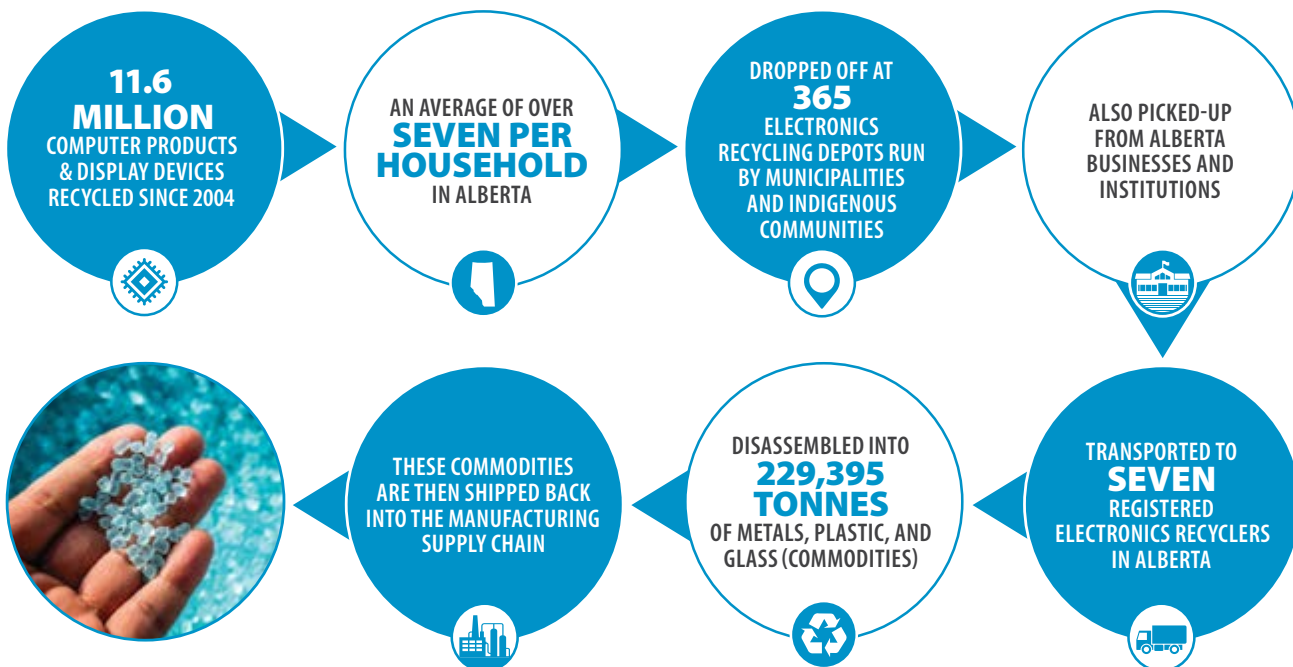


STEWARDSHIP ELECTRONICS RECYCLING 2022-23 PROGRESS REPORT



MAKING RECYCLING MORE CONVENIENT

96% of the population live no further than a 20-minute drive from an electronics recycling depot.

ELECTRONICS RECYCLING RESULTS

This chart displays the results of electronics recycling over the last three years. Processed volumes in 2022/23 continue to decline as the trend toward lighter devices continues over time. There were 53 Hard-to-Get Electronics Roundups held this year by non-profit organizations and community groups (with uptake in larger centres).

	PROGRAM MATERIALS TONNES	KG. PER CAPITA	RECOVERY RATE	ePILOT MATERIALS* TONNES
2020/21 Result	8,600	1.94	31%	4,663
2021/22 Result	8,493	1.90	34%	5,340
2022/23 Target	9,026	1.99	36%	N/A
2022/23 Result	8,377	1.80	31%	5,176

*2020/21 ePilot tonnage represents six months of operation plus a clean-up of volumes at processor sites at the outset of the ePilot. 2021/22 and 2022/23 ePilot tonnage represents 12 months of operation.

PROGRAM SUSTAINABILITY

In 2022/23 an incentive review study was initiated and will be finalized in 2023/24. This review is an encompassing look at ARMA’s stewardship programs to assess the overall incentive model and make recommendations on necessary adjustments to incentive program activities, incentive structure, and associated incentive rates.

