

**Document purpose:**

This document is the result of the programme reviews EECA and MBIE conducted across EECA's programme portfolio in 2016. The reviews were in response to a requirement to reprioritise the EECA's portfolio in the context of the new NZEECS, the new EV programme, and expanded levy. The framework for the review is available [here](#).

The reviews were based on existing documentation and workshops with MBIE, PwC and EECA staff.

## About ENERGY STAR

ENERGY STAR is a voluntary endorsement labelling programme that EECA has run since 2005 under agreement from the United States Environmental Protection Agency. The programme aims to improve consumer choices by marking those appliances that are in the top 25% for energy efficiency.

In New Zealand it covers 15 product categories, including consumer appliances, office and commercial equipment and windows.

## Conclusions

It is difficult to determine the effectiveness and impact of ENERGY STAR, given other EECA interventions in the market (MEPS and MEPL) and due to historical data issues. Overall, however, ENERGY STAR does not appear to provide sufficient value additional to the Equipment Energy Efficiency (E3) Programme.

In some cases, ENERGY STAR could provide additional value to MEPS and MEPL, such as where:

- a consumer's purchase decision is driven by energy use (ENERGY STAR is most effective for products that consumers perceive to be high energy using)
- products are unlikely to be regulated, or for which regulation will take a long time to implement
- MEPS or MEPL do not meet consumer requirements (e.g. residential heat pumps where performance changes substantially in different climate zones, or LED lights where product quality was an issue).

For heat pumps, there is anecdotal evidence that ENERGY STAR sets standards for products with industry; for example, suppliers import higher efficiency heat pumps into New Zealand in response to ENERGY STAR<sup>1</sup>. ENERGY STAR also provides a high standard to signal the future direction of energy efficiency standards.

The challenges of measuring the programme's value will be addressed with plans to collect sales and energy performance data for ENERGY STAR products for which EECA currently has no such data outside of MEPS and MEPL. This will enable better assessment of ENERGY STAR's impact outside of MEPS and MEPL.

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<sup>1</sup> For example, EECA has received an email from a prominent supplier asking for future ENERGY STAR heat pump requirements in order to inform "new model development".

## Recommendations

It is recommended that ECCA:

- narrow its focus to the best opportunities for energy efficiency, including reviewing existing product categories
- consider setting ENERGY STAR as a criterion in government procurement
- consider alternative, industry-led standards if ENERGY STAR only provides value for heat pumps
- consider getting industry to contribute financially to EECA's administration of ENERGY STAR

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## 1 The problem

The price of a product is rarely linked to its energy use. Often products of the same size and technology, sold at the same or a similar price can vary widely in the amount of energy they use. This lack of available information on, or a clear price signal linked to, energy efficiency means that consumers do not tend to consider whole-of-life costs when buying a product. Consumers also lack any other means to compare how much energy products use and how much the products cost to operate.

In turn, the lack of consumer awareness of, or ability to identify, the energy performance of products means that there is little demand for energy efficient products and little incentive for industry to introduce more efficient technologies to New Zealand markets<sup>2</sup>.

### 1.1 Why is it a problem?

Energy-using products vary widely in their type and application. They consist of things like fridges, washing machines, gas water heaters, electric motors, refrigerated display cabinets, distribution transformers and external power supplies. In aggregate, they contribute significantly to New Zealand's energy demand and greenhouse gas emissions, so improvements in efficiency can quickly add up and result in significant reductions in greenhouse gas emissions across the country.

Residential energy-using products (hot water heating, space heating, electronics, refrigeration and lighting) contribute to 8% of New Zealand's energy-related greenhouse gas emissions. In the business sector, motor systems, lighting, refrigeration and space conditioning make up 7% of New Zealand's energy emissions<sup>3</sup>.

By 2035, New Zealand's energy demand is forecast to increase by 8% producing an estimated 29.8 million tonnes of CO<sub>2</sub> emissions.

### 1.2 The programme

#### 1.2.1 Origins

ENERGY STAR is a voluntary endorsement labelling programme that EECA has run since 2005 under agreement from the United States Environmental Protection Agency (US EPA). At the time, EECA had determined that there was a place for an endorsement label due to the time taken to develop regulatory interventions. Several options were considered, including ENERGYWISE, the Australian TESAW voluntary endorsement mark, a UK option and ENERGY STAR. ENERGY STAR was thought to be the best option based on availability, and the results of consumer and business stakeholder research.

