

# Changes in Victorian attitudes and perceptions of the waste and resource recovery sector: 2016 to 2019

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Engaging Communities on Waste project



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## About Sustainability Victoria

Sustainability Victoria is a Victorian government agency and our vision is for a sustainable and thriving Victoria.

Our purpose is to support Victorians to use resources more sustainably and to take practical action on climate change – we do this via delivering programs and shaping policy.

We also have obligations under the Environment Protection Act 1970 for statewide waste management strategy and planning.



# Executive Summary

The 2019 CSIRO Victorian Attitudes to Waste Management survey measured community attitudes and perceptions about waste and the waste and resource recovery sector, comparing results to 2016. In the 2019 survey we also investigated attitudes and perceptions of waste to energy.

This report documents the changes in attitudes over the three-year period and models the drivers that underpin trust and social acceptance of both the waste and resource recovery and waste to energy sectors. The report also documents changes in waste reducing behaviours currently undertaken in respondent households.

These research findings provide an evidence base for matters that are important to communities with respect to waste, the waste and resource recovery sector, and waste to energy. This evidence base provides opportunities for government and industry to focus their initiatives on areas that can drive waste reducing behaviour, and increased trust and acceptance of the sector, its infrastructure, and activities. Making changes in these areas support sustainable waste management solutions and better outcomes for Victorian communities.

## What we did

Over a six-week period in March and April 2019, we conducted an online survey of 1,244 Victorians living in metropolitan and regional areas of Victoria. The survey took approximately 20 minutes to complete and included 130 questions about people's attitudes, knowledge and behaviour in relation to waste and resource recovery.

We also asked half the sample of respondents ( $n = 621$ ) about their views towards living near an imaginary waste and resource recovery complex using a scenario. The other sample half ( $n = 623$ ) were given a scenario about living near a waste to energy plant. In both scenarios we asked about issues such as possible impacts, benefits, trust, and governance in relation to living near such a site.

## Who participated

The survey sample included people from all over Victoria. The sample design ensured half the participants lived within a 2 km radius of waste and resource recovery infrastructure, as listed in the 'Existing hubs of state importance', *Statewide Waste and Resource Recovery Infrastructure Plan: Victoria 2015-44*. The other participants were from across urban and regional Victoria.

- 68.5% from Metropolitan Melbourne
- 31.5% from Regional Victoria

All participants were randomly selected from a panel of approximately 75,000 participants.



Participants were asked if they were negatively affected by a waste and resource recovery facility near their home such as a landfill, transfer station, or organic processing facility.

- 50% self- identified as ‘Impacted residents’
- 50% self-identified as ‘Non-impacted residents’; also referred in the report as ‘Victorian public’

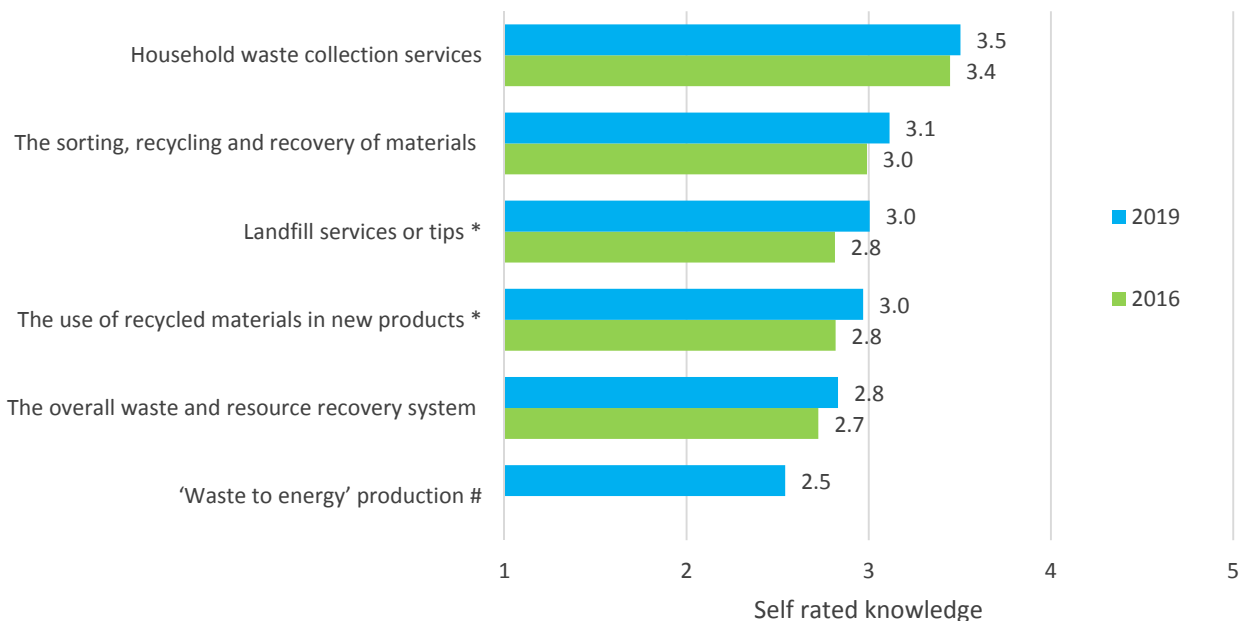
The people who completed the survey were over 18 years old and representative of Victoria based on ABS (2015) statistics for age, sex, and geography.

## What we found

### Self-rated knowledge

- In 2019, residents felt they knew significantly more about landfills and the use of recycled materials in new products compared to 2016.
- Knowledge about household waste collection services was good.
- Knowledge about the overall waste and resource recovery system was low, especially knowledge about ‘waste to energy’ production.

Figure 1 Self-rated knowledge scores

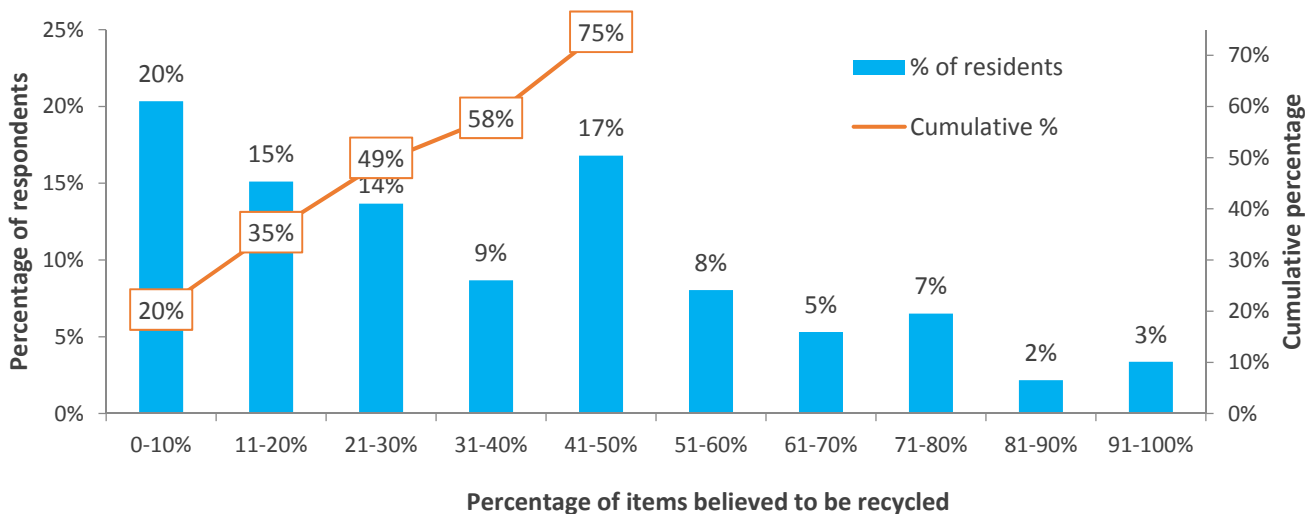


Note: 1 = No knowledge; 3 = some knowledge; 5 = A lot of knowledge

\*significant difference between years; # significantly lower than other items (p<.001)

- The low levels of knowledge about what happens to waste after it is collected from kerbsides is reflected in Victorians severely underestimating the percentage of their kerbside recycling that gets recycled (cf. going to landfill).
  - 75% of Victorians believed that less than half of kerbside recycling was being recycled into new products, as shown by the cumulative percentage line in Figure 2.
  - Only 3% thought that it was over 90%.
  - The *Victorian Local Government Waste Services Report 2016-17* shows that actual amount of recycling items processed or recycled into new products was approximately 95%.

Figure 2 Percentage of items in kerbside recycling bins believed to be recycled into new products: 2019

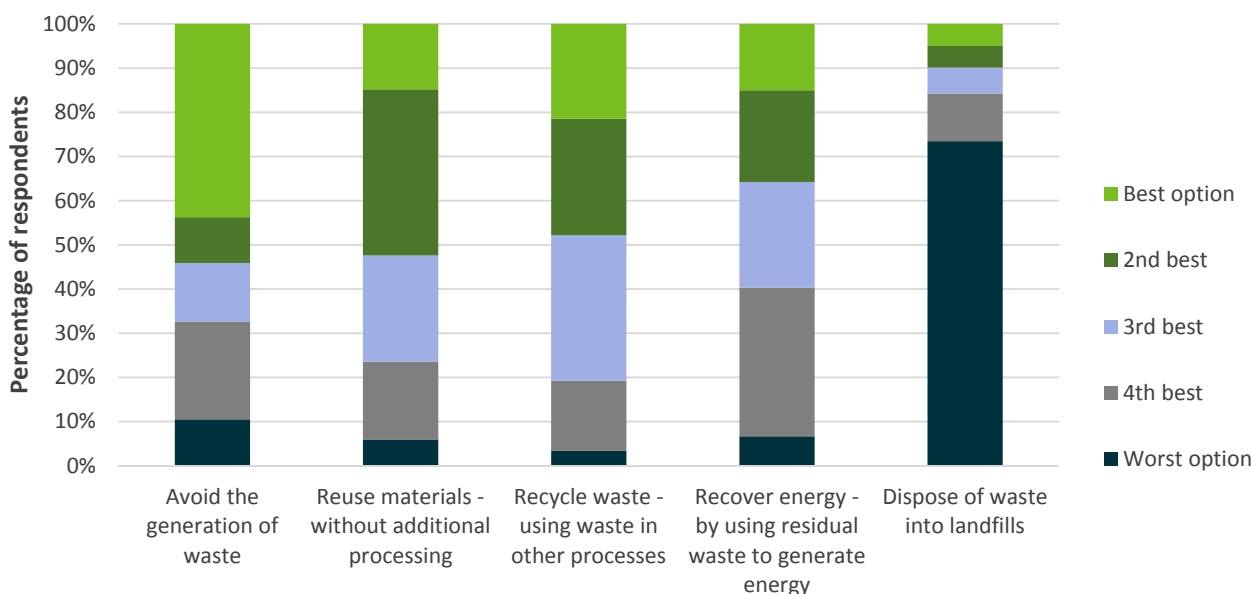


## Attitudes about waste

### General views about the waste hierarchy as a way to manage waste

- Almost 75% of people thought landfills were the worst option for managing waste.
- Approximately 45% of people thought the avoidance of waste generation was the best option for managing waste.
- Approximately 80% of people ranked reusing and recycling waste materials in their top three options for managing waste.
- Up to 40% of people ranked waste to energy as their least two preferred options for managing waste.

Figure 3 Views about the waste hierarchy as the best options for managing waste: 2019



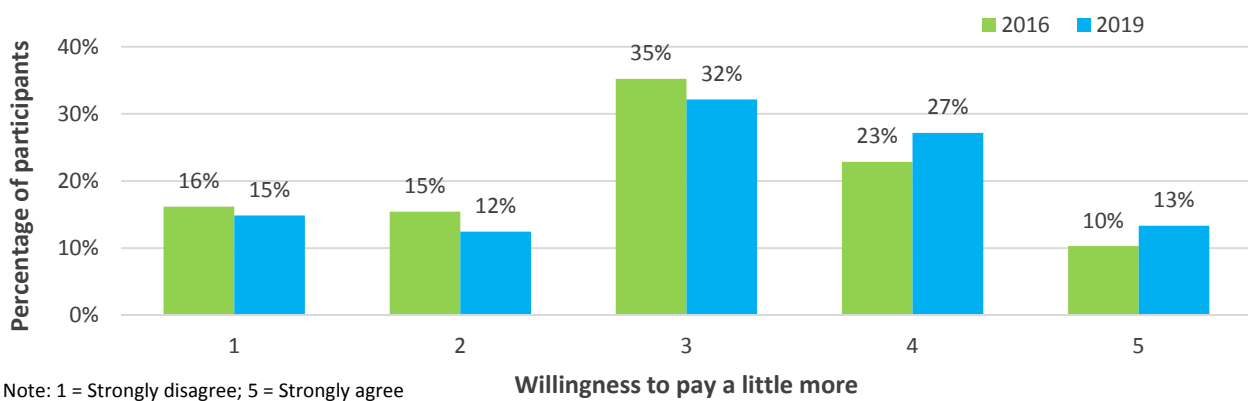
## Essentialness of waste and resource recovery services

- Waste and resource recovery services were perceived as very essential services.
- As in 2016, waste management and resource recovery services were ranked 5th in essential services to emergency services, hospital and health services, water and sewerage services, and electricity and gas services.

## Willingness to pay more to reduce waste going to landfill

- In 2019 more people were prepared to pay more to reduce waste going to landfill than those who disagreed. Compared to 2016, there was a statistically significant increase in the percentage of residents willing to pay a little bit more in 2019; now 40% agree or strongly agree.

**Figure 4 Willingness to pay a little more for household waste collection / disposal to reduce the amount of waste going to landfill: 2016 and 2019**

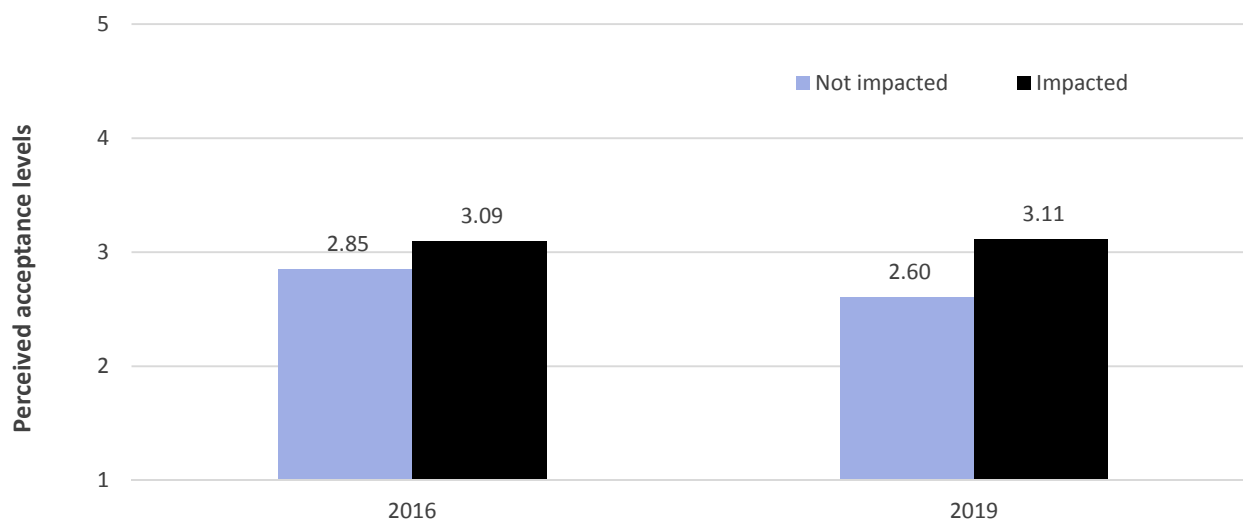


## Social acceptance

### Social acceptance of the waste and resource recovery sector

- The broader Victorian public (non-impacted residents) have significantly lower levels of acceptance of waste and resource recovery facilities than residents who actually live near a waste facility and feel impacted by the facility.
- Acceptance levels for impacted residents were positive on average while acceptance levels for non-impacted residents were negative on average.
- Acceptance levels of non-impacted residents had reduced in 2019 compared to 2016, whereas acceptance levels for impacted residents were unchanged.

**Figure 5 Acceptance of living near a waste facility 2016 and 2019: Differences between impacted and non-impacted residents**



Note: 1 = Strongly disagree; 5 = Strongly agree, Significant difference between 2016 and 2019 for non-impacted residents ( $p < .001$ )

### Social acceptance of living near a waste to energy plant

- Perceptions of possible impacts were lower than for a waste complex and societal benefits were assessed more favourably than for a waste complex.
- Higher percentage of residents were OK with living near a waste to energy plant compared to a waste complex with a lower percentage rejecting the notion.
- Those already living near a waste and resource recovery (WRR) facility were significantly more likely to accept living near a waste to energy plant, suggesting that co-locating waste to energy plants within existing WRR precincts would be OK with more residents.

### Underlying drivers of social acceptance

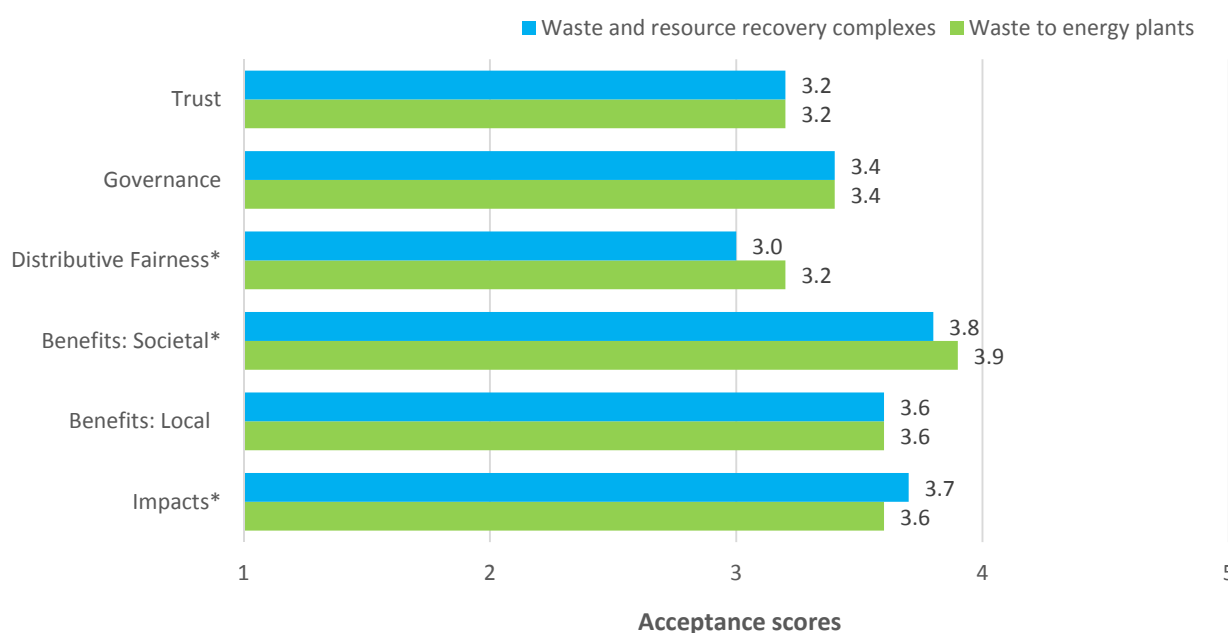
Five key drivers contributed to people's acceptance of living near a waste complex (hub) and to a waste to energy plant:

- **Trust in the waste sector** – This relates to trust in state government bodies, local councils, and local operators. Acceptance of WRR facilities increases when local communities trust the sector to act in their best interests, to act responsibly, and to act competently. Trust was higher in state and local government than local operators. Trust was underpinned by the quality of the relationship between the community and the sector and the fairness in the way the community is treated. Both are key attributes of meaningful communication and genuine community engagement. Good governance also underpins trust in the sector.
- **Governance of the sector** – This refers to both 'hard governance' (e.g. legislation, regulation and compliance) and soft governance (e.g. planning, strategic vision, and collaboration between key stakeholders in the sector). Generally, regulation and compliance was seen as effective while planning, vision, and collaboration was seen less favourably.
- **Perceived impacts** – Residents held concerns about living near waste hubs or waste to energy plants, though these concerns were lower for waste to energy plants. The least desirable aspect of waste hubs were landfills, and the highest concerns were about odour, illegal roadside

dumping, dust, health impacts, and environmental impacts on air, soil and water. The highest concerns regarding waste to energy plants were about odour, air quality, and health impacts, and the potential for illegal roadside dumping.

- Perceived benefits** – Residents also saw benefits with waste hubs. The main local benefits of living near a waste hub was the convenience of being able to dispose of large household items and garden rubbish, and the local employment and training opportunities the hub provides. Victorians also saw the main societal benefits of waste hubs as managing waste generated by all sectors and helping existing landfills last longer. Societal benefits for waste to energy plants were seen as higher than those for waste hubs, which included landfills.
- Distributive fairness** – This takes into account whether residents consider it is fair to live near waste hubs and waste to energy plants, including wider societal considerations. Distributive fairness was modest for living near waste hubs, though, higher for waste to energy plants. The findings suggest that distributive fairness can be enhanced by strong narratives as to the broader need for waste complex activities at particular locations, minimising any perceived impacts, and compensating or providing benefits for local communities.

**Figure 6 Main drivers underlying acceptance of living near a waste facility: waste hubs and waste to energy plants**



Note: 1 = Strongly disagree; 5 = Strongly agree: \* indicates significant difference ( $p < .05$ )

## Key conclusions

### **Victorians are still motivated to recycle and reduce waste going to landfill despite negative incidents in the media**

Following the 2016 survey, several events in the industry had the potential to negatively impact waste-reducing intentions and behaviours of Victorian households. Despite this, Victorians remain motivated to reduce the amount of waste going to landfill and continue to view the waste and resource recovery sector as an essential service.

### **Victorians presently impacted by a waste and resource recovery facility have more favourable attitudes toward the sector than those who are not impacted**

In terms of where they live, people impacted by waste and resource recovery infrastructure report more positive attitudes about living near a waste and resource recovery hub than the broader Victorian public, who can only imagine it. Impacted residents have become slightly more positive about the sector since 2016, whereas non-impacted residents have become less favourable.

### **Knowledge reduces perceptions of risk associated with waste complexes and waste to energy plants**

Higher levels of knowledge about waste hubs and waste to energy plants were linked to lower perceived risk associated with these facilities. More knowledge was also linked to increased levels of social acceptance, though the effects of knowledge on perceived risks and acceptance were greater for the waste to energy scenario and only modest for acceptance of a waste hub. Nonetheless, community knowledge about waste hubs and waste to energy plants was very low, representing a significant opportunity to improve people's understanding, with subsequent improvement in an understanding of risks and increased confidence in the manageability of any risk.

### **Perceived benefits underpinning social acceptance of a hub relate to the recycling and recovery activities**

People perceived benefits that a waste and resource recovery hub offer, such as local economic and social investment benefits and broader societal benefits, only when the hub included recycling and resource recovery activities. If the hub was to function solely as a landfill, support for the hub would reduce, and the perceived benefits would also be diminished.

### **Governance is doing a good job in contributing to trust and the acceptance of hubs**

People's perception of governance was robust and this confidence contributed significantly in residents forming more positive views of the relationship between the industry and local communities, and trust in the sector. Impacted residents viewed matters related to governance of the waste and resource recovery sector positively on average whereas non-impacted residents were less favourable.

## **People are more accepting of living near a waste to energy plant than a waste and resource recovery hub**

The difference in these views are most likely explained by the presence of a landfill within a waste and resource recovery hub rather than the acceptance level of the waste to energy plant being high.

## **When people reduce waste in their homes, it spills over to increased support for a waste and resource recovery hub**

The more recycling and other waste reducing behaviours undertaken in a person's household the more accepting a person is of the hub. This is largely driven by the hub functioning as recycling and waste recovery complexes as well as a landfill, which are activities that align with waste reducing behaviours.

## **Demographic differences are less important in driving attitudes than social perceptions**

Demographic differences do not seem to drive differences in attitudes towards the sector as much as perceptions of trust, governance, impacts, benefits, and fairness. There is little variation in these perceptions based on characteristics such as age, gender, income levels, education levels and household size. Demographic differences are evident when it comes to knowledge of the WRR system, WRR hubs, and waste to energy plants. However, these differences tended not to translate to waste reducing behaviours or acceptance of waste facilities.

# 1 Introduction and background information

This research investigates community attitudes and perceptions of waste and the waste and resource recovery sector in Victoria, and measures changes between 2016 and 2019. It identifies differences in perceptions between those who currently feel impacted by waste and resource recovery infrastructure and the broader Victorian public. The research also examines attitudes and perceptions of waste to energy in 2019. The report builds on previous research findings of an earlier CSIRO-SV research project and uses the same survey instrument to compare attitudes in 2019 to three years earlier. This current study also examines waste to energy perceptions for the first time.

Understanding community attitudes and perceptions of the waste and resource recovery sector is important if the aim is to achieve sustainable waste management solutions for our growing populations. Research findings from studies such as this is another way of giving voice to communities about what is important to them. Gathering empirical evidence on matters that are important to communities helps policy makers, planners, and industry deliver changes to the waste and resource recovery sector that will meet community expectations.

The nature and function of waste management activities and types of infrastructure are forever evolving as the sector responds to the increasing challenges of growing urban centres, changes to our climate, changing consumer habits and social trends, and the ongoing emergence of new materials and products that require a waste management solution. Through innovative technology and new waste management solutions the waste and resource recovery sector is increasingly becoming a key component of the circular economy. Achieving broad community support for the changes and initiatives taking place in this domain is integral to achieving the best possible outcomes for our communities, regions, and cities.

This research provides government, industry and community stakeholders with the opportunity to address issues that matter to local communities. These issues are wide-ranging and encompass community engagement processes to ensure community involvement, mitigating impacts, delivering benefits, ensuring robust governance, and addressing issues of fairness and trust. It is through addressing the breadth of these issues that the sector can achieve broad community support for their plans and activities.

## PROJECT AIMS

1. Report community attitudes and perceptions about waste, waste reducing behaviour, the waste and resource recovery sector, and waste to energy in 2019; and how these perceptions have changed from 2016.
2. Identify and expand our understanding of the drivers for building trust and community acceptance of the waste and resource recovery sector, its operators, facilities, and activities; including waste to energy plants.
3. Identify and confirm the relative importance of the key drivers that contribute to building trust and achieving acceptance in the waste and resource recovery sector; including waste to energy plants.
4. Communicate key messages to inform opportunities for policy, programs, and collaborative actions to shape behaviour among stakeholders in the waste and resource recovery sector that support waste reducing behaviour and social acceptance of sustainable waste management solutions.



## KEY EVENTS OVER PREVIOUS 18 MONTHS

Since the previous survey conducted in 2016, a range of state and national events, and other social changes have occurred, each contributing to possible changes in attitudes and perceptions of the waste and resource recovery sector in 2019. Seven events are described briefly in this section to provide relevant background and contextual information.

### China 'bans' Australian imports of recycling waste

In January 2018, China imposed restrictions on the import of recyclable material; decreasing maximum contamination thresholds. The threshold of 0.5% contamination for plastics and paper is currently unachievable for Australia's processing facilities, effectively 'banning' Australia's recyclable material from China. Australia is heavily reliant on overseas markets such as China to purchase and reprocess materials such as paper, plastic and glass; leaving processors with limited options. Further to this, the 'ban' has led to an oversupply and decrease in the average price of mixed paper and mixed plastic scrap with subsequent losses for processors.

Without a significant market for Australia's recyclables, some processors have resorted to stockpiling materials, while others refused to accept any more material from local councils. Some local councils have also been forced to send recyclable material to landfill sites when no other alternative has been available. The ban and its impacts to Australia were highly publicised by national media outlets, with reports also highlighting the potential for council rate rises as councils struggled to cope with increased kerbside recycling collection costs. The State Government has subsequently intervened to provide additional funding aimed towards developing solutions to the issue.

### Serious fires within metropolitan Melbourne related to stockpiling of waste

Metropolitan Melbourne has experienced a number of serious fires occurring at warehouses, transfer stations and recycling facilities where waste and recycling materials have been stockpiled. Several notable incidents are listed below in chronological order. Serious impacts of these incidents included evacuations of local residents, pollution of local waterways, and sending burnt/contaminated recyclables to landfill.

- July 2017 – SKM recycling facility in Coolaroo. Residents forced to evacuate
- April 2018 – Knox Transfer Station in Wantirna
- August 2018 – Warehouse in West Footscray stockpiling chemicals
- October 2018 – Knox Transfer Station in Wantirna
- April 2019 – Warehouse in Campbellfield stockpiling toxic chemical waste
- April 2019 – Recycling plant in Tottenham

The last two events occurred shortly after the 2019 survey.

### SKM recycling difficulties

In February 2019, SKM Recycling, who receives the majority of Victoria's kerbside recycling, were ordered by the EPA to stop accepting materials at their recycling plants in Coolaroo and Laverton due to concerns that stockpiled plastic posed a high fire risk. Local councils serviced by SKM were forced to send recyclable material to landfill while the sites were cleared. This caused a significant disruption to the recycling system.

