



Infrastructure capacities and needs for hazardous waste in Australia

Presentation to Waste 2015, Coffs Harbour, 7 May 2015



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The project

Commonwealth Department of the Environment project

- commitment in National Waste Policy

Undertaken by a consortium of:

-    

Three parts:

- 20 year projections of hazardous waste arisings and fates
- estimate Australia's current infrastructure capacity & distribution
- combine these results to compare current capacities with future needs

This presentation

- large and unfinished project (currently at draft report stage)
- will attempt to scan it and cover interesting bits

Hazardous waste is?

Materials subject to higher levels of jurisdictional regulation

- trackable, listed, prescribed, controlled or regulated waste

A few other materials not (yet) so controlled

- new persistent organic pollutants declared under Stockholm Convention
- contaminated biosolids
- lithium ion batteries

Groups analysed based on NEPM 15 classification

- disaggregated a few key groups

Hazardous waste groups

Waste group	Closest NEPM category	Waste group	Closest NEPM category
1 Plating & heat treatment	A	16 PFOS	M160a
2 Acids	B	17 POP-BDEs	M160b
3 Alkalis	C	18 HBCD	M160c
4 Mercury & compounds	D120	19 HCB	M160d
5 Lead & compounds	D220	20 Other organic chemicals	Other M
6 Non-toxic salts	D300	21 Contaminated soils	N120
7 Other inorganic chemicals	Other D	22 Contaminated biosolids	N205a
8 Reactive chemicals	E	23 Other industrial treatment residues	N205b
9 Paints, resins, inks, organic sludges	F	24 Asbestos	N220
10 Organic solvents	G	25 Other soil/sludges	Other N
11 Pesticides	H	26 Clinical & pharmaceutical	R
12 Oils	J	27 Tyres	T140
13 Animal effluent and residues (+ food processing waste)	K100	28 Other miscellaneous	Other T
14 Grease trap waste	K110	29 Lithium-ion batteries	n/a
15 Tannery & wool scouring wastes	K140 & 190		

Projections method

Looked for pre-existing projections

Considered

- historical data, including ‘arisings’ (tonnages), industry sources, fates
- likely futures of industry sources
- projected population and economic growth
- opinions of industry and government
- current stockpiles

