

## Appendix 2

### Outcomes of the Victorian Energy Upgrades program

#### *Equitable distribution of VEU Program participation and benefits*

Internal analysis by the Department shows that those benefits of the program that are accessible for participants only, have historically been distributed fairly equally between:

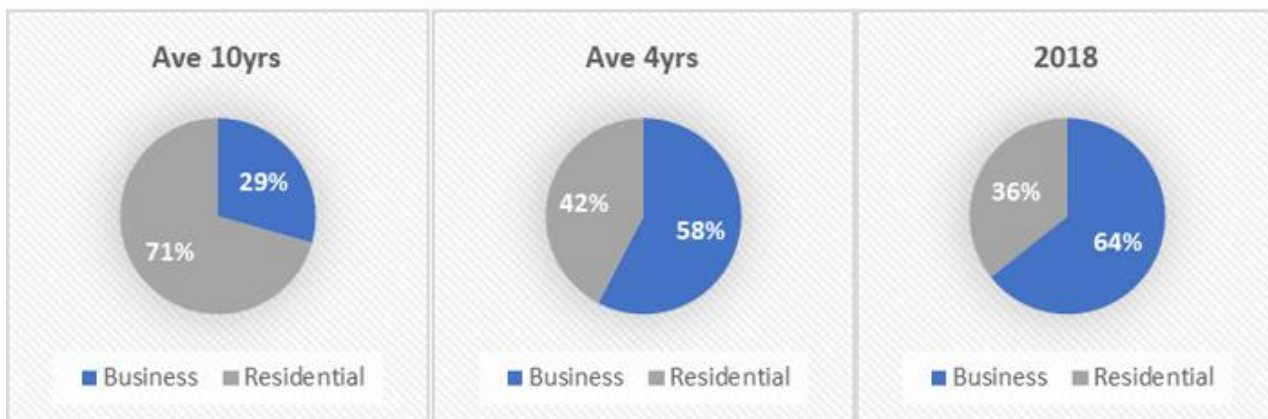
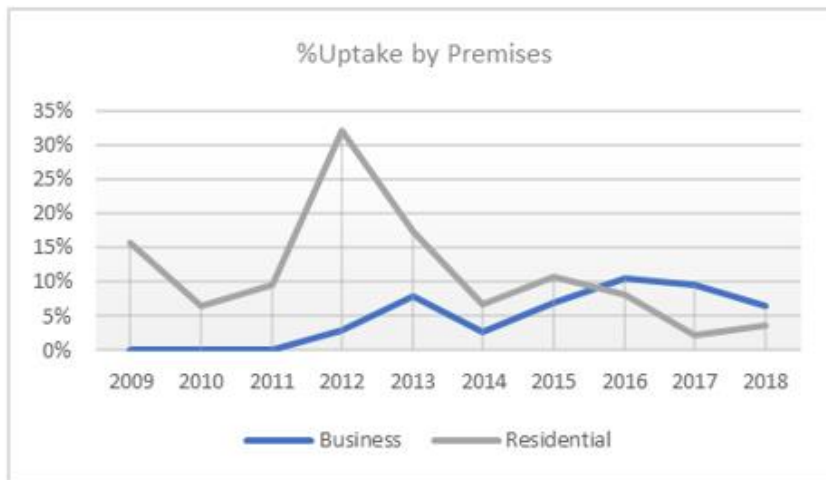
- the regional and metropolitan regions,
- residential and non-residential consumers<sup>124</sup>
- socio-economic quintiles.

Numbers of VEECs are the best indicator of the spread of incentives and investment by the program, whereas numbers of activities carried out under the program or premises that carried out an upgrade indicate the level of participation within a sector.