## Independent inquiry into the EPA and subsequent changes

An independent inquiry was undertaken into the EPA to examine and advise on its future. The final report of the inquiry was handed down in March 2016, and identified 48 areas for improvement. The Government released its response in January 2017, supporting in full or in part, all of the recommendations. Following the Government's response to the Inquiry major changes were made to the *Environment Protection Act 1970* in two phases. In October 2017, legislation passed to establish the EPA as an independent statutory authority and legislated a Governing Board, Chief Executive Officer and Chief Environmental Scientist. The Environmental Protection Act was further amended in 2018.

In order to work within the new legislation the EPA is overhauling its services, systems and processes. When the amended Act commences in 2020 it will give the EPA "enhanced powers and tools to prevent risks to the environment and human health as well as the ability to issue stronger sanctions and penalties which hold environmental polluters to account" (Environmental Protection Authority Victoria, 2018). Further to this, the legislation includes a new environmental duty requiring businesses and individuals to understand and minimise risks to human health and the environment, which will be criminally enforceable.

## Parliamentary Inquiry into waste and recycling

On 6 March 2019, the legislative council of Victoria actioned an inquiry into current circumstances in municipal and industrial recycling and waste management as a result of the impacts caused by China's waste import restrictions.

## Media coverage on waste and recycling issues

In May 2017, the first season of *The War on Waste* premiered on the ABC. The television program consisted of three episodes with a focus on the generation, impacts and solutions of material waste in Australia. A second season with an additional three episodes aired in July 2018. The program is considered to have had a significant impact with notable campaigns to ban single use plastic bags from supermarkets, ban plastic straws from food outlets and decrease the use of disposable coffee cups.

This opened up increased media coverage from *Four Corners*, *The 7:30 report*, *Foreign Correspondent* and *Q&A*. As a result, the Australian public has seen an increase in negative interest in waste issues.

## Australian Paper proposal for a waste to energy plant

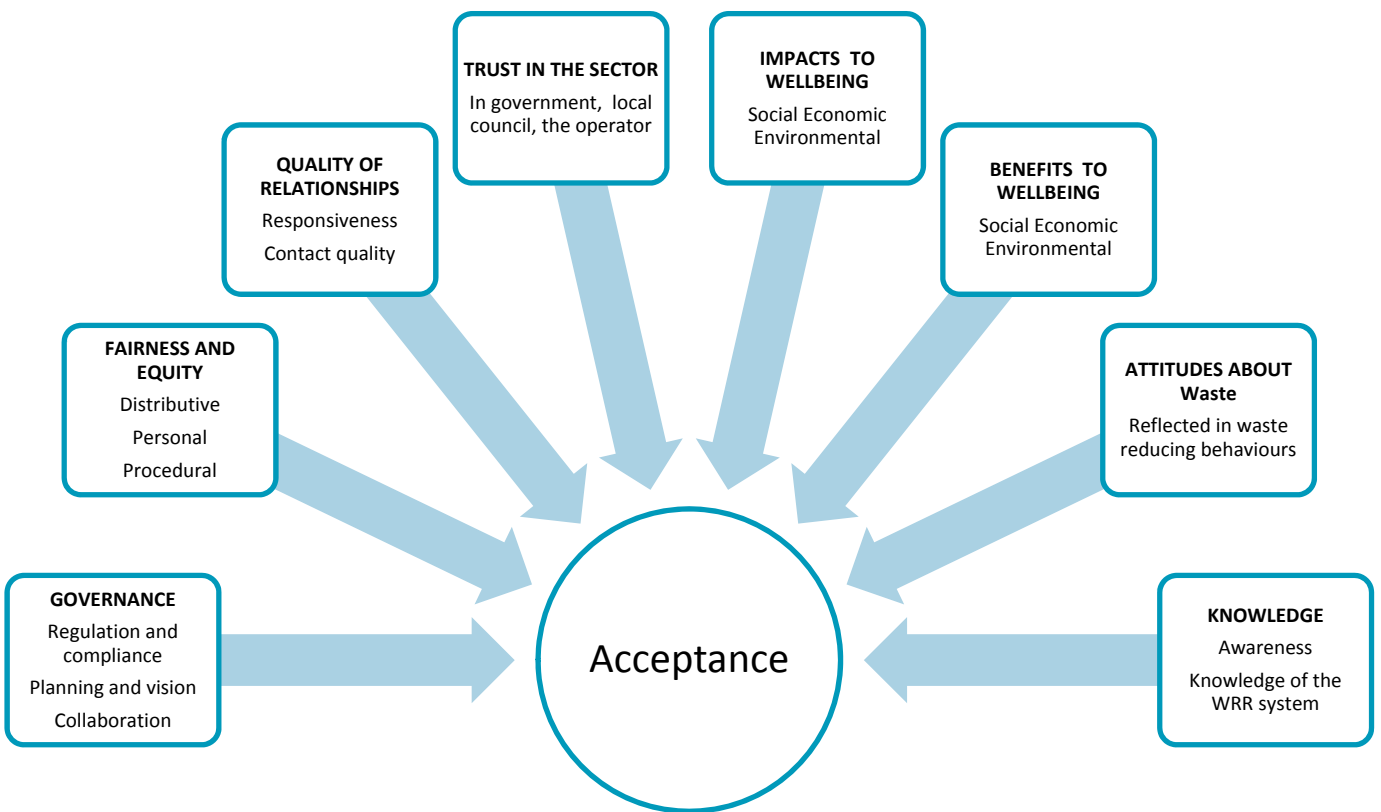
Australian Paper are currently in the planning stages to build a waste-to-energy plant in the Latrobe Valley. The plant will be built in partnership with Suez and will be used to help power Australian Paper's mill in Maryvale. Feasibility studies have been completed and construction of the plant is expected to commence by 2020. The plant is expected to generate 225 megawatts of electricity and use 650 million tonnes of waste per year. Australian Paper are currently looking to secure a long term supply of municipal solid waste, and commercial and industrial waste.

## DRIVERS OF SOCIAL ACCEPTANCE IN THE WASTE DOMAIN

The survey draws from earlier research findings to measure and test key drivers of social acceptance in the waste domain. Figure 7 shows eight groups of potential factors that underpin overall community attitudes towards the waste sector, referred to as social acceptance of the sector. These factors work together to shape people’s overall level of acceptance, with some factors more important than others.

The research findings from this current study will identify and expand upon the most important factors and the relationships between them. This is achieved through statistical modelling of the results to come up with a model to describe the underlying components contributing to social acceptance of the waste sector. This model provides opportunities for decision makers to focus their programs and initiatives and to gauge the likely effectiveness of one initiative over another through understanding the importance of the factor that the intervention is targeting.

Figure 7 Drivers of social acceptance in the waste domain



## 2 Method: How we conducted the research

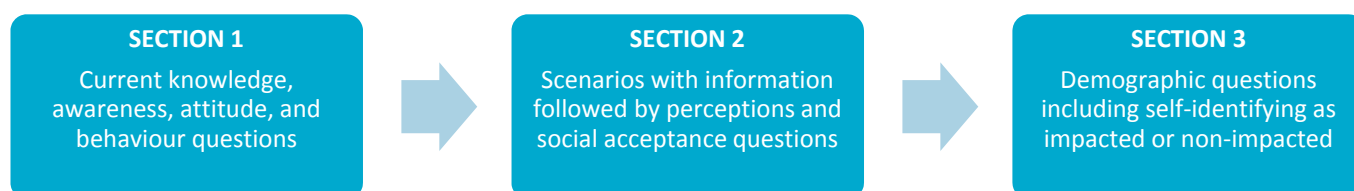
### SURVEY PROCEDURE

An online survey about Victorian attitudes to waste and the waste and resource recovery sector was conducted in June 2016 and repeated in March-April 2019. In both years, the survey used a representative sample of Victorian residents from a research panel administered by the Online Research Unit (ORU). The survey instrument was similar in both years and took 15 -20 minutes to complete on average.

The study was conducted in accordance with the ethical review processes of CSIRO and within the guidelines of the National Statement on Ethical Conduct in Human Research.

Figure 8 shows, the survey proceeded in three sections and used a scenario.

Figure 8 Survey procedure



### SURVEY SAMPLE

In 2019, the sample comprised 1,244 residents from across Victoria, which was similar to the previous 2016 sample of 1,212 residents. Participants were a minimum of 18 years old and considered to be representative of Victoria based on ABS (2016) statistics for age, sex, and geography. Table 1 shows the sample profile for 2019 and 2016 and the ABS census data.

Table 1 Sample profile: Age, gender, geography: 2016 and 2019

Variable	Sample profile 2016	Sample profile 2019	ABS census 2016
Aged 18 – 34	29.2%	29.6%	30.3%
Aged 35 – 54	38.0%	32.9%	34.4%
Aged 55+	32.8%	37.5%	35.3%
Male	50.6%	48.4%	49.9%
Female	49.8%	51.5%	51.1%
Indeterminate/Intersex/Unspecified		0.2%	n.a.
Metropolitan Melbourne	79.0%	68.5%	75.8% <sup>1</sup>
Regional Victoria	21.0%	31.5%	24.2% <sup>2</sup>

Note: n.a. = not asked in 2016 census, though will be asked in the 2021 census

<sup>1</sup> Melbourne Greater Capital City Statistical area as a percentage of the total Victorian population in June 2015

<sup>2</sup> Total Victorian population outside the Melbourne Greater Capital City Statistical Area in June 2015

## SAMPLE DESIGN

To ensure the survey measured attitudes that reflected both the views of those who felt impacted by waste and resource recovery activity as well as the broader Victorian population, two sampling strategies were employed in both 2016 and 2019.

### 1. Victorians in targeted postcodes ( $n = 610$ in 2016, $n = 610$ in 2019)

- Residents were randomly selected from postcodes within a 2km radius of infrastructure listed on the 'Existing hubs of state importance' as detailed in the *Statewide Waste and Resource Recovery Infrastructure Plan: Victoria 2015-44* (Sustainability Victoria, 2015).
- Postcodes with more than 20 registered complaints or 'Pollution Reports' registered with the Environment Protection Authority about waste or waste management issues in 2016 were also included. These same postcodes were also targeted in 2019.

### 2. Victorians in other postcodes ( $n = 602$ in 2016, $n = 634$ in 2019)

- Residents were randomly selected across the remaining postcodes in urban and regional Victoria.

## Impacted respondents

In 2019, the sampling design resulted in approximately half the sample indicating they felt negatively impacted by a waste and resource recovery facility near their home. These facilities included any of the following: a transfer station; a landfill or tip; an organic processing or composting facility; or any other type of waste or resource recovery facility.

The size of the 'impacted' sample had increased significantly from the previous survey when 24% felt impacted in 2016. This may relate to an increased salience of waste and resource recovery site incidents in 2019.

### 2019 Sample

- 50 % identified as *Impacted residents* - ( $n = 626$ ), stating they were negatively affected by one or more different types of waste and resource recovery facilities
- 50 % identified as *Non-impacted residents* - ( $n = 618$ ) stating they were not affected by waste and resource recovery infrastructure

**Total respondents** ( $N = 1,244$ )

## **SURVEY QUESTIONS AND FORMAT**

The surveys in 2016 and 2019 were essentially the same. However, the survey for 2019 included some additional attitudinal and waste to energy questions.

The survey covered three main sections and comprised 134 questions (items) in 2016 and 172 in 2019.

### **SECTION 1: Knowledge, attitude, and behaviour questions**

- General attitudes about waste and resource recovery – essentialness of service, shared responsibility, efficacy beliefs (self and collective), social influences
- Self-reported waste reducing behaviour
- Knowledge of the waste sector, including additional questions in 2019 about waste to energy

See Appendix D for a more detailed description of the survey items.

### **SECTION 2: Scenarios with background information followed by perceptions and social acceptance questions**

- Perceived impacts
- Perceived benefits
- Perceived fairness and equity
- Trust
- Quality of relationships
- Procedural fairness
- Governance
- Community acceptance

See Appendix C (Social Acceptance and Perceptions of Waste and Resource Recovery Facilities) for a more detailed description of the survey items.

### **SECTION 3: Demographics questions**

- Age / Gender / Income / Education / working status, plus household size and dwelling type in 2019
- Geographic location (postcode)
- Impacted by current waste and resource recovery infrastructure

The survey questions were developed in earlier research, which explored community expectations and perceptions of the Waste and Resource Recovery sector (Walton, Jeanneret, McCrea, Lacey, & Moffat, 2016). The survey was also informed by previous research conducted by CSIRO on the social licence to operate in mining and coal seam gas industries (Moffat & Zhang, 2014; Moffat, Zhang, & Boughen, 2014; Williams & Walton, 2013).

## SCENARIOS USED IN THE SURVEY

In the second half of the survey design, scenarios were used to measure residents' perceptions and attitudes of the waste and resource recovery sectors. Scenarios are used as a way of creating a common level of understanding and to ensure that respondents are answering questions in relation to a common stimulus or situation. The same scenario was used in both the 2019 and 2016 surveys, though in 2019 half the sample were given a waste to energy scenario.

- In 2016, all respondents answered attitude and perception questions in relation to living near a waste and resource recovery complex.
- In 2019, respondents were randomly allocated to answer questions about one of two different scenarios:
  1. Living near a waste and resource recovery complex ( $n=621$ )
  2. Living near a waste to energy plant ( $n=623$ )

## DATA ANALYSIS AND REPORTING RESULTS

To analyse the data, *t*-tests and Analysis of Variance (ANOVA) were used to test for differences among question responses and between sample groups. Multiple regression was used to predict waste reducing behaviours, and a path analysis was also used to test the acceptance models.

All results described as 'significant' refer to a statistical significance. The *p*-value used for significance varied based on the size of the comparison groups.

Using varying *p* levels avoids over reporting very small differences between groups detectable because the sample size is large. Thus the *p*-values for statistical significance varied between  $p < .001$  for the larger sample size groups and  $p < .05$  for the smaller sample sizes. We have purposefully kept the reporting of statistical tests to a minimum within the document, so that it is easier to read, and have rounded mean scores to one decimal point and percentages to whole numbers in most graphs.

# Results

## 3 Knowledge and attitudes about waste and recycling

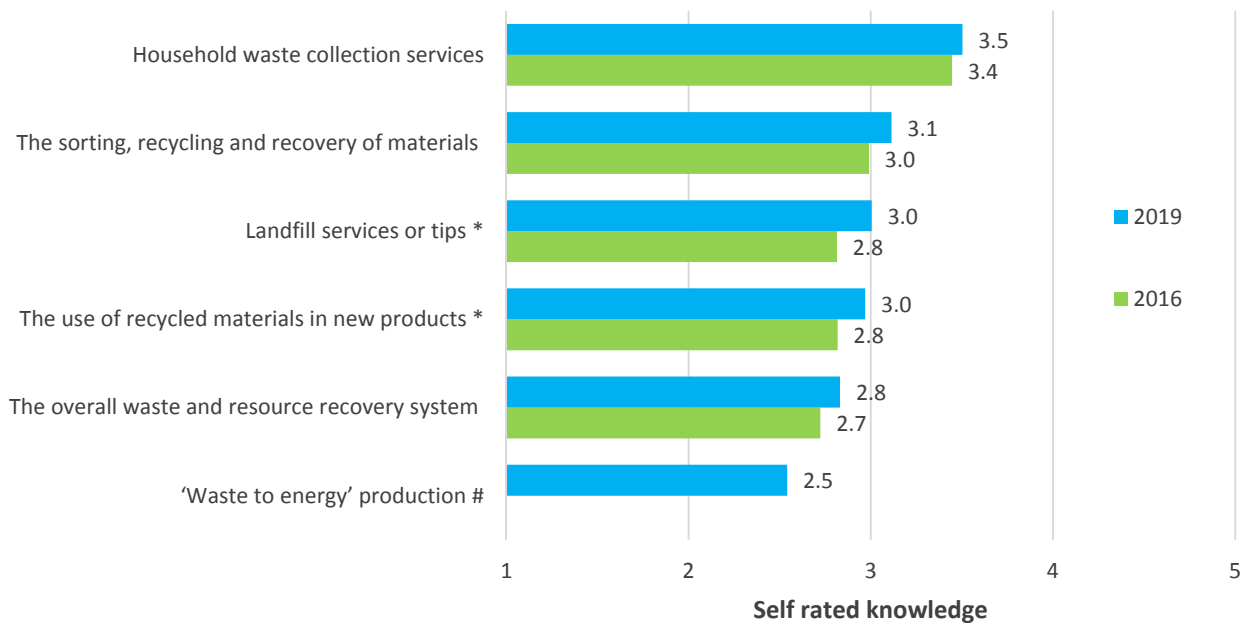
### 3.1 Knowledge levels of the waste and resource recovery system

In 2019, residents felt they knew significantly more about landfills and the use of recycled materials in new products compared to 2016 ( $p < .001$ ). People’s knowledge of the household waste and collection services was good; however, their knowledge about the overall waste and resource recovery system was low, especially knowledge about ‘waste to energy’ production. Self-rated knowledge of ‘waste to energy’ production was statistically significantly less than other aspects of the waste and resource recovery system.

For the knowledge questions, respondents were asked to self-rate their knowledge about six main components of the waste and resource recovery system after being given a diagram and brief explanation of each component (see Appendix A ).

Figure 9 shows the average knowledge scores for each component of the system, where 1 = no knowledge, 3 = some knowledge and 5 = a lot of knowledge.

**Figure 9 Self-rated knowledge scores: 2016 and 2019**



Note: 1 = No knowledge; 3 = some knowledge; 5 = A lot of knowledge

\*significant difference between years; # significantly lower than other items ( $p < .001$ )



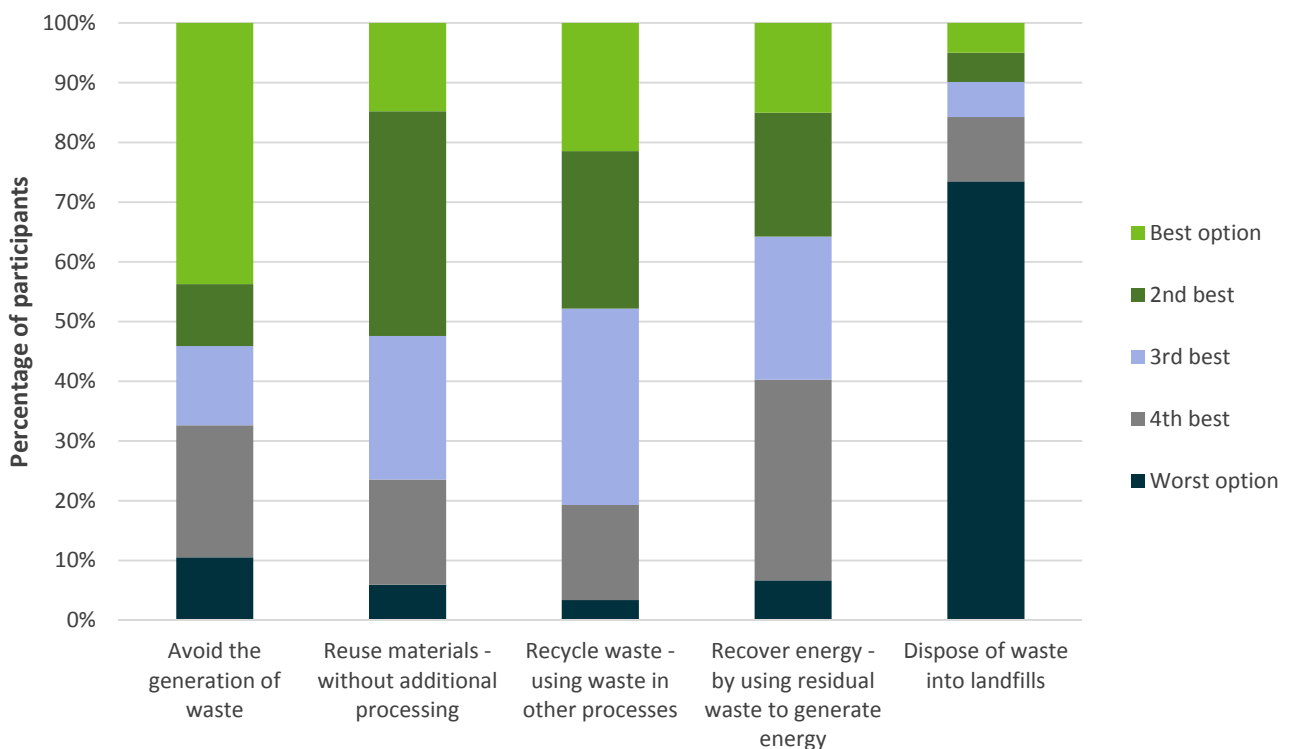
## 3.2 Attitudes

### 3.2.1 General views about the waste hierarchy

The waste hierarchy represents the preferred options for sustainably managing society’s waste and is used internationally and nationally to guide policy direction. Respondents were asked to rank each of the five waste management solutions from the best through to worst solution that they preferred for managing waste.

As shown in Figure 10, almost 75% of residents thought that landfills were the worst option for managing waste, while 45% of people thought avoidance of waste was the best option. Approximately 80% of residents ranked reusing and recycling waste materials in their top three options for managing waste. Finally, up to 40% of residents ranked waste to energy as their least two preferred options.

Figure 10 Views about the waste hierarchy as the best options for managing waste: 2019



### 3.2.2 General views about the sector

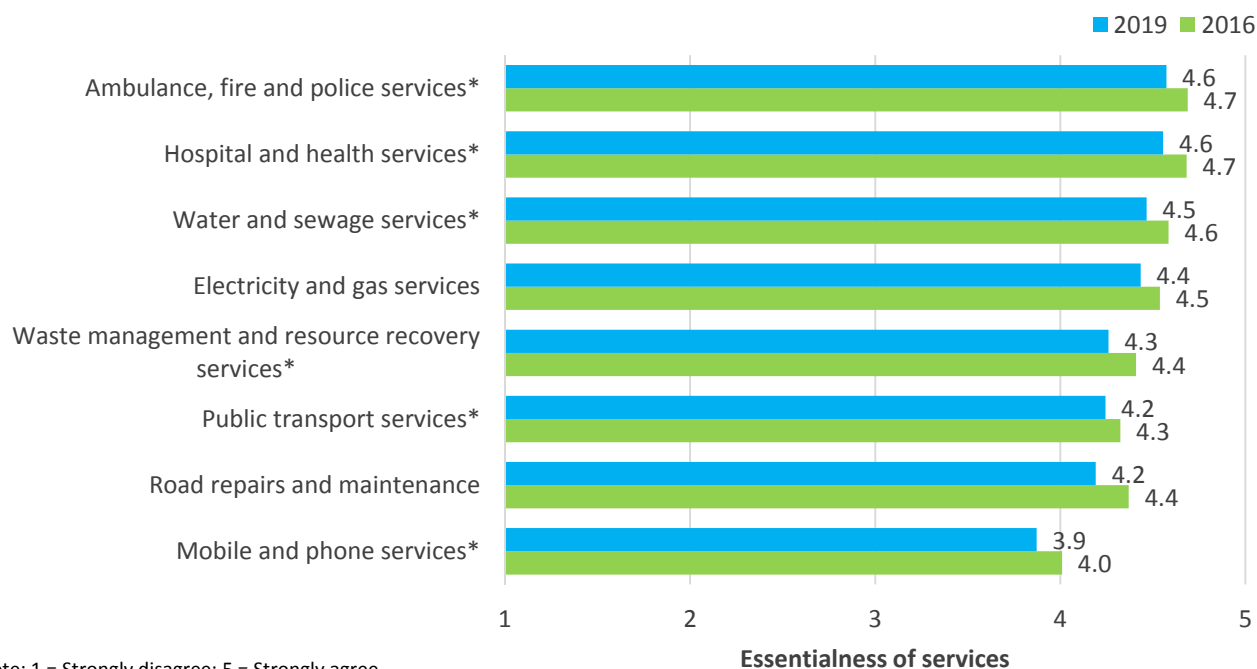
#### Essentialness of the service

Respondents were provided with the definition of an essential service as “a service that is a basic right for the community, and any failure to deliver it results in risks to the community”. Respondents were then asked how much they agreed waste and resource recovery services were essential services, along with rating a range of other services. Figure 11 shows the average rating for each service.

As in 2016, waste management and resource recovery services were ranked fifth in essential services. A similar order of essential services were evident in 2019, except for public transport ranking higher in 2019 than road repairs and maintenance.

In general, all services were seen as slightly less essential in 2019 than in 2016 though these differences were not statistically significantly different.

Figure 11 Perceived essentialness of various services: 2016 and 2019



Note: 1 = Strongly disagree; 5 = Strongly agree  
 \* significantly different between years (p < .001)

### 3.2.3 Beliefs about waste generation

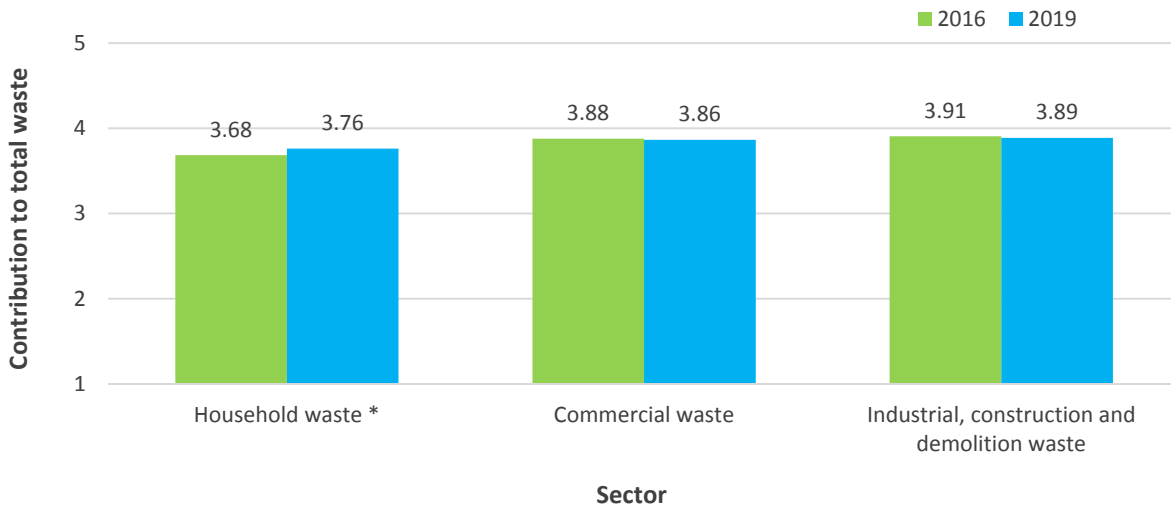
#### Contributors to waste

Respondents were asked to identify how much they believed the different producers of waste each contributed to total waste generation, using a scale where 1 = not much of the total waste to 5 = most of the total waste. The three sectors of waste producers were:

- *Household waste* (including garbage, recyclables and organic waste)
- *Commercial waste* (including food and other retailers, accommodation and other service providers, public sectors and educational institutions)
- *Industrial, construction and demolition waste* (including manufacturing, housing, civil, and commercial projects)

Figure 12 shows that residents thought household waste contributed less than the other two sectors and this pattern remained the same in 2019 as in 2016. The mean scores were all over 3, which shows that residents see all three sectors as large contributors on average (see bar heights). There were no statistically significant difference in these beliefs between 2019 and 2016.

**Figure 12 Beliefs about sectors contributing to total waste: 2016 and 2019**



Note: 1 = not much of the total waste to 5 = most of the total waste; \* in both 2016 and 2019, household waste perceived to be significantly less contributors than other sectors; no significant differences between years ( $p < .001$ )

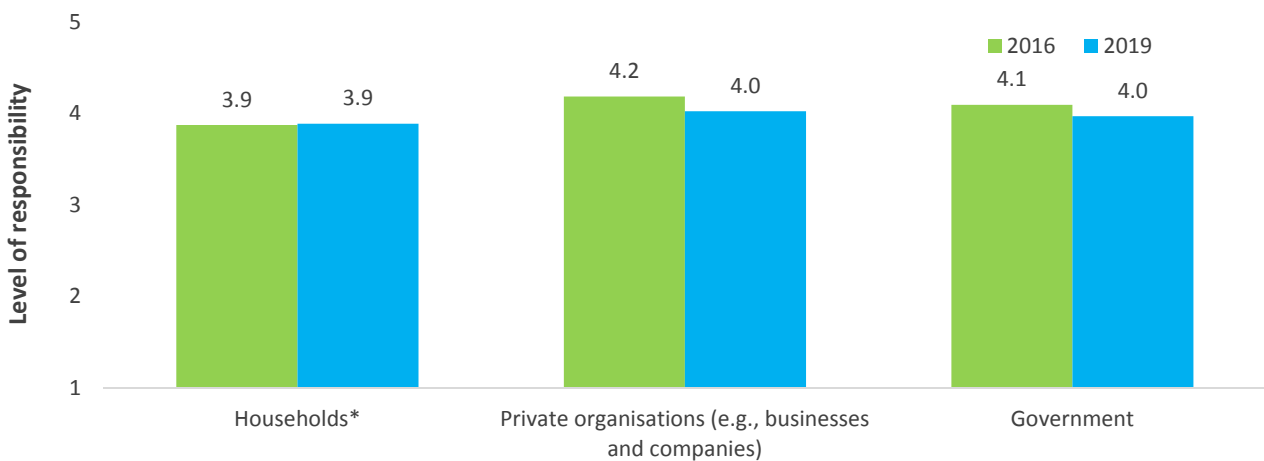
### 3.2.4 Beliefs about reducing waste

#### Responsibility for reducing waste

In 2019 respondents perceived households to be slightly less responsible for reducing waste compared to private organisations and governments. As shown in Figure 13, residents were asked which of these sectors should bear most responsibility for reducing the amount of waste going to landfills using a scale from 1 = very little responsibility to 5 = most of the responsibility. This result is consistent with perceptions that waste management and resource recovery is an essential service and consequently, expectations government be more responsible than households. The results also suggest that households are engaged with the notion of reducing waste and see themselves as highly responsible.