Significant uncertainties

- best, high and low estimates

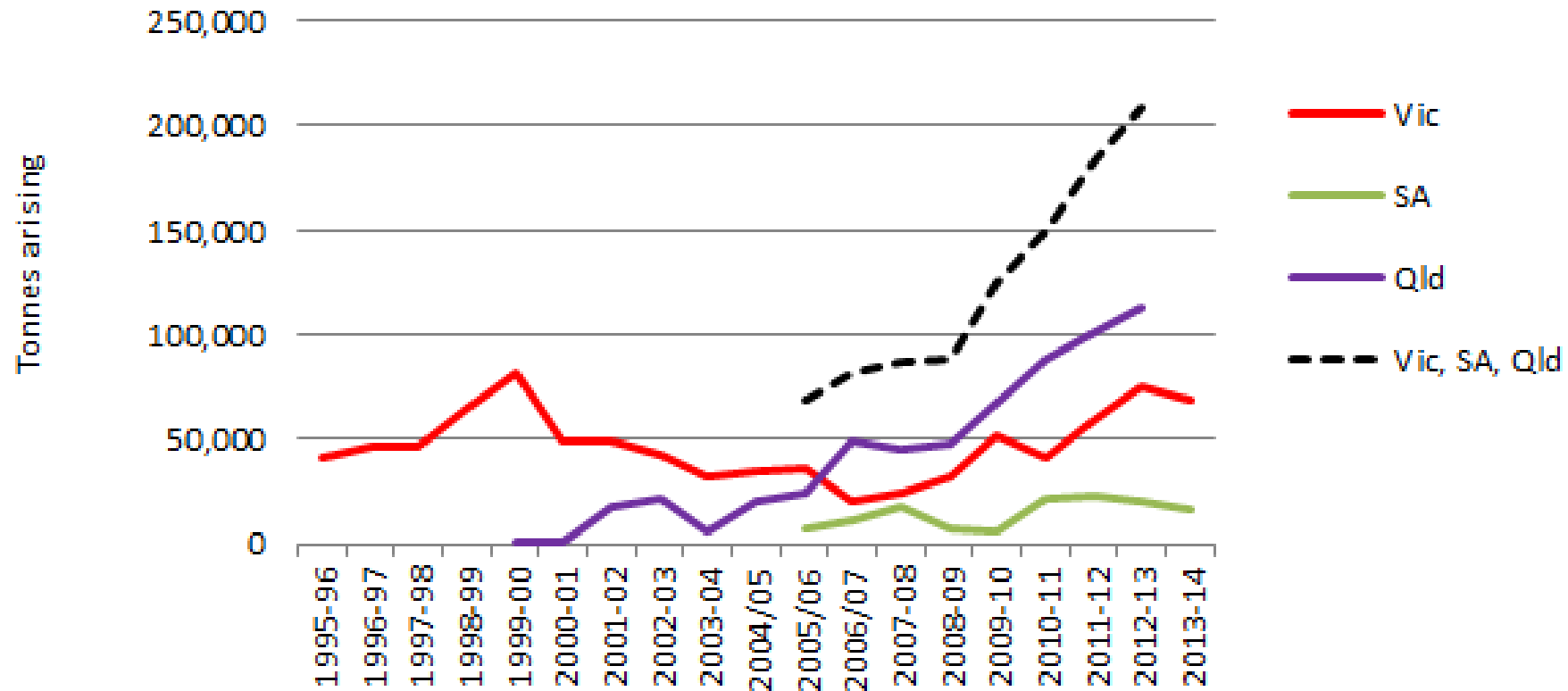
Jurisdictional data

Jurisdiction	Date range	Source industry	Fate	Comments
ACT	2013			Data collated by waste type
NSW	2010-2014	✓	✓	Full 'data dump' (280,000 entries)
NT	2012-2014		✓	Covered only inter-state transfers
Qld	1999-2013	✓	✓	Full 'data dump' of 30 files, each with up to 83 worksheets, each with up to 65,000 entries
SA	2006-2014	✓		Data collated by waste type
Tas	2012-2013			Covered only inter-state transfers
Vic	2003-2014	✓	✓	Full 'data dump' (1.6 million entries)
WA	1999-2014		✓	Full 'data dump' (1.3 million entries)

Challenges included ...

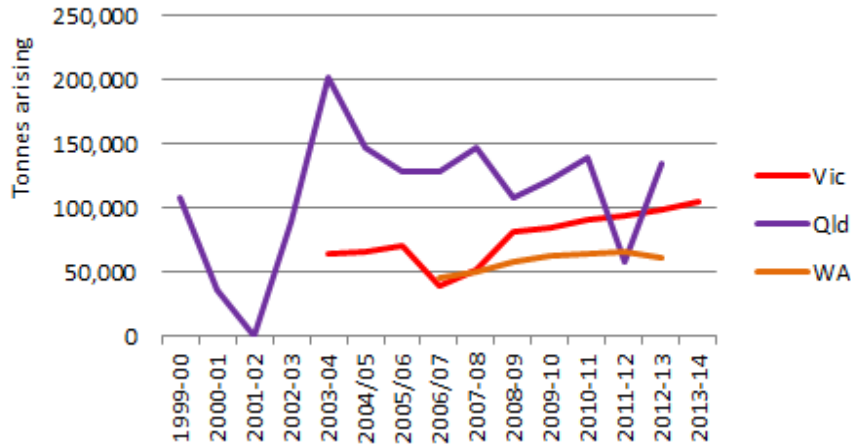
- multiple counting; varying methods for classifying wastes, sources and fates; apparent differences in user interpretations of their waste; storage release spikes; varying measurement methods (t, m³, items)
- establishing a representative baseline