#### 1.2.2 Purpose

The programme aims to improve consumer choices through the provision of information. For most energy-using and energy-conserving products, the running costs and overall energy efficiency of the various options on the market are not available. It is assumed that by providing additional

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<sup>2</sup> While very few products are developed specifically for the New Zealand market, some are (e.g. heat pumps) and aligning with international partners (Australia) prevents product dumping in New Zealand.

<sup>3</sup> [EECA analysis based on MBIE Energy in New Zealand tables and EECA's Energy End-Use Database.](#)



information about this, consumers and businesses will make more energy efficient choices in the products that they purchase.

As a voluntary programme, ENERGY STAR can be used in situations where consumer information about energy use is lacking in the marketplace (and Minimum Energy Performance Standards (MEPS) are unlikely to be introduced in the near future), or where other EECA programmes may require information about energy use, such as for heat pumps or solar water heaters.

### 1.2.3 Key components

ENERGY STAR is an independent, government-backed quality mark that is used on a voluntary basis on a range of products. In New Zealand it covers 15 product categories including consumer appliances, office and commercial equipment and windows.

**Table 1: Product categories covered by ENERGY STAR and other EECA interventions**

Product Categories	ENERGY STAR	MEPS	MEPL
Air conditioners / Heat pumps	✓	✓	✓
Clothes Washers	✓	✗	✓
Computer monitors	✓	✓	✓
Computers	✓	✓	✗
Dishwashers	✓	✗	✓
Household refrigerators & freezers	✓	✓	✓
Televisions	✓	✓	✓
Compact fluorescent lamps	✓	✓	✗
LEDs	✓	✗	✗
Luminaires	✓	✗	✗
Printers	✓	✗	✗
Gas space heaters	✓	✗	✗
Gas central heating	✓	✗	✗
Solar water heaters	✓	✗	✗
Windows	✓	✗	✗

Residential windows are the only energy-conserving product covered under the programme. They include a mix of framing types (e.g. wood and aluminium) and different types of insulating glass units. Because windows are a bespoke product, the manufacturers qualify as partners and agree to manufacture to a defined specification.

As ENERGY STAR is a programme developed by the US EPA it cannot be used for transport related products. The US has another programme (SmartWay) that is used in the transport market.

The key components of the programme are:

- The ENERGY STAR brand – EECA promotes ENERGY STAR as a shortcut to the most efficient products. The endorsement label is applied to products in stores that qualify, and to point of sale materials and other advertising.

- Development/adaptation of product standards (specifications for high energy performance). These need to be reviewed from time to time to ensure that they remain fit for purpose.
- Working with retail and manufacturer stakeholders. Stakeholders need to sign up as partners, and promote the ENERGY STAR brand and product models that meet the criteria.
- Maintaining the EECA register of qualifying products.
- Conducting testing to ensure compliance with the high performance standard.
- Promotion of the ENERGY STAR mark through mass-media advertising (under the ENERGYWISE information brand).

### 1.3 Market characteristics

The market includes both business and residential energy-using and energy-conserving products (i.e. windows).

New Zealand is primarily an importer (not manufacturer) of energy-using products. Most of the products are available internationally.

The market for energy-using products is difficult to characterise as it encompasses a wide range of product types, each with its own market attributes. The pathway to purchase, price and product characteristics can vary widely.

#### 1.3.1 Pathway to purchase

Residential products are often sold through appliance retailers, such as Harvey Norman. For some products, such as lighting, a large percentage is sold either in supermarkets, specialist retailers such as Lighting Direct or in hardware stores such as Mitre 10. Windows are often purchased as part of a larger building project or renovation to increase the performance of the thermal envelope.

Online sales are an increasing trend. Most of the larger retailers offer online purchase, and there are brand specific websites, such as Dell computers and Apple, which offer online purchase, as well as comparison sites such as PriceSpy and PriceMe. Many consumers, even if they purchase in-store, do some research online<sup>4</sup>. For some residential products, installers are the main point of contact for consumers, for example space and water heating products.

In the business area, products include items such as office equipment and commercial lighting; there is also cross-over with residential products, such as laptop computers. Regardless, the pathway to purchase for business products tends to be quite different, with more products being sold via installers, or specified in contracts, and less focus on customers physically viewing an appliance in-store.