In 2019, the survey asked about the responsibility of local and state governments separately, but they were both seen as having the same level of responsibility (both 4.0 out of 5), so are reported in Figure 13 as 'government'.

**Figure 13 Beliefs about responsibility for reducing waste: 2016 and 2019**



Note: 1 = Very little responsibility; 5 = Most of the responsibility

\* In 2016 and 2019, households perceived they bear statistically less responsibility than private organisations or government ( $p < .001$ )

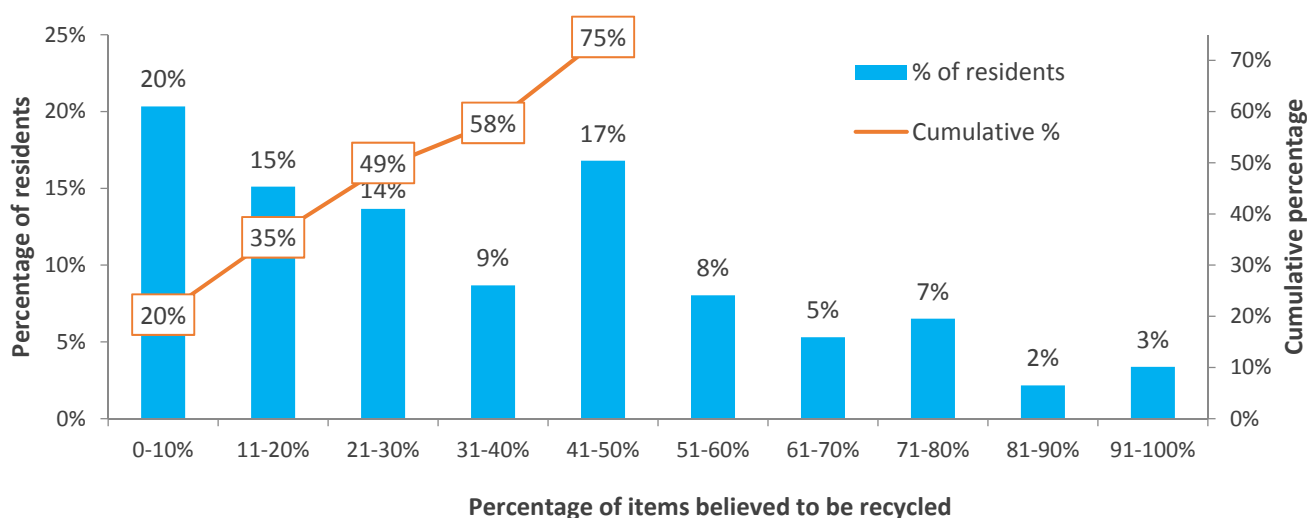
### 3.2.5 Beliefs about recycling

#### Beliefs about amounts of recycling being recycled

In 2019, residents were asked for the first time what percentage of items in kerbside recycling bins they thought were being recycled into new products. Figure 14 shows that 20% of residents believed that only 0 to 10 percent of items in kerbside recycling bins were recycled into new products; and 75% of respondents believed that less than half of kerbside recycling was being recycled into new products, as shown by the cumulative percentage line in Figure 14.

In its *Victorian Local Government Waste Services Report 2016-17*, the Victorian government estimated the actual amount of recycling items processed or recycled into new products was over 90%, though only 3% of people in this survey believed this to be the case, as shown in Figure 14.

Figure 14 Percentage of items in kerbside recycling bins believed to be recycled into new products: 2019

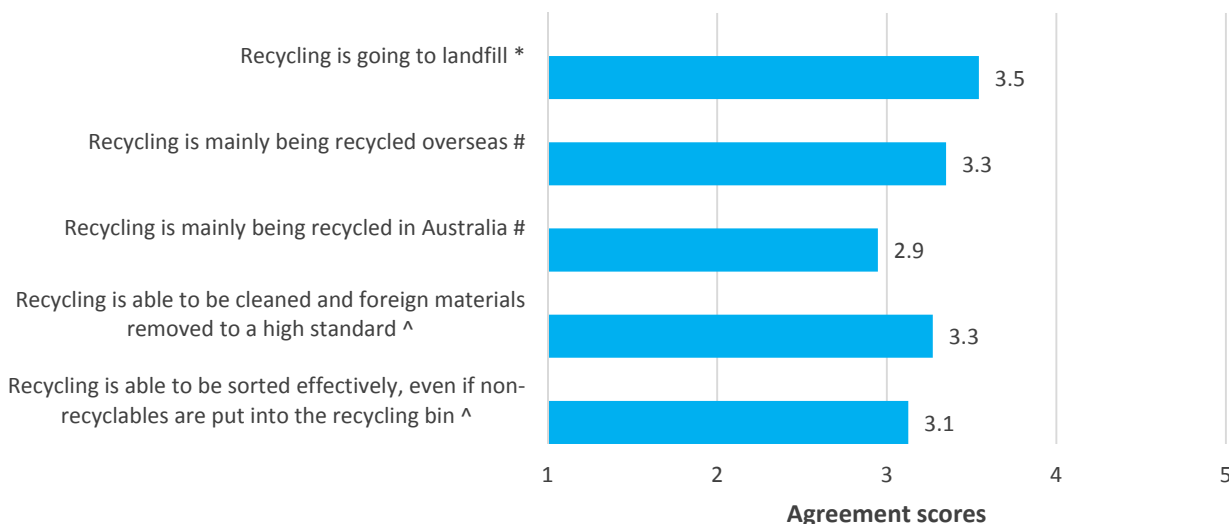


#### Beliefs about recycling management and outcomes

In 2019, residents were also asked about other beliefs regarding how recycling is managed and its outcomes. As shown in Figure 15, the most common belief was that local recycling was going to landfill, which was significantly higher than the other beliefs about local recycling.

Residents also agreed on average that local recycling was going overseas to be recycled more than they believed it was being recycled in Australia. Residents also believed that local recycling material could be cleaned to a high standard, though were not as confident that it could be effectively sorted.

**Figure 15 Beliefs about recycling management and outcomes: 2019**

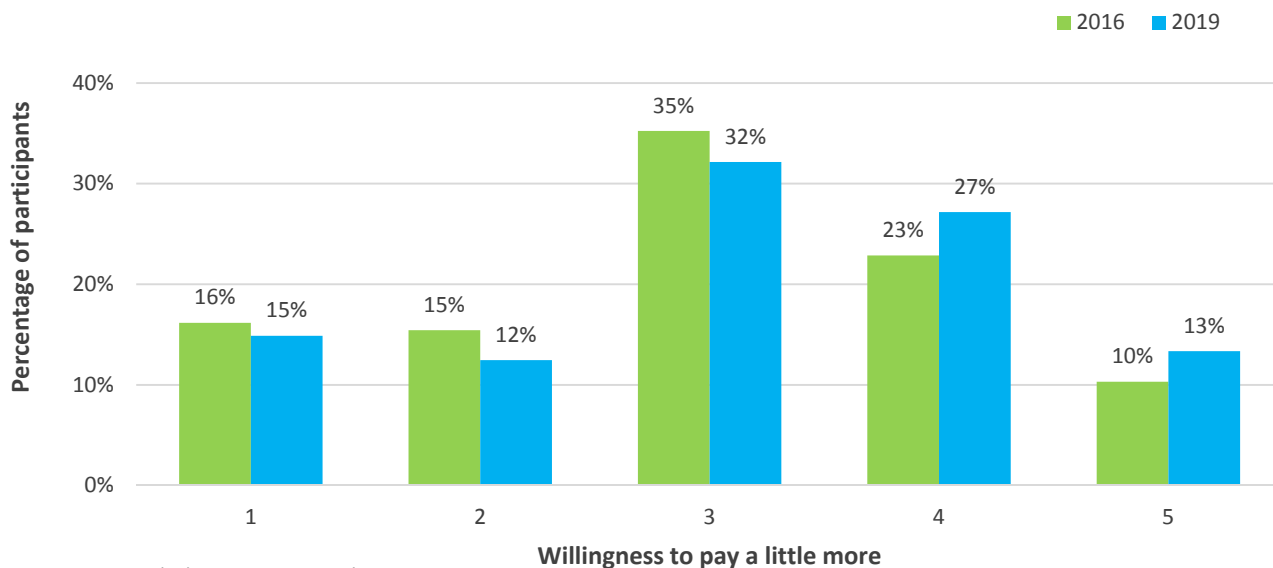


Note: 1 = Strongly disagree; 5 = Strongly agree; \* indicates significantly higher than other beliefs; # significantly different from each other; ^ significantly different from each other (p<.001)

### Willingness to pay more to reduce waste going to landfill

In 2019 more people agreed they were prepared to pay more to reduce waste going to landfill than those who disagreed. Compared to 2016, there was a statistically significant increase in the percentage of residents willing to pay a little bit more in 2019 (40% agree or strongly agree), as shown in Figure 16.

**Figure 16 Willingness to pay a little more for household waste collection / disposal to reduce waste going to landfill: 2016 and 2019**



Note: 1 = Strongly disagree; 5 = Strongly agree

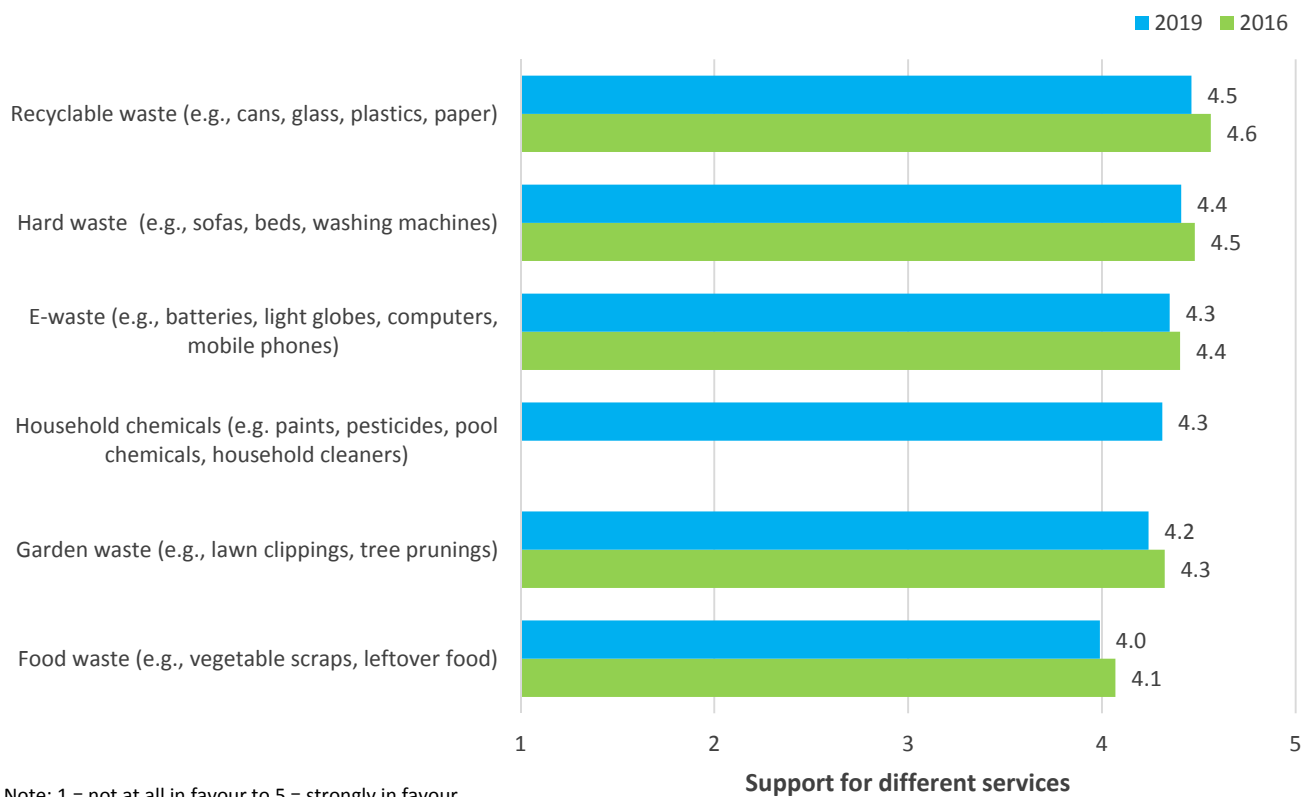
### Support for different types of services to reduce waste going to landfill

A range of services can be utilised for reducing waste going to landfill. Respondents were asked to what extent they were in favour of various services that collect and dispose of differing types of waste, on a scale from 1 = not at all in favour to 5 = strongly in favour.

In 2019, there was still strong support for a range of different services for reducing waste going to landfill. Figure 17 shows the level of support was not significantly different from 2016 and the various services were still ranked in the same order, with recyclables still receiving the highest level of support.

Even though food waste services received less support than other services, residents were still very much in favour of it. In 2019, an additional service for ‘collecting or disposing’ household chemicals was added and also received strong support.

**Figure 17 Attitude towards different services for collecting or disposing of different types of waste: 2016 and 2019**



Note: 1 = not at all in favour to 5 = strongly in favour

## 4 Waste reducing behaviour

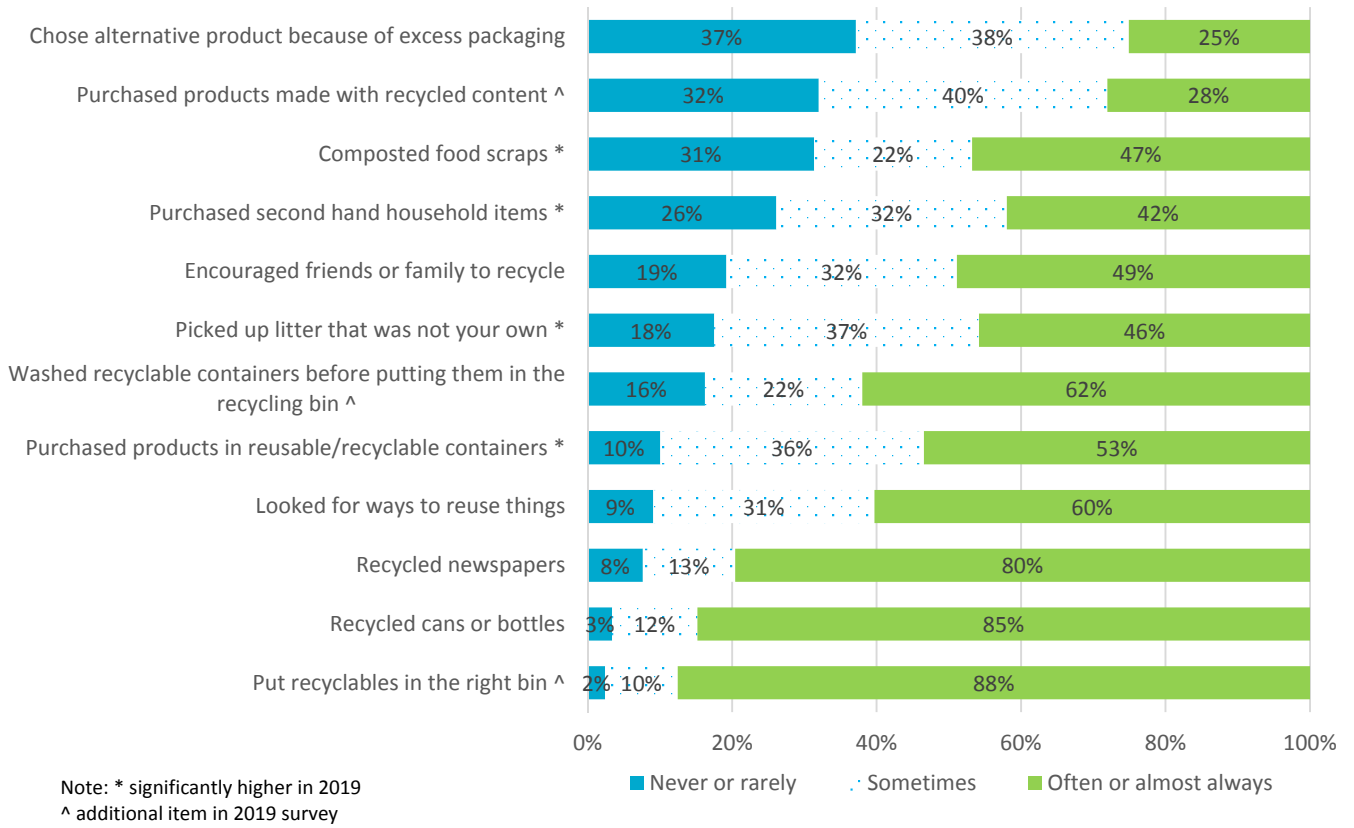
### 4.1 Self-reported behaviour

In 2019, the most common behaviour for reducing waste going to landfill was putting recyclables in the right bin, which was a new item introduced in the 2019 survey. The next three most common behaviours in 2019 were recycling cans or bottles, recycling newspapers, and looking for ways to reuse things. In contrast, the least common behaviours were choosing alternative products because of excess packaging and purchasing products made with recycled content. Figure 18 shows the waste reducing behaviours ordered by behaviours that are done least often.

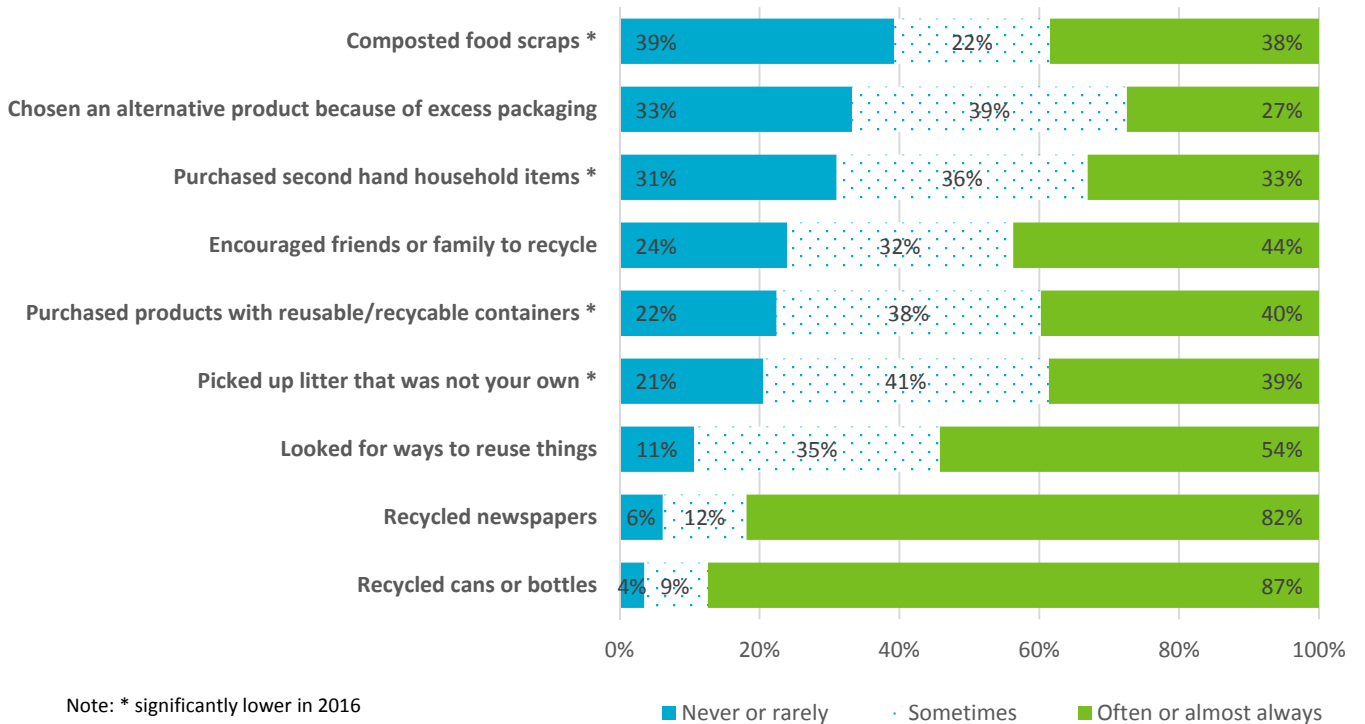
Compared to 2016, four behaviours were significantly improved in 2019. Composting of food scraps, purchasing of second-hand household items, purchasing products in reusable or recyclable containers, and picking up litter that was not their own were occurring more frequently in 2019 than 2016. Also encouraging, is that no behaviours for reducing waste going to landfill declined between 2016 and 2019. Figure 19 shows the rates for self-reported behaviour in 2016.

These results suggest that recycling cans, bottles and newspapers are part of routine household behaviour for most Victorians. The less frequently performed behaviours such as food composting had improved significantly from 2016, with almost half respondents reporting they compost often or almost always (47%) up from 38% in 2016. This makes composting no longer the least performed waste reducing behaviour in households.

**Figure 18 Frequency of self-reported behaviours for reducing waste going to landfill: 2019**



**Figure 19 Frequency of self-reported behaviours for reducing waste going to landfill: 2016**



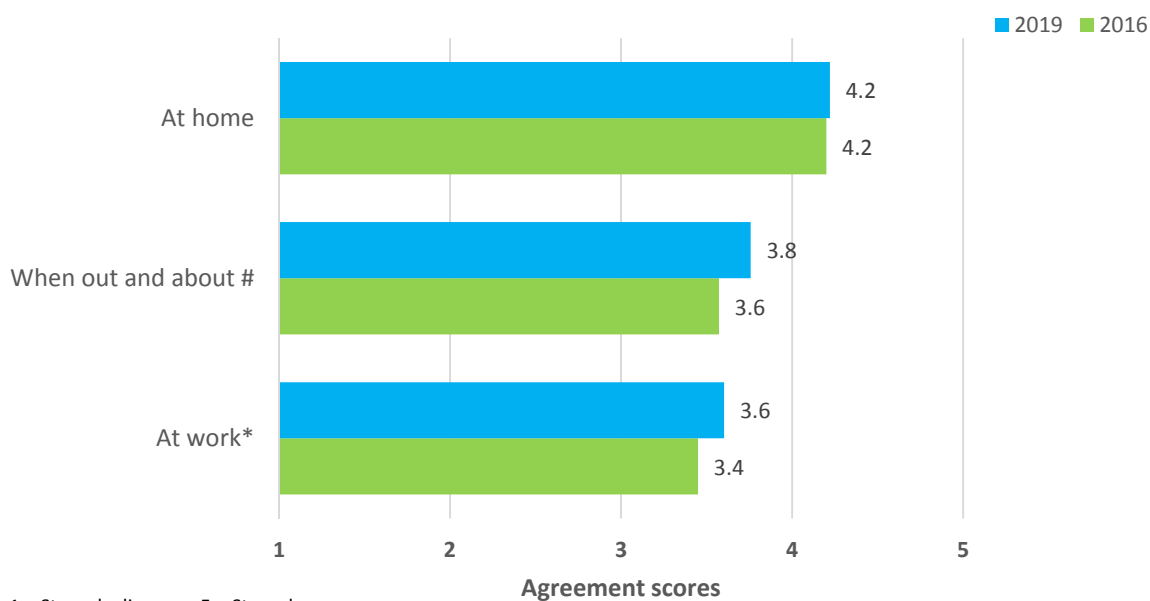


## 4.2 Effort put into reducing waste at work and home

In 2019, people continued to indicate they put more effort into reducing waste going to landfill when they are at home than at work or when out and about. However, in 2019 there was an increase in the reported effort that people were putting into reducing waste going to landfill when at work and when out and about compared to their effort in 2016. These results are displayed in Figure 20.

These results continue to suggest that different drivers of behaviour are at play in different environments with some environments being more enabling than others. For example, recycling bins may be more prevalent in homes than working environments, or there may not be a culture at some workplaces for reducing waste going to landfill, even though the person may be doing so at home.

Figure 20 Effort put into reducing waste going to landfill - at home / at work / out and about: 2016 and 2019



Note: 1 = Strongly disagree; 5 = Strongly agree

\* significant difference between years ( $p < .001$ ); # significant difference between years ( $p < .002$ )

## 4.3 Underlying drivers of waste reducing intentions and behaviour

Drawing from the Theory of Planned Behaviour (Ajzen, 1985, 1991; Ajzen & Fishbein, 2005) and analyses of correlation statistics between the general attitudes and self-reported behaviours, we identified a range of variables that underlie or drive people's intentions to reduce waste going to landfill and their actual behaviour.

These variables include residents' attitudes toward reducing their waste going to landfill (*attitudes*), where *attitudes* can be viewed as a person's overall evaluation of the benefits of undertaking the behaviour versus the costs, where costs can be considered in terms of time, effort, convenience, as well as money. Their perceived behavioural control about reducing their waste (*perceived control*), where *perceived control* reflects how easy or difficult it is for a person to undertake the behaviour, even if they want to. What others around them are doing (*social norms*), and their *intentions* to reduce waste going to landfill. *Social norms* are a type of social pressure on a person's behaviour generated from a person's beliefs about what they think others are doing in relation to the behaviour. In this study, we have used descriptive norms about 'what others do' rather than norms about what 'should be done' as the social influence.

In addition, we have included a *collective efficacy* belief as a driver of behaviour. This is where people believe ‘together we can make a difference’. If people believe that the problem is all too big and difficult to overcome then it is likely to influence that person’s intention to reduce their waste going to landfill. We have also included *trust in recycling not going to landfill, knowledge of the waste and resource recovery sector* and *effort put into waste reducing behaviours* as three other variables that shape intentions or actual behaviour.

Table 2 shows that attitudes to waste reduction were very positive and a sense of collective efficacy was high in both years. Victorian residents were also putting in a good effort to reduce the amount of waste going to landfill, though they did not have a high sense that they or others could minimise the amount of their waste going to landfill, as shown by perceived control and social norms measures. However, trust that their recycling was not going to landfill was not high and knowledge of the WRR system was relatively low.

Table 2 also shows, intentions to reduce household waste going to landfill did not change significantly between years and was reasonably high in both years. However, there was a significant increase in actual waste reducing behaviour, which includes behaviours inside and outside the home. This was potentially improved by a significant increase in knowledge of the WRR system in 2019, as well as significantly more effort by Victorians to reduce the amount of waste going to landfill in 2019.

**Table 2 Summary of mean scores and survey items used to measure the underlying drivers of waste reducing intentions and behaviours: 2016 and 2019**

Underlying drivers	Survey items	Mean scores 2016	Mean scores 2019
Attitudes to waste reduction	It is important for your household to minimise the amount of waste that goes to landfill	4.33	4.39
Perceived control	It is difficult for your household to minimise the amount of waste that goes to landfill (reverse coded)	3.18	3.09
Social norms	[An average of three items] Family members (outside your household) are minimising the amount of waste they sent to landfill Your friends are minimising the amount of waste they send to landfill Victorians generally are minimising the amount of waste they send to landfill	3.30	3.35
Collective efficacy	Households, businesses and governments can effectively work together to reduce the amount of waste going to landfills	4.15	4.05
Trust in recycling	My household recycling is being recycled and not going to landfill		3.44
Knowledge of WRR system	How much do you feel you know about waste and resource recovery activities [an average of 5 items, excluding waste to energy activities]	2.96	3.08*
Intentions to reduce household waste going to landfill	Our household intends to keep future household waste going to landfill to a minimum	3.99	4.02
Effort	How much effort do you put into reducing waste going to landfill when at home, at work, out and about [an average of 3 items:]	3.73	3.86*
Actual waste reducing behaviour (self-reported)	How often do you undertake the following behaviours [an average of nine different waste reducing behaviours]	3.46	3.60*

Note: \* Significantly improved in 2019; Residents were asked how much they agreed with each survey item from 1 = strongly disagree to 5 = strongly agree.

## 4.4 Predicting intentions and effort to reduce waste and waste reducing behaviours

The underlying drivers of waste reducing behaviour explained people's intentions to reduce behaviour and their actual self-reported waste reducing behaviour very well. Table 3 shows the most important predictors of intentions to reduce waste were attitudes about the importance of reducing waste, social norms about how much others were doing, and a sense of collective efficacy that households, businesses and government could work together to reduce waste going to landfill. This is reflected in the values of the beta coefficients in Table 3, where the larger the beta the more important the predictor.