Historical data - asbestos

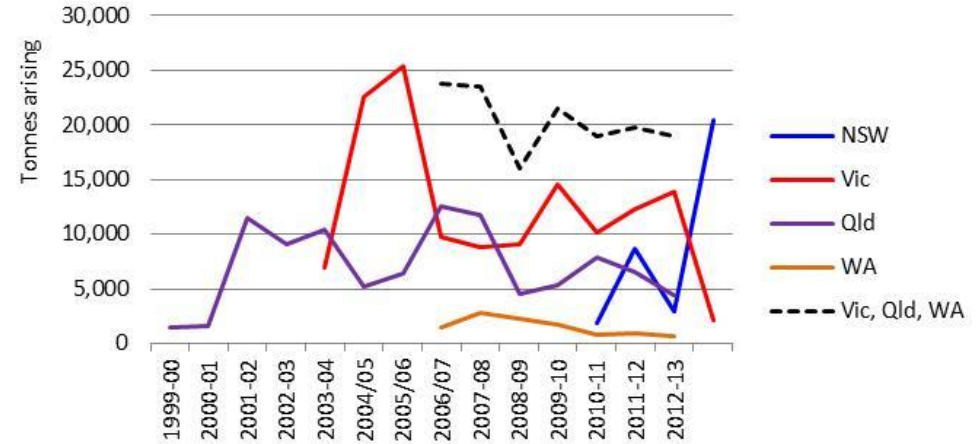


More selected historical data

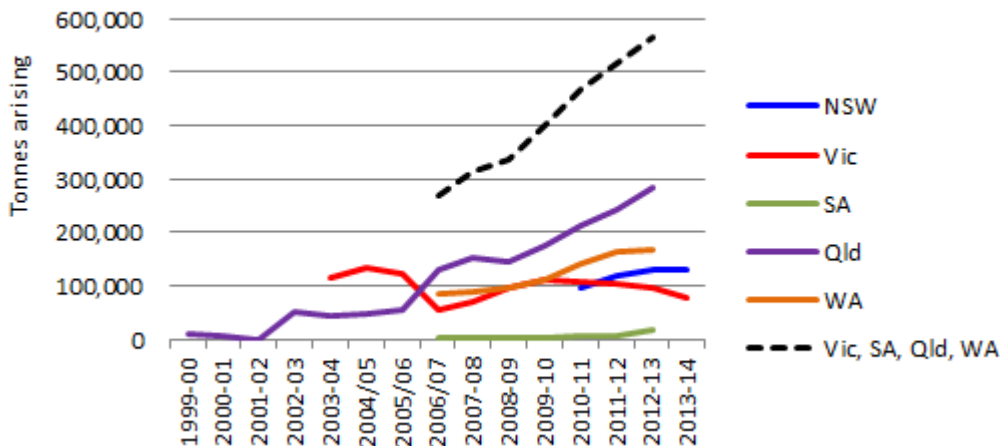
Grease trap waste



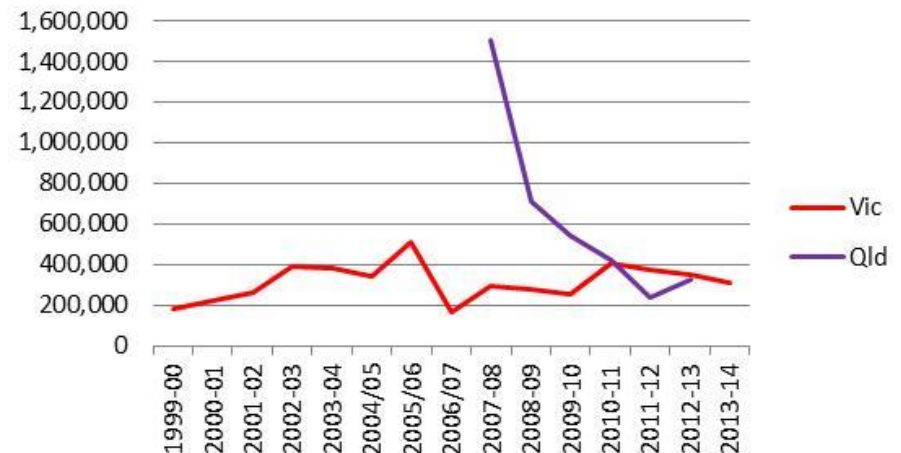
Other inorganic chemicals



Oils