Over the ten years of the program, 66 per cent of VEECs have been created on residential premises and 34 per cent on non-residential premises. Although these results suggest that residential consumers benefit more than non-residential consumers, it is important to remember that the VEU program began as a residential program, and that non-residential consumers could only participate from December 2011 onwards and that before that period they did not pay for the cost of the program. The recent trend of investment has been towards upgrades on non-residential premises. Over the last four years 63 per cent of VEECs were created on non-residential premises and in 2018, where the program experienced a peak of activity in non-residential lighting upgrades, 81 per cent of VEECs were created for businesses. However, during this time, residents were still actively participating in the program. 85 per cent of activities carried out in 2018 were carried out on non-residential premises. These residential activities may have created less VEECs, and thereby received less incentives but each of these households nevertheless used the program's benefits to help upgrade to a more efficient home. When these numbers were considered in light of the total percentage of premises that are residential or non-residential, analysis over the last four years shows that 58 per cent of all non-residential premises and 42 per cent of all residential premises have participated in the program.

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<sup>124</sup> Generally, each premises is considered to have one primary consumer attached to it.



**Figure 23 Proportional Uptake of VEU program benefits across business and residential premises**

The difference in participation and benefits between metropolitan and regional areas has stayed similar over time. Both the benefits of the program and the participation under the program have generally been proportioned at about 70-80 per cent for metropolitan consumers and 20-30 per cent for regional consumers. However, given that there is a smaller concentration of regional premises (and principal consumers of those premises), this is to be expected. After the respective concentration levels of premises is taken into account, regional premises consistently see between 41-48 per cent participation rates. Over the lifetime of the program participation rates have been split 48:52 per cent between regional and metropolitan consumers.

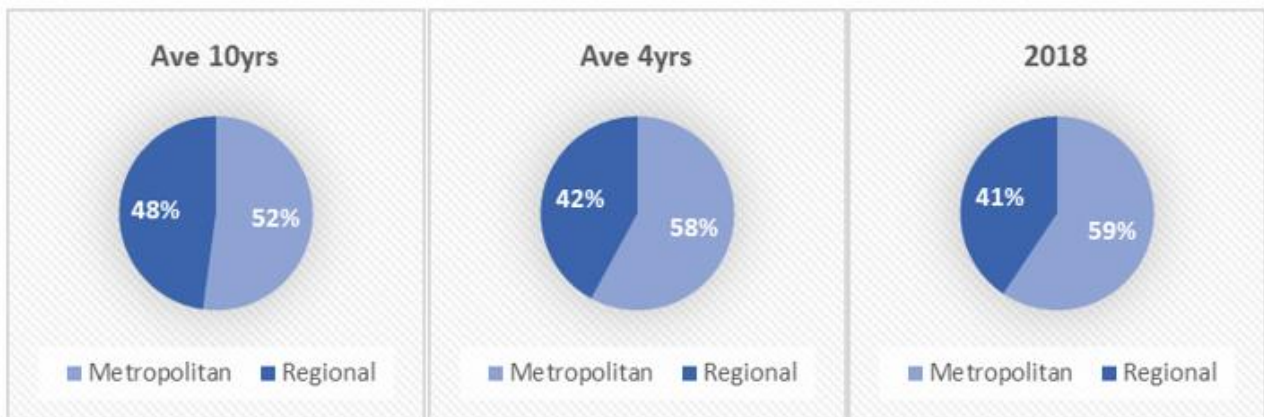
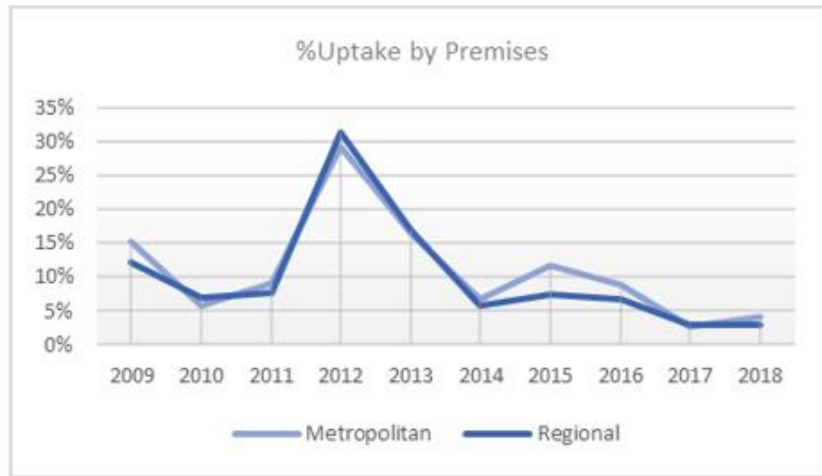