#### 1.3.2 Scale of price

The price bracket varies across products from a low outlay (e.g. one compact fluorescent lamp is less than \$10) to whiteware and heating appliances which can be over a thousand dollars each. Industrial products like motors and transformers also have a much higher cost.

<sup>4</sup> The amount that this occurs changes depending on the product, but [EECA's Quantitative Labels Research](#) showed it was reasonably common.

### 1.3.3 Product characteristics

For some categories the number of factors influencing the consumer decision is limited while in others there are many (e.g. appearance, perceived quality/brand, price, size). Therefore the importance a purchaser places on energy consumption varies.

## 2 Strategic fit

The New Zealand Energy Strategy 2011-2021 notes that one of the Government's four key priorities is the efficient use of energy. This is to be achieved through four focus areas, including "warm, dry energy efficient homes", "enhanced business competitiveness through energy efficiency" and by providing "better consumer information to inform energy choices".

The New Zealand Energy Efficiency and Conservation Strategy (NZECS) 2011-2016 includes the objective of "Greater business and consumer uptake of energy efficient products" and the goal to "extend minimum energy performance standards, labelling and ENERGY STAR product coverage to remain in line with major trading partners."

The programme is also consistent with Government initiatives such as the energy and climate area in the [Business Growth Agenda \(BGA\)](#) Natural Resources chapter. The BGA signals that New Zealand should "ensure well-functioning markets, and identify and remove regulatory barriers to support renewable energy and reduce carbon emissions."

[EECA's strategy](#) has objectives related to the energy efficiency of products:

- Residential consumers understand and consider the energy cost impact of choices they make when selecting and using appliances.
- Annual residential energy use per household is less than the 2015 baseline.
- By 2020, 25% of the total identified economic potential for energy efficiency improvement has been accessed in the key areas of space heating, water heating, refrigeration and lighting.
- Average energy intensity of appliances and products sold in New Zealand (and covered by an efficiency standard) is improving by 0.5% per year by product line.

## 3 Role for government

### 3.1 Market failures and barriers

The key market failure addressed by the ENERGY STAR programme is imperfect information.

If the market were functioning appropriately, consumers and businesses would understand the benefits of using energy efficient products and be able to identify these products at point of purchase. They would be able to optimise the whole of life cost for a particular product, and assign a value to that alongside other features such as quality, or size. There is no easy proxy for whole of life cost (there is not necessarily a consistent relation to capital cost).



Without labelling, information on a product's energy efficiency is not readily available and there are high 'search costs' associated with trying to find it.

### 3.1.1 Market failure

*Imperfect information:* Without labelling, search costs for energy efficiency information are high because energy efficiency information either does not exist or was not made readily available. This means consumers are unable to minimise the total cost of ownership by taking energy efficiency into consideration when purchasing a product.

*Principle-agent issue:* In some instances, builders, tradespeople or landlords may be responsible for the purchase of the product. They don't prioritise energy performance as they don't stand to benefit from reduced energy costs.

### 3.1.2 Market barriers

*Lack of capacity:* Purchasers lack the time, ability or inclination to collate and analyse energy consumption data for the products they are considering purchasing.

*Preferences:* Purchasers prioritise other features for the products they are considering purchasing (e.g. a television's picture quality)

*Present bias:* Purchasers prioritise the capital cost of the product rather than the whole-of-life costs.

## 3.2 Potential benefits

Table 2: Public and private benefits expected

PUBLIC BENEFITS	PRIVATE BENEFITS
<ul style="list-style-type: none"><li>• Avoided greenhouse gas emissions</li></ul>	<ul style="list-style-type: none"><li>• Reduced energy costs for consumers</li><li>• Improved business competitiveness and productivity</li><li>• Deferred need to invest in new generation infrastructure</li></ul>

### 3.2.1 Primary public good benefits

Products sold under the programme will consume less energy than those that would otherwise have been sold, resulting in reduced greenhouse gas emissions.

### 3.2.2 Private good benefits

Products will use less energy, for the same output, leading to lower energy costs for consumers.

More efficient products will result in lower overheads for businesses, enabling them to be more competitive.

Lower energy demand due to more efficient products will allow New Zealand to defer investment in new generation infrastructure and continue to meet most of its stationary energy needs from renewable and low-emissions energy sources.

### 3.3 Potential costs

As a voluntary programme, costs for retailers and manufacturer partners are low, and they can opt out should costs be considered too high.