The primary objective of this review is to optimize the programs with the following goals in mind:

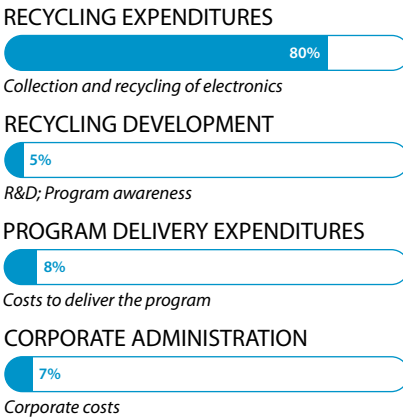
- 1. Ensure materials are managed appropriately at end-of-life.
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- 3. Optimize the collection network to support high recovery rates and access of Albertans.
- 4. Consider the impacts of recycling by-products with volatile market prices.

- 5. Provide an adequate level of funding to ensure sustainable collection, transportation, and processing at a reasonable cost (environmental fees) to Albertans.
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- 7. Support the advancement of the circular economy in Alberta by encouraging entrepreneurship, investment, and innovation.
- 8. Ensure an optimal transportation model.
- 9. Ensure the program incentive model minimizes disruption to the operation of free markets

Periodically, sustainability reviews of processor operations are conducted by an independent third-party to assess if program funding levels are appropriate. In 2022/23, a sustainability review was completed for the Paint program, providing valuable information for the management of the program.

FEES AS OF OCT. 1/21		
	TVS, MONITORS, AND ALL-IN-ONE COMPUTERS LESS THAN 30 INCHES	\$2.50
	TVS, MONITORS, AND ALL-IN-ONE COMPUTERS 30 INCHES OR LARGER	\$6.00
	COMPUTERS AND SERVERS	\$2.00
	LAPTOP, NOTEBOOK, AND TABLET COMPUTERS	\$0.80
	PRINTERS, SCANNERS, PHOTOCOPIERS, AND FAX MACHINES	\$3.00

FEE MANAGEMENT



ELECTRONICS EXPANDED

The ePilot has continued to receive strong support from Albertans with over 5,100 tonnes of devices being dropped off for recycling in the categories of small appliances, audio-visual, telecom, power and air tools, games, toys and music, and lawn and garden material.

The data gathered through the ePilot project—which began in September 2020—was used to develop recommendations to modernize the electronics recycling program for the long term. These recommendations were submitted to the province in 2022 and are being reviewed. In the interim, the ePilot has been extended through Ministerial Order until March 2024.



PROGRAM PARTICIPATION AND ACCESS

Municipalities and Indigenous communities are key partners on the front line of the program, managing 365 electronics recycling depots in 148 communities across the province. Each site is reviewed annually, with ARMA field staff assisting site operators to ensure they are maximizing the tools available to them through the program.

Additionally, 53 Electronics Recycling Roundups were held this year. These are special community events that provide an additional opportunity for Albertans to recycle over and above the year-round depots.

87% OF ALBERTANS SUPPORT THE ELECTRONICS RECYCLING PROGRAM

Albertans' support of the electronics recycling program remains strong, as measured in the 2021/22 Survey. This response helps drive the program's success as a means to effectively divert end-of-life electronics from landfills.

Surveys are done every three years so there is no new data this year.



HOW 11.6 MILLION ELECTRONICS ARE RECYCLED

Registered processors pick up TVs and computer products from businesses, institutions, and registered collection sites located in municipalities and Indigenous communities across the province. The collected material is transported to Alberta-based processing facilities where they are broken down and separated into metals, plastic

and glass, which are then shipped into the manufacturing supply chain. The following are results from the past three years, revealing a year-over-year decrease in glass and plastic which could be indicative of a decrease in cathode-ray-tube TVs and monitors available for recycling.

2020-21 RESULTS = 8,600 TONNES



2021-22 RESULTS = 8,493 TONNES



2022-23 RESULTS = 8,377 TONNES



*Includes batteries, toner, ink, wire, cables, wood.