Figure 24 Proportional Uptake of VEU program benefits across regional and metropolitan premises

The Department applied SEIFA IRSAD quintiles that split Victoria into geographical quintiles of most-disadvantaged (Q1) to most advantaged (Q5).<sup>125</sup> Although the more advantaged quintiles did demonstrate a slightly larger participation rate and received a slightly higher share of the benefits from the program, more disadvantaged quintiles nevertheless received a substantial portion of the benefits and a solid participation rate. Once, the proportion of VEEC benefits and overall participation was considered in light of the percentage of consumers/premises that are in each quartile, the analysis showed that the benefits and participation were even more evenly spread out, with a slightly higher percentage of the benefits going to more disadvantaged households. This held true in 2018, despite the large uptake of non-residential lighting upgrades experienced that year which are unlikely to be harnessed by premises within lower quintiles.

<sup>125</sup> It should be noted that the SEIFA IRSAD quintiles measure economic advantage, not total economic resources. The analysis matches VEEC creation data to 2016 Census and SEIFA IRSAD data.

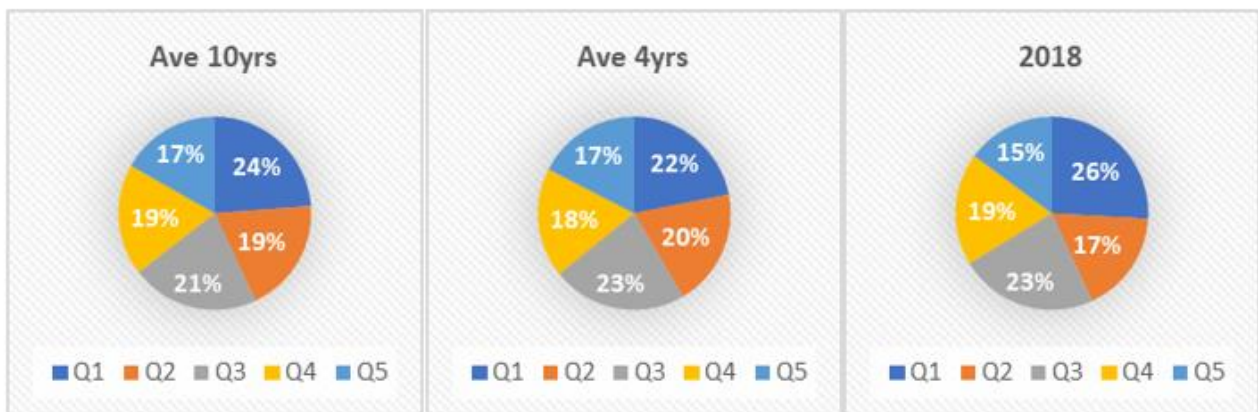
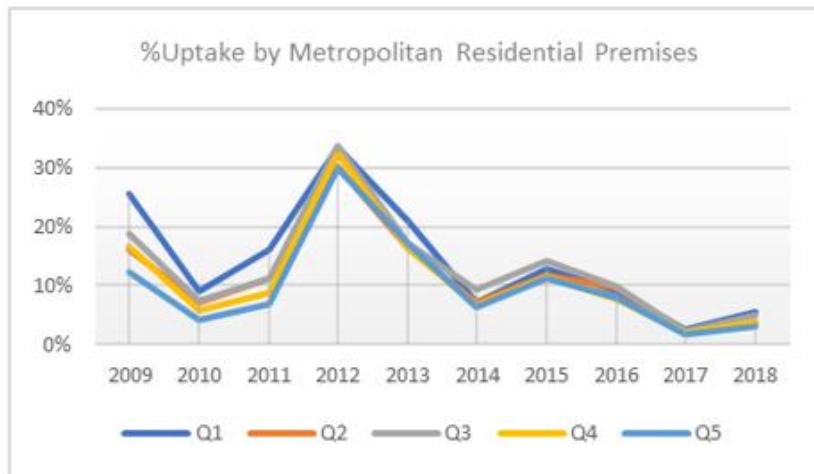


Figure 25 Proportional Uptake of VEU program benefits across SEIFA IRSAD socio-economic quintiles

*Distribution of benefits over VEU program activities*

The Department also analysed how benefits and participation was spread across different types of upgrades. In both the metropolitan and regional sectors of Victoria, over the life of the program, the majority of investment has been into efficient lighting upgrades, although in both sectors there has also been a large amount of investment in stand-by power controllers.