The results show that trust in household recycling not going to landfill did not significantly influence household intentions to reduce household waste going to landfill. This is good news given media coverage of increasing stocks of domestic recyclables following the effective ban on exports of recyclable materials to China.

Table 3 also shows the main drivers of effort put into reducing waste going to landfill when at home, at work, and when out and about are similar but a much stronger influence from knowledge. Finally, Table 3 shows the main driver of actual waste reducing behaviours was effort, and it seems improvements in this was the main factor behind a significant increase in waste reducing behaviours in 2019. Moreover, effort and knowledge are stronger predictors of actual waste reducing behaviours than intentions to reduce household. Knowledge played an important role across all aspects of reducing waste – in improving intentions and effort to reduce waste, and increasing actual waste reducing behaviour.

Improvements in effort related mainly to efforts while at work or out and about. This suggests that increased effort put into waste reducing behaviours external to the home may also be translating to what people are doing at home. This mechanism indicates the importance of social learning and conscious effort transitioning into new habit formation.

In contrast, perceived control (the perceived difficulty of reducing household waste going to landfill), trust in recycling, and collective efficacy were not significant predictors of actual behaviours, also suggesting that media coverage of increasing stockpiles of recyclables was not affecting waste reducing behaviours.

**Table 3 Predictors of intentions to reduce waste going to landfill and predictors of waste reducing behaviour: 2019**

Underlying drivers	Predictors of Intentions Beta	Predictors of Effort Beta	Predictors of Behaviour Beta
Attitudes to waste reduction	.31***	.22***	.12***
Perceived control	.14***	.09***	.05*
Social norms	.25***	.13***	.11***
Collective efficacy	.24***	.03	.03
Trust in recycling	.02	.05	.07**
Knowledge	.08***	.14***	.17***
Intentions		.18***	.04
Effort			.39***
R2	41.4%	26.6	38.7%

Note: \*\*\* significant at  $p < .001$ ; \*\* significant at  $p < .01$ ; \* significant at  $p < .05$

## 5 Social acceptance and perceptions of waste and resource recovery hubs

Respondents were asked questions about living near a waste and resource recovery site. A scenario was used to create a common platform for responding to the questions. In 2016, all respondents were asked questions about living within two kilometres of the waste complex described in the scenario (i.e.,  $N = 1,212$ ). However, in the 2019 survey, half of the respondents were asked about living near this type of complex ( $n = 621$ ) and the other half were asked about living near a waste to energy plant ( $n = 623$ ) using a different scenario. Results for the living near a waste to energy plant scenario are reported separately in Section 6.

### Waste complex scenario

The scenario asked residents to imagine they had moved house and lived within two kilometres of a waste complex which included the following activities:

- A landfill or tip (i.e., burying waste that cannot be recycled, reprocessed or reused)
- A transfer station ( i.e., a local drop off point for excess household waste which is then sorted for further processing, resale, or else disposed to landfill )
- A tip shop (i.e., an on-site shop selling second hand goods recovered from household waste)
- Sorting recyclables (i.e., separating recyclables into different material streams)
- Organic reprocessing (e.g., composting grass clippings and tree prunings for soil, wood chips, or other organic matter)
- Recovering and reprocessing building materials (e.g., recovering waste timber and crushing cement)

They were also asked to imagine that:

- The local council granted planning permits for this waste complex
- The Environment and Planning Authority (EPA) granted an operating licence to a large private contractor to manage this waste complex within the EPA's regulatory guidelines.

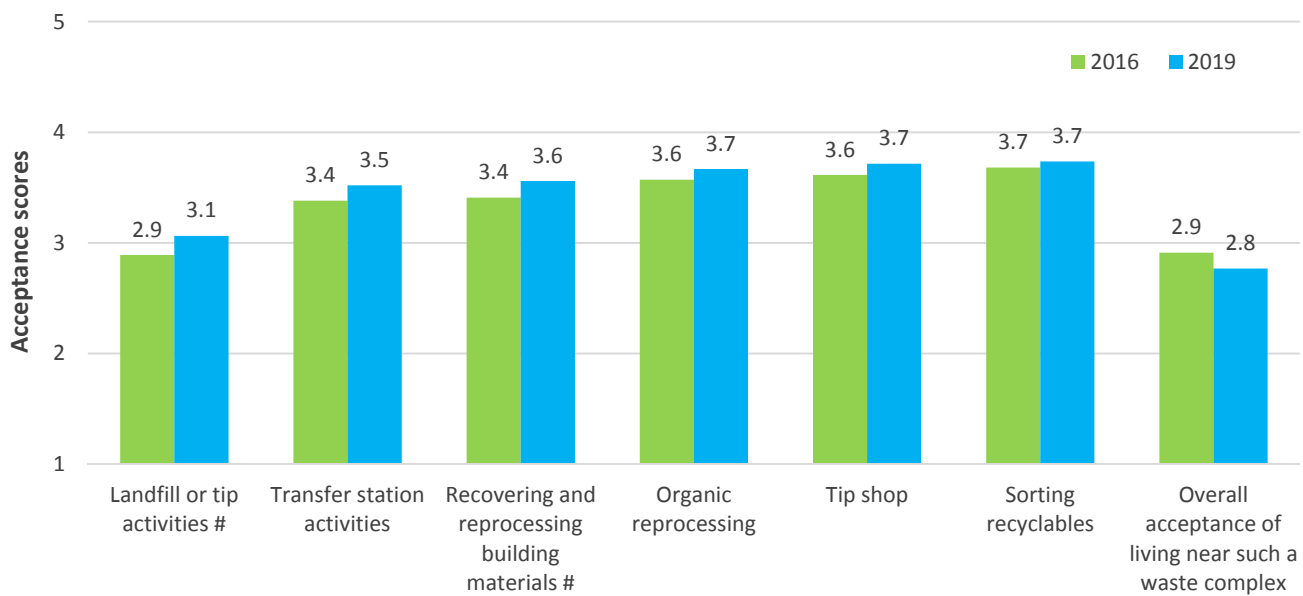
### 5.1 Levels of social acceptance of a waste complex

After being asked a range of questions about living near the facility described in the scenario (referred to here as the waste complex), residents were asked about their level of acceptance of such a complex. Residents were asked to think about living near such a waste complex (e.g., within 2 kms) and how accepting they would be of the activities listed above, using a scale from 1 = not at all accepting; 3 = somewhat accepting; 5 = very accepting.

Figure 21 shows the average level of acceptance for living near each activity. Acceptance of living near a landfill or building material recovery and processing activities improved slightly from 2016, and living near a landfill shifted to an overall positive view on average in 2019 from an overall negative view in 2016. However, overall acceptance of living near a waste complex, as described in the scenario, was similar in 2019 to 2016.

The most negatively viewed activity was living near landfill or tip activities, which was marginally positive in 2019. In contrast, living near the other activities were viewed considerably more positively, with average acceptance scores above the mid-3 range. However, it is the notion that a waste complex includes a landfill that drives down the overall evaluation of acceptance of living near a waste complex.

**Figure 21 Social acceptance of different types of infrastructure: 2016 and 2019**

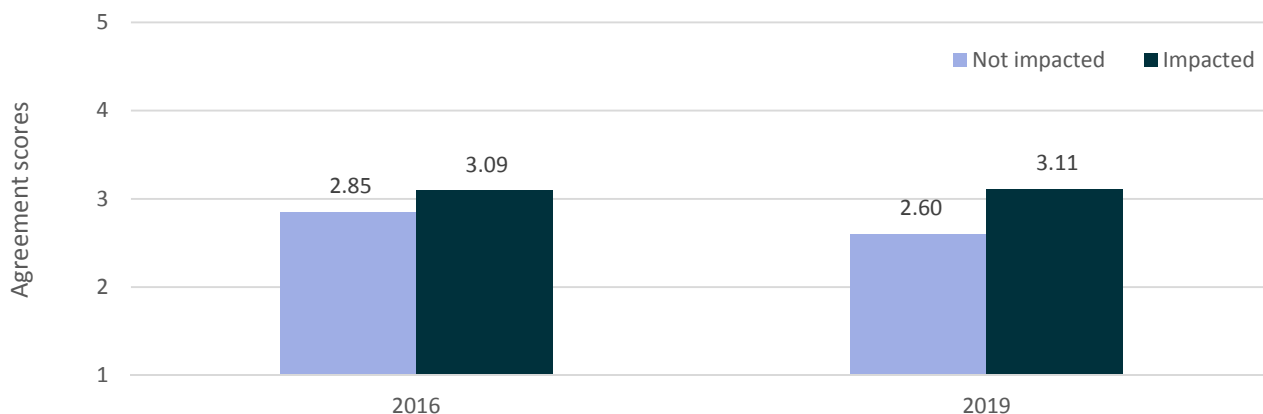


Note: 1 = not at all accepting; 3 = somewhat accepting; 5 = very accepting.  
 # significant differences between years ( $p < .01$ )

Differences in acceptance emerge when comparing non-impacted and impacted residents. Figure 22 shows that the broader Victorian public (non-impacted residents) have significantly lower levels of acceptance of waste and resource recovery facilities than residents who actually live near a waste and resource recovery facility and who feel impacted by the facility.

Acceptance levels of non-impacted residents had reduced in 2019 compared to 2016, whereas acceptance levels for impacted residents were unchanged. Acceptance levels for impacted residents are positive on average while acceptance levels for non-impacted residents are negative on average.

**Figure 22 Acceptance of living near a waste complex, 2016 and 2019: differences between impacted and non-impacted residents**

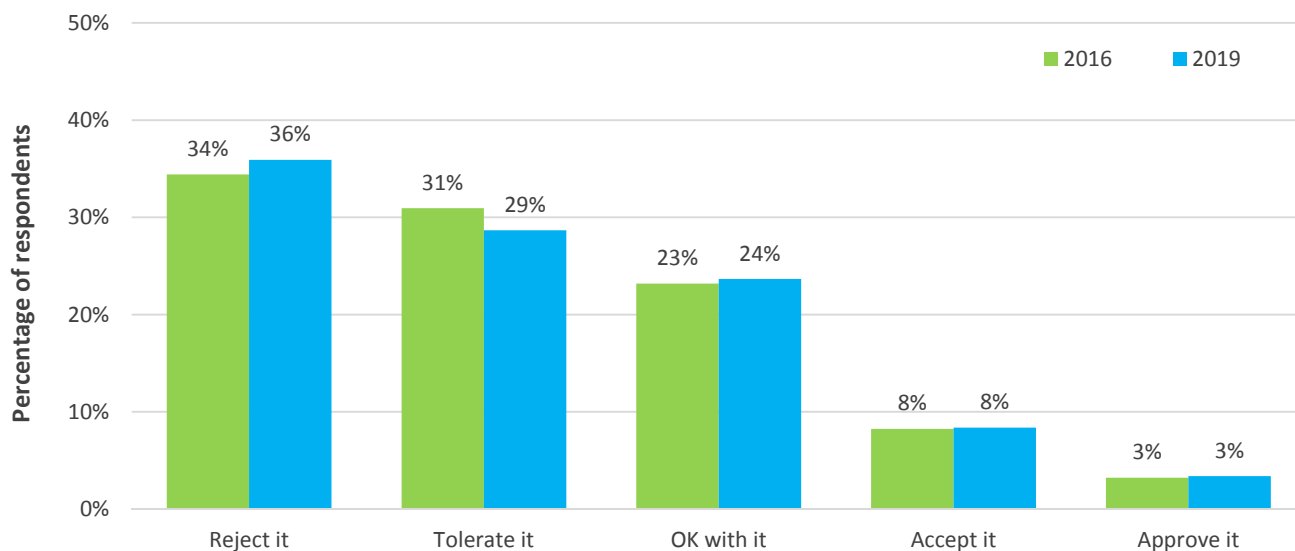


Note: 1 = Strongly disagree; 5 = Strongly agree, Significant difference between 2016 and 2019 for non-impacted residents (p<.001)

Residents were also asked which term best describes their attitude toward this type of waste management facility: I would reject it, I would tolerate it, I would be OK with it, I would accept it, or I would approve of it.

Figure 23 shows that in 2019, 36% of residents would reject living near such a facility. Over half the residents would tolerate or be OK with it (29% and 24% respectively), and 11% would accept or approve of it. These attitudes in 2019 were not statistically different compared to 2016. The most common response would be to reject it, however almost two thirds of respondents would at least tolerate it.

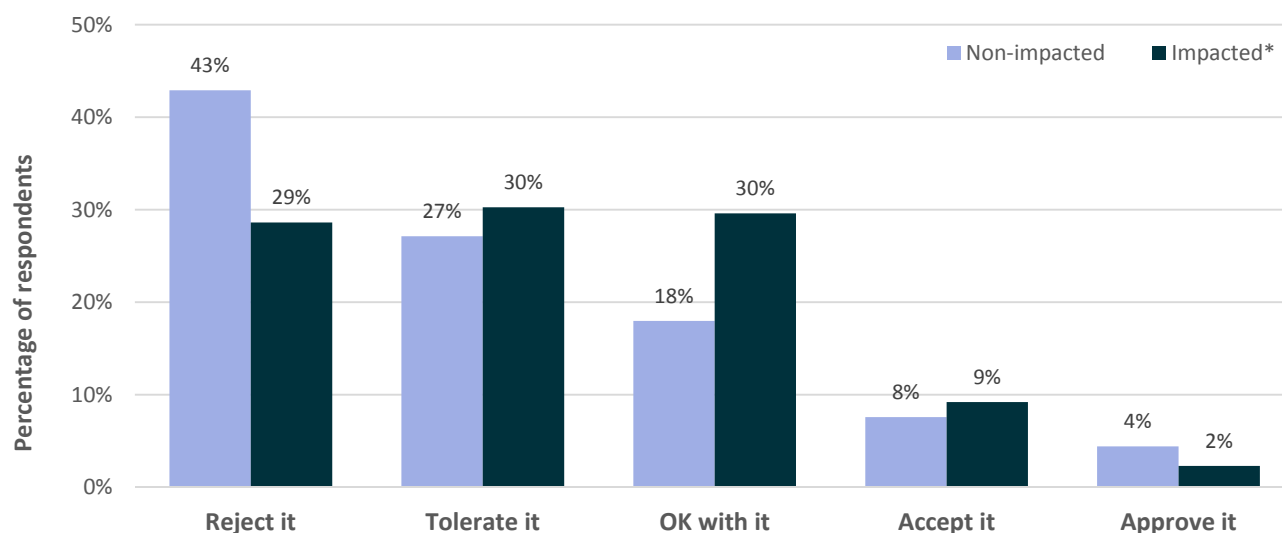
**Figure 23 Attitudes towards living near a waste and resource recovery hub: 2016 and 2019**



Note: Percentages rounded to the nearest whole percent

When comparing impacted and non-impacted residents in 2019, results indicate significant differences in the proportion of people who would reject living near a waste facility. Figure 24 shows that non-impacted residents hold significantly more 'reject' views than impacted residents, whereas impacted residents have much higher levels of 'being ok with it'. This result highlights the negative view held by the broader Victorian public towards living near a landfill compared to the more positive view held by impacted residents. Victorian public perceptions appear to be worse than the reality for people who live nearby.

**Figure 24 Attitudes towards a WRR hub: Differences between impacted and non-impacted residents, 2019**



Note: Percentages rounded to the nearest whole percent; significantly different at  $p < .001$

## 5.2 Underlying drivers of social acceptance

The survey measured a range of drivers of social acceptance of waste facilities using multiple items to evaluate each driver. The questions related to the waste complex described in the scenario. Table 4 provides a short description of each driver and the overall average score for 2016 and 2019. It also shows the difference between impacted and non-impacted residents for 2019.

Figure 25 shows many of the underlying drivers did not change significantly at the overall level, but particular items within the overall measure may have changed significantly. Notably the most differences were between impacted and non-impacted residents in 2019 relating to their perceptions of distributive fairness, relationship quality, trust in the sector, and governance, as shown in Figure 26. More specific results for each driver are discussed in detail in section 5.4.

Figure 25 Perceptions of underlying drivers of social acceptance of a WRR hub: 2016 and 2019

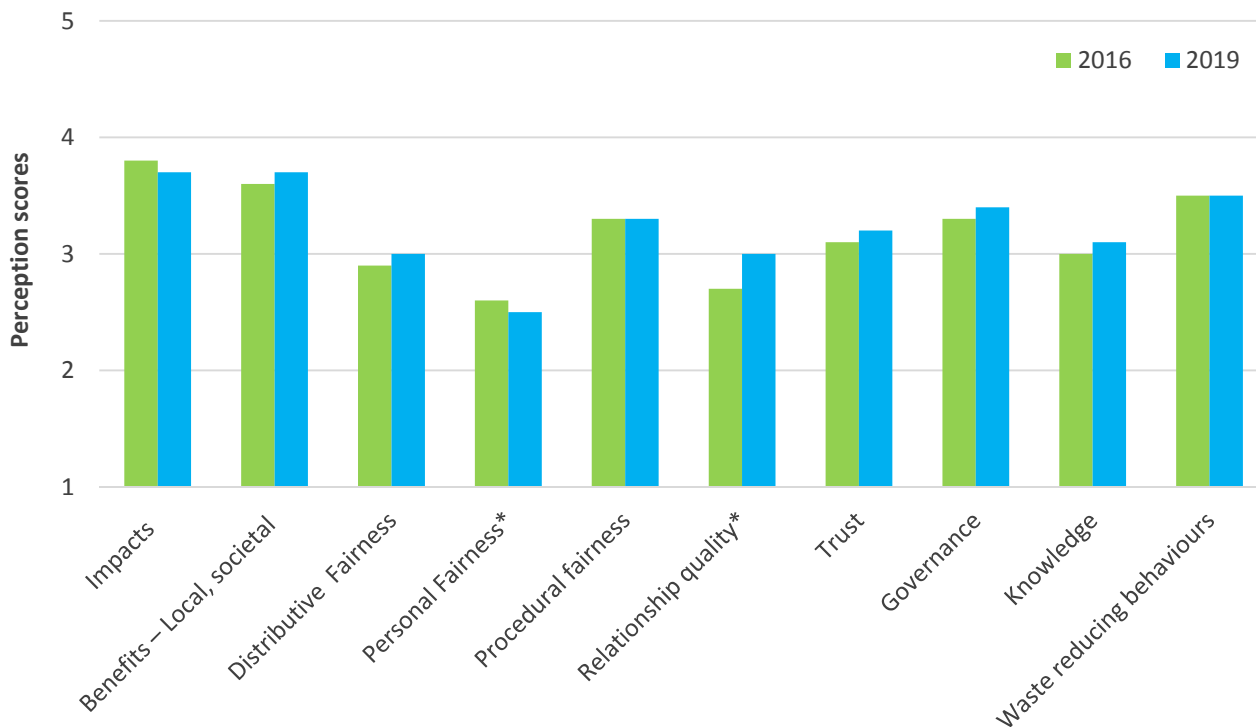
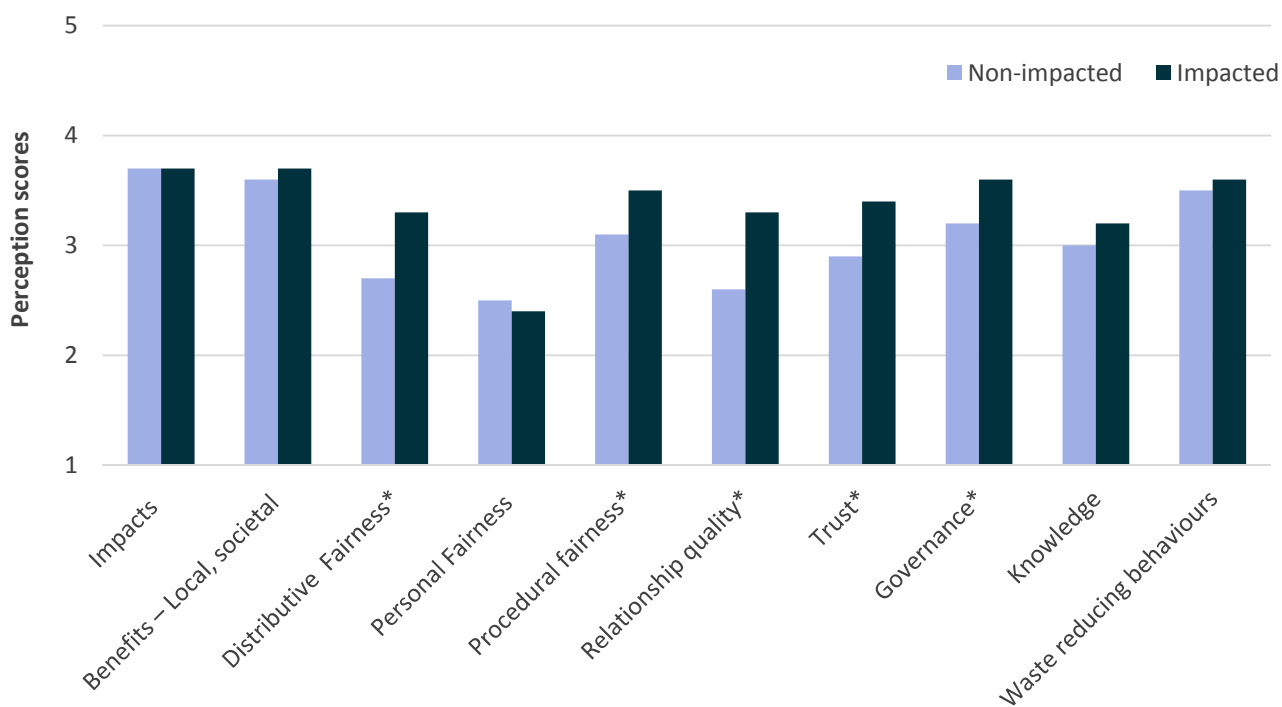


Figure 26 Perceptions of underlying drivers of social acceptance of a WRR hub: Impacted and non-impacted residents, 2019





**Table 4 Summary of perceptions of underlying drivers of social acceptance in the waste and resource recovery sector**

Drivers	Description	2016	2019	Impacted residents 2019	Non-impacted 2019
<b>Impacts</b>	For example, dust and odour, environmental management (soil, air, water contamination), noise, increased traffic, litter, scavenging birds, and visual impacts	3.8	3.7	3.7	3.7
<b>Benefits – Local and societal</b>	<i>Local benefits</i> of convenient disposal of large household items and waste, local employment/training opportunities, corporate support for community activities, for example	3.6	3.6	3.6	3.6
	<i>Societal benefits</i> - managing waste generated by society, reducing public health risks, and supporting the Victorian economy, for example	3.7	3.7	3.7	3.7
<b>Distributive Fairness</b>	Distributional fairness – feelings of unfair impacts are a negative driver of acceptance. feelings of distributional fairness, whereas reasons that support the ‘greater good’ (citizenship fairness) may act as a positive influence	2.9	3.0	<b>3.3<sup>H</sup></b>	<b>2.7<sup>L</sup></b>
<b>Personal Fairness</b>	NIMBYism and proximity to infrastructure underpinning feelings of fairness	<b>2.6<sup>H</sup></b>	<b>2.5<sup>L</sup></b>	<b>2.4<sup>L</sup></b>	<b>2.5<sup>H</sup></b>
<b>Procedural fairness</b>	Procedural fairness - driven by quality of relationships, meaningful two-way dialogue; opportunity to be heard and have a voice; not feeling intimidated or that there are power imbalances in the interactions.	3.3	3.3	3.5	3.1
<b>Relationship quality</b>	Relationship quality is related to the quality of contact (e.g., open, honest and genuine) and responsiveness of the operator to concerns and issues	<b>2.7<sup>L</sup></b>	<b>3.0<sup>H</sup></b>	<b>3.3<sup>H</sup></b>	<b>2.6<sup>L</sup></b>
<b>Trust</b>	Trust relates to acting responsibly, in the community best interests and in the capability of local operators, local government and state government bodies.	3.1	3.2	<b>3.4<sup>H</sup></b>	<b>2.9<sup>L</sup></b>
<b>Governance</b>	Governance included regulations, planning, and collaborations which govern processes and activities associated with waste management and resource recovery facilities.	3.3	3.4	<b>3.6<sup>H</sup></b>	<b>3.2<sup>L</sup></b>
<b>Knowledge</b>	Self-rated knowledge of the waste and resource recovery components and overall systems	3.0	3.1	3.2	3.0
<b>Waste reducing behaviours</b>	Level of self-reported behaviour for a range of waste reducing behaviours. Used to represent an overall attitude to waste and resource recovery.	3.5	3.5	3.6	3.5

Note: Items consistent across 2016 and 2019 surveys; Bold font indicates significant differences between year ( $p < .001$ ); L is significantly lower, H is significantly higher

## 5.3 Model of social acceptance: waste and resource recovery

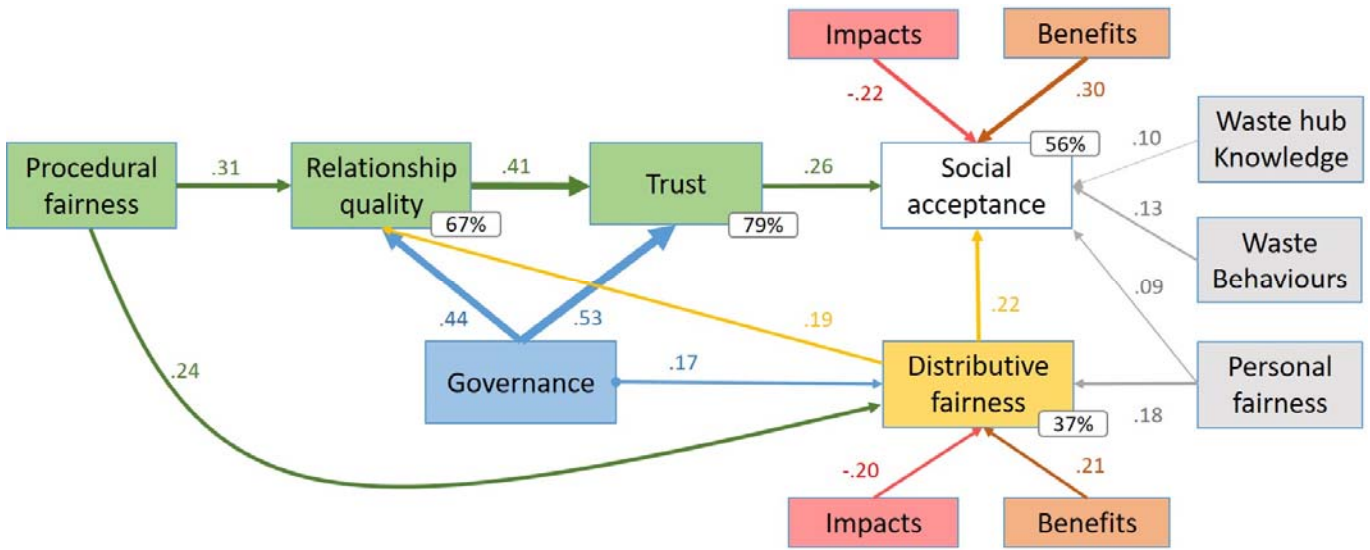
The research identified the most important drivers underlying social acceptance of a waste and resource recovery complex and modelled the relationships between the drivers. Some drivers may directly predict social acceptance and others may be indirectly associated with social acceptance. For example, some drivers may influence trust, which then affects acceptance.

Figure 27 outlines the model of social acceptance, which fitted the data well. When interpreting the model, the width of the arrows reflects the importance of the predictors or drivers (e.g. the wider the arrow the stronger the relationship). The number on the arrows also indicates the level of importance of that driver, the larger the number the larger the influence of that driver. This means for example when trust increases so does acceptance. A negative sign on impacts means when perceptions of impacts increase, acceptance decreases or distributive fairness decreases.

As shown in the model:

- Four main drivers act directly on acceptance: Trust, impacts, benefits, behaviour, and distributive fairness.
- Four drivers act indirectly on acceptance: relationship quality and procedural fairness both driving trust, governance acting on trust and distributive fairness, and personal fairness acting on distributive fairness
- Governance exerts a very large influence in determining the level of trust in the sector and the perceptions communities hold about the quality of the relationship between the sector and the community. They play a very important role in supporting good relationships with the operator and trust in the industry more generally.
- Knowledge about the functions of the hub, how it is regulated, and the role of the various forms of government influences people's acceptance for the hub
- Fairness in terms of the rationale and justification for the hub and in return some form of benefit to the local community is also a key driver referred to as distributive fairness. Perceptions of impacts and benefits, and procedural and personal fairness are also driving evaluations of distributive fairness
- Waste reducing behaviours act to improve acceptance of the hub. The more recycling and other waste reducing behaviours undertaken in a person's household the more accepting a person is of the hub. This is largely driven by the hub functioning as recycling and waste recovery complexes as well as a landfill, which are activities that align with waste reducing behaviours. Support for the hub would be less if these functions were absent.

