (see detailed recommendations in the previous section). Manufacturers should not be able to escape these obligations, and all goods should be subject to them.

→ Extension of the warranty on repairs, which is currently relatively short (three months in Quebec). It should be noted that this warranty applies specifically to repair services. It coexists alongside the legal warranty, which continues to apply and does not expire as a result of the goods being repaired.

→ Provide modalities to allow DIY repair based on the French legislation.

→ A definition for planned obsolescence with meaningful penalties to be applied in the case of infringement.

→ In order to ensure that HAEs are made increasingly durable, provincial legislation

could include a requirement that provincial consumer protection agencies publish a document setting out reasonable life expectancy benchmarks for each type of appliance in an attempt to simplify enforcement of the legal warranty (e.g. refrigerators - 15 years, computers - 10 years, etc.). There is no official information regarding the reasonable lifespans of various goods. This document could be available on the websites of consumer protection agencies. This would provide consumers with access to reference material that they could show to retailers and manufacturers in support of their efforts to have their HAEs repaired.

→ From the standpoint of increasing goods durability, there should be a trend to lengthening the notion of reasonable lifespan over time. This reference document should therefore be updated frequently (every three to five years).

→ At the same time, the sale of extended warranties should be prohibited, since a reasonable lifespan would extend beyond that of this type of warranty.

→ Independent experts should be asked to provide input to the process of defining criteria and reasonable lifespans for each device.

Application of the proposed legislative changes would be conditional on the necessary financial resources being provided to support the agencies responsible for their implementation and on the availability of clear information being provided to consumers wanting to avail themselves of their right to repair. According to *Option consommateurs*, the lack of funding for the bodies responsible for overseeing enforcement of consumer protection legislation means that many of the measures contained in the legislation are often not fully respected by merchants, especially when it comes to legal warranties. The funding for provincial consumer protection agencies needs to be increased, so as to ensure that the measures provided for in consumer protection legislation are enforced.

4.1.5 Implement a durability index

To provide consumers with better information on the repairability and durability of their appliances, a durability index should be displayed on some HAE products. Such an index would include an assessment of the item's repairability as well as other factors indicative of a long product life. Informational barriers are important for consumers and 56.6% of those surveyed agreed that this type of index needs to be created. Repairers were also open to the idea.

This index should be visible to consumers at the point of purchase (e.g. on the product or packaging) and online. This durability index could be defined in the federal Consumer Packaging and Labeling Act or in provincial consumer protection legislation.

The definition of this index, the various assessment criteria and the choice of appliances submitted should be decided with the support of independent experts, representatives of consumer protection agencies and environmental organizations. However, some of the lessons learned from the repairability index introduced in France that should inform its adoption in Quebec and Canada would include:

→ The various criteria included in the index need to be weighted differently, based on their relative significance to the durability of the appliance;

- → The device's index ratings should be compiled by an independent third party, such as a government certification agency, and not by the manufacturer;
- → In the interests of transparency, the index calculation grids need to be easily accessible to consumers;
- → The index criteria could be reviewed periodically and standards raised so as to encourage manufacturers to improve their practices over time.

It is also recommended that higher priority be given to HAEs that have a greater environmental impact, both in terms of their life cycle and their end-of-life management.

4.1.6 Raise public awareness on the benefits of repair and reuse

In order to curb psychological obsolescence among consumers and to encourage the use of repair and DIY repair, communication and awareness-raising are also essential. In this sense, it would be wise to establish awareness campaigns, on both the environmental, economic and social effects of the overconsumption of HAEs, and on the benefits of repair and reuse. Results from the Canada-wide survey show that one out of every two Canadians are looking for information on the end-of-life environmental impacts of HAEs.

For example, advertising campaigns to encourage people to buy second-hand appliances and have their products repaired could be developed to counteract the frequent ads for new products, which contributes to the early replacement of HAEs. The French government has an ad campaign called "*Les bonnes habitudes*", which includes a video to promote practices such as re-use and repair.

Communication and awareness raising regarding the repair industry should also be aimed at increasing confidence in the sector, given the mixed views the public has of it, and the concerns about the professionalism of repairers that were raised by some consumers.