There is some limited potential for private sector intervention, such as through third party websites, or industry associations. However, no single party has the ability to solve the market failures and barriers without government intervention.

## 4 Intervention

### 4.1 Intervention logic

See Appendix One for an intervention logic diagram.

### 4.2 Options

Alternatives to a voluntary endorsement labelling programme for energy efficient products include:

- Information only campaigns – to influence purchase decisions and user behaviour (how owners of products operate those products)
- Dis-endorsement labelling to alert consumers to poorly-performing products.
- Minimum energy performance standards (MEPS) to prevent poorly-performing products from entering the market, ensure consumers are not exposed to the worst-performing products, and shift the market gradually towards more efficient products
- Voluntary codes of practice to obtain industry's agreement to meet energy efficiency criteria – these work best when industry is willing to cooperate and is small in scale (thereby making it easier to ensure maximum coverage of the market).
- Procurement guidelines to specify energy efficiency criteria for bulk purchases of products.

Standards, labelling and information measures can be complementary. For a given product class, mandatory MEPS can prevent the worst-performing models from gaining entry to the market while a voluntary high-efficiency standard or endorsement label can be used to promote high-performance models. High efficiency standards can also be used as criteria in other programmes, for example procurement guidelines and subsidy schemes.

The voluntary nature of ENERGY STAR means it can often be used where time is of the essence. For example, where technology advancement is quite fast (e.g. lighting or televisions), ENERGY STAR can be implemented quickly whereas regulation would take several years or be deferred until these issues have settled.

### 4.3 Investment objectives

EECA's 2016/17 Statement of Performance Expectations contains the objective that at least 40% of sales in regulated categories are ENERGY STAR qualified models.

The reason this is confined to regulated product categories is because EECA only receives sales data from those product categories that are regulated by Minimum Energy Performance Standards or Mandatory Energy Performance Labelling (see E3 programme review).

#### 4.4 Potential impact

An evaluation by Concept Consulting in 2015/16 (see Section 5) found that the effect of ENERGY STAR on purchase patterns was small enough to be difficult to detect in the data. The evaluation estimated an average 0.5% reduction in energy use across ENERGY STAR labelled appliances.

#### 4.5 Market readiness

For the successful implementation of ENERGY STAR, there needs to be an established product market, with a range of efficiencies, and an industry that is capable of promoting its products and engaging with EECA. The readiness of the market for ENERGY STAR depends on the category considered, as there is a wide range of industries and product classes represented in the current and potential ENERGY STAR portfolio.

#### 4.6 Risks

The key risks identified for the ENERGY STAR programme are reputational and relationship related.

Firstly, the relationship with the US EPA is crucial, as they allow the use of the ENERGY STAR brand, as well as a lot of specification work. If this relationship was to break down this would make the programme difficult to run.

Secondly, the programme relies on the energy rating database and the MEPS standards developed by the E3 programme for many specifications, particularly for whiteware appliances. If this was to become unusable, for example because the relationships with MEPS programme partners or Australia's Department of the Environment and Energy were to break down, it would make it more difficult to run the programme.

ENERGY STAR also requires good relationships with a number of stakeholders to facilitate the registration of products, and promotion of the brand; there is a risk that damage to the EECA brand/reputation would in turn damage these relationships.

There is also risk to the programme from poor administration and compliance practices. Poor record keeping, fraudulent activity on the part of manufacturers, or issues with test procedures all have potential to affect the programme by causing a lack of confidence in the programme.

Lack of funding could be a problem. ENERGY STAR is primarily a marketing programme, and as such, if it is not funded sufficiently, there is a risk the label will not be understood by consumers, and therefore be of little effect.

#### 4.7 Interdependencies

There is a high level of interdependency with other EECA products programmes, and with partners at the US EPA and the Australian Department of the Environment and Energy.

Minimum Energy Performance Standards and Mandatory Energy Performance Labelling (MEPL) complement EECA's ENERGY STAR programme. While MEPS acts as a 'minimum acceptable' energy efficiency baseline, MEPL highlights the range of performance across the product class and ENERGY STAR indicates 'best in class'. Because ENERGY STAR is voluntary, it is quicker to implement than a new MEPS and MEPL regulation. This means it is sometimes used as a 'warm-up' to regulation or a way to start securing benefits sooner.