KEEPING HAZARDOUS SUBSTANCES OUT OF THE LANDFILL

Since 2004, 15,325 tonnes of hazardous material has been safely and properly handled during the recycling process. The following are results from the past three years showing some of the substances of concern that have been diverted from the landfill.

	MATERIAL	2020-21	2021-22	2022-23
	Lead (tonnes) Circuit boards, cathode ray tubes, TVs, monitors, CPUs, laptops, and printers.	289	270	229
	Mercury (kg.) Batteries - general; mercury lamp batteries and switches; laptops	0.34	0.36	0.30
	Cadmium (kg.) Circuit boards, cathode ray tubes, insulated wire, TVs, monitors, and CPUs	4.10	3.13	3.23
	Beryllium (kg.) Circuit boards, TVs, and monitors	12.25	11.51	9.70
	Antimony (tonnes) Circuit boards, CPUs, laptops, and printers	1.25	1.07	1.08

SECURITY

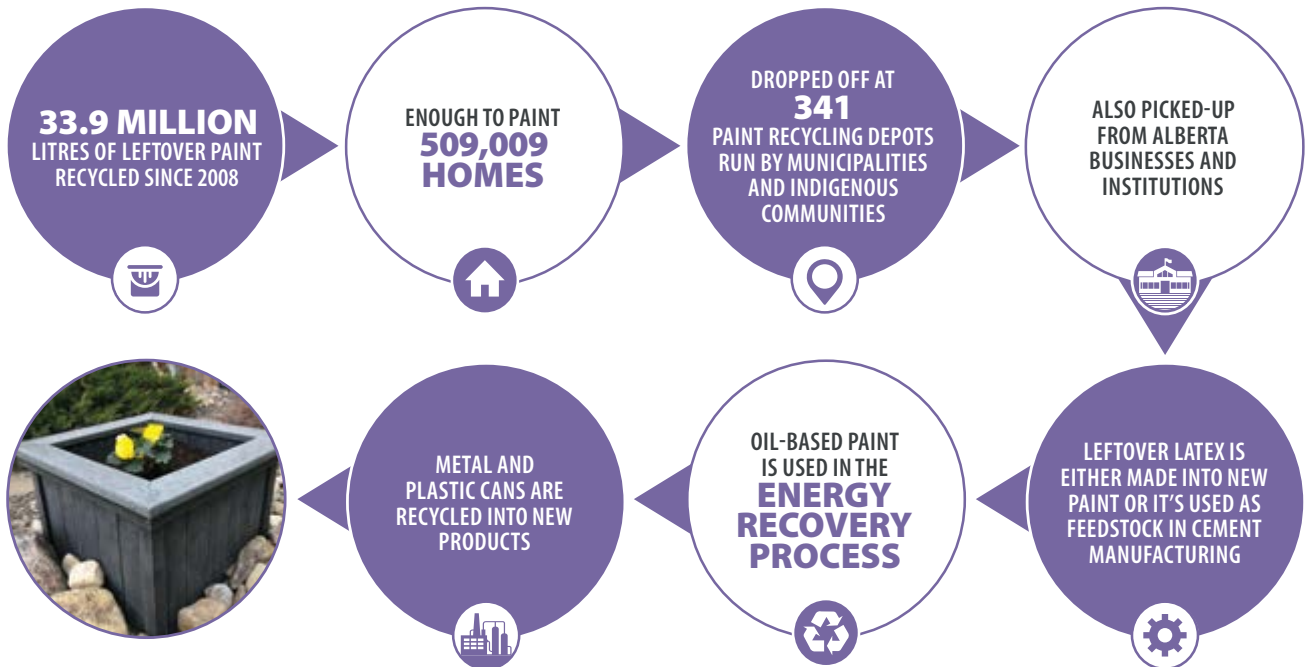
Electronics recyclers registered with ARMA adhere to registered processor compliance requirements, ensuring safe and proper disposal of personal information found on devices. However, ARMA recommends wiping your device or hard drive before recycling it for your peace of mind.



ENVIRONMENTAL COMPLIANCE

A program goal is to ensure registered processors operate in an environmentally and socially responsible manner. Annual environmental audits by external experts are conducted to confirm if the processors are following program requirements.