4.1.7 Equipping the public to practive DIY repair

Since 29.2% of those surveyed who had had their HAE repaired chose DIY repair, and since lack of information has been identified as a barrier to repair, it would seem necessary to equip the population to repair their devices themselves. This could be done by setting up, or supporting the creation of, an official information, educational and resource platform on DIY repair. Funding DIY repair initiatives, as suggested above, would also allow for the democratization and popularization of this practice among the public. Workspaces dedicated to DIY repair activities could be systematically integrated into public services, such as libraries and cultural centres.

4.1.8 Show government leadership

In order to encourage manufacturers to design products that are repairable and sustainable, and thereby increase the supply of these types of products, governments need to set an example by systematically including HAE repairability and sustainability criteria in their public procurement policy and on calls for tenders issued by public agencies.

Since the volumes of government budgets and procurement requirements are substantial, these demands have the potential to significantly impact the supply of goods available on the market by encouraging manufacturers to market goods that have higher levels of repairability and durability. Some cities, such as Winnipeg and Stockholm, are already including these types of repairability and sustainability criteria in their calls for tenders.

Governments should also prioritize repair when appliances break down, as well as reuse when they are taken out of service. HAEs that are no longer being used by public agencies could be refurbished and used by the public or other organizations, thereby extending their useful lives.

4.2 MANUFACTURERS AND RETAILERS

4.2.1 Prioritize ecodesign

In order to extend the life of appliances and to facilitate their repair, HAE manufacturers should prioritize ecodesign. This includes elements such as:

- → Products that are easy to disassemble and reassemble, using readily available tools;
- → Making replacement parts available for several years, as the vast majority of respondents and repairers indicated they would like to see when surveyed;
- → Access to instructions and schematics for use in appliance repair, disassembly and maintenance to support DIY repair activities and address informational barriers. For example, tutorials could be made available to consumers to assist in the maintenance and repair of HAEs.

Appliance manufacturers could also provide clear and easy-to-understand instructions for use of their appliances (diagrams, with multilingual text that is easily readable and understandable, web-based tutorials, etc.) and make these available to repairers and owners. This would make it easier for repairers to perform repairs and for owners to properly maintain their appliances or even perform some of the repairs themselves, if they so choose.

These new practices could even prove beneficial for businesses, since the survey revealed that 70.8% of consumers want reliable and durable HAEs, and that nearly 6 out of 10 respondents would like to see these appliances designed in an environmentally responsible manner. Manufacturers could therefore promote and advertise these practices to attract new customers and set them apart from their competitors.

4.2.2 Facilitate the possibility of repair

There are a number of good practices that manufacturers and retailers could adopt to promote access to the repair of their HAEs, including:

- → Prioritize repairing a product under warranty instead of systematically replacing it, and adapt their supplier and repair networks to make repair the most economical option;
- → Extend a product's manufacturer's warranty after it has been repaired or suspend the warranty for the duration of a repair;
- → Allow repairs by third parties (e.g. independent repair technicians) without adversely affecting the product's warranty;
- → Offer affordable repair packages to address the issue of costs, as this is the second obstacle to repair: Since the limit of acceptable repair costs for consumers is 30% of the price of a new device, repair costs for manufacturers and retailers should be below this threshold. Some companies, such as the *Groupe SEB* in France, offer fixed-price repair plans for certain products.

4.3 CITIZENS

4.3.1 Prioritize reuse and buy long-life products

To limit the volume of raw resources extracted and to extend the life of existing products, consumers should consider buying used HAEs. There are a number of resources to help in the search for second-hand appliances: stores that sell used and refurbished items, offers of refurbished products by some manufacturers, online resale platforms, donations from friends and family, etc.

If a new appliance is absolutely necessary, it is important to research a product's repairability and durability ratings before making a decision. This can be done directly, through the manufacturer or the retailer at the time of purchase. There are also numerous online resources, such as IFixit, which has developed a repairability index for various types of electronics and *Protégez-Vous* which has created a repairability index for a few small appliances.