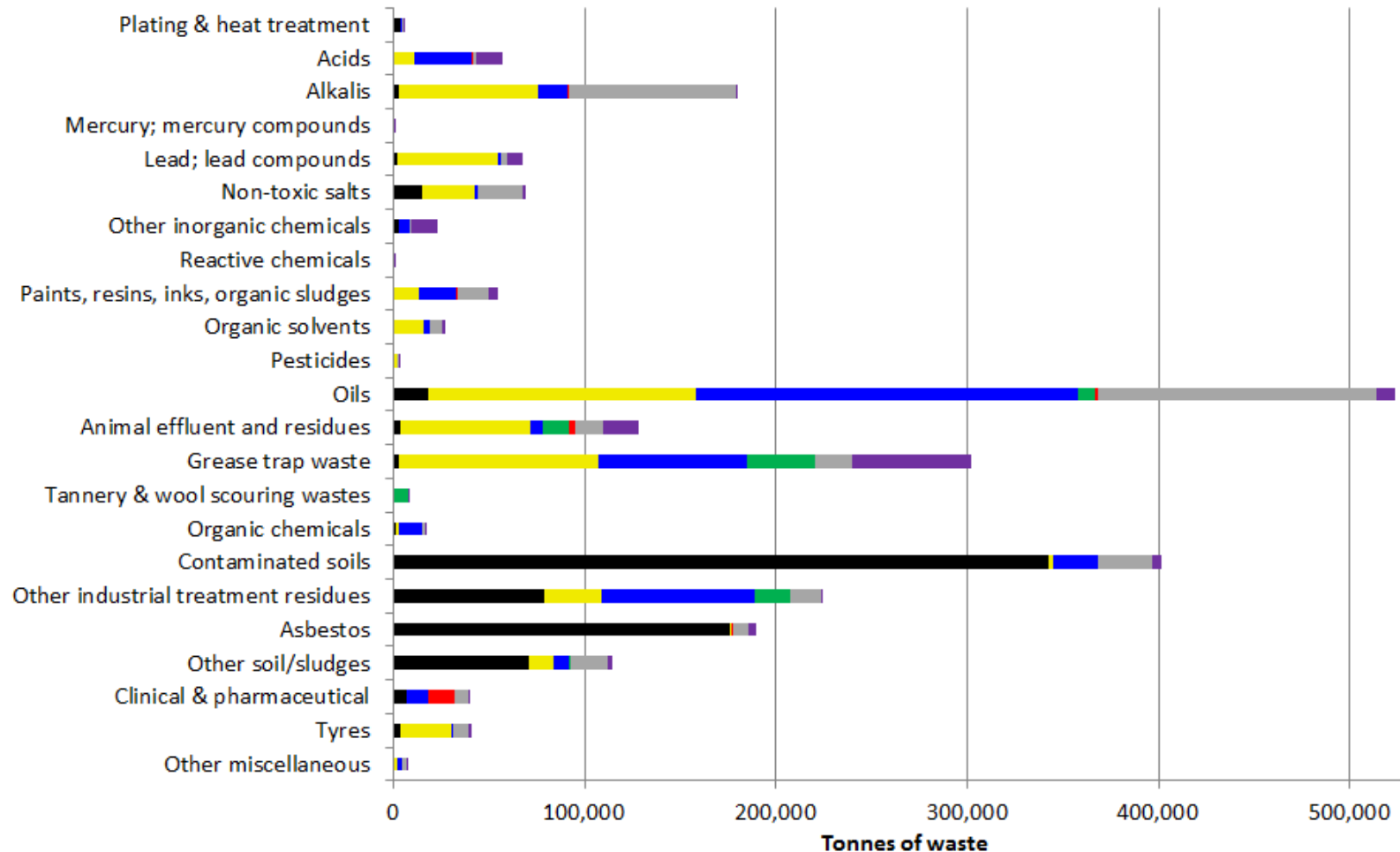


Contaminated soils



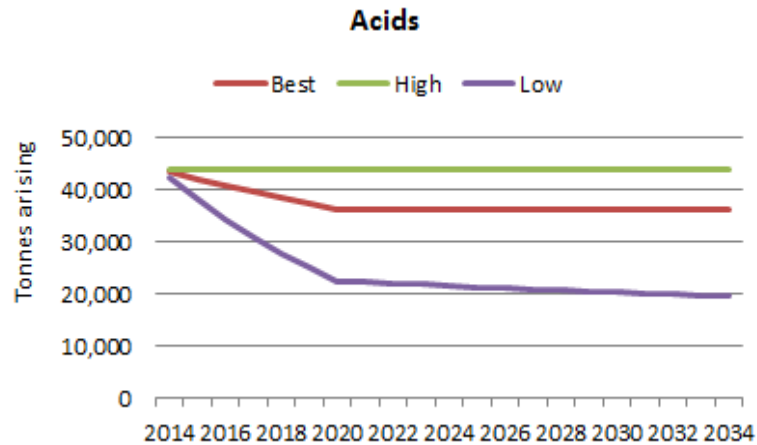
Hazwaste tonnes & fate, 2012-13

■ Landfill
 ■ Recycling
 ■ Chemical/ physical treatment
 ■ Biodegradation
 ■ Incineration
 ■ Storage or transfer
 ■ Other or not stated

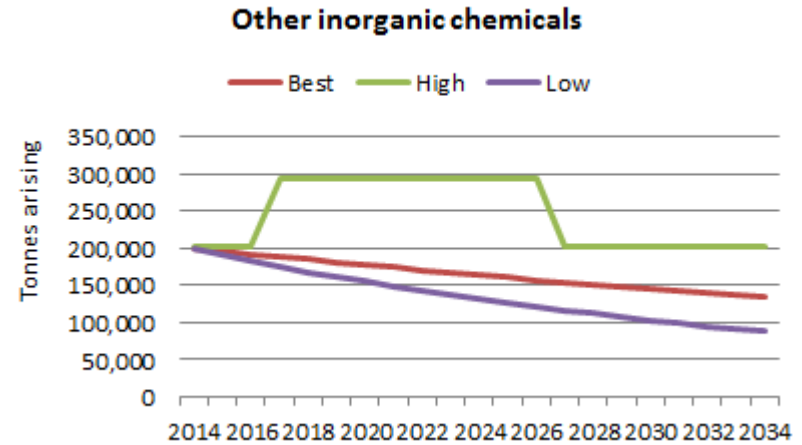


Note: based on data from NSW, Qld and Vic only

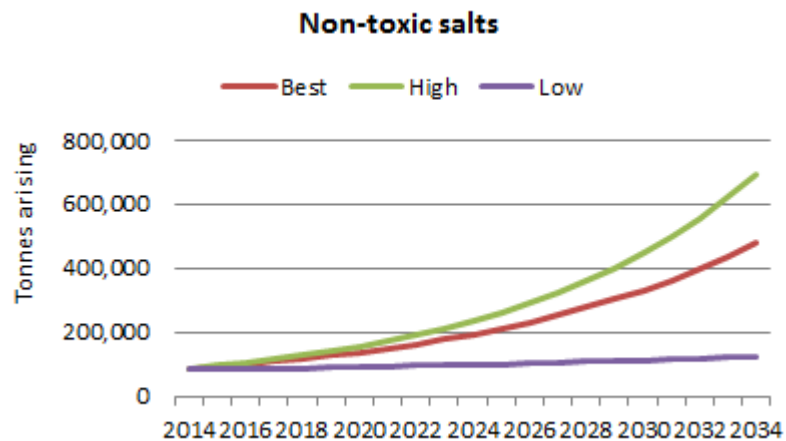
Selected projections



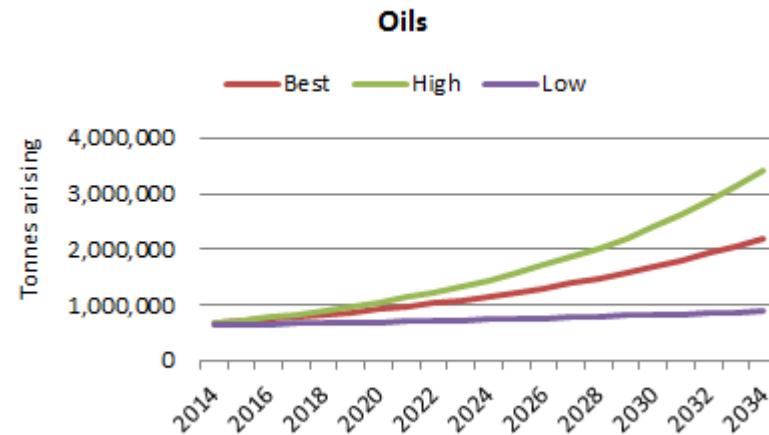
Aluminium smelting expected to decline



In high scenario, stockpiles of spent pot lining are processed



Significant increase likely with coal seam gas expansion

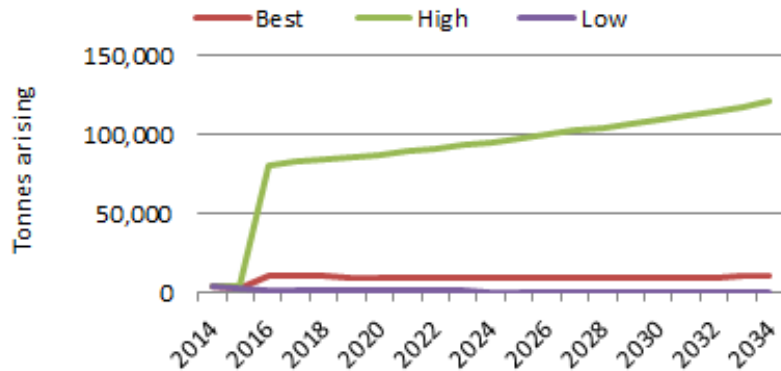


Best estimate has strong increases in WA & Qld (mining); stable elsewhere

New Stockholm waste projections

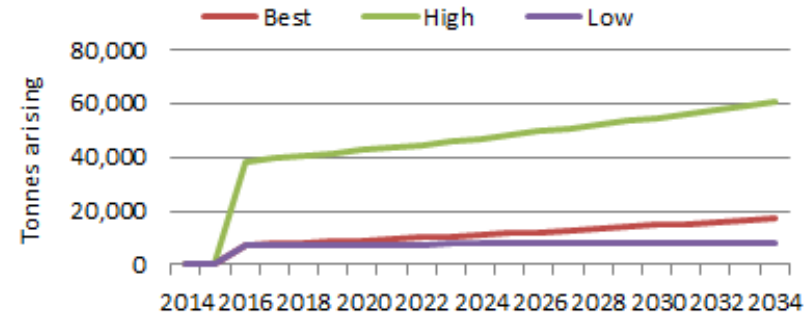
General assumption – ratification by 2015-16 (including low concentration limit)

PFOS



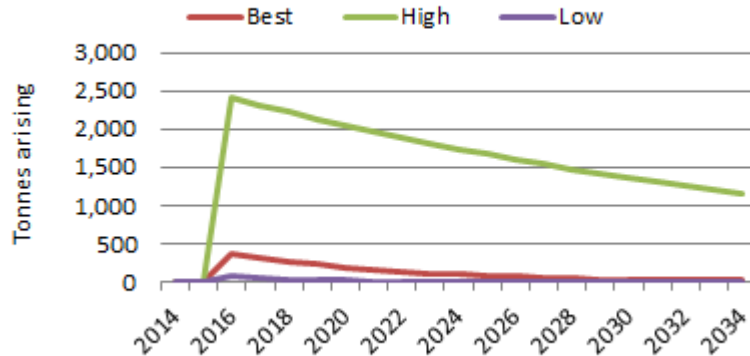
Sources: fire-fighting foams & washwaters; biosolids (high case)

HBCD



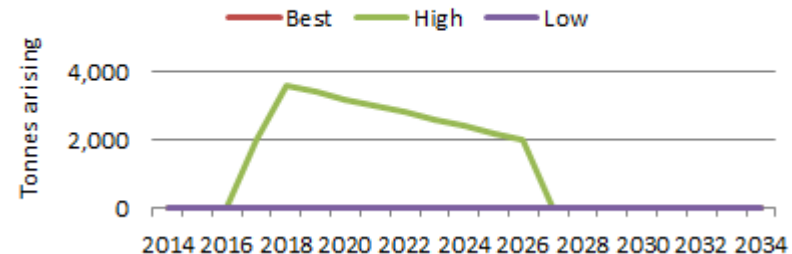
Sources: expandable polystyrene and, in high case, biosolids

POP-BDEs



Source: recycled plastics in waste electrical & electronic equipment

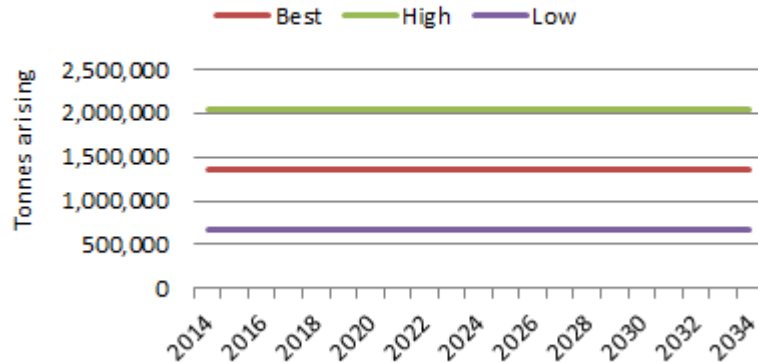
HCB



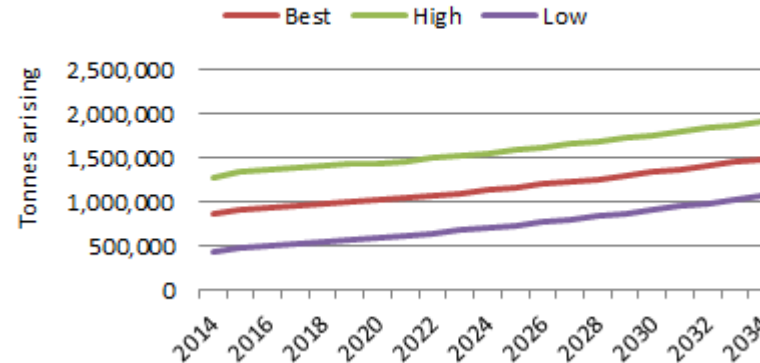
Source: Orica stockpile in Sydney

More selected projections

Contaminated soils

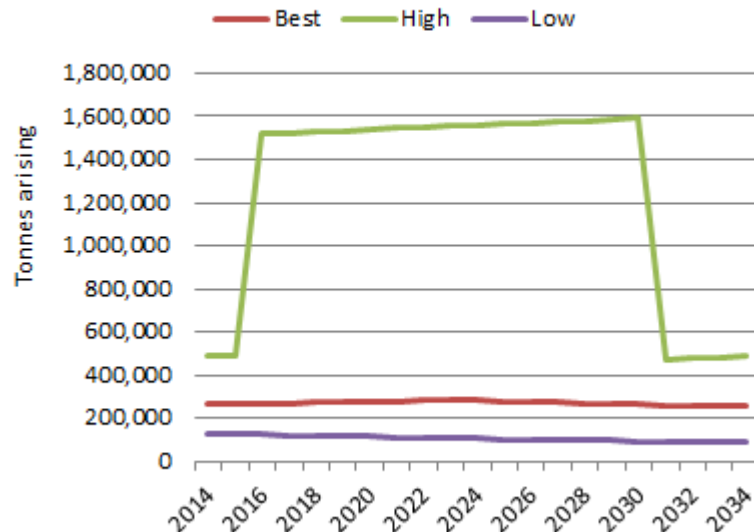


Asbestos

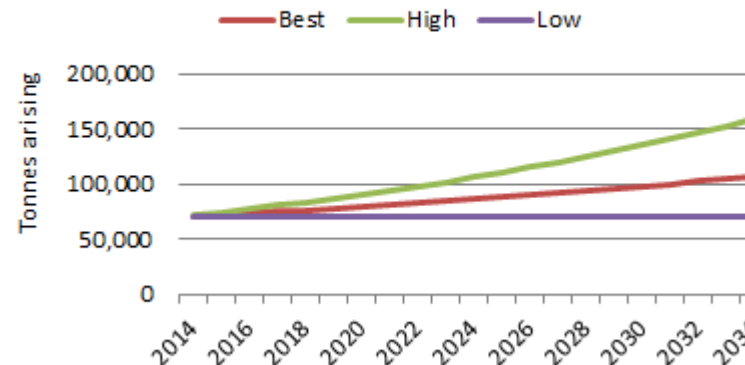


Ongoing growth within an uncertain range

Contaminated biosolids



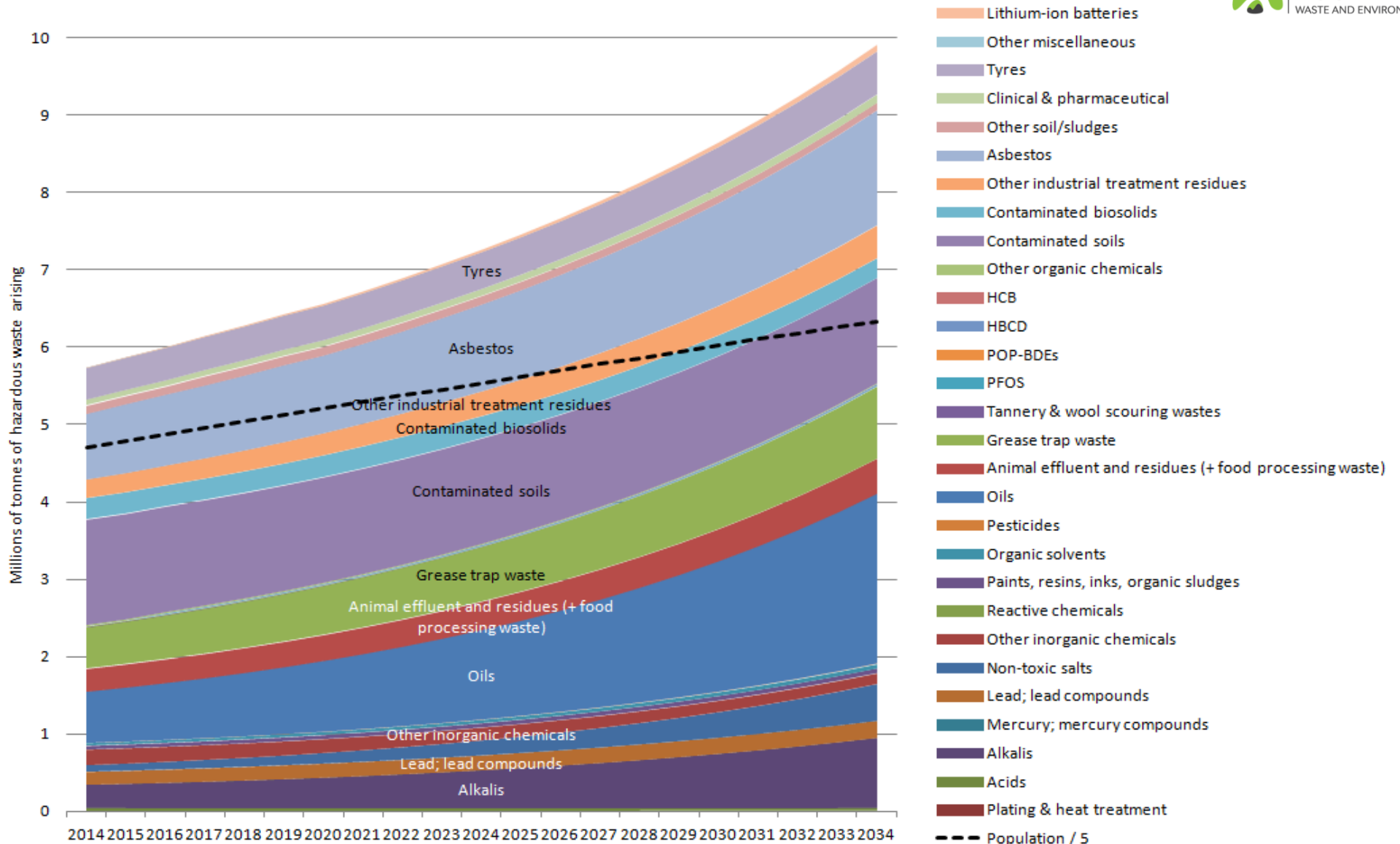
Clinical & pharmaceutical



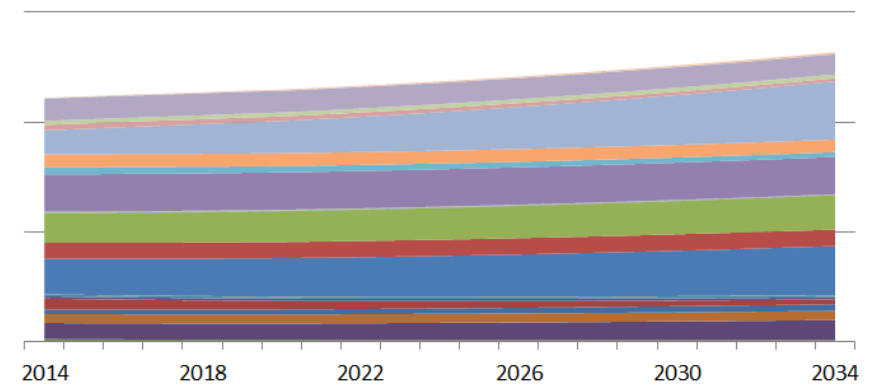
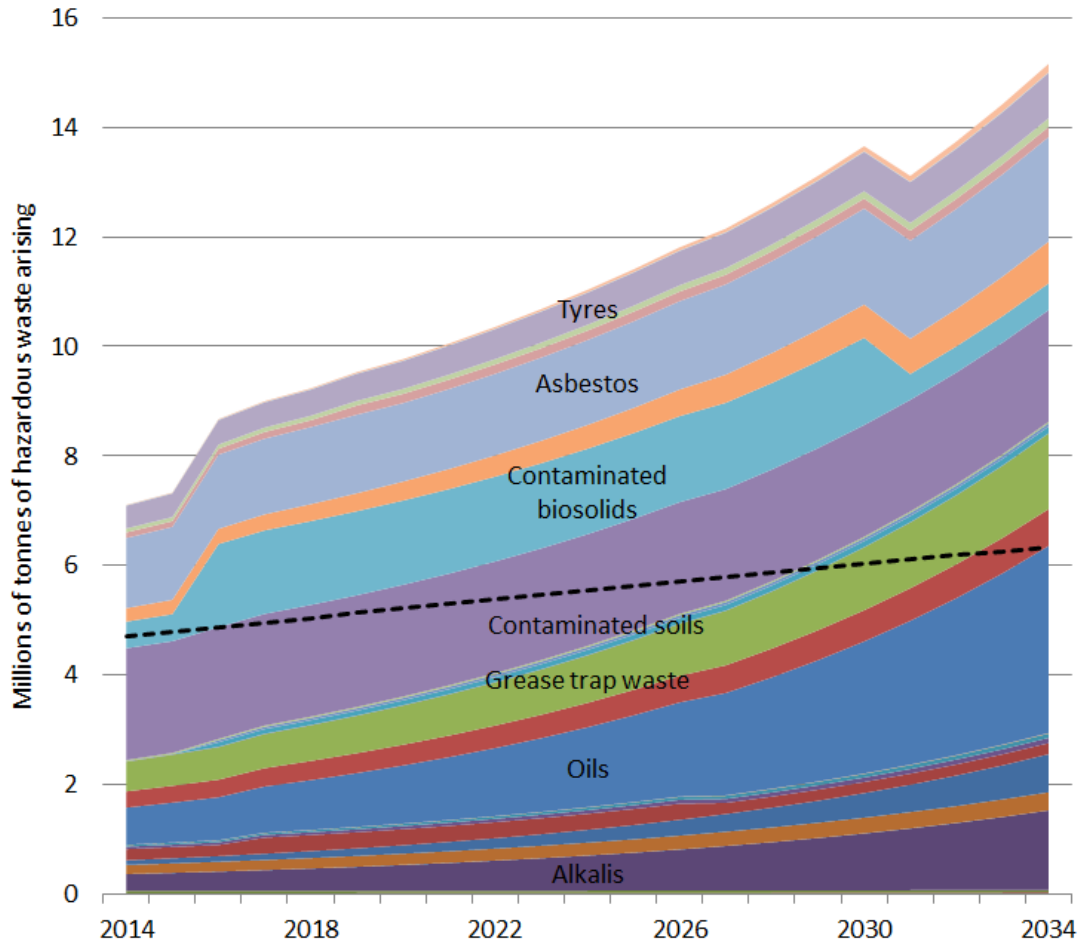
Best estimate is based on an industry projection

Based on estimated exceedances of Vic C3 levels. High case assumes release of large contaminated Victorian stockpile

Collated best estimate



High & low estimates



Infrastructure capacity assessment

Industry consultation

- identified 126 companies with 240 sites
- face-to-face interviews with 23 large operators (response rate 92%)
- phone / email / online survey with others
- overall response rate of 64% (by site)

Questions about:

- equipment
- recent annual quantities
- capacity (without upgrade)
- plans
- stockpiles

Infrastructure groups & receipts

Hazardous waste infrastructure group	No. sites	Est. currently received (kt/yr)	Est. potential capacity (kt/yr)
Recovery: recycling and energy recovery (ER)			
Hazwaste packaging fac.	31	22	55
E-waste fac.	12	64	161
Oil fac.	10	279	580
Lead fac.	4	106	188
Mercury fac.	2	Withheld for confidentiality reasons	
Solvents/paints fac.	5	10	16
Solvents/paints fac. (ER)	1	Withheld for confidentiality reasons	
Spent pot lining fac.	5	Withheld for confidentiality reasons	
Organics fac.	11	191	249
Treatment			
CPT plant	49	1,159	1,559
Clinical waste fac. (T)	10	26	26
Soils treatment fac.	3	Withheld for confidentiality reasons	
Disposal: landfill, thermal destruction (TD)			
Hazwaste landfill fac.	11	257	321
Hazw. l'fill (NEPM code N, T)	24	409	728
POPs fac. (TD)	1	Withheld for confidentiality reasons	
Clinical waste fac. (TD)	6	17	30
Transfer station or temporary storage fac.	47	253	366

Note: large amounts of hazardous waste is received by non-specific infrastructure, e.g. grease trap & organics, contaminated soils, asbestos.

Key findings

New Stockholm POPs

- existing processing capacity is far below our best estimate (assuming ratification) of 42 kt of demand in 2034 and a high estimate of 209 kt/yr.
- three operators are exploring options using existing infrastructure.

Chemical and physical treatment plants

- falling demand due to decline in manufacturing (Vic, NSW)
- infrastructure for mining, oil & gas waste needs to grow (Qld, WA)

Spent pot lining from aluminium smelting

- national stockpile of about 900 kt – a problem given the industry's decline
- we already have an orphaned stockpile of mercury waste

Hazwaste landfill capacity

- no impending shortage of hazwaste landfill capacity is apparent
- risks from unforeseen events e.g. site fire, disasters, legal challenges

More key findings

Asbestos disposal

- abundant options, but high cost in rural areas leads to illegal dumping

Lithium ion batteries

- kilotonnes likely to be entering the waste stream by 2034
- there is a fire risk associated with this waste

Exhaustion of national capacity is modelled for:

- oil recycling around 2020
- clinical waste around 2025
- lead waste by 2031

Hazardous waste policy isn't always helping

- inconsistent levies drive interstate export
- lack of certainty impedes investment

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