STEWARDSHIP PAINT RECYCLING 2022-23 PROGRESS REPORT



MAKING RECYCLING MORE CONVENIENT

93% of the population live no further than a 20-minute drive from a paint recycling depot.

PAINT RECYCLING RESULTS

This chart displays results of paint recycling over the last three years. Paint and coating processed remained relatively flat over the previous year.

PAINT AND COATINGS PROCESSED	KG. (MILLIONS)	LITRES* (MILLIONS)	KG. PER CAPITA	RECOVERY RATE	CAPTURE RATE
2020/21 Result	3.02	2.51	0.68	9%	77%
2021/22 Result	2.95	2.46	0.66	9%	78%
2022/23 Target	2.70	2.25	0.60	10%	85%
2022/23 Result	2.94	2.45	0.63	10%	86%

*Based on an average weight per litre of 1.2 kg.



RECYCLING RESULTS FOR PAINT CANS

PAINT AND COATING CONTAINERS PROCESSED

Reported volumes of recycled containers have decreased over 2021/22. Some recyclers have expressed challenges with finding an end-market that will accept their empty containers for recycling.

AEROSOL PAINT CANS PROCESSED

The handling of aerosol paint cans by registered processors resulted in a large increase over the prior year, i.e. delays in processing at the previous year end pushed a large volume from 2021/22 into 2022/23.

PAINT AND COATING CONTAINERS PROCESSED	METAL (KG.)	PLASTIC (KG.)	TOTAL (KG.)
2020/21 Result	255,133	161,776	416,908
2021/22 Result	402,278	309,721	711,999
2022/23 Target	301,286	242,529	543,815
2022/23 Result	363,319	169,213	532,532

AEROSOL PAINT CANS PROCESSED	UNITS	RECOVERY RATE
2020/21 Result	702,697	14%
2021/22 Result	651,743	14%
2022/23 Target	705,672	17%
2022/23 Result	1,024,115**	25%

***See commentary in 'Aerosol Paint Cans Processed' section above.*

RECYCLING EMPTY METAL & PLASTIC PAINT CANS

Made-in-Alberta solutions address the handling of leftover latex paint with an approved recycler who processes it into new paint. If the latex is solid or semi-solid, it can be used as feedstock in cement manufacturing rather than being landfilled.

Leftover oil-based products such as stains and finishes are used in fuel blends to provide an alternative fuel source. Plastic containers are recycled into molded products, and the metal cans are recycled into industrial products such as rebar.



PROGRAM SUSTAINABILITY

The environmental fees Albertans pay for new paint are used to help fund the collection and recycling of used material along with other program-related costs. Registered producers and suppliers remit fees on eligible products sold. ARMA values their commitment as part of the front line of the program.

In 2022/23 an incentive review study was initiated and will be finalized in 2023/24. This review is an encompassing look at ARMA's stewardship programs to assess the overall incentive model and make recommendations on necessary adjustments to incentive program activities, incentive structure, and associated incentive rates.

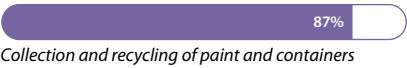
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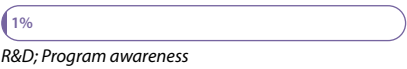
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FEE MANAGEMENT

RECYCLING EXPENDITURES



RECYCLING DEVELOPMENT



PROGRAM DELIVERY EXPENDITURES



CORPORATE ADMINISTRATION



	100ml to 250ml	\$0.25
	251ml to 1L	\$0.50
	1.01L to 5L	\$1.00
	5.01L to 23L	\$2.25
	Aerosol/Spray Paint Cans (all sizes)	\$0.25



ALBERTA BUSINESSES RECYCLE THEIR PAINT

Commercial paint roundups are firmly established events in Edmonton, Calgary, and for the third year in a row, Red Deer. The roundups enable painting contractors and businesses to drop off unlimited amounts of program paint at no charge. ARMA staff are also on site to help unload material.

WHAT HAPPENS TO YOUR LEFTOVER PAINT?

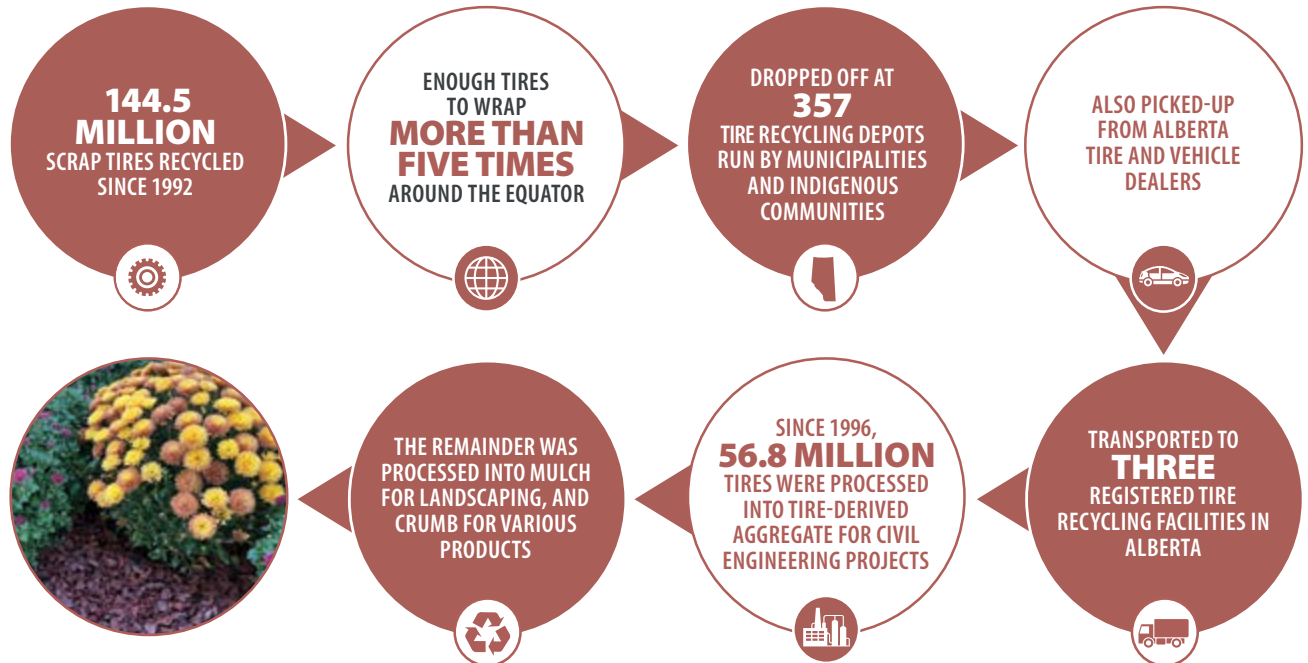
Registered recyclers pick up leftover or unused paint and empty cans from 341 paint recycling depots and recycling roundups (31 events in 2022/23) as well as from businesses and institutions.

Oil-based paint is bulked and shipped to approved downstream processors to be used in fuel blends to provide alternative fuel sources.

Latex paint is delivered to an approved recycler in Alberta for processing into new paint or, if the latex is solid or semi-solid, it is used as feedstock in cement manufacturing.



STEWARDSHIP TIRE RECYCLING 2022-23 PROGRESS REPORT



TIRE SUPPLIERS' RECYCLING ROLE

When Albertans get new tires, they usually leave their old ones behind. They can because vehicle and tire dealers, and auto repair shops play a dual role—selling new tires and making sure the old scrap tires you leave behind are collected for recycling at Alberta facilities.

TIRE RECYCLING RESULTS

Tire volumes collected in 2022/23 increased over the previous year, consistent with higher sales of new tires. Processing volumes declined marginally due to market fluctuations and reduced demand for processed tire material. This chart displays results of tire recycling over the last three years.

TIRES PROCESSED	— TONNES —		KG. PER CAPITA	RECOVERY RATE FOR PLTT, MTT, AND SIO TIRES *	RECOVERY RATE FOR OFF-THE-ROAD-TIRES
	COLLECTED	PROCESSED			
2020/21 Result	67,804	66,461	14.98	94%	80%
2021/22 Result	73,572	66,308	14.80	95%	65%
2022/23 Target	70,664	65,929	14.57	95%	74%
2022/23 Result	77,581	64,940	13.97	97%	78%

*Passenger and Light Truck Tires (PLTT), Medium Truck Tires (MTT), Specialty, Industrial and Other Tires (SIO).