In general, the spread of incentives across different types of upgrades has been more diverse:

- over the lifetime of the program compared to last year, and
- in the regional sector compared to the metropolitan sector.

If there is ample opportunity for energy efficiency upgrades of a particular type to be carried out, it is expected that more of those upgrades will occur under the program. This is complicated by the fact that it becomes more beneficial for accredited providers to carry out more expensive upgrades when certificate (VEEC) prices are higher. When the total opportunity in sectors is not being targeted well, it can either be because there are not enough accredited providers equipped to carry out these upgrades (meaning the program may need to increase engagement or make it easier to understand requirements for activities) or

that undertaking other upgrades is providing more benefits. Over the life of the program, within the metropolitan sector:

- inefficient water heaters are consistently being targeted fairly well (14-18 per cent of the total opportunity being exhausted) by the program
- upgrades to high efficiency home appliances such as refrigerators, televisions and washing machines for which minimum standards exist, are slowly being targeted more, which may be the result of increased awareness of the opportunity but may also be the result of lowering costs of high efficiency appliances. As minimum standards rise for such appliances, and incentives therefore decrease, this trend is quite interesting and engagement around these types of appliances may capitalise on a potential shift in attitudes of consumers purchasing such products.
- space heating upgrades are no longer being targeted as well in 2018 compared to the start of the program. Given that over time it is reasonable to expect the costs of high efficiency appliances would decrease, it may be that this is due to a lack of awareness about the possibilities available. However, it may also be a result of a slight decrease in incentives that correlated with an increased minimum efficiency of space heating. This trend will be interesting to observe given the increase of incentives initiated at the end of 2018.

ACTIVITY CATEGORY	abbrev.
Water Heating	WH
Space Heating	SH
Weather Sealing	WS
Shower Rose	SR
High Efficiency Appliances	HEA
Stand-by Power Controllers	SBPC
Lighting	L
In-home Displays	IHD

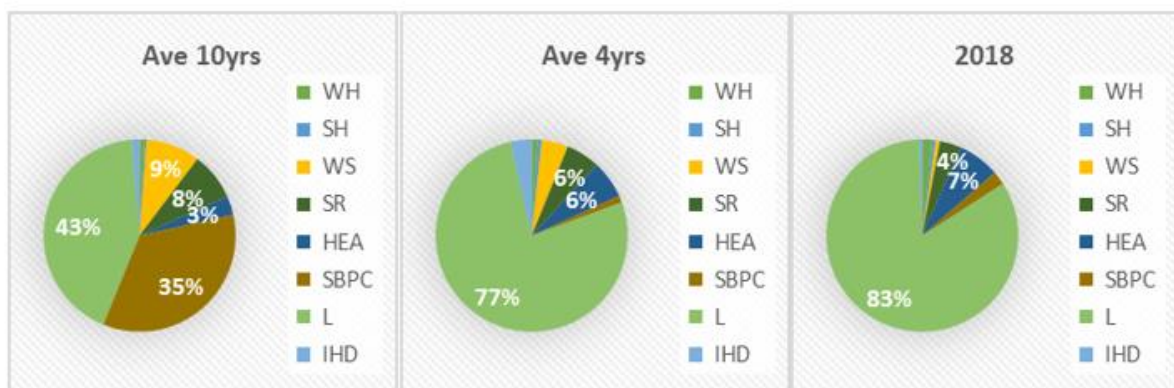
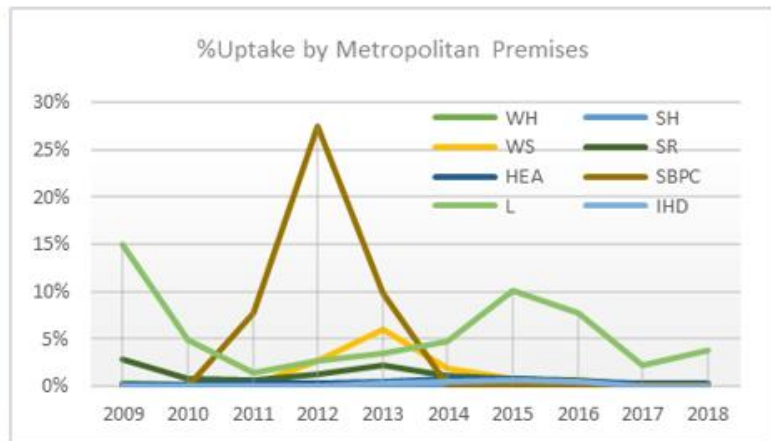


Figure 26 Proportional Uptake of VEU program investment over different types of upgrades in Metropolitan Victoria

In the regional sector, water heating upgrades have steadily been targeted well (from 6 per cent to 17 per cent) whereas space heating upgrades are targeted better than in the metropolitan areas and, with the exception of 2018, seem to be better targeted in later years. Interestingly, the regional sectors also showed a large proportion of shower rose upgrades over the life of the program, but this has steadily increased and was minor in 2018. Similar patterns are seen for weather sealing measures. These types of low-cost activities are considered to be more likely for lower socio-economic quartiles of Victoria (because there is no cost/minimal cost to the consumer), and regional Victoria contains a larger proportion of consumers with lower incomes. Then again, many parts of regional Victoria (those parts with cooler climates) also tend to require a higher rate of electric water heating and space heating and therefore higher incentives are provided for an upgrade.

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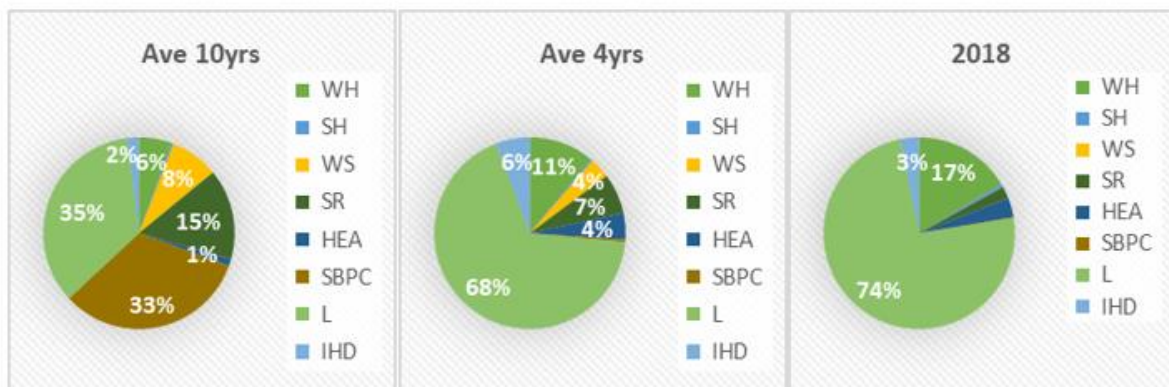
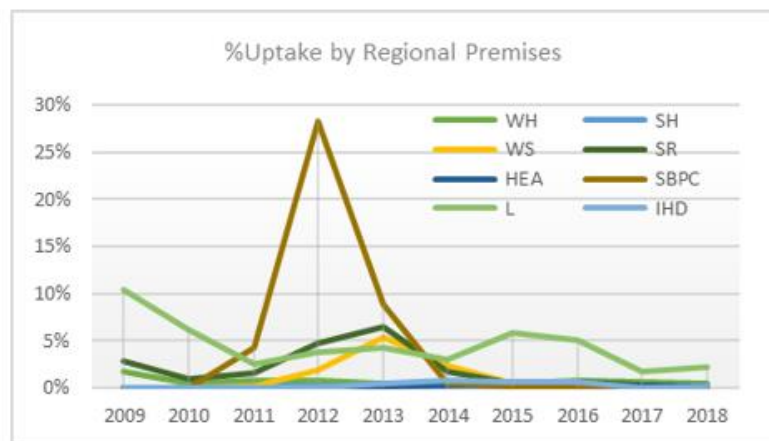


Figure 27 Proportional Uptake of VEU program investment over different types of upgrades in Regional Victoria

In 2018, the Department updated the incentives provided for the different measures and altered requirements for upgrading measures. These changes will affect the types of upgrades we see under the program, in particular how well space heating measures are targeted.