Monitoring performance of ENERGY STAR relies on the sales data that is required to be provided under MEPS and MEPL regulation.

Other EECA programmes (e.g. Warm Up New Zealand and the solar water heating programme) have used the ENERGY STAR specifications as a way of differentiating those products which will be included in a subsidy programme.

#### 4.8 Resource allocation

From 2013 to 2015, ENERGY STAR cost \$3.5m (about \$1.2m per year).

Approximately 2 FTE are allocated to the ENERGY STAR programme, consisting mainly of account management from the Products team, and a small amount of marketing resource.

### 5 Performance

#### 5.1 Effectiveness

An evaluation of the ENERGY STAR programme was carried out by Concept Consulting in 2015/16<sup>5</sup>. Concept Consulting analysed sales and efficiency data for a large selection of ENERGY STAR product categories, completed a stakeholder survey with programme partners, and conducted market research to establish consumer understanding. They examined the purpose, interactions with MEPL and effectiveness of ENERGY STAR and came to the following conclusions:

- For most product groups, the energy savings impact of ENERGY STAR is smaller than is detectable within the quantitative data analysis<sup>6</sup>.
- The extent to which consumer purchases have altered because of ENERGY STAR was unable to be determined.
- The voluntary nature of ENERGY STAR means that it is not possible to easily collect sales data to monitor the extent to which it is delivering improved outcomes. Sales data is only available for those products that are also subject to regulation through MEPS and/or MEPL; this makes drawing out the effect of the different interventions difficult. This impairs the ability to monitor the success of ENERGY STAR and is considered a significant issue.
- Where the MEPL label is already in place it is likely to materially reduce the incremental effectiveness of ENERGY STAR.

<sup>5</sup> See [Concept Consulting ENERGY STAR evaluation 2016](#).

<sup>6</sup> EECA's view is that this is not totally unexpected given that ENERGY STAR is a voluntary programme and also that drawing out its impact from other interventions and business-as-usual efficiency improvement is incredibly difficult.



- For the residential appliance categories where both labels currently apply, market research indicates the MEPL label is more effective.
- The pass/fail nature of ENERGY STAR gives it greater potential (than MEPL) to be leveraged more effectively as part of a broader initiative. For example, public procurement initiatives, where central or local government agencies are required to purchase appliances which meet certain criteria, or subsidy programmes. This is because the performance criteria for qualification in the public procurement or subsidy mechanism can be simply expressed as “it must be ENERGY STAR”, whereas a scale-based metric requires specifying the minimum qualifying value against this scale for each product category – and potentially regularly revising this qualifying value as the scale is periodically re-assessed.
- In some product categories, ENERGY STAR may not be achieving overall best outcomes for consumers. This is particularly in relation to outcomes where consumers suffer a higher total cost of ownership from higher up-front purchase costs (e.g. windows) or non-energy running costs (e.g. potentially the case relating to water costs for clothes washers) being of a scale which outweigh the benefits of lower energy costs.
- The evaluation indicates that those categories where ENERGY STAR is likely to be having some benefit are those where:
  - the size of the energy prize is relatively large (i.e. it is a large energy-consuming category and there is a significant range of appliance efficiencies on offer)
  - the MEPL label doesn't already apply
  - energy is inherently of significant importance relative to other value attributes (capital cost, functionality)
  - incremental testing costs are not too high
- There is often a marked difference in what consumers said was important versus what they sought information on. The proportion of consumers who said they considered the running costs of appliances was significantly higher than those who said they actually worked it out. Further work would be required to understand this issue better, but it may be a case of stated-preferences differing from revealed-preferences. It may also indicate a poor understanding of how to calculate running costs

The recommendations to EECA were:

- Explicitly put in place governance arrangements to ensure that ENERGY STAR is implemented in a way which doesn't result in lower value outcomes for consumers.
- Implement the label (ENERGY STAR or MEPL) such that comparison is between functionally-equivalent products within a product category. For example, it may be appropriate to split clothes washers between top and front-loaders.
- EECA should clarify the core value proposition of ENERGY STAR. Is it only about energy savings, or is it about helping consumers identify energy-using products with the lowest total cost of ownership (without sacrificing functionality)?
- Facilitate and encourage either the MEPL label and/or ENERGY STAR to be featured on consumer information websites such as PriceSpy.
- Consider securing funding from industry.

The actions EECA is planning on taking as a result of this evaluation are outlