



Used Oil Container Product Stewardship

MATERIAL FLOWS



Final Scheme Design

Appendix 1: Material flows

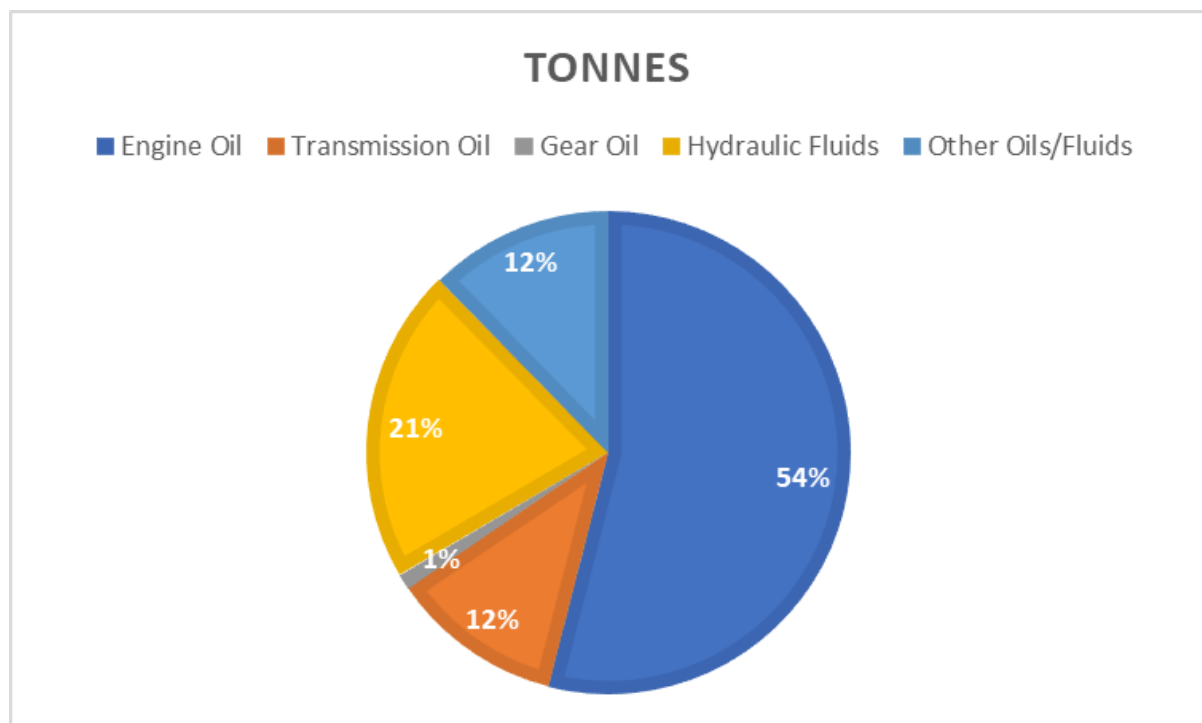
Overview

Consumption by market segment

Total consumption of in-scope packaged oil lubricants is estimated to have been 101 million litres in 2021. The lubricants were housed in about 41 million containers, weighing an estimated 7,157 tonnes (Table 9). About 54% of the containers, by volume and weight, were used for motor vehicle engine oils (Figure 3). Other significant market segments include transmission oil (12% by weight), motor vehicle hydraulic fluids (21%) and oils used in other equipment (12%).

Table 1: Used oil lubricants and containers by market segment, in volume, count and tonnes, 2021

	Volume (L)	Count (containers)	Tonnes (containers)	% (weight)
Engine Oil	54,124,429	20,767,347	3,863.3	54%
Transmission Oil	11,796,531	5,553,386	826.3	12%
Gear Oil	1,249,728	691,919	74.0	1%
Hydraulic Fluids	21,122,908	8,768,758	1,510.2	21%
Other Oils/Fluids ¹	12,375,915	4,748,594	883.4	12%
Total	100,669,511	40,530,004	7,157	100%



¹ Includes lubricants used in small scale boating and marine, horticultural and other small scale agricultural equipment, small scale commercial equipment and household garden equipment.

Figure 1: Percentage split of oil containers by mass and market segment, 2021

Total consumption of packaged lubricants has remained relatively steady over the last 14 years (Figure 4). This situation reflects an increase in the total size of the motor vehicle fleet in Australia over the period, but a reduction in engine oil consumption of new vehicles relative to older vehicles.

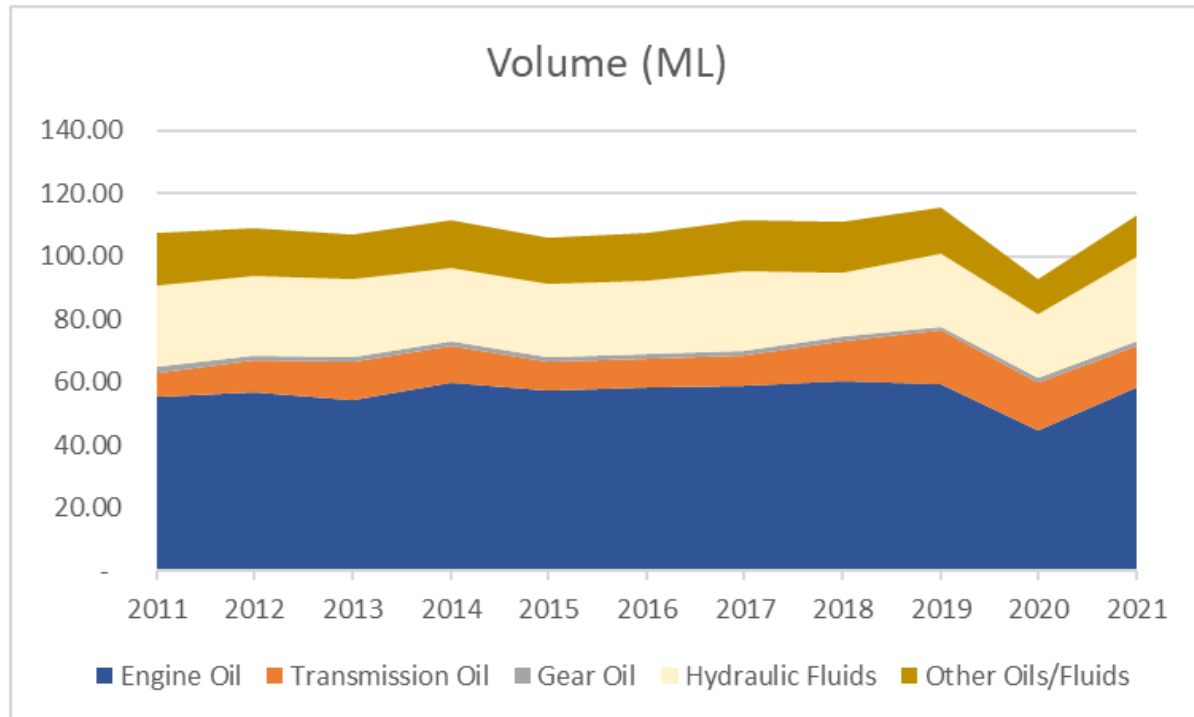


Figure 2: Consumption of in-scope packaged lubricants, 2011-2021 (ML)

Regional breakdown of oil containers

Table 10 provides a regional breakdown of in-scope oil containers in tonnes. In 2021, an estimated 4,828 tonnes of in-scope containers (67%) were consumed in the state and territory capital cities, with the remaining 2,329 tonnes (33%) being consumed in regional and rural areas.

Table 2: Regional breakdown of in-scope oil containers, tonnes, 2021

State/Territory	Region	Tonnes	%
New South Wales	Metro	1,490	21%
	Non-metro	760	11%
Victoria	Metro	1,416	20%
	Non-metro	407	6%
Queensland	Metro	717	10%
	Non-metro	745	10%
South Australia	Metro	383	5%
	Non-metro	119	2%
Western Australia	Metro	595	8%
	Non-metro	172	2%
Tasmania	Metro	66	1%
	Non-metro	92	1%
Northern Territory	Metro	41	1%
	Non-metro	28	0%

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Australian Capital Territory	Metro	120	2%
	Non-metro	6	0%
Subtotals	Metro	4,828	67%
	Non-metro	2,329	33%
Total		7,157	100%

Consumption by packaging size

Of the total 41 million in-scope oil containers consumed in 2021, approximately 29 million or 72% were 1 litre containers (Table 11). About 6.5 million containers (16%) were 5 litre containers, with 1.1 million containers (3%) being 10 litre containers. On a volume (and weight) basis, 1 litre containers comprise a smaller but still substantial share of oil container packaging at 29% of total packaging volume. Five litre containers comprise 32% of total packaging volume, 10 litre containers 11% and 20 litre containers 13%.

Table 3: Consumption of oil containers by packaging size, 2021

Volume	Count	Count %	Volume	Volume %
Up to 1 litre	29,282,153	72%	29,282,153	29%
Up to 4 litres	1,809,876	4%	7,239,503	7%
Up to 5 litres	6,491,539	16%	32,457,693	32%
Up to 6 litres	785,488	2%	4,712,930	5%
Up to 7 litres	365,339	1%	2,557,370	3%
Up to 10 litres	1,149,232	3%	11,492,324	11%
Up to 20 litres	646,377	2%	12,927,537	13%
Total	40,530,004	100%	100,669,511	100%

Projections of oil container packaging, numbers and mass

The total number of in-scope used oil container packs generated in Australia each year is projected to increase from about 41 million containers in 2021 to 45 million containers per year in 2030. Thereafter, packaging numbers are projected to experience a decline to 34 million containers in 2042 and 25 million containers in 2050 (Figure 5). The key driver of this trend is electric vehicle (EV) take-up in the Australian motor vehicle fleet. The proportion of EVs in the Australian fleet is expected to experience a rapid increase from the early 2030s onwards from only about 2.5% of the total fleet in 2031 to a majority of the total fleet by 2040 (Figure 6). EVs will dominate the total fleet by 2050. This trend will affect sales of motor vehicle engine oils. Oils used in non-motor vehicle applications (Other Oils) are expected to experience a similar trend.

The mass of in-scope used oil containers is expected to follow the trend outlined above. The total mass of containers is projected to increase from 7,157 tonnes in 2021 to about 7,921 tonnes in 2030 and then experience a steady decline to about 5,824 tonnes in 2042. In the absence of any significant materials technology developments over this period, the material composition of the containers is expected to remain roughly constant at about 82% HDPE, 15% metal and 3% other materials (Figure 7).

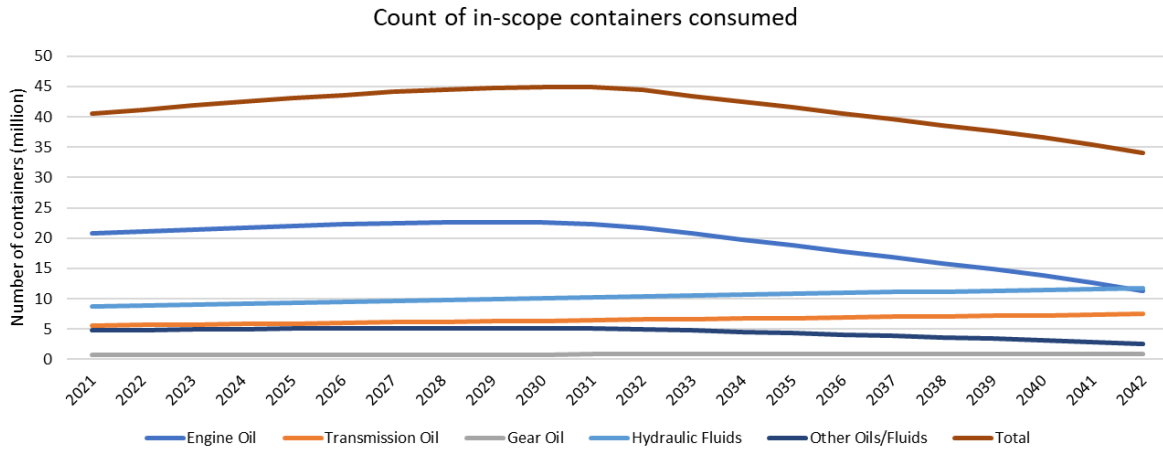


Figure 3: Projected number of packaged oil containers, 2021-2042

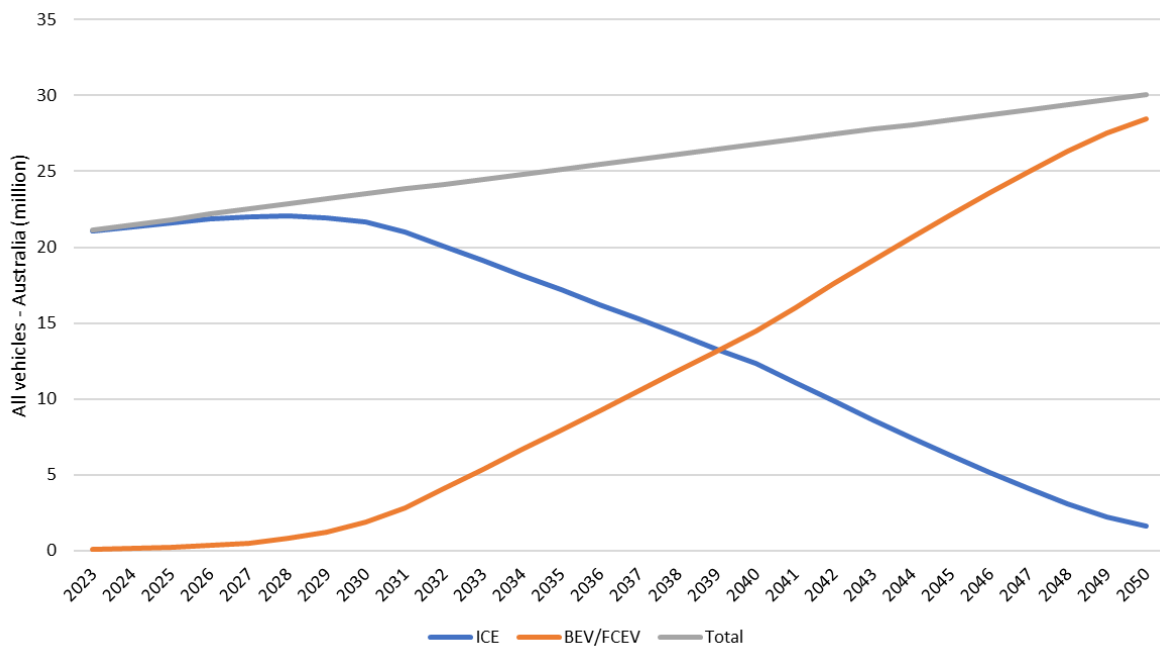


Figure 4: Projected motor vehicles numbers in Australia, ICE and EV², 2023-2050

² Include battery electric vehicles (BEV) and fuel cell electric vehicles (FCEV)

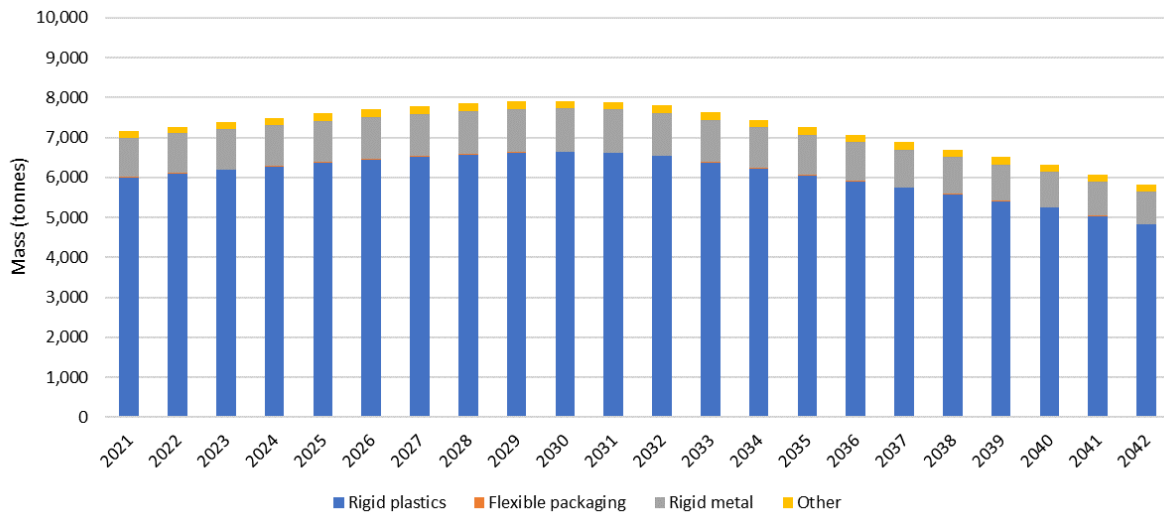


Figure 5: Projected mass of packaged oil containers by packaging material, 2021-2042 (tonnes)

Destination of containers

Recovery of used oil containers is estimated at present to be about 550 tonnes or 7.7% of the total weight of used oil containers generated each year. In the absence of any major new initiatives, this recovery rate is assumed to remain unchanged under the Base case. Under Option 1 (PSO) and Option 2 (Co-reg) recovery of used oil containers is assumed to achieve the 50% recovery target after five years of scheme implementation and then remain at 50%. Thus, recovery of used oil containers under these options would increase to about 4,000 tonnes by 2030 before gradually declining to about 2,900 tonnes in 2042 in line with the projected decline in mass of containers generated (Figure 8). Under Option 3 (Voluntary) recovery of used oil containers is assumed to achieve the 30% recovery target after five years of scheme implementation and then remain at 30%.

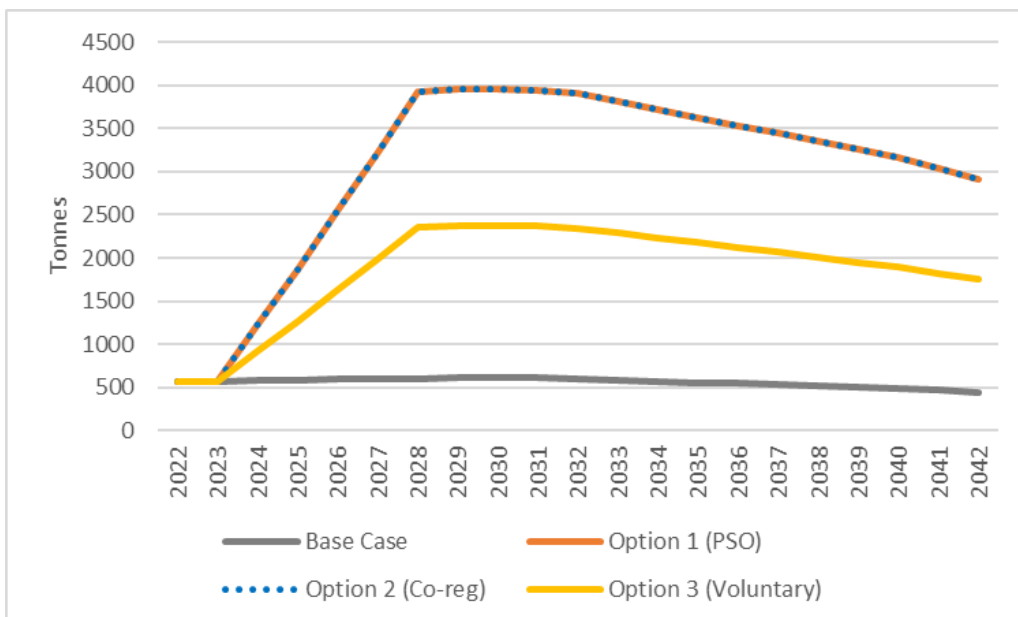


Figure 6: Projected recovery of used oil containers under Base case and options, 2021-2042 (tonnes)