The VEU program's tendency to target one particular activity strongly for a period of time (as can be seen by Figure 27) and then moving to another, is a strength of the program. The program is designed to allow the lowest cost opportunities to take off and eventually be able to be produced at low-cost at large scale. This kind of production at scale has transformed the lighting industry and made it possible to produce LED lighting at affordable prices.

Nevertheless, this analysis will inform future work by the VEU program. Although the residual cost of upgrades for consumers primarily dictates the uptake they see under the program, engaging with industries for those types of activities/technologies that have minimal uptake can also increase awareness of opportunities available and, to some extent, increase uptake of those opportunities.

#### *Creating economies of scale*

As discussed briefly above, one of the strengths of the VEU program has been to create economies of scale.

Typically, as new products (such as high efficiency products) are introduced into the markets, they are available at high price and sold at low volumes. Over time, improvements in manufacturing techniques, labour productivity and other technological progress will generally allow products to be sold at lower cost and at larger volumes. Only when a product has become common-place does its price remain constant, or at times, increase. This progression and its associated U-shaped cost curve are common.<sup>126</sup> By making additional funds available for the installation of certain products for longer periods of time, programs such as the VEU program can speed up this process significantly. They artificially lower the upfront cost of these products. This can lead to increased interest in the products for a sustained period. As such, companies that install and manufacture these products can set up business plans planning for distribution of their products to the Victorian economy, at scale much earlier. This then allows them to invest more in improving manufacturing techniques and in progressing the technology and will then bring the natural price of the product down. Eventually, incentives are no longer needed for the product to be available at low cost to consumers.

Over the past few years, the transformation of the lighting industry to allow it to produce high efficiency products (i.e., LEDs) at scale, provide them at low cost, and eventually become self-sufficient is an indicator of the VEU program's success. The VEU program, together with similar programs and other states have driven the transformation of this industry. LED costs have plummeted, with 94 per cent of the 2018 VEU program target being met through lighting replacements. With higher efficiency lights using a fraction of the energy of old lights and having been replaced in mass across Victoria, this represents a great success in terms of energy and emissions savings as well. Incentives have already begun to be rolled back over the past year, and this will continue over the next few years. It has been determined that the product can now be delivered at low cost, at scale, without assistance by the program.

#### *Accredited products under the VEU program*

The VEU program has a range of benefits. One that is not discussed as often is the benefits of the program's accreditation of products. Products under the program must be of high efficiency but are also generally required to meet higher quality and safety standards. To be installed under the program, evidence that they meet requirements must be submitted to the program regulator, the Essential Services Commission. If the right evidence is submitted, they are registered for the purposes of the VEU program. These products are audited periodically using a risk-based framework to ensure they achieve stated outcomes. As such, registration under the program is highly valued as the product can be labelled to meet this independent quality, safety and efficiency standard.

There are currently 22,948 products on the ESC register. Not only does this mean that incentives are available for a wide range of products, but also that the program is a mass labelling scheme. For these products, consumers can be assured that they are high efficiency (especially interesting when there is no star rating) and of 'government approved' quality. As such, the products can be distinguished from other like products and this may improve their uptake even outside of the VEU program.

An additional benefit of the register is that it can be harnessed by other programs. For instance, the *Building Regulations 2018* require that either a specific solar water heater system or a rainwater tank is installed to meet the efficiency requirements of certain buildings. To determine whether solar water heater systems meet their requirements, the VBA uses the ESC register of VEU products. As such, the VEU program minimises the cost of administering the requirements of other programs. In some cases, the VEU program also harnesses products on other registers.

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<sup>126</sup> Horowitz, 'Economic Indicators of Market Transformation: Energy Efficient Lighting and EPA's Green Lights' (2001), 22(4) *The Energy Journal* 95, 96.