4.3.2 Proper maintenance of HAEs

According to the repairers interviewed, breakdowns are often the result of little or no maintenance, so proper care of appliances allows to use them longer. Information on how to care for them can be obtained from the manufacturer (e.g. website, user manuals, etc.) and if the information is not available from the manufacturer, there are other resources available, such as Youtube and iFixit, where numerous tutorials on the subject of maintenance can be found.

4.3.3 Reintroducing the repair habit

When an appliance breaks down, the first reflex should be to have it repaired. We should not hesitate to consult a repair specialist for a diagnosis. Sometimes the problem is minor or can be fixed with proper maintenance. A quick search online or among friends and family can often help find a suitable solution (maintenance procedure to solve the problem, repair specialist, online tutorial or information allowing you to do the repair yourself, etc.).

4.3.4 Get engaged to support the right and acess to repair

Citizen participation in support of repair is essential if changes are to be implemented and the habit of repairing devices is to become more and more popular. Consumers can attend repair events and activities to share or develop their repair knowledge and skills, and also to support these initiatives and the organizations that promote them.

Consumers can also learn about and get involved in right-to-repair advocacy movements and organizations in their own areas in an effort to help bring about change.

5. Conclusion

As the consumption of HAEs in Canada is not decreasing and the manufacturing of these appliances generates negative environmental, social and financial costs, repairing them is an essential solution to extending their lifetime and thereby limiting these negative impacts. However, this study reveals that only 18.6% of the population would have their appliances repaired when they break down, and that devices break in 28% of cases within the first year of use. It is now time for changes to be made so that people can take back the power over their devices.

Based on the results of this study, this low use of repair is due primarily to:

- consumers' perception that HAEs are irrepairable;
- the high costs associated with this activity when compared with the cost of a new appliance;
- the difficult access to the necessary parts and tools for both consumers and repairers;
- various other barriers, such as access to information (to perform DIY repairs or to locate repair services), the profitability of repair companies, the time required and geographical accessibility for customers, as well as customer fears about having their appliance repaired; and
- the Canadian legislative framework, which could act as a lever in promoting and encouraging appliance repairs if improved.

Additional levers that can be used to support repair and which emerged from this research include specifically:

- government measures: financial incentives, repairability or durability indexes, legislation to penalize planned obsolescence, etc.
- measures by manufacturers and retailers: more affordable repair charges, easier access to the components needed for repair, products that are more durable and repairable, etc.

The barriers to repair documented in this study demonstrate that the current linear economic system is firmly entrenched. The road is smoothly paved for appliances to proceed to the landfill after use, and there are many obstacles to repair. But these roadblocks are not insurmountable; there are a variety of measures that need to be put into place and all the stakeholders—governments, manufacturers and consumers—need to assume their share of the responsibility.

On the one hand, governments have to provide incentives for repair, including subsidies, a sustainability index and a directory of certified companies, as well as support for DIY repair activities and public awareness. They also need to amend various laws to ensure that the public has a real right to repair.

Manufacturers need to focus on ecodesign (by designing appliances that are durable and repairable and providing access to the components needed for repair) and ensure easier access to repair for their customers.

Finally, consumers need to educate themselves on the repairability, durability and maintenance of their HAEs, and prioritize repairing their appliances. The public can also get involved by supporting the right to repair and access to repair, including by contributing to DIY repair initiatives.

While this research provides an initial look at HAE repair in Canada, there are other angles to this theme that still need to be explored, such as the availability of repair training, geographic accessibility to repair services for remote communities, and the perspectives of other stakeholders in the repair ecosystem.

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Annexes

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Annex 1. Glossary

Annex 2. Detailed methodology

Annex 3. Summary of meetings with Indigenous peoples in Quebec

Annex 4. Detailed Analysis of Structural Measures

Annex 5. References Consulted for the Literature Review

Annex 6. References Consulted for the Analysis of the Structural Measures

Annex 7. References Consulted for the Legislative Analysis

Annex 8. Description and issues relating to France's Repair Fund

Équiterre

WORKING TOWARDS REPAIRABLE APPLIANCES AND ELECTRONICS IN CANADA

OCTOBER 18TH 2022