Figure 27 Model explaining social acceptance of the waste and resource recovery sector

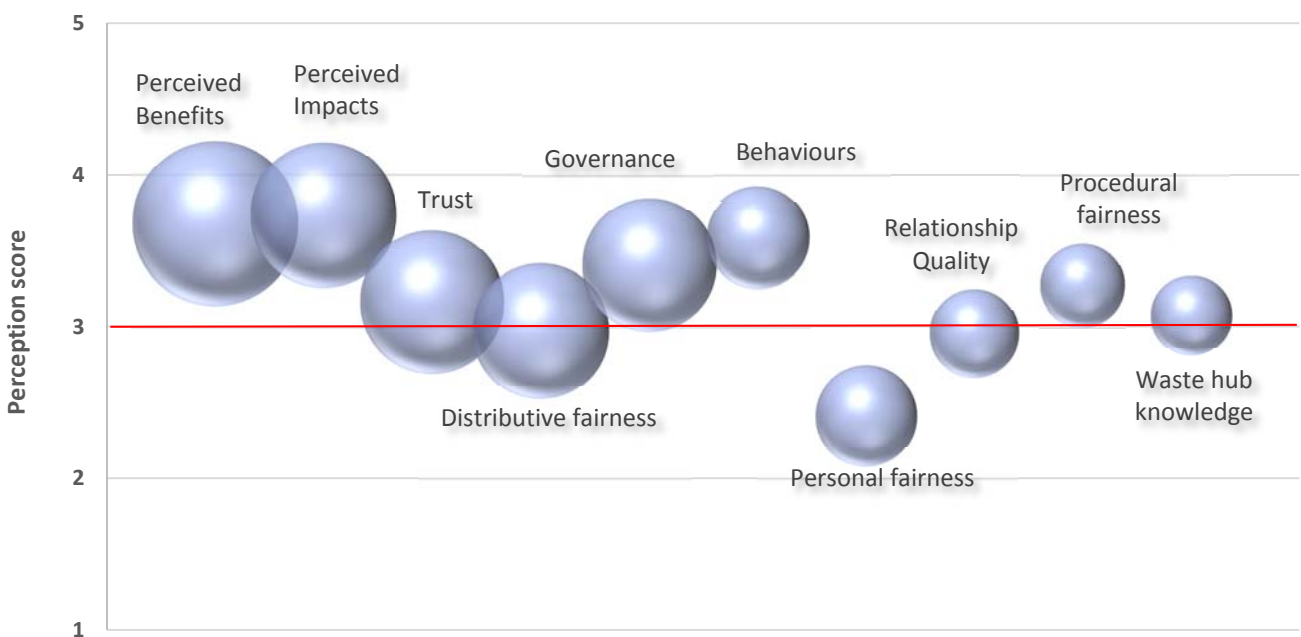


Note: Model fit: RMSEA = .06; SRMR = .03

The bubbles in Figure 28 show the relative importance of each underlying driver by combining all the effects (direct and indirect) that each driver exerts. The height of the bubble indicates the perception score for each driver and the size of the bubble the relative importance.

All the underlying drivers are significant in the model, though the top five drivers of social acceptance were perceived benefits and impacts, trust in the industry, governance and distributive fairness. Relationship quality and procedural fairness are also important drivers of social acceptance, though their effects are more indirect, lying further back in the path model. Knowledge about the waste complex or ‘hub’ has a small direct effect on social acceptance.

Figure 28 Relative importance and perceptions of underlying drivers of acceptance of a waste and resource recovery hub



Note: Size of bubble indicates relative importance of that driver; height of bubble indicates perception score of the driver (y axis); bubbles below the red line indicate an unfavourable perception for that driver except for perceived impacts where a higher the score indicates greater concerns about impacts

## 5.4 Deeper dive into the underlying drivers

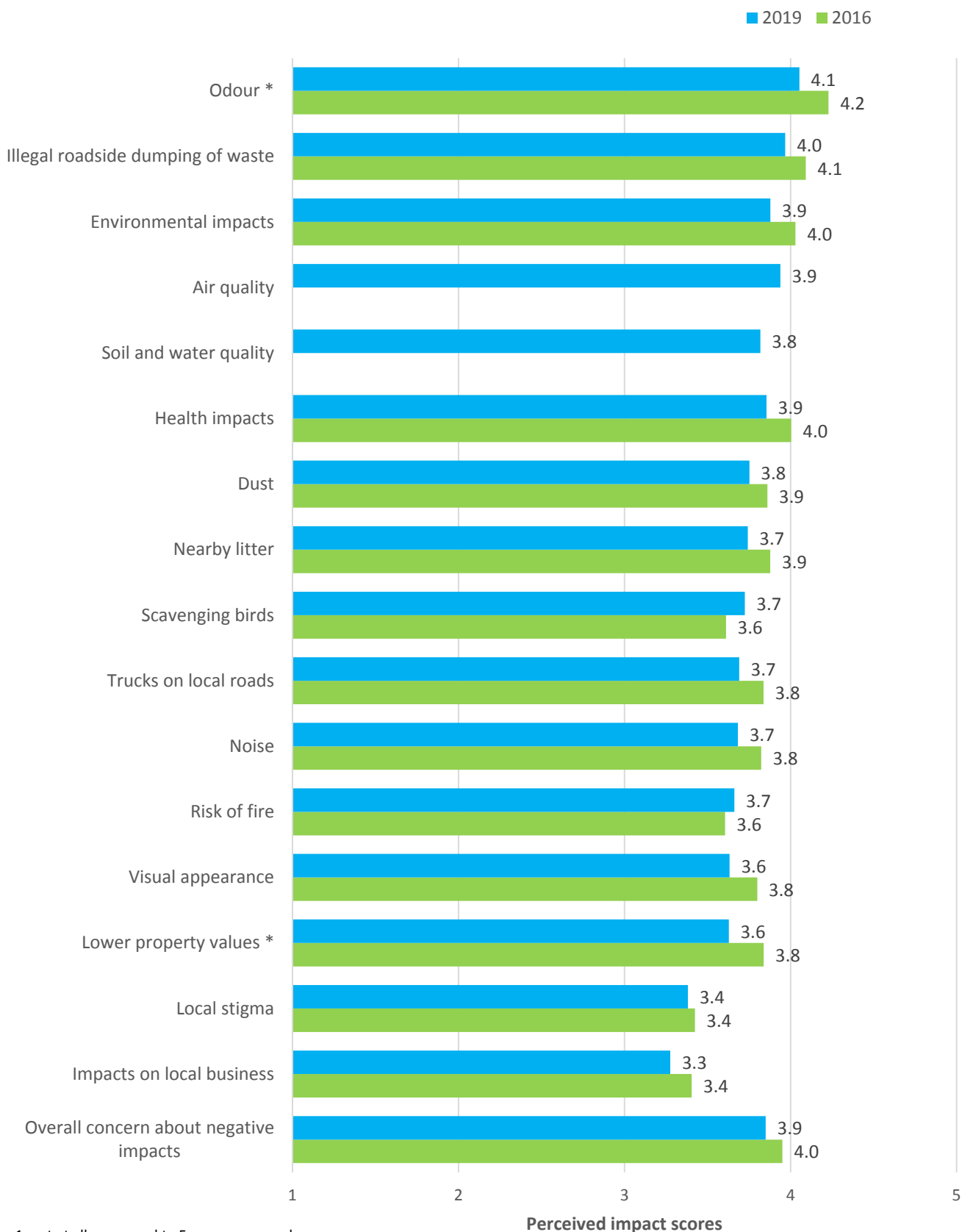
### 5.4.1 Impacts

The survey asked respondents how concerned they would be about a range of potential impacts associated with the imaginary waste complex described in the scenario. They responded on a scale from 1 = not at all concerned to 5 = very concerned. Figure 29 shows there was a small though significant decline in concerns about odour and lower property values in 2019 compared to 2016. However, perceived impacts of living near a waste complex were generally similar in 2019 and overall concerns were not significantly different.

Odour and illegal roadside dumping were of most concern, followed by environmental impacts, which were also broken down into air, soil, and water quality in 2019. The lowest concerns were about local stigma and impacts on local businesses. Interestingly, concerns about a risk of fire did not increase significantly between surveys, despite several major fires in waste complexes reported in the media since the 2016 survey.

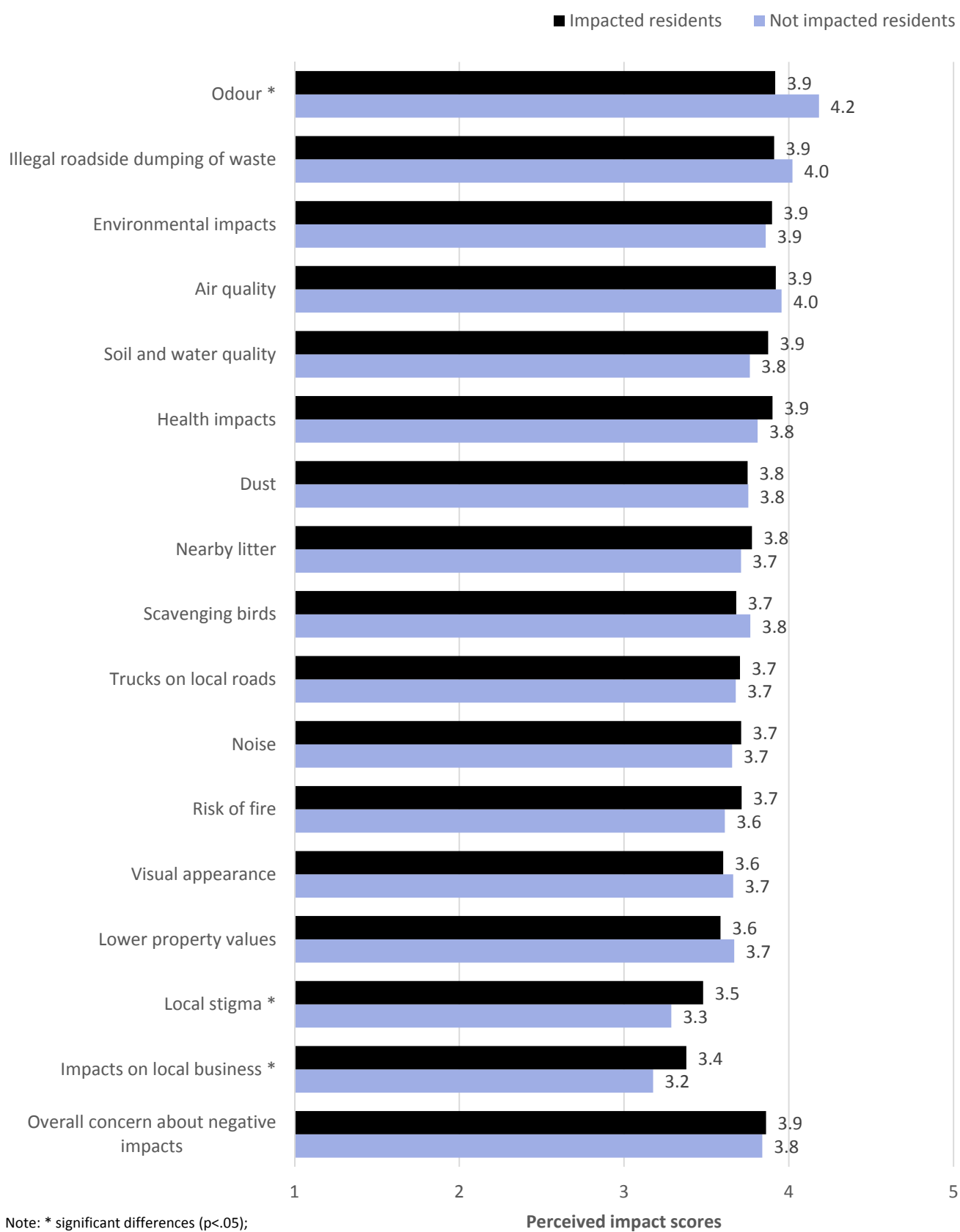
Comparisons between impacted and non-impacted residents showed that impacted residents were significantly less concerned than the general public about odour associated with living near a waste complex, which was the main concern identified with living near a waste complex. However, impacted residents were more concerned about local stigma and impacts on local business than the general public, which were the least common concerns of all the concerns as shown in Figure 30. This pattern of significant differences between impacted residents and the general public were similar to the differences found in 2016.

Figure 29 Perceptions of impacts associated with living within 2 kms of a waste complex hub: 2016 and 2019



Note: 1=not at all concerned to 5=very concerned  
 \* significant differences between years (p<.001)

**Figure 30 Perceptions of impacts associated with living within 2 kms of a waste complex: Impacted and non-impacted residents, 2019**



### Risk manageability

An additional bank of questions were asked in 2019 about perceived risks associated with living near a waste complex. As shown in Figure 31, on the one hand residents generally agreed that the risks were potentially high and that they could adversely affect future generations, but also they agreed that risks were generally manageable and understood by science. However, there was less agreement that potential risks were understood by the community. As such, these results suggests there is a level of confidence in the community that the risks are manageable by industry, government and science.

Notably, risk perceptions were significantly correlated with knowledge about the waste and resource recovery system, especially for the last three items in Figure 31. This suggests that increasing knowledge of the WRR system increases perceptions that risks are understood and manageable.

**Figure 31 Perceptions of risk manageability: 2019**

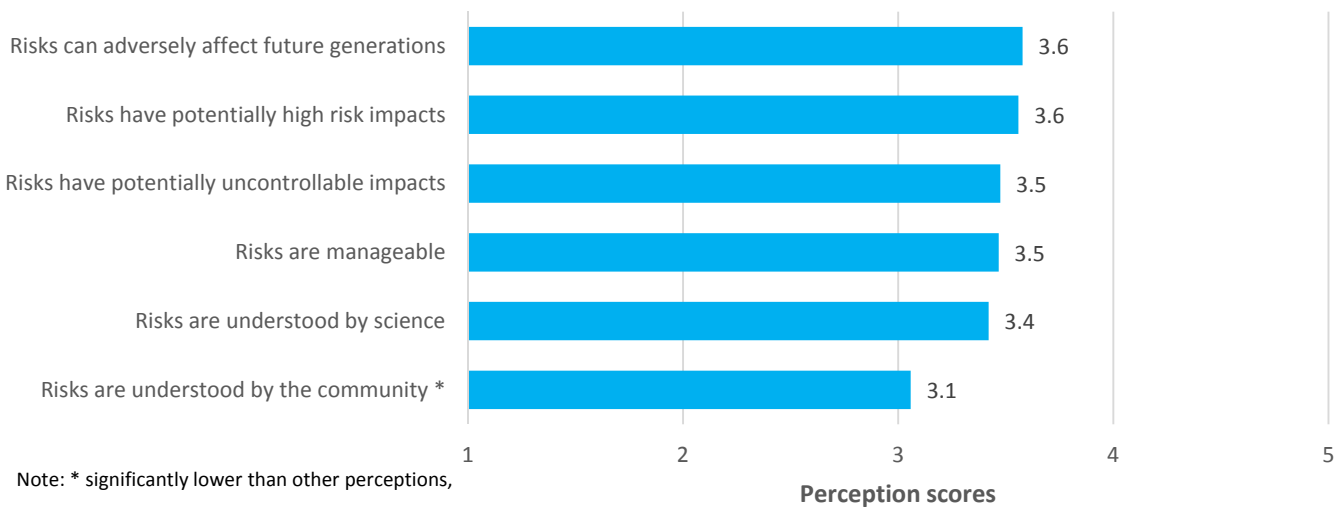
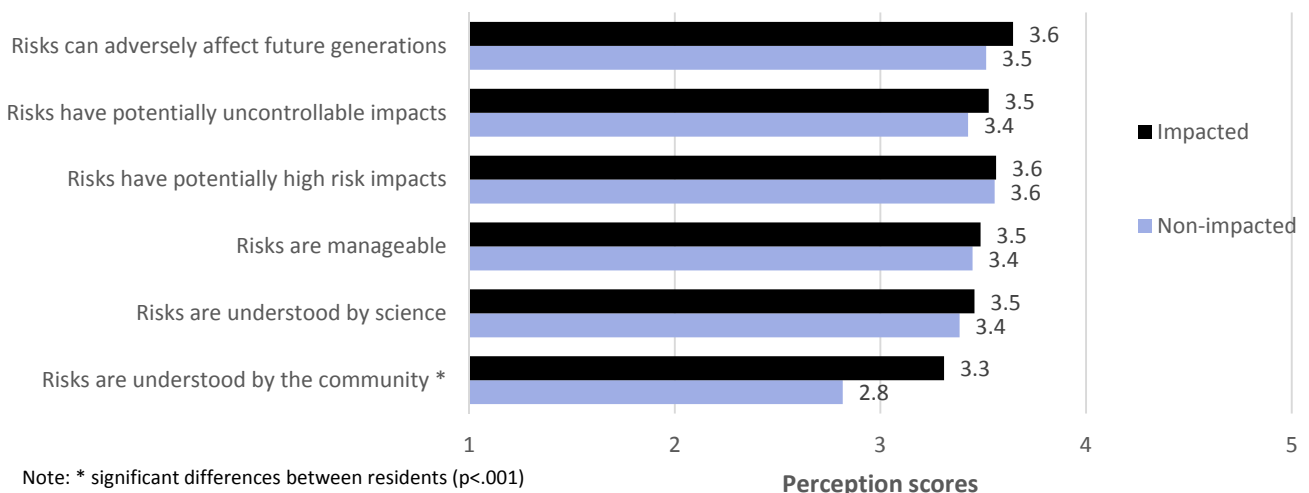


Figure 32 shows non-impacted residents felt that potential risks were not understood by community whereas impacted residents indicated that risks were understood moderately well by the community.

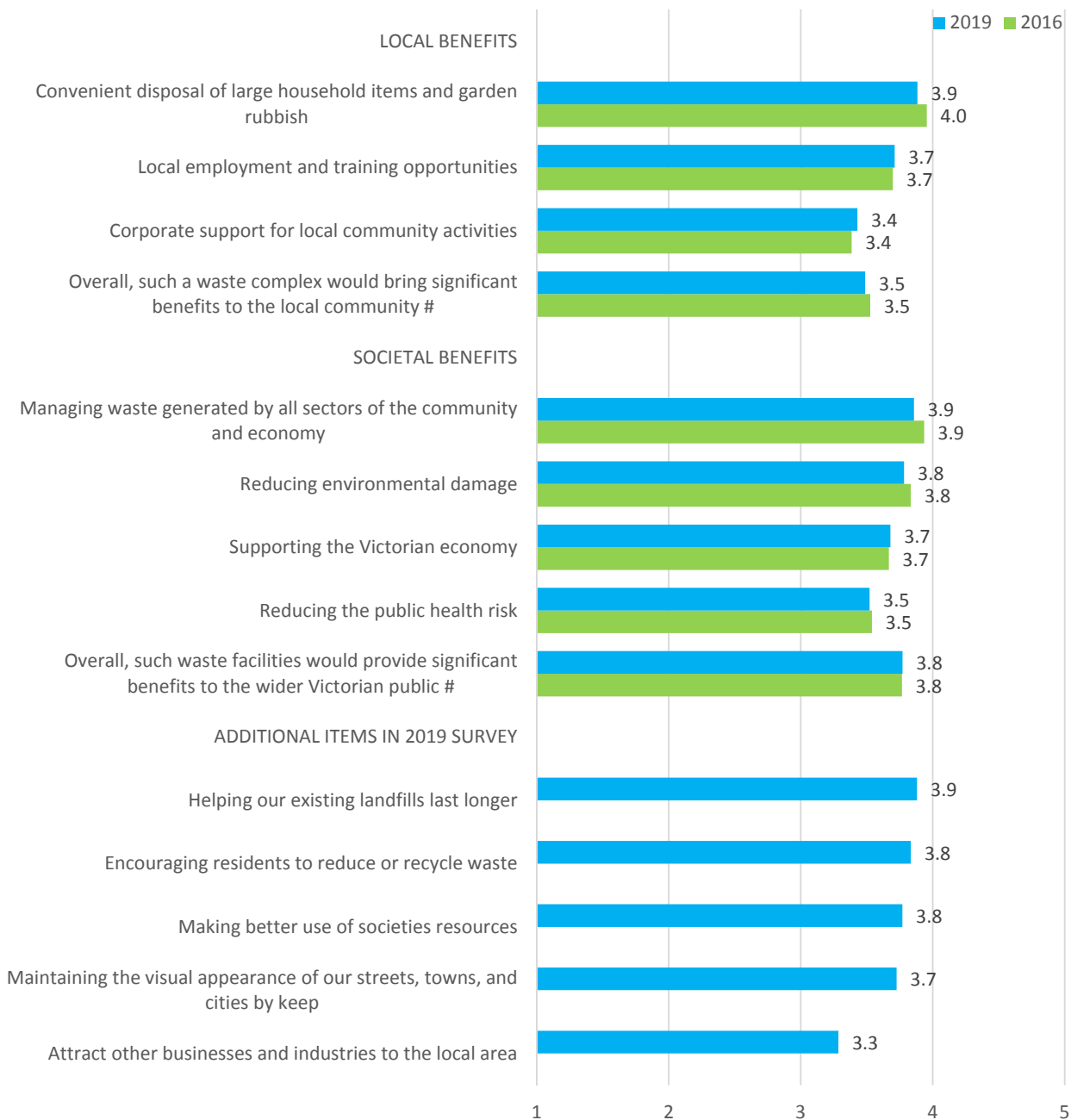
**Figure 32 Perceptions of risk manageability: Impacted and non-impacted residents, 2019**



### 5.4.2 Benefits

Victorians were asked about potential benefits, both locally and for the broader Victorian society, from a waste management facility as described in the scenario. Figure 33 shows societal benefits were perceived as significantly higher than local benefits from living near a waste complex. Managing waste generated by all sectors and helping existing landfills last longer were seen as the main societal benefits of waste complexes. Convenient disposal of large household items and garden rubbish was still seen as the best local benefit. Residents were less likely to agree that waste complexes would attract other businesses and industries to the local areas or support local community activities. None of the perceived benefit survey items changed significantly between 2016 and 2019.

Figure 33 Perceptions of benefits: 2016 and 2019



Note: no significant differences between years ( $p < .001$ )  
 # Overall items significantly different from each other

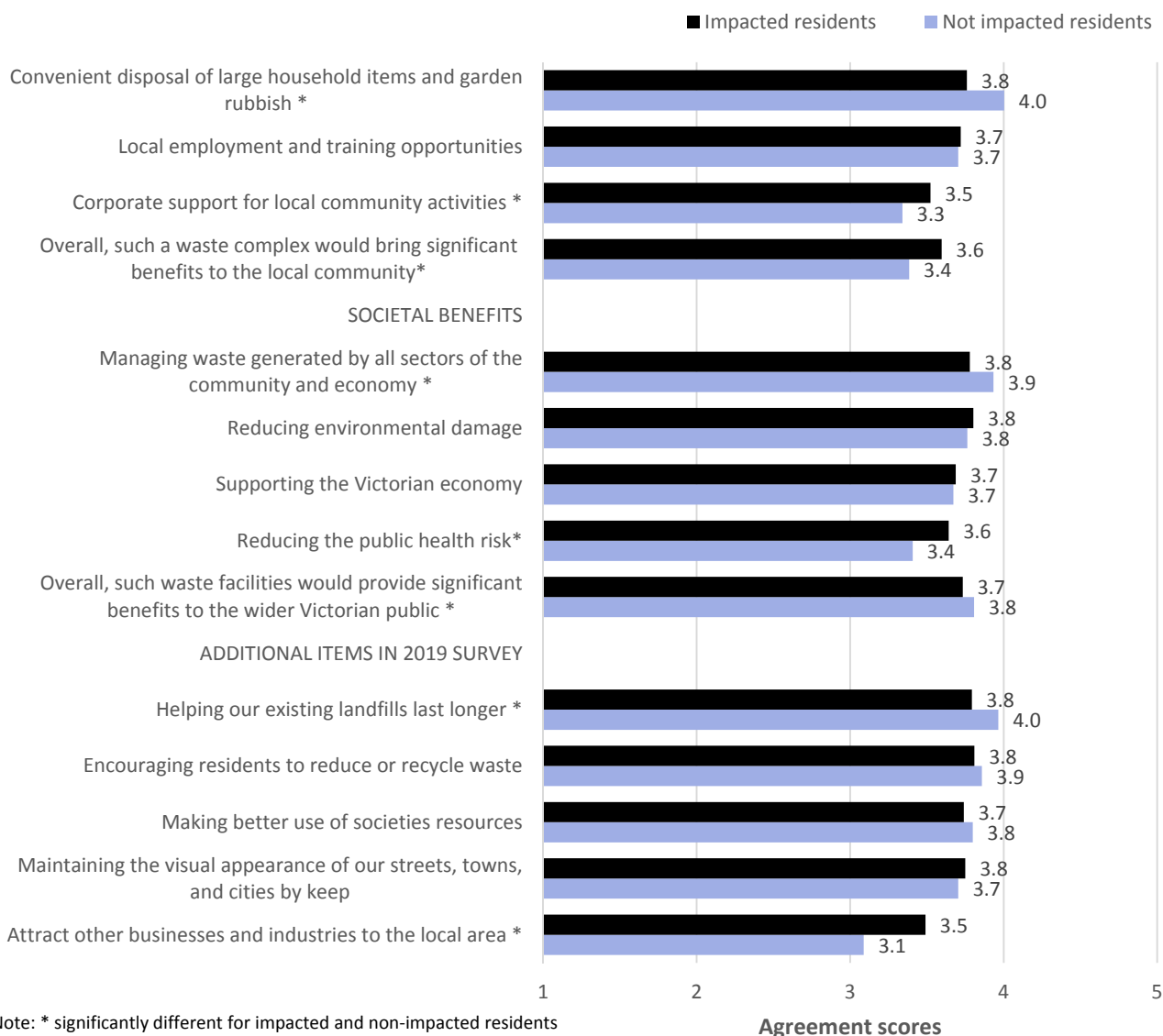


Figure 34 shows impacted residents had similar levels of agreement about overall local and societal benefits on average. However, agreement about overall local benefits was significantly lower for non-impacted residents than their agreement about overall societal benefits. They also considered overall local benefits to be significantly lower than did impacted residents.

Like in 2016, impacted residents did not see living near a waste complex quite as beneficial for conveniently disposing of large household items and garden rubbish as did non-impacted residents. However, they were more likely to recognise corporate support for local community activities, as per 2016.

Regarding the new benefit items in the 2019 survey, impacted residents were less likely to agree that waste complexes like that in the scenario would help existing landfills to last longer. However, both impacted and non-impacted residents agreed that they would. Impacted residents were also much more likely to agree that local waste complexes attract other businesses and industries to the local area, while non-impacted residents were less sure. This is consistent with impacted residents seeing more local benefits overall.

**Figure 34 Perception of benefits: Impacted and non-impacted residents, 2019**



Note: \* significantly different for impacted and non-impacted residents

Agreement scores

### 5.4.3 Fairness and equity

Fairness and equity relates to feelings of fairness or unfairness about the locational siting of waste management facilities and the inequity of who is bearing the costs and who is receiving the benefits. The study measured two types of fairness: *personal fairness* and *distributive fairness*. Distributive fairness was called *citizenship fairness* in the 2016 survey.

- Personal fairness

Personal fairness measures whether residents would think it was fair and equitable to live near this imaginary waste management complex. It was measured as the average agreement with the following two items (both reverse coded)

- I would consider it unfair to live near such a waste complex (*reverse coded*)
- It would conflict with my ideas about equity to live near such a waste complex (*reverse coded*)

- Distributive fairness

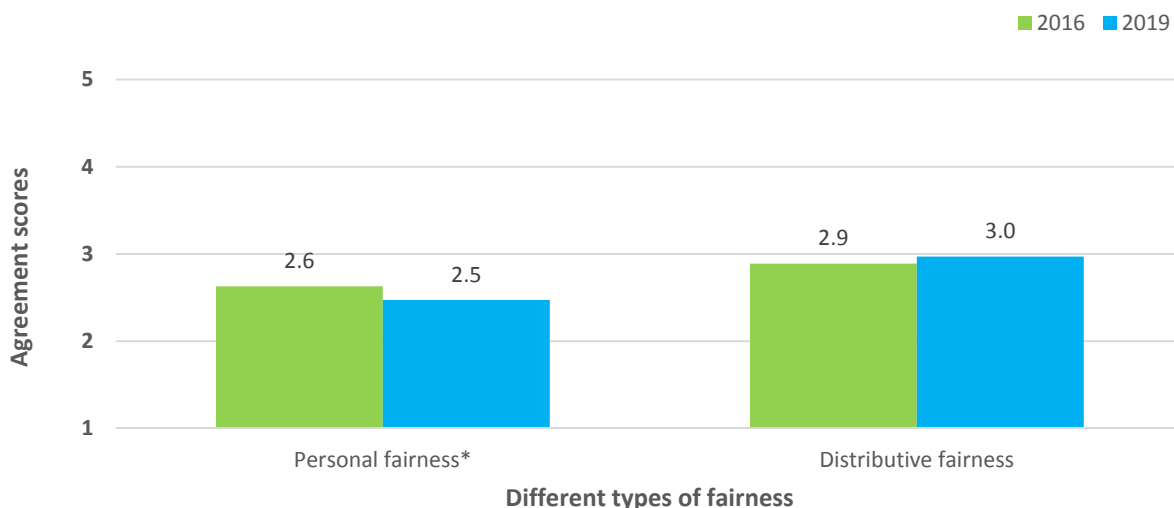
Distributive fairness on the other hand takes into account wider societal considerations when judging the fairness of living near a waste management facility, and was measured as the average agreement with the following three items:

- I would consider it fair to live near such a waste complex if my local council were compensated accordingly
- If there were good arguments for such a waste complex near me instead of in someone else's neighbourhood, I would be accepting
- Because such a waste complex ultimately has to be built somewhere, I would not object to living near such a facility.

Figure 35 shows perceptions of distributive fairness were significantly higher than perceived personal fairness and this pattern was similar for both 2016 and 2019. This means that at a broader society level, people believe living near a waste complex is fair as long as councils are compensated accordingly or that there is a justifiable reason for its location. In contrast, at a personal level people believe it is less fair to have to live near a waste complex when all the benefits are going to society. This indicates that even though living near a waste complex may be seen as personally unfair by an individual, it is seen as less unfair if viewed from a broader 'greater good' or societal perspective.

The findings suggests that if a strong narrative is conveyed as to the broader need of the waste complex to justify its activities and location, and the local communities are compensated accordingly then this will drive a greater sense of fairness about the waste complex location. Perceived personal fairness dropped significantly in 2019, making the difference between these perceptions even greater.

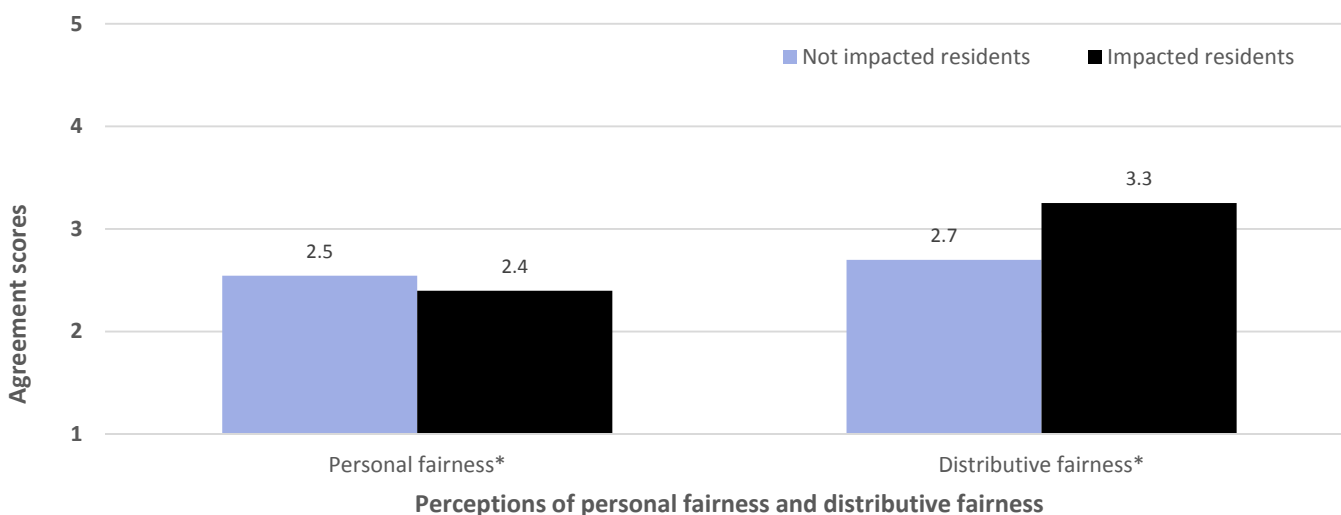
**Figure 35 Perceptions of different types of fairness: personal fairness and distributive fairness: 2016 and 2019**



Note: 1 = Strongly disagree; 5 = Strongly agree: \* indicates significant difference between years  
 Significant difference between personal and distributive fairness in both 2016 and 2019

Figure 36 shows perceived personal fairness and distributive fairness for impacted and non-impacted residents. Perceived personal fairness about living near a waste complex was similar between impacted and non-impacted residents, both quite low, and significantly lower for impacted. However, perceived distributive fairness was much higher and even positive for impacted residents, indicating that they perceived living near such a complex was fair if there are good reasons for it and local council was compensated.

**Figure 36 Perceptions of fairness: impacted and non-impacted residents, 2019**



Note: 1 = Strongly disagree; 5 = Strongly agree: \* indicates significant difference (p<.05)

### 5.4.4 Procedural fairness

Procedural fairness refers to processes underpinning citizen voice and decision making. The survey measured multiple aspects of procedural fairness, such as the opportunity for the community to feel it can be heard, have a voice, and be able to participate in decision making processes. These questions are designed to address the idea of power imbalances that may exist between communities and other key sector stakeholders.

The survey measured procedural fairness as it related to communities engaging with three main actors in the waste sector:

- Procedural fairness related to local government
- Procedural fairness related to state government
- Procedural fairness related to the waste complex operator (or local operator)

Figure 37 shows, Victorians generally agreed on average that procedures would be fair in relation to engaging with state and local governments and the local operator though scores were modest for all three stakeholders. These perceptions of procedural fairness did not change significantly between 2016 and 2019.

**Figure 37 Perceptions of procedural fairness: 2016 and 2019**

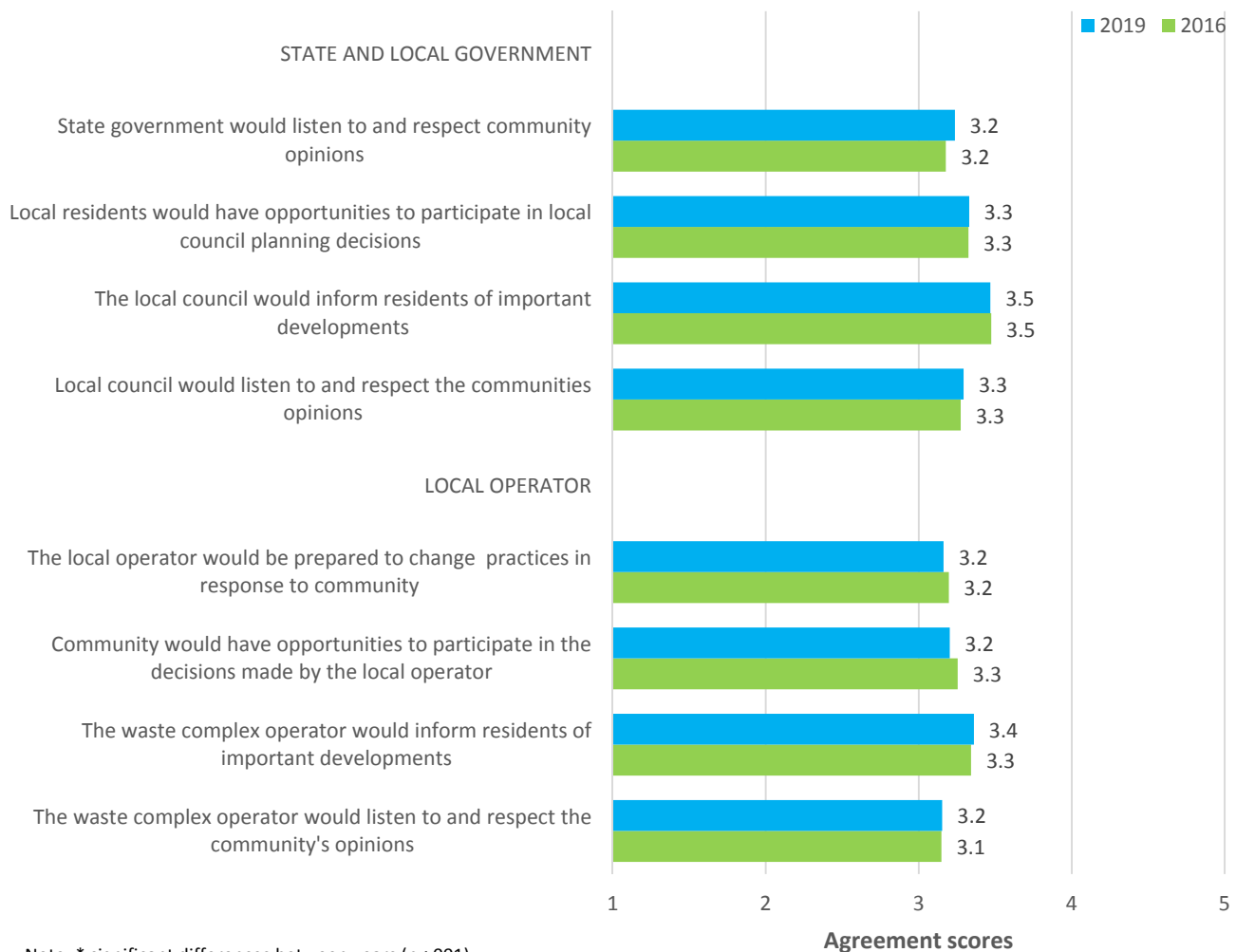
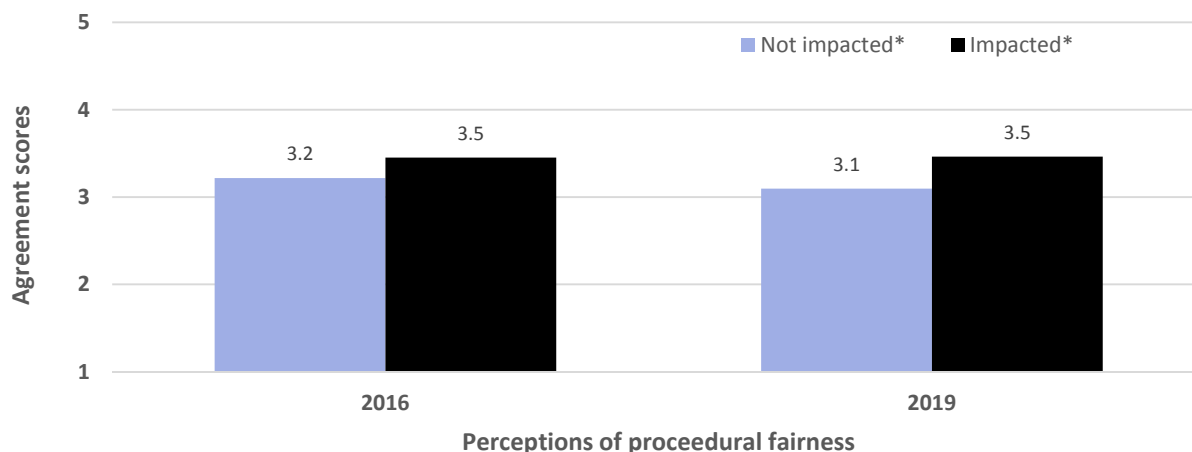


Figure 38 shows that perceptions of procedural fairness differed between impacted and non-impacted residents. Residents who considered themselves impacted by a waste and resource recovery facility rated procedural fairness significantly higher than those that were not impacted. Impacted residents were considerably more positive. This means that residents who have experienced actual impacts from a waste and resource infrastructure have, on average, higher perceptions of opportunities for citizen voice and involvement in decision making than those who have not been affected by such sites.

**Figure 38 Perceptions of procedural fairness 2016 and 2019: impacted and non-impacted residents**



Note: 1 = Strongly disagree; 5 = Strongly agree

\* indicates significant difference between impacted and non-impacted residents ( $p < .001$ )

#### 5.4.5 Relationship quality

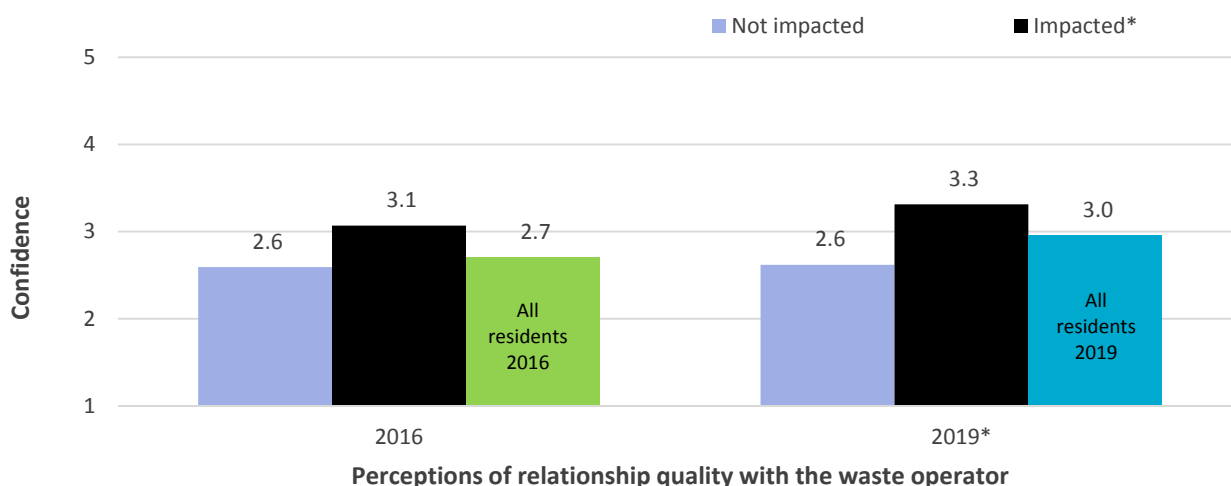
Relationship quality includes the contact quality of relationships between the local community and the local waste complex operator and the perceptions of how responsive the operator is to community concerns.

Relationship quality was measured using four items, where residents were asked how confident they would be that the community's relationship with the waste complex operator would have the following qualities on a scale from 1= not at all confident to 5=very confident.

- Contact quality
  - open, honest and transparent
  - genuine two way dialogue
- Operator responsiveness
  - responds to concerns and issues in a timely manner
  - committed to genuinely responding to community concerns

As shown in Figure 39, perception of relationship quality improved significantly in 2019. This was due to a significant improvement in perceptions of residents impacted by a WRR facility, which was positive on average. By comparison, residents not impacted by a WRR facility in 2016 and 2019 had similar and low levels of confidence in having a good relationship with local waste complex operators. In both 2016 and 2019, impacted residents were much more confident of having a good relationship with the operator.

**Figure 39 Perceptions of relationship quality between the local community and the waste operator, 2016 and 2019: Differences between impacted and non-impacted**



Note: 1 = 1 = not at all confident; 5 = very confident; \* indicates significant difference (p<.001)

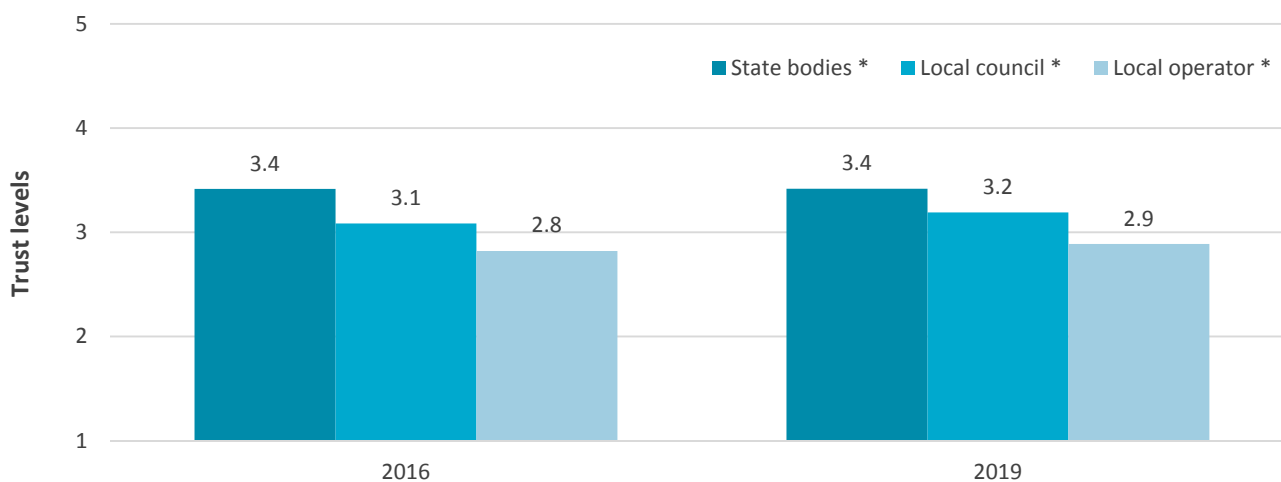
### 5.4.6 Trust

The survey measured trust in three key stakeholders of the sector to act in the local community’s best interest, to act responsibly, and to act competently. The three stakeholders included:

- Trust in state government bodies, such as the Environmental Protection Authority (EPA)
- Trust in the local council
- Trust in the local operator

Figure 40 shows that trust in state bodies, local councils and local operators did not significantly change between years. As in 2016, in 2019 trust in state government bodies was positive and significantly higher than trust in local councils, which was significantly higher than trust in local operators. Trust in local operators' was relatively low on average in both years.

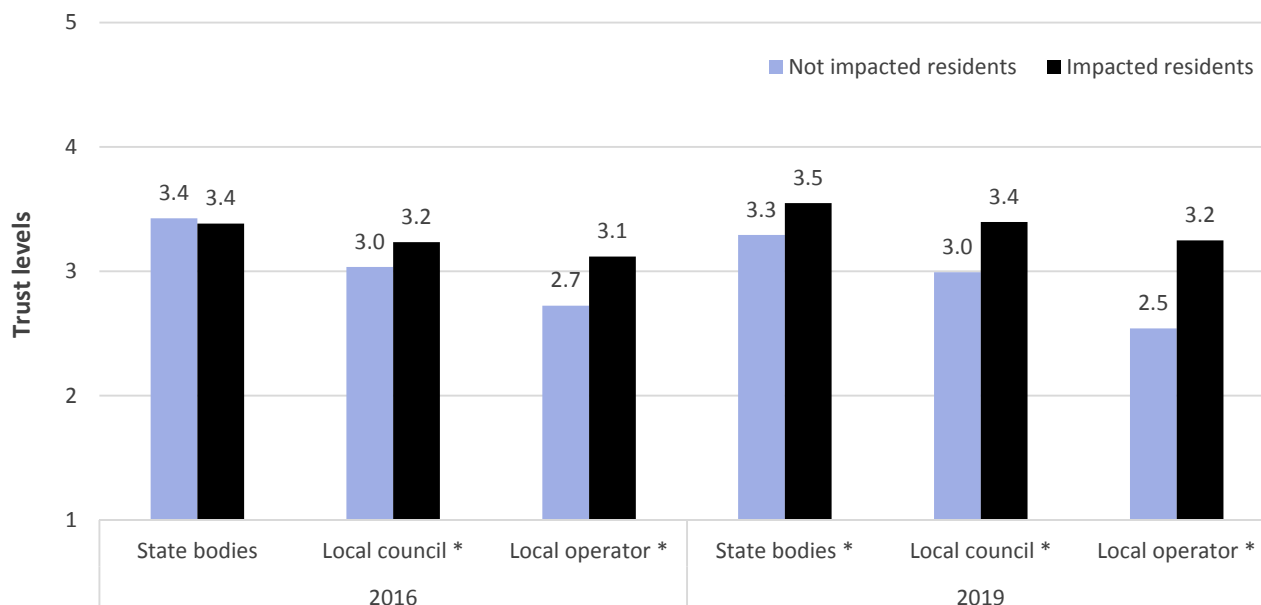
**Figure 40 Perceptions of trust in the sector: 2016 and 2019**



Note: 1 = Strongly disagree; 5 = Strongly agree; \* indicates significant difference between entities (p<.001)

Figure 41 shows in 2019, impacted residents had significantly more trust in state bodies, local councils and local operators, than non-impacted residents. The difference in trust between impacted and non-impacted residents increased in 2019 with trust in state bodies and local councils increasing significantly for impacted residents, while trust in local operators decreased significantly for the broader Victorian public (non-impacted residents).

**Figure 41 Perceptions of trust in the sector 2016 and 2019: Difference between impacted and non-impacted residents**



Note: 1 = Strongly disagree; 5 = Strongly agree:

\* significant difference between impacted and non-impacted residents ( $p < .05$ )

### 5.4.7 Governance

Governance relates to the institutions, rules, and processes which govern activities associated with waste management and resource recovery facilities. There are both ‘hard’ and ‘soft’ forms of governance. Hard governance refers to formal institutions and their rules and regulations, while soft governance refers to informal rules and processes that guide such activities. This survey measured perceptions of three components of governance:

- Regulation and compliance

Refers to the confidence residents have in regulations, rules, and operating practices that govern the everyday operations of waste management sites.

- Planning and strategic vision

Refers to perceptions that state government, local government and the waste complex operator would have good plans and strategic vision for the future.

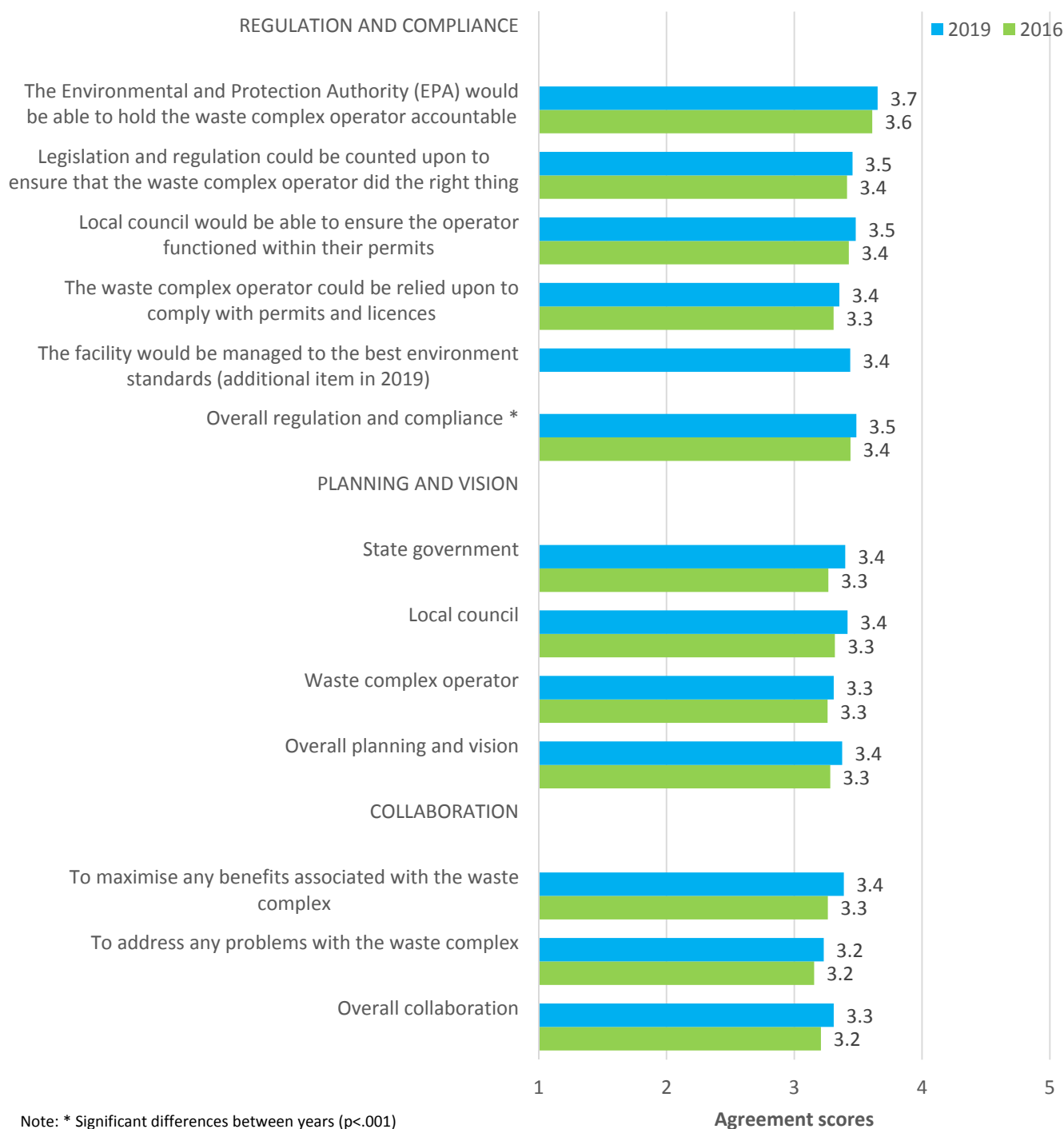
- Collaboration

Refers to perceptions that different stakeholders (local residents, businesses, government, and operators) could come together to solve problems or maximise any benefits associated with the waste complex.

Figure 42 shows that Victorian residents held moderately high levels of confidence that the EPA was able to hold waste complex operators accountable. This was followed by their confidence in legislation and regulation being able to be counted on, and local governments being able to ensure waste operators did the right thing. Thus, residents thought that formal aspects of governance could be relied upon to govern the waste and resource recovery sector.

More generally, overall regulation and compliance was viewed significantly more positively than overall planning and vision, and overall collaboration. This pattern was the same in both 2019 and 2016.

**Figure 42 Confidence in governance: 2016 and 2019**



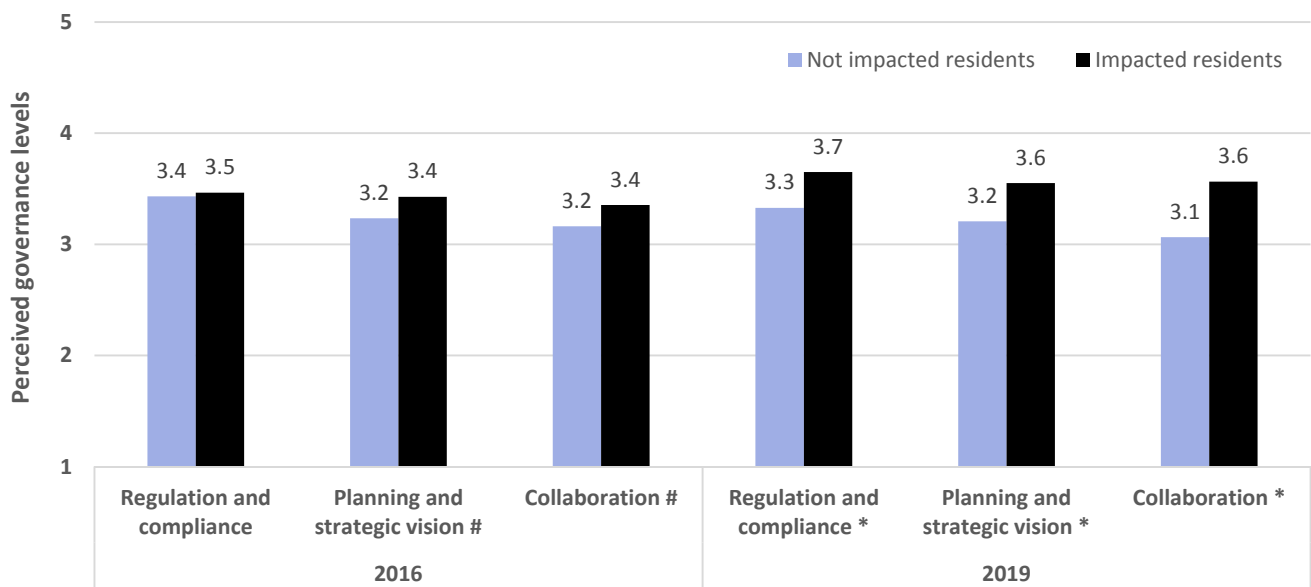
Note: \* Significant differences between years (p<.001)  
1 = strongly disagree to 5 = strongly agree



When comparing differences between impacted and non-impacted residents, significant differences in perceptions emerged across all aspects of governance in 2019, which was not the case in 2016. In 2019, impacted residents held significantly more positive views of all three aspects of governance: *regulation and compliance, planning and strategic vision, and collaboration* ( $p < .001$ ).

Figure 43 shows, these differences in perceptions between impacted and non-impacted residents were greater in 2019 than in 2016. As with trust, it seems differences between impacted and non-impacted residents' views about governance increased in 2019, with impacted residents holding significantly more positive perceptions than the wider Victorian public.

**Figure 43 Perceptions of governance in 2016 and 2019: Differences between impacted and non-impacted residents**



Note: # significantly different between years at  $p < .05$  and \* at  $p < .001$

## 6 Social acceptance and perceptions of waste to energy plants

In the 2019 survey half the sample were given a waste to energy scenario and asked similar questions about underlying drivers as asked in the waste and resource recovery complex scenario. As well as analysing mean scores for each driver, comparisons were also made with the waste and resource recovery scenario.

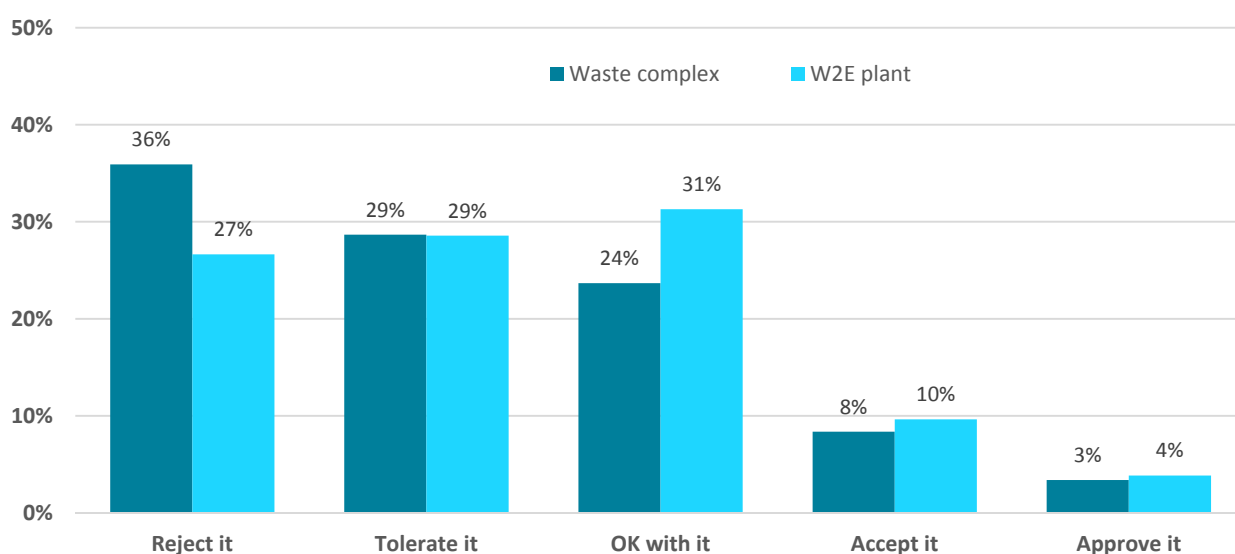
### 6.1 Perceptions of waste to energy

Table 5 shows that overall acceptance for living near a waste to energy facility was low but significantly higher than acceptance of living near a waste and resource recovery complex that included a landfill. Perceptions of impacts were lower than for a waste complex and societal benefits were assessed more favourably than for a waste complex. Residents also viewed waste to energy as potentially fairer if considered from a broader societal level provided if the burden to the local communities were offset by some benefit, such as the local council being paid accordingly.

### 6.2 Attitude towards living near a waste to energy plant

People were also asked about their attitude towards living near a waste to energy plant and compared to living near a waste and resource recovery complex. Figure 44 shows a higher percentage of residents were OK with living near a waste to energy plant compared to a waste complex and a lower percentage rejecting the notion. Presumably this stems from the waste complex scenario including a landfill, which was seen by residents as the worst option for managing waste.

Figure 44 Comparison of attitudes towards living near a WRR complex and a waste to energy plant, 2019



Note: Percentages rounded to the nearest whole percent; significantly different at  $p < .01$

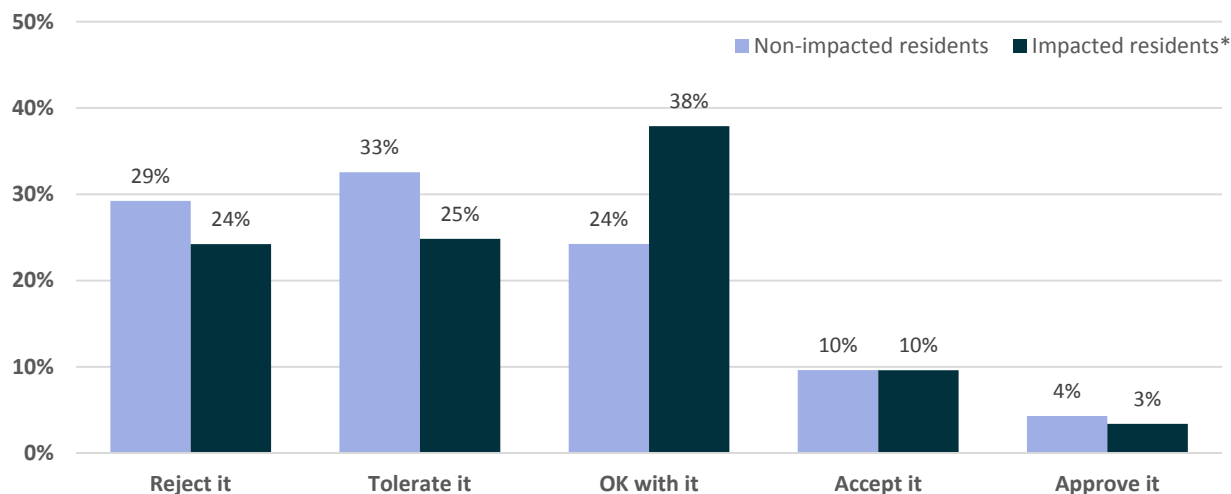
Figure 45 shows attitudes towards living near a waste to energy facility for impacted and non-impacted residents. Those already living near a waste and resource recovery facility were significantly more likely to accept living near a waste to energy plant, suggesting that co-locating waste to energy plants within existing WRR precincts would be OK with more residents. However, situating additional activities to existing WRR precinct also raises issues with distributive fairness and cumulative impacts. Thus, any perceived impacts from W2E plants would need to be well managed. Scores for each of the individual items comprising each of the drivers can be found by referring to the survey results in Appendix A

**Table 5 Summary of perception scores for underlying drivers and social acceptance of a waste to energy plant compared to a waste and resource recovery complex, 2019**

Drivers	Description	Waste and resource recovery complex	Waste to energy plant
<b>Impacts</b>	For example, dust and odour, environmental management (soil, air, water contamination), noise, increased traffic, litter, scavenging birds, and visual impacts	<b>3.7<sup>H</sup></b>	<b>3.6<sup>L</sup></b>
<b>Benefits: Local and societal</b>	<i>Local benefits</i> of convenient disposal of large household items and waste, local employment/training opportunities, corporate support for community activities, for example	3.6	3.6
	<i>Societal benefits</i> - managing waste generated by society, reducing public health risks, and supporting the Victorian economy, for example	<b>3.8<sup>L</sup></b>	<b>3.9<sup>H</sup></b>
<b>Distributive Fairness</b>	Distributional fairness – feelings of unfair impacts are a negative driver of acceptance. feelings of distributional fairness, whereas reasons that support the ‘greater good’ (citizenship fairness) may act as a positive influence	<b>3.0<sup>L</sup></b>	<b>3.2<sup>H</sup></b>
<b>Personal Fairness</b>	NIMBYism and proximity to infrastructure underpinning feelings of fairness	2.4	2.6
<b>Procedural fairness</b>	Procedural fairness - driven by quality of relationships, meaningful two-way dialogue; opportunity to be heard and have a voice; not feeling intimidated or that there are power imbalances in the interactions.	3.3	3.4
<b>Relationship quality</b>	Relationship quality is related to the quality of contact (e.g., open, honest and genuine) and responsiveness of the operator to concerns and issues	<b>3.0<sup>L</sup></b>	<b>3.1<sup>H</sup></b>
<b>Trust</b>	Trust relates to acting responsibly, in the community best interests and in the capability of local operators, local government and state government bodies.	3.2	3.2
<b>Governance</b>	Governance included regulations, planning, and collaborations which govern processes and activities associated with waste management and resource recovery facilities.	3.4	3.4
<b>Knowledge</b>	Self-rated knowledge of the waste and resource recovery components and overall systems; and waste to energy knowledge	3.1	3.1
<b>Waste reducing behaviours</b>	Level of self-reported behaviour for a range of waste reducing behaviours. Used to represent an overall attitude to waste and resource recovery.	3.6	3.6
<b>Social acceptance</b>	Multi-item measure for the waste and resource recovery hub	<b>2.5<sup>L</sup></b>	<b>2.7<sup>H</sup></b>
	Two-item measure for the waste to energy plant		

Note: includes additional items in 2019 survey; bold font denotes significant differences ( $p < .05$ ); L significantly lower, H significantly higher; # Knowledge overall waste and resource recovery system

Figure 45 Attitudes towards living near a waste to energy plant: impacted and non-impacted residents, 2019



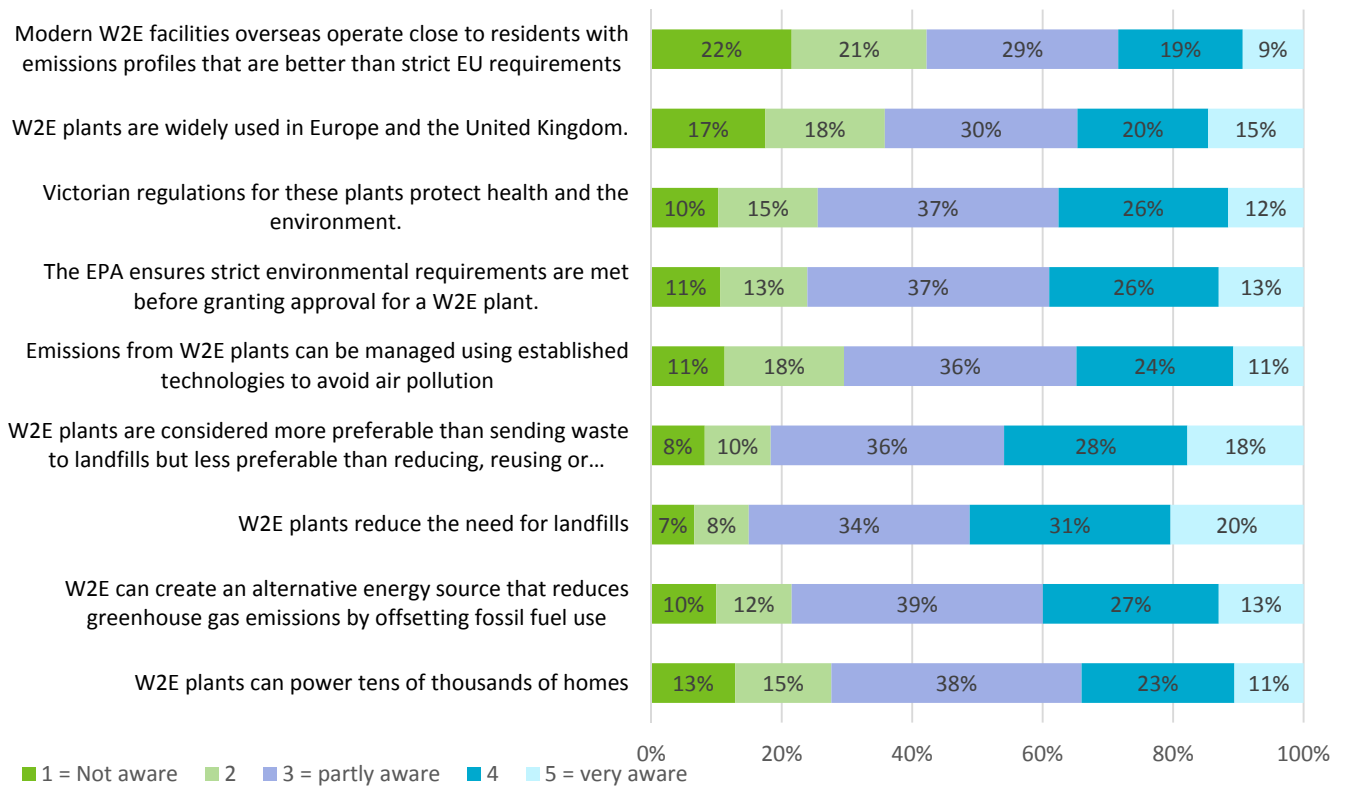
Note: Percentages rounded to the nearest whole percent; significantly different at  $p < .01$

### 6.3 Awareness and understanding of waste to energy

Levels of awareness and understanding of waste to energy are shown in

Figure 46 below. Overall, respondents had moderate levels of awareness and understanding of waste to energy with partial awareness being the most frequent response for all statements. Respondents had the lowest awareness about modern facilities overseas operating close to residents with emissions profiles better than strict EU requirements, and the wide use of waste to energy plants in Europe and the United Kingdom. Awareness levels were highest in regards to waste to energy plants reducing the need for landfill, and waste to energy being preferable to landfill but less preferable to reducing, reusing and recycling.

**Figure 46 Levels of awareness and understanding of waste to energy**



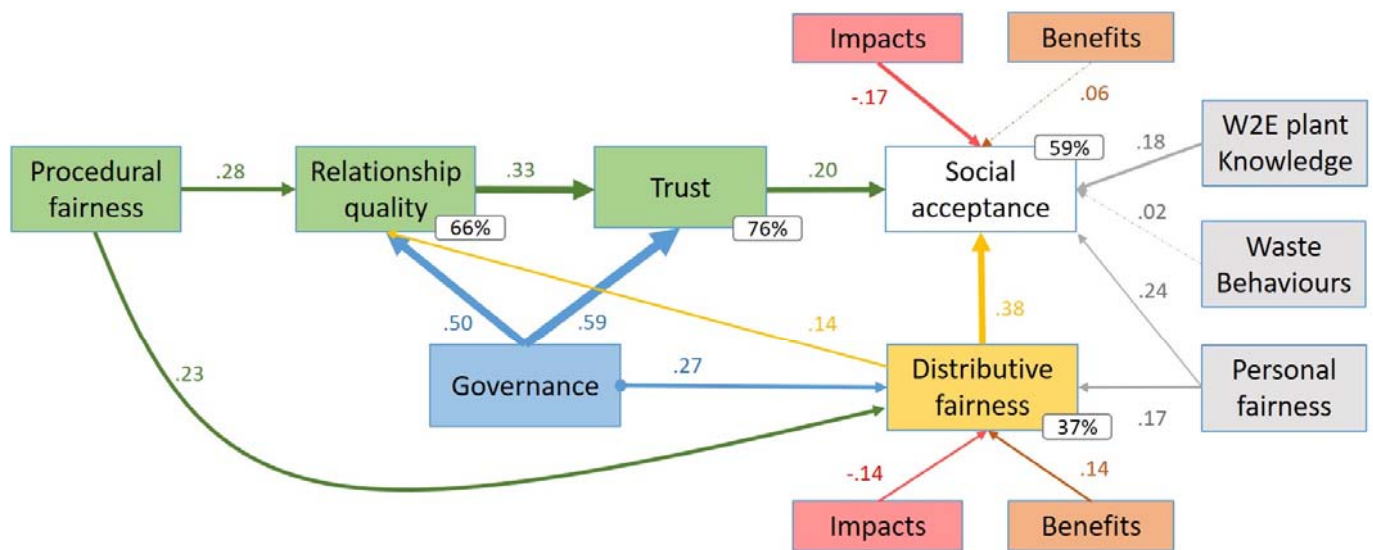
## 6.4 Model of social acceptance: waste to energy

The social acceptance path model also fitted the W2E plant scenario well. Figure 47 shows that the W2E plant model explains very similar levels of social acceptance and its underlying drivers as the waste complex model.

- Social acceptance of waste to energy plants relies mainly on trust in the industry and perceptions of distributive fairness.
- Trust in the industry is strongly underpinned by good governance, which is essential for a number of drivers.
- Distributive fairness is also underpinned by good governance, along with mitigating impacts and actualising local and societal benefits. However, perceptions of personal unfairness will diminish perceptions of distributive fairness and social acceptance.
- Knowledge about waste to energy plants including how they operate, their benefits, impacts, how they would be governed, and their use overseas is a strong driver of acceptance. Knowledge is a much greater influence on acceptance in waste to energy than it is in acceptance of a waste and resource recovery hub.
- Perceived benefits only plays an indirect role in increasing social acceptance, unlike social acceptance of waste complexes. The indirect role is via increasing distributive fairness. Benefits did not significantly increase social acceptance directly, perhaps because the W2E plant scenario did not include the breadth of waste and resource recovery activities included in the waste complex scenario.
- Waste behaviours at home did not increase social acceptance of waste to energy plants directly or indirectly. As waste to energy plants are a way of converting general waste to

energy, they may not be seen as relating to recycling and reprocessing of household recyclables.

Figure 47 Model of acceptance of living near a waste to energy plant

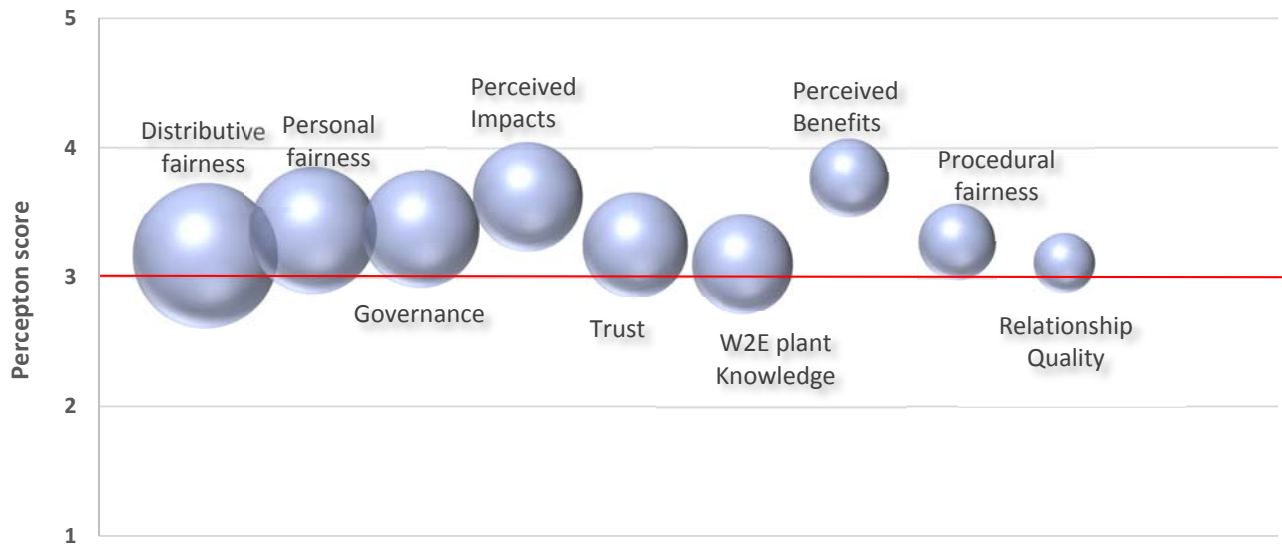


Notes: solid lines significant; dashed lines not significant; model fit statistics (RMSEA = .04; SRMR = .02)

Figure 48 shows when taking into account direct and indirect effects, issues around fairness become very important. Personal fairness was more important for residents who may be asked to live near a waste to energy plant than they were for living near a waste complex. As with waste complexes, distributive fairness, governance, perceived impacts and trust in the industry were among the more important predictors of social acceptance. Knowledge about waste to energy plants also played an important role in social acceptance of living near them.

Unlike the waste complex model, perceived benefits was not a strong driver of social acceptance of waste to energy plants. However, they were still a significant driver because of indirect effects via perceptions of distributive fairness. Also in contrast to the waste complex model, household waste reducing behaviours had no significant direct or indirect effects on social acceptance of waste to energy plants and are not shown on the bubble diagram.

Figure 48 Relative importance and perceptions of underlying drivers of acceptance of a waste to energy plant



Note: Size of bubble indicates relative importance of that driver; height of bubble indicates perception score of the driver (y axis); bubbles below the red line indicate an unfavourable perception for that driver except for perceived impacts where a higher the score indicates greater concerns about impacts

## 7 Demographic differences

Differences in results based on demographic characteristics such as age, gender, income brackets, education levels, and working status were assessed. Comparisons were also made based on geographic location – whether someone lived in metropolitan Melbourne or regional Victoria. These results are displayed in Table 6 and the main highlights from the results are described below.

Significant differences with regards to age were found across behaviours, knowledge and social acceptance. Respondents in the middle-aged bracket were found to perform less waste reducing behaviours, perhaps reflective of time-poor lifestyles. Younger respondents (18-34 years) were found to have higher confidence in their knowledge of both WRR hubs and waste to energy plants, and also higher levels of acceptance for both types of facilities.

Some significant differences are displayed between males and females in Table 6. Males had slightly higher knowledge of the WRR system, however females were found to perform more waste reducing behaviours. Interestingly, the higher level of waste reducing behaviours of females did not translate into significantly higher levels of acceptance of living near WRR hubs, as was the case in the model in Section 5.3. This may be an indication of perhaps other factors influencing their acceptance such as concerns about impacts.

Results with regards to education level were somewhat expected. Respondents with a higher level of education had significantly higher levels of confidence in knowledge. However, this did not translate into significantly higher waste reducing behaviours or social acceptance of WRR hubs and waste to energy plants.

Respondents with lower household income were found to have significantly lower confidence in their knowledge of the WRR system, however there were no significant differences in waste reducing behaviours between household income brackets. Knowledge confidence for WRR and waste to energy facilities was also significantly higher for those on higher incomes.

Analysis of the dwelling type of respondents revealed significant differences with regards to social acceptance. Those in separate houses are less accepting of living near a WRR complex than those in flats or apartments. While respondents in 'other' accommodation are more accepting of living near a waste to energy plant. It is also worth noting that household size did not have any effect on the knowledge or acceptance variables.

Minimal differences were found between those living in metropolitan Melbourne and the rest of Victoria. Those living outside of Melbourne were found to perform slightly though significantly more waste reducing behaviours. Geographic location produced no significant differences with regards to acceptance levels.

In conclusion, the results in Table 6 show that although there were significant differences in knowledge levels across different demographic characteristics, in general, these did not translate into significant differences in behaviour or social acceptance. Overall, demographic variables did not explain a great deal of the variance in respondents' attitudes, rather it is the perceptions of the socio-psychological factors that underpin acceptance.



**Table 6 Demographics: levels of knowledge and social acceptance for a waste complex and waste to energy, 2019**

	WRR system knowledge	Waste reducing behaviours	Knowledge		Social acceptance	
			WRR hubs	W2E plants	WRR hubs	W2E plants
<b>Age</b>		***	**	***	***	***
18-34 yrs	3.1	3.6	3.0	3.0	2.7	2.9
35-54 yrs	3.0	3.5	2.7	2.6	2.4	2.5
55+ yrs	3.1	3.7	2.7	2.7	2.3	2.5
<b>Gender</b>	*	***		*		
Male	3.1	3.5	2.9	2.9	2.5	2.7
Female	3.0	3.7	2.7	2.7	2.4	2.6
<b>Education</b>	***		***	**		
Less than Year 12	2.9	3.5	2.5	2.4	2.6	2.6
Completed Year 12	3.1	3.6	2.5	2.9	2.4	2.6
Certificate, diploma or trade	3.1	3.6	2.7	2.7	2.4	2.6
Bachelor degree or higher	3.2	3.6	3.0	2.9	2.5	2.7
<b>Household income</b>	***		*	**		
Less than \$40,000	3.0	3.6	2.6	2.6	2.4	2.8
Between \$40,000 and \$80,000	3.1	3.6	2.8	2.8	2.4	2.7
Between \$80,000 and 120,000	3.2	3.6	2.9	2.8	2.6	2.6
More than \$120,000	3.1	3.5	2.9	2.8	2.5	2.5
<b>Employment</b>	***		***	***	*	
Working	3.2	3.6	2.9	2.9	2.5	2.7
Not working	3.0	3.6	2.6	2.5	2.3	2.6
<b>Dwelling type</b>					**	*
Separate house	3.1	3.6	2.8	2.7	2.4	2.6
Row, terrace or townhouse	3.2	3.6	2.9	2.9	2.6	2.6
Flat or apartment	3.1	3.6	2.8	2.9	2.8	2.8
Other	2.8	3.5	2.9	2.7	2.8	3.2
<b>Household size</b>						
1	3.1	3.6	2.6	2.7	2.7	2.7
2	3.1	3.6	2.8	2.7	2.3	2.6
3	3.1	3.6	2.9	2.9	2.5	2.6
4 or more	3.1	3.6	2.8	2.8	2.5	2.7
<b>Region</b>		*		*		
Melbourne	3.1	3.6	2.8	2.8	2.4	2.7
Rest of Vic	3.1	3.7	2.8	2.6	2.6	2.6

Note: \* p<.05; \*\* p<.01; \*\*\* p<.001

# 8 Conclusions

In 2019 the survey measured community attitudes and perceptions about waste, recycling, waste reducing behaviour, the waste and resource recovery sector, and waste to energy, and compared these results to 2016. Through the research design we were also able to compare how these attitudes and perceptions varied based on someone being impacted by waste and resource recovery infrastructure. Thus we were able to report on impacted residents as well as broad Victorian attitudes (non-impacted residents).

## Victorians are still motivated to recycle and reduce waste going to landfill despite negative incidents in the media

In the intervening years since the 2016 survey there have been a number of key events that have been prominent in the media, mostly with the potential to shape attitudes in a negative way and less so in a positive way. Results indicate that despite some difficulties within the industry around recycling and fires, Victorians are still motivated to reduce waste going to landfill and see waste and the resource recovery sector as important and as essential as other services such as health and hospitals, water, energy, and public transport. This is despite a common belief that less than half of kerbside recycling was being recycled into new products. Moreover, people believe it is best if we stop generating waste in the first place and see landfills as the least preferred option for managing waste.

## Victorians presently impacted by a waste and resource recovery facility have more favourable attitudes toward the sector than those who are not

Contrary to what might be expected, people who identify as impacted by waste and resource recovery infrastructure in terms of where they live, report more positive attitudes about living near a waste and resource recovery hub than those from the broader Victorian public who have no direct experience and can only imagine it. Impacted residents have become slightly more positive about the sector including trust in the sector, the governance underpinning it, the impacts, and the benefits over the three-year period. In contrast, people who do not feel impacted have less favourable perceptions of the sector and lower acceptance of the idea of living near a waste and resource recovery hub. Moreover, these perceptions are lower compared to 2016.

One possible explanation for this general finding is that community engagement activities by the various stakeholders of the sector (government and industry) are maintaining constructive and effective relationships with impacted communities. In contrast, the broader Victorian public are likely gaining a negative impression of the sector with attitudes more influenced by negative media coverage of events that have been affecting the industry such as fires, and difficulties with recycling. Another explanation is that living near a waste and resource recovery hub is only a small part of people's lives with 75% of residents who live near a hub indicating they are tolerating, ok with it, accepting, or approving it.

## Knowledge reduces perceptions of risk associated with waste complexes and waste to energy plants

Higher levels of knowledge about waste hubs and waste to energy plants were linked to lower perceived risk associated with these waste and resource recovery facilities. Higher knowledge was also linked to

increased levels of social acceptance for both. However, the effects of knowledge on perceived risks and acceptance were greater for the waste to energy scenario and only modest for acceptance of a waste hub. Nonetheless, community knowledge about waste hubs and waste to energy plants were very low, representing a significant opportunity to improve people's understanding, with subsequent improvement in an understanding of risks and increased confidence in the manageability of any risk.

### Perceived benefits underpinning social acceptance of a hub relate to the recycling and recovery activities

People perceived benefits that a waste and resource recovery hub offer, such as local economic and social investment benefits and broader societal benefits, only when the hub included recycling and resource recovery activities. If the hub was to function solely as a landfill, support for the hub would reduce, and the perceived benefits would also be diminished. Reducing the size of the landfill component in the profile of a waste and resource recovery hub will increase acceptance for the hub. This may be helpful in messaging around the location of a waste to energy plant if it were near a landfill.

### Governance is doing a good job in contributing to trust and ultimately social acceptance of hubs

People's perception of governance was robust and this confidence contributed significantly in residents forming more positive views of the relationship between the industry and local communities, and trust in the sector. Impacted residents viewed matters related to governance of the waste and resource recovery sector positively on average whereas non-impacted residents were less favourable.

### People are more accepting of living near a waste to energy plant than a waste and resource recovery hub

The difference in these views are most likely explained by the presence of a landfill within a waste and resource recovery hub rather than the acceptance level of the waste to energy plant being high. Acceptance for the plant was modest with most people (approx. 75%) indicating they would at least tolerate it. Attitudes were more positive for people who identified as impacted residents and rejection levels were lower (24%) compared to non-impacted residents (29%).

### When people reduce waste in their homes it spills over to increased support for a waste and resource recovery hub

The more recycling and other waste reducing behaviours undertaken in a person's household the more accepting a person is of the hub. This is largely driven by the hub functioning as recycling and waste recovery complexes as well as a landfill, which are activities that align with waste reducing behaviours. Support for the hub would be less if these functions were absent.

### Demographic differences are less important in driving attitudes than social perceptions

Demographic differences do not seem to drive differences in attitudes towards the sector as much as perceptions of trust, governance, impacts, benefits, and fairness. There is little variation in these perceptions based on characteristics such as age, gender, income levels, education levels and household size. Demographic differences are evident when it comes to knowledge of the WRR system, WRR hubs, and waste to energy plants. However these differences tended not to translate across waste reducing behaviours or acceptance of waste facilities.

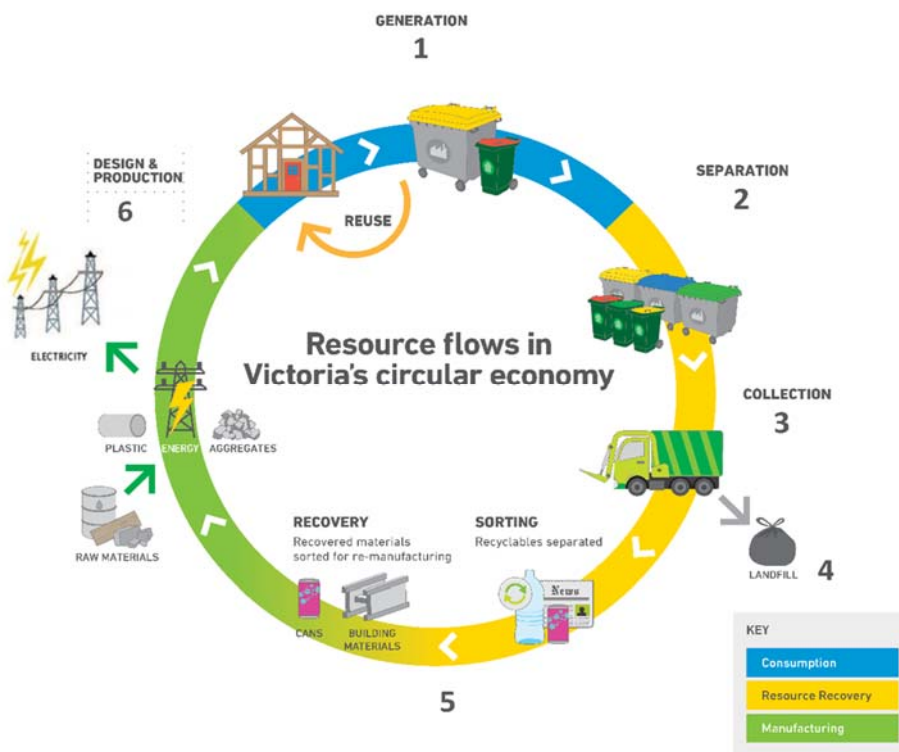
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# Appendix A Waste and resource recovery system

The waste and resource recovery system manages the waste that all sectors of the community and economy generate.

It is a network of different activities and different types of infrastructure, each performing a specific function in managing our waste. The diagram below is representative of how the current waste system works in Victoria. The Victorian Government's vision is to strengthen the circular nature of our waste system.



The main components are:

- 1. Generation** - Waste generated from households, businesses, industry and government needs to be managed. Victoria generates over 12 million tonnes of waste per year.
- 2. Separation** - Prior to collection, waste is often separated by households, factories, businesses, construction and other organisations into different waste streams (e.g. recyclables and organics like food and garden waste).
- 3. Collection** - Waste streams are collected in different bins and transported for further management. Waste that cannot be re-used, recycled, composted or reprocessed is taken to landfill.
- 4. Landfills (Tips)** - Sites for burying waste that cannot be recovered. These sites are important, but also the last resort for managing waste.  
Landfills may also be co-located with:
  - A transfer station or resource recovery centre where people can bring their excess waste, which is then sorted for further processing, or resale if possible, or else disposed to landfill
  - A resale or tip shop selling second hand goods from waste
- 5. Sorting, recycling and recovery** - Recyclables are further sorted and reprocessed into useful materials. Organic waste (food and garden waste) can be processed or composted for soil or other organic material.
- 6. Design and production** – Waste, recycled or reprocessed materials can be used in:
  - **Designing and manufacturing** new goods and services (e.g. new plastic products)
  - **Energy generation from waste** ( e.g., by combusting waste or capturing methane from waste)

# Appendix B Example of the scenarios used in the survey

Respondents in 2019 were randomly allocated to one of two survey conditions:

- Scenario 1: a waste resource and recovery complex ( $n=621$ )
- Scenario 2: a waste to energy complex – with basic information ( $n=623$ )

## B.1 Scenario 1 - Waste resource and recovery complex scenario

Imagine you moved house and lived within 2 kilometres of a waste resource and recovery complex. This *waste complex* includes the following activities.

- A landfill or tip (i.e., burying waste that cannot be recycled, reprocessed or reused)
- A transfer station and resource recovery centre ( i.e., a local drop off point for excess household waste which is then sorted for further processing, resale, or else disposed to landfill )
- A tip shop (i.e., an on-site shop selling second hand goods recovered from household waste)
- Sorting recyclables (i.e., separating recyclables into different material streams)
- Organic reprocessing (e.g., composting grass clippings and tree prunings for soil, wood chips, or other organic matter)
- Recovering and reprocessing building materials (e.g., recovering waste timber and crushing cement)

Also imagine that:

- The local council granted planning permits for this waste complex
- The Environment and Planning Authority (EPA) granted an operating licence to a large private contractor to manage this waste complex within the EPA's regulatory guidelines.

## B.2 Scenario 2 – Waste to energy plant scenario

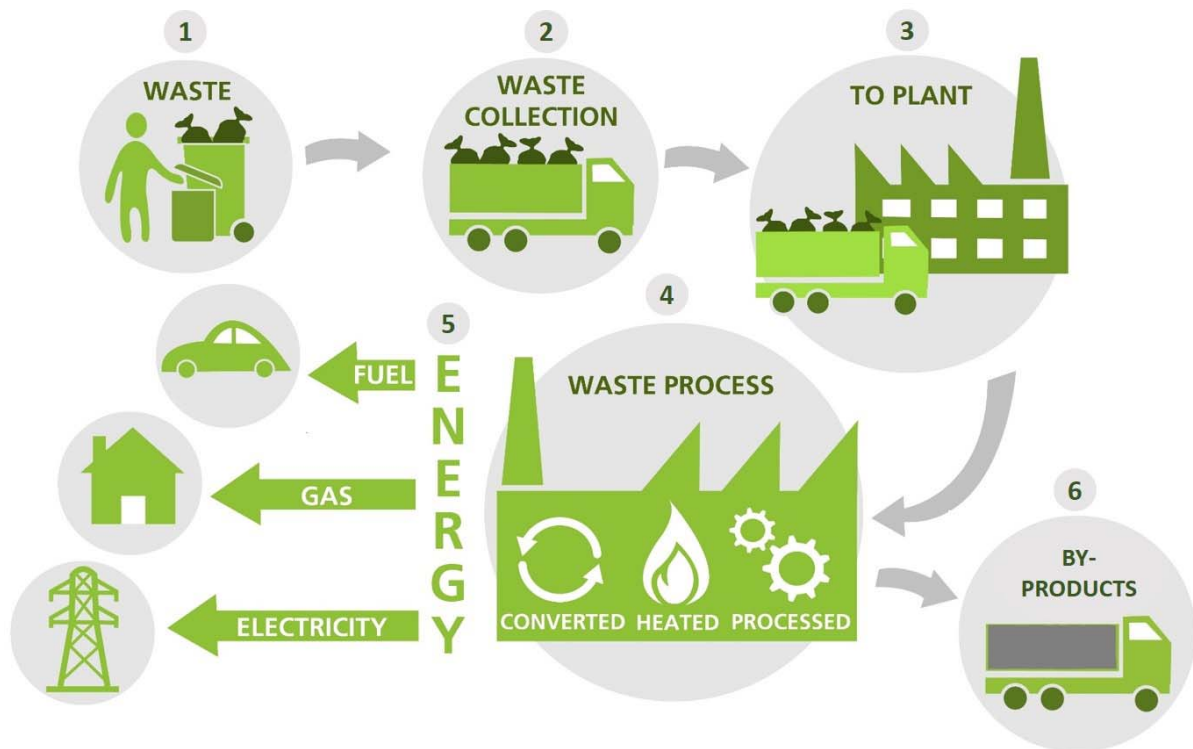
### Background information - Waste to Energy plant

Modern waste to energy (W2E) plants can use various technologies to create energy from general household waste, which otherwise would be sent to landfill. The basic process is:

1. Households sort their waste into general waste, recycling, and other bins.
2. Garbage trucks collect the general waste from households
3. General waste is delivered to the waste to energy plant, which usually includes a pre-processing facility that ensures recyclables and unsuitable materials are removed, so that waste streams are converted to energy using the most suitable technology.
4. Instead of burying general waste in a landfill, it can be used to make energy and other by-products

5. Energy can be produced as fuel, gas and/or electricity

6. By-products may be used to make other products (e.g., in road base, fertiliser, or fuel pellets). Hazardous residues that can't be reused are sent to landfill and safely disposed of.



### Scenario – waste to energy plant

Imagine you moved house and lived within 2 kilometres of such a *waste to energy plant*. This complex includes the following activities.

- delivery of general waste from garbage trucks to inside the plant
- sorting and removing any recyclables mistakenly placed in general waste bins
- converting the general waste (non-recyclables) to energy within the plant
- filtering air emissions to control pollution within strict international standards
- producing byproducts that can be further used (e.g., in roads or briquettes)
- sending any hazardous residues offsite to a landfill for safe disposal

Also imagine that:

- The local council granted planning permits for this waste to energy plant
- The Environment and Planning Authority (EPA) granted an operating licence to a large private contractor to manage this waste to energy plant within the EPA's regulatory guidelines.

# Appendix C Survey results: Social acceptance and perceptions of Waste and Resource Recovery Facilities and Waste to Energy plants

## Scenario questions

**How concerned would you be about the following potential impacts?**

*Scale: 1=not at all concerned to 5=very concerned*

	Waste hubs		Waste hubs in 2019				Scenarios in 2019	
	2016	2019	Impacted	Non-impacted	Metro. Melb.	Region. Vic.	Waste hubs	W2E plants
- odour	4.2	4.1	3.9	4.2	4.1	4.0	4.1	3.9
- air quality	n.a.	3.9	3.9	4.0	4.0	3.8	3.9	3.8
- soil and water quality	n.a.	3.8	3.9	3.8	3.8	3.8	3.8	3.6
- environmental impacts (air, soil and water)	4.0	3.9	3.9	3.9	3.9	3.8	3.9	n.a.
- noise	3.8	3.7	3.7	3.7	3.7	3.6	3.7	3.6
- nearby litter	3.9	3.7	3.8	3.7	3.8	3.7	3.7	3.6
- illegal roadside dumping of waste	4.1	4.0	3.9	4.0	4.0	4.0	4.0	3.8
- dust	3.9	3.8	3.8	3.8	3.8	3.6	3.8	3.6
- risk of fire	3.6	3.7	3.7	3.6	3.7	3.5	3.7	3.6
- health impacts	4.0	3.9	3.9	3.8	3.9	3.7	3.9	3.8
- scavenging birds and vermin	3.6	3.7	3.7	3.8	3.8	3.7	3.7	3.5
- visual appearance	3.8	3.6	3.6	3.7	3.7	3.5	3.6	3.5
- local stigma (e.g. bad media coverage)	3.4	3.4	3.5	3.3	3.5	3.2	3.4	3.3
- lower property values	3.8	3.6	3.6	3.7	3.7	3.5	3.6	3.6
- trucks on local roads	3.8	3.7	3.7	3.7	3.8	3.5	3.7	3.7
- local business impacts	3.4	3.3	3.4	3.2	3.4	3.1	3.3	3.3
- Overall, how concerned would you be about potential negative impacts	4.0	3.9	3.9	3.8	3.9	3.8	3.9	3.7

**How much do you agree that any risks associated with this [waste complex/waste to energy plant]**

*Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree*



- are understood by science	n.a.	3.4	3.5	3.4	3.4	3.4	3.4	3.6	
- are understood by the community	n.a.	3.1	3.3	2.8	3.1	3.0	3.1	2.8	
- are manageable	n.a.	3.5	3.5	3.4	3.5	3.4	3.5	3.5	
- have potentially high risk impacts	n.a.	3.6	3.6	3.6	3.6	3.4	3.6	3.4	
- have potentially uncontrollable impacts	n.a.	3.5	3.5	3.4	3.6	3.3	3.5	3.3	
- can adversely affect future generations	n.a.	3.6	3.6	3.5	3.6	3.4	3.6	3.3	
<b>How much do you agree that such a [waste complex/waste to energy plant] would provide the following significant local benefits</b>									
<i>Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree</i>									
- convenient disposal of large household items and garden waste [only for Scenario 1 – a waste complex]	4.0	3.9	3.8	4.0	3.9	3.8	3.9	n.a.	
- local employment and training opportunities	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.8	
- attract other businesses and industries to the local area	n.a.	3.3	3.5	3.1	3.3	3.3	3.3	3.4	
- corporate support for local community activities (e.g. waste operator sponsorship of a local sporting club)	3.4	3.4	3.5	3.3	3.5	3.4	3.4	3.6	
- Overall, how much do you agree that such a [waste complex/waste to energy plant] would bring significant benefits to the local community	3.5	3.5	3.6	3.4	3.5	3.5	3.5	3.6	
<b>How much do you agree that such [waste complexes/waste to energy plants] would provide the following significant societal benefits</b>									
<i>Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree</i>									
- managing waste generated by all sectors of the community and economy	3.9	3.9	3.8	3.9	3.8	3.9	3.9	3.9	
- reducing the public health risk	3.5	3.5	3.6	3.4	3.5	3.6	3.5	3.6	
- reducing environmental damage	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.9	
- maintaining the visual appearance of our streets, towns, and cities by keeping them free from waste	n.a.	3.7	3.8	3.7	3.7	3.7	3.7	3.8	
- supporting the Victorian economy	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.9	
- making better use of societies resources	n.a.	3.8	3.7	3.8	3.8	3.8	3.8	3.9	
- encouraging residents to reduce or recycle waste	n.a.	3.8	3.8	3.9	3.8	3.9	3.8	3.9	
- helping our existing landfills last longer	n.a.	3.9	3.8	4.0	3.9	3.9	3.9	4.0	
- Overall, how much do you agree that such waste facilities would provide significant benefits to the wider Victorian public	3.8	3.8	3.7	3.8	3.8	3.8	3.8	3.9	
<b>How much do you agree with the following statements?</b>									
<i>Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree</i>									
- I would consider it unfair to live near such a [waste complex/waste to energy plant]	3.5	3.6	3.6	3.5	3.6	3.4	3.6	3.4	

- I would consider it fair to live near such a [waste complex/waste to energy plant] if my local council were compensated accordingly	2.9	2.9	3.2	2.6	2.9	2.9	2.9	3.1
- If there were good arguments for such a [waste complex/waste to energy plant] near me instead of in someone else's neighbourhood, I would be accepting	3.0	3.1	3.4	2.9	3.1	3.1	3.1	3.3
- Residents should not have to live near [waste complexes/waste to energy plants]	n.a.	3.8	3.7	3.8	3.8	3.7	3.8	3.6
- Because such a [waste complex/waste to energy plant] ultimately has to be built somewhere, I would not object to living near such a facility.	2.8	2.9	3.2	2.6	2.9	2.8	2.9	3.1
- It would conflict with my ideas about equity to live near such a [waste complex/waste to energy plant]	3.3	3.4	3.6	3.3	3.5	3.3	3.4	3.3

**Thinking about how decisions might be made regarding the plans and operations of the [waste complex/waste to energy plant], how much do you agree that:**

*Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree*

- The [waste complex/waste to energy plant] operator would listen to and respect the community's opinions	3.1	3.2	3.4	2.9	3.1	3.2	3.2	3.3
- The [waste complex/waste to energy plant] operator would inform residents of important developments regarding the site	3.3	3.4	3.5	3.2	3.3	3.4	3.4	3.5
- People in your community would have opportunities to participate in the decisions made by the [waste complex/waste to energy plant] operator	3.3	3.2	3.5	3.0	3.3	3.1	3.2	3.4
- The [waste complex/waste to energy plant] operator would be prepared to change its practices in response to community sentiment	3.2	3.2	3.4	3.0	3.2	3.1	3.2	3.2
- The local council would listen to and respect the communities opinions	3.3	3.3	3.5	3.1	3.3	3.2	3.3	3.3
- The local council would inform residents of important developments regarding the site	3.5	3.5	3.5	3.4	3.5	3.4	3.5	3.5
- Locals would have opportunities to participate in local council planning decisions relating to the site	3.3	3.3	3.5	3.2	3.3	3.3	3.3	3.4
- State government would listen to and respect community opinions about the site	3.2	3.2	3.5	3.0	3.3	3.2	3.2	3.3

**Thinking about the [waste complex/waste to energy plant] operator's relationship with the local community, how confident are you that the waste complex operator would**

*Scale: 1=not at all confident; 5=very confident*

- respond to concerns and issues in a timely manner	2.7	3.0	3.3	2.6	2.9	3.0	3.0	3.1
- be committed to genuinely responding to community concerns	2.7	3.0	3.3	2.7	3.0	3.0	3.0	3.2
- be open, honest and transparent	2.7	2.9	3.3	2.6	2.9	3.0	2.9	3.1
- engage in genuine two way dialogue	2.7	3.0	3.3	2.6	2.9	3.0	3.0	3.1

**Thinking about a private company operating this [waste complex/waste to energy plant], to what extent would you**

*Scale: 1=not at all to 5=a great deal*

- trust them to act in the local community's best interests	2.7	2.8	3.2	2.4	2.8	2.8	2.8	2.9
- trust them to act responsibly	2.8	2.9	3.3	2.5	2.9	3.0	2.9	3.0
- trust their capability	3.0	3.0	3.3	2.7	3.0	3.1	3.0	3.2

**Thinking about how the [waste complex/waste to energy plant] operator would be governed, how much do you agree that:**

*Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree*

- Legislation and regulation could be counted upon to ensure that the [waste complex/waste to energy plant] operator did the right thing	3.4	3.5	3.6	3.3	3.5	3.4	3.5	3.5
- The Environmental and Protection Authority (EPA) would be able to hold the [waste complex/waste to energy plant] operator accountable	3.6	3.7	3.8	3.5	3.7	3.6	3.7	3.7
- Local council would be able to ensure the operator functioned within their permits	3.4	3.5	3.7	3.3	3.5	3.4	3.5	3.4
- The [waste complex/waste to energy plant] operator could be relied upon to comply with permits and licences.	3.3	3.4	3.5	3.2	3.3	3.4	3.4	3.4
- Overall, the facility would be managed to the best environment standards	n.a.	3.4	3.6	3.2	3.5	3.4	3.4	3.5

**How much do you agree that there would be good future plans and strategic vision for the [waste complex/waste to energy plant] site by the**

*Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree*

- State government	3.3	3.4	3.6	3.2	3.4	3.4	3.4	3.4
- Local council	3.3	3.4	3.6	3.3	3.4	3.4	3.4	3.3
- The [waste complex/waste to energy plant] operator	3.3	3.3	3.5	3.1	3.3	3.4	3.3	3.4

**How much do you agree that local residents, businesses, government and the [waste complex/waste to energy plant] operator would be able to work together**

*Scale: 1=strongly disagree; 3=neither agree nor disagree; 5=strongly agree*

- to address any problems with the [waste complex/waste to energy plant]	3.2	3.2	3.5	3.0	3.2	3.3	3.2	3.3
- to maximise any benefits associated with the [waste complex/waste to energy plant]	3.3	3.4	3.6	3.1	3.4	3.4	3.4	3.5

**Thinking about local council overseeing this [waste complex/waste to energy plant], to what extent would you**

*Scale: 1=not at all to 5=a great deal*

- trust them to act in the local community's best interests	3.1	3.2	3.4	3.0	3.2	3.2	3.2	3.2
- trust them to act responsibly	3.1	3.2	3.4	3.1	3.3	3.2	3.2	3.3
- trust their capability	3.0	3.1	3.4	2.9	3.1	3.1	3.1	3.1

**Thinking about state government bodies involved in overseeing this waste complex, such as the Environment Protection Authority (EPA), to what extent would you**

*Scale: 1=not at all to 5=a great deal*

- trust them to act in the local community's best interests	3.4	3.4	3.5	3.2	3.4	3.3	3.4	3.5
- trust them to act responsibly	3.5	3.5	3.6	3.3	3.5	3.4	3.5	3.6
- trust their capability	3.4	3.4	3.6	3.3	3.5	3.4	3.4	3.5

**Thinking about living near this type of [waste complex/waste to energy plant] (e.g., within 2 kms), how accepting would you be of the following activities at that site?**

*Scale: 1=not at all accepting; 3=somewhat accepting; 5=very accepting*



- Waste to energy plants reduce the need for landfills	3.5
- Waste to energy plants are considered more preferable than sending waste to landfills but less preferable than reducing, reusing or recycling our waste	3.4
- Emissions from waste to energy plants can be managed using established technologies to avoid air pollution	3.0
- The EPA ensures strict environmental requirements are met before granting approval for a waste to energy plant.	3.2
- Victorian regulations for these plants protect health and the environment.	3.1
- Waste to energy plants are widely used in Europe and the United Kingdom.	3.0
- - Modern waste to energy facilities overseas operate close to residents with emissions profiles that are better than strict EU requirements.	2.7

Notes: shaded cells are unfavourable responses on average on the 5-point scales; n.a. = item not asked that year; total N = 1,244; N waste hubs = 621; N W2E plants = 623

## Appendix D Survey results for knowledge, attitudes and behaviour items

	Victoria by Year		Victoria in 2019			
	2016	2019	Impacted	Non-impacted	Metro. Melb	Regional Vic
<b>How much do you feel you know about the following waste and resource recovery services?</b>						
<i>Scale: 1= no knowledge; 3 = some knowledge; 5 = a lot of knowledge.</i>						
- Household waste collection services (e.g., kerbside collection of garbage, recyclables, and food and garden waste)	3.4	3.5	3.5	3.5	3.5	3.5
- Landfill services or tips (including transfer stations, resource recovery centres and tip shops)	2.8	3.0	3.1	2.9	3.0	3.1
- The sorting, recycling and recovery of materials (e.g., glass, paper, construction, and organic material like food and garden waste)	3.0	3.1	3.2	3.0	3.1	3.2
- The use of recycled materials in new products	2.8	3.0	3.1	2.8	3.0	3.0
- 'Waste to energy' production by converting waste to make energy such as electricity, fuels, and gas	n.a.	2.5	2.8	2.3	2.6	2.5
- The overall waste and resource recovery system	2.7	2.8	3.0	2.6	2.8	2.8
<b>Rank the following activities in order of how you believe waste can best be managed. Rank from 1 = best to 5 = worst.</b>						
- Avoid the generation of waste	n.a.	2.5	2.7	2.2	2.4	2.6
- Reuse materials - without additional processing	n.a.	2.6	2.7	2.5	2.6	2.6
- Recycle waste - using them in other processes	n.a.	2.5	2.6	2.5	2.6	2.5
- Recover energy - by using residual waste to generate energy	n.a.	3.0	2.9	3.0	3.0	2.9
- Dispose of waste into landfills	n.a.	4.4	4.1	4.7	4.4	4.4
<b>How much do you agree that the following services are essential services?</b>						
<i>Scale: 1= strongly disagree to 5 = strongly agree</i>						
- Electricity and gas services	4.5	4.4	4.2	4.7	4.5	4.4
- Water and sewage services	4.6	4.5	4.2	4.7	4.5	4.4
- Public transport services	4.4	4.2	4.0	4.4	4.3	4.0
- Ambulance, fire and police services	4.7	4.6	4.3	4.8	4.6	4.6
- Hospital and health services	4.7	4.6	4.3	4.8	4.6	4.6
- Mobile and phone services	4.0	3.9	3.8	4.0	3.9	3.8
- Road repairs and maintenance	4.3	4.2	4.1	4.4	4.2	4.3

- Waste management and resource recovery services	4.4	4.3	4.0	4.5	4.3	4.2
<b>How much do you think the following sectors contribute to total waste generation?</b>						
<i>Scale: 1 = not much of the total waste to 5 = most of the total waste</i>						
- Household waste (including garbage, recyclables and organic waste like food and garden waste)	3.7	3.8	3.7	3.8	3.8	3.8
- Commercial waste (including food and other retailers, accommodation and other service providers, public sectors and educational institutions)	3.9	3.9	3.8	3.9	3.9	3.8
- Industrial, construction and demolition waste (including manufacturing, housing, civil, and commercial projects)	3.9	3.9	3.8	4.0	3.9	3.8
Approximately, what percentage of items in kerbside recycling bins do you think are recycled into new products						
- ....% (enter a number from 0 to 100)	n.a.	38.5	41.0	36.0	37.9	40.0
<b>To what extent do you agree that that local recycling is:</b>						
<i>Scale: 1= strongly disagree to 5 = strongly agree</i>						
- able to be sorted effectively, even if non-recyclables are put into the recycling bin	n.a.	3.1	3.4	2.9	3.1	3.1
- is able to be cleaned and foreign materials removed to a high standard	n.a.	3.3	3.4	3.1	3.3	3.3
- is mainly being recycled in Australia	n.a.	2.9	3.2	2.7	2.9	2.9
- is mainly being recycled overseas	n.a.	3.3	3.5	3.2	3.4	3.3
- is going to landfill	n.a.	3.5	3.6	3.5	3.6	3.5
How much responsibility do you think households, the private sector, and governments should bear for reducing the amount of waste going to landfills?						
<i>Scale: 1 = Very little responsibility to 5 = Most of the responsibility</i>						
- Households	3.9	3.9	3.8	4.0	3.9	3.8
- Businesses, companies and other private organisations	4.2	4.0	3.9	4.1	4.1	4.0
- Government	4.1	4.0	3.9	4.1	4.0	3.9
- Local Government	n.a.	4.0	3.9	4.0	4.0	3.9
- State Government	n.a.	4.0	3.9	4.1	4.0	3.9
<b>How much do you agree with the following statements</b>						
<i>Scale: 1 = strongly disagree to 5 = strongly agree</i>						
- It is important for your household to minimise the amount of waste that goes to landfill	4.3	4.4	4.2	4.6	4.4	4.4
- It is difficult for your household to minimise the amount of waste that goes to landfill	2.8	2.9	3.2	2.6	2.9	2.9
- Family members (outside your household) are minimizing the amount of waste they sent to landfill	3.4	3.4	3.6	3.3	3.4	3.4
- Your friends are minimising the amount of waste they send to landfill	3.3	3.4	3.5	3.3	3.4	3.4
- Victorians generally are minimising the amount of waste they send to landfill	3.2	3.2	3.4	3.0	3.3	3.2
- Our household intends to keep future household waste going to landfill to a minimum	4.0	4.0	3.9	4.2	4.0	4.0

- Households, businesses and governments can effectively work together to reduce the amount of waste going to landfills	4.1	4.0	3.9	4.2	4.1	4.0
- My household recycling is being recycled and not going to landfill	n.a.	3.4	3.5	3.3	3.4	3.5
- Our household would be willing to pay a little more for your household waste collection/disposal if it reduced the amount of waste going to landfill?	3.0	3.1	3.3	2.9	3.1	3.1
<b>Please indicate how often you have done each of the following in the last year</b>						
<i>Scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Almost always</i>						
- Looked for ways to reuse things	3.6	3.7	3.7	3.7	3.7	3.7
- Recycled newspapers	4.4	4.3	4.1	4.5	4.3	4.3
- Recycled cans or bottles	4.5	4.4	4.2	4.7	4.4	4.5
- Washed recyclable containers before putting them in the recycling bin	n.a.	3.7	3.7	3.8	3.7	3.8
- Put recyclables in the right bin	n.a.	4.5	4.2	4.8	4.5	4.5
- Composted food scraps	3.0	3.3	3.4	3.1	3.1	3.5
- Encouraged friends or family to recycle	3.3	3.4	3.5	3.3	3.4	3.4
- Picked up litter that was not your own	3.2	3.4	3.4	3.3	3.4	3.4
- Not purchased a product because of its packaging	2.9	2.8	3.0	2.6	2.8	2.9
- Purchased products in reusable or recyclable containers	3.2	3.6	3.6	3.6	3.5	3.7
- Purchased second hand household items (e.g., from Op Shops, eBay or Gumtree)	3.0	3.2	3.3	3.1	3.1	3.3
- Purchased products made with recycled content (e.g. polar fleece jumper made from recovered plastic bottles)	n.a.	2.9	3.2	2.7	2.9	2.9
<b>How much effort do you put into reducing waste going to landfill when</b>						
<i>Scale: 1 = none to 5 = a lot of effort</i>						
- you're at work	4.2	4.2	4.1	4.3	4.2	4.2
- at home	3.4	3.6	3.7	3.6	3.6	3.6
- when you're out and about	3.6	3.8	3.7	3.8	3.7	3.8
<b>To what extent are you in favour of services that collect or dispose of the following</b>						
<i>Scale: 1 = not at all in favour to 5 = strongly in favour</i>						
- food waste (e.g., vegetable scraps and leftover food)	4.1	4.0	3.9	4.1	4.0	3.9
- garden waste (e.g., lawn clippings and tree prunings)	4.3	4.2	4.1	4.4	4.3	4.1
- recyclables waste (e.g., cans, glass, plastics and paper)	4.6	4.5	4.2	4.7	4.5	4.4
- e-waste (e.g., batteries, light globes, computers, mobile phones)	4.4	4.3	4.1	4.6	4.4	4.3
- hard waste (e.g., sofas, beds and washing machines)	4.5	4.4	4.2	4.7	4.4	4.3
- household chemicals (e.g. paints, pesticides, pool chemicals and household cleaners)	n.a.	4.3	4.1	4.6	4.3	4.3

Notes: shaded cells are unfavourable responses on average on the 5-point scales; n.a. = item not asked in 2016; N = 1,212 and 1,244 in 2016 and 2019 respectively



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