PROGRAM SUSTAINABILITY

The environmental fees Albertans pay for new tires are used to help fund the collection and recycling of used material along with other program-related costs. Registered producers and suppliers remit fees on eligible products sold. ARMA values their commitment as part of the front line of the program.

In 2022/23 an incentive review study was initiated and will be finalized in 2023/24. This review is an encompassing look at ARMA's stewardship programs to assess the overall incentive model and make recommendations on necessary adjustments to incentive program activities, incentive structure, and associated incentive rates.

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FEE MANAGEMENT

RECYCLING EXPENDITURES



Collection and recycling of tires

RECYCLING DEVELOPMENT



R&D; Program awareness

PROGRAM DELIVERY EXPENDITURES



Costs to deliver the program

CORPORATE ADMINISTRATION



Corporate costs





This chart breaks out the amount of tires processed by type for the past three years. Tires vary in size and weight, therefore a standardized unit is applied to present the results, using a passenger-tire-equivalent (PTE) of one PTE equaling 10 kgs. There is 100 PTEs in one tonne of tires.

YEAR	PASSENGER, LIGHT TRUCK, SPECIALTY, INDUSTRIAL & OTHER TIRES (PTE)	MEDIUM TRUCK TIRES (PTE)	OFF-THE-ROAD TIRES (PTE)
2020/21	4,099,700	2,096,000	450,400
2021/22	4,302,000	1,934,400	394,300
2022/23	4,072,900	2,015,600	405,500

	CAR AND LIGHT TRUCK TIRES <i>INCL. SPARES, SPORT & CROSS-OVER UTILITY, MEDIUM TRUCK <19.5" RIM</i>	\$4.00/tire
	SPECIALTY, INDUSTRIAL AND OTHER TIRES <i>INCL. TRAILER, ATV, DIRT BIKE, FORKLIFT, SMALL LOADERS, AND SKID-STEERS</i>	\$4.00/tire
	MEDIUM TRUCK TIRES <i>INCL. LARGE COMMERCIAL FREIGHT TRUCKS, AND PASSENGER BUSES</i>	\$14.00/tire
	OFF-THE-ROAD TIRES <i>INCL. CONSTRUCTION, ROAD BUILDING, FORESTRY MINING, ETC.</i>	\$40.00, \$100.00, or \$200.00/tire depending on rim size

ENVIRONMENTAL COMPLIANCE

A program goal is to ensure all scrap tires are collected and processed by registered recyclers in an environmentally and socially responsible manner. Monthly inspections by ARMA and an environmental audit by external experts every three years confirm recyclers are meeting program requirements.



THE RECYCLING PROCESS FOR USED TIRES

Tires are recycled in Alberta by ARMA-approved processors into products such as tire-derived aggregate (TDA)—an engineered, cost-effective alternative to conventional aggregate for use in leachate drainage blankets—mulch for landscaping purposes, and crumb applied as a top dressing in sports fields and as feedstock for manufactured products.



STAGE 1

Tires are shredded into spec pieces for use as tire-derived aggregate (TDA). The steel and fibre are still embedded.

APPLICATION: TDA is a cost-effective alternative to conventional aggregate (a limited and non-renewable resource) for use in leachate drainage blankets.



STAGE 2

The shredded tires are ground to make mulch, with the steel removed.

APPLICATION: For use in landscaping.

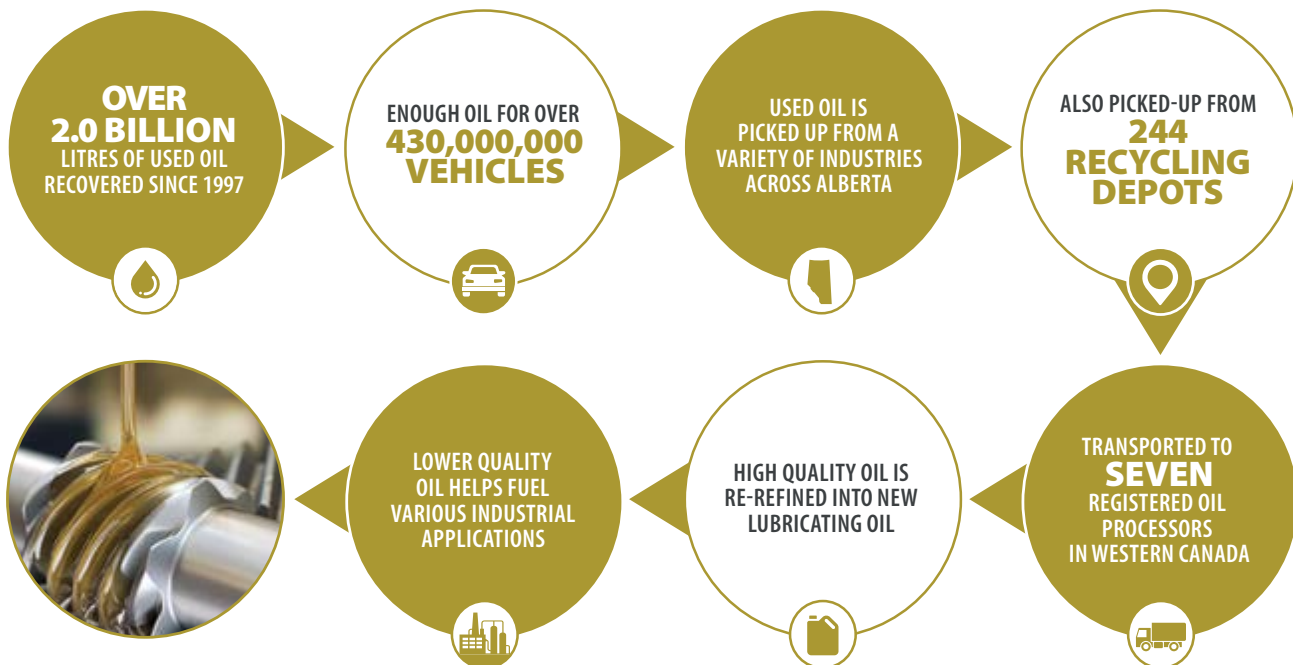


STAGE 3

The shredded tires are processed into crumb, with the steel and fibre removed.

APPLICATION: For use in playground surfaces, various molded products, synthetic turf, and athletic tracks.

STEWARDSHIP USED OIL & MATERIALS RECYCLING 2022-23 PROGRESS REPORT



MAKING RECYCLING MORE CONVENIENT

Municipalities and Indigenous communities are committed to this program and have established 244 recycling depots and held 28 roundups in 2022/23 for the collection of used oil materials.

USED OIL RECOVERY RESULTS

This chart presents results over the last three years for used oil recovery. 2022-23 showed a 5.2% increase in recovered oil over the previous year.

USED OIL RECOVERED	LITRES (MILLIONS)	KG.* (MILLIONS)	KG. PER CAPITA	CAPTURE RATE
2020/21 Result	73.26	63.74	14.37	74%
2021/22 Result	78.05	67.91	15.16	70%
2022/23 Target	82.73	71.98	15.90	78%
2022/23 Result	82.07	71.40	15.37	70%

*Based on an average weight per litre of 0.87 kg.

Definition of capture rate: industry estimates that 34.3% of oil sold is consumed during use, leaving 65.7% as end-of-life.



COLLECTION AND PROCESSING RESULTS FOR FILTERS

The chart presents results over the last three years for used oil filters collected and processed. Collected volumes declined by 1.8% while processed volumes of filters rose marginally by 0.7%.

FILTERS COLLECTED AND PROCESSED	— KG. (MILLIONS) — COLLECTED	— PROCESSED	KG. PER CAPITA	RECOVERY RATE
2020/21 Result	3.74	2.67	0.84	77%
2021/22 Result	3.98	2.90	0.89	72%
2022/23 Target	4.24	3.03	0.96	82%
2022/23 Result	3.91	2.92	0.84	76%



COLLECTION AND PROCESSING RESULTS FOR CONTAINERS

This chart presents results over the last three years for containers collected and processed.

There was small decrease in containers collected. The volume of containers processed was negatively impacted by equipment issues at a processing site. ARMA continues to conduct container audits at processor sites to ensure that program funds are used for eligible material.

CONTAINERS COLLECTED AND PROCESSED	— KG. (MILLIONS) — COLLECTED	— PROCESSED	KG. PER CAPITA	RECOVERY RATE
2020/21 Result	2.15	1.61	0.49	92%
2021/22 Result	2.14	1.77	0.48	86%
2022/23 Target	2.38	1.79	0.53	96%
2022/23 Result	2.09	1.53**	0.45	87%

**2022/23 container processing volumes were negatively impacted by equipment issues at a processing site.



WHAT HAPPENS TO YOUR EMPTY CONTAINERS AND USED FILTERS

Plastic oil containers and metal oil filters are an equally important part of the Used Oil Materials Recycling Program as the environmental fees paid at the time of purchase help fund the collection and recycling of these materials.

The containers are pelletized and used as feedstock for new plastic products such as composite lumber, fence posts, and parking curbs. Oil filters are crushed (with the residual oil captured) and processed into industrial materials such as rebar.

PROGRAM SUSTAINABILITY

The environmental fees Albertans pay for new oil materials are used to help fund the collection and recycling of leftover material along with other program-related costs. Registered producers and suppliers remit fees on eligible products sold. ARMA values their commitment as part of the front line of the program.

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FEE MANAGEMENT

RECYCLING EXPENDITURES



Collection and recycling of used oil materials

RECYCLING DEVELOPMENT



R&D; Program awareness

PROGRAM DELIVERY EXPENDITURES



Costs to deliver the program

CORPORATE ADMINISTRATION



Corporate costs

ENVIRONMENTAL COMPLIANCE

An objective of the program is to ensure that all used oil materials are collected and processed by registered recyclers in an environmentally and socially responsible manner. Monthly inspections by ARMA and an environmental audit every three years, confirm if the recyclers are following the requirements of the program.



ADJUSTMENTS TO THE ENVIRONMENTAL FEES FOR LUBRICATING OIL & MATERIALS

When ARMA assumed responsibility for the Used Oil Program in October 2018, the program was facing significant challenges. Since then, ARMA has been working diligently with collection sites, Registered Processors, and Alberta Environment and Protected Areas (EPA) on solutions to the ongoing challenges of the Used Oil Program.

With input from key stakeholders (including registered processors), an environmental fee adjustment has been identified as an urgent need to support the sustainability of the collection, transportation, and processing network for the industry. These environmental fees have not been updated since 2011. The new fees, to take effect October 1, will align Alberta's fees with those currently being charged by other jurisdictions across Canada. The adjustment will allow the program to provide increased support to the recycling activities of registered processors, municipal collection sites, and Indigenous communities.

New Eco Fee Rates starting October 1, 2023

- I. For lubricating oil, \$0.06 per litre or per kilogram;
- II. For lubricating oil containers, \$0.12 per litre of container size for containers made of high-density polyethylene (HDPE) or metal materials and \$0.20 per litre of container size for containers made of non-HDPE or non-metal materials; and
- III. For filters, \$0.55 for a filter less than 203 mm in length and \$1.25 for a filter 203 mm or more in length.

For questions about the changes to environmental fees, please email usedoil@albertarecycling.ca



PROPOSED PROGRAM EXPANSION

In 2021-22 ARMA received direction from Alberta Environment and Protected Areas to consult with industry associations and other stakeholder organizations regarding expanding the program to include:

- Diesel Exhaust Fluid (DEF) containers,
- Glycol/Antifreeze concentrate and pre-mix,
- Glycol/Antifreeze containers,
- Brake fluid containers,
- Aerosol containers for brake cleaner, automotive parts cleaner, and lubricant, and
- Windshield washer fluid containers.

The proposed expansion also focused on increasing the maximum container size in the program from 30L to 210L. The consultations received industry support for the materials listed above to be included in a program expansion.

These recommendations were submitted to the province in 2022/23 and are being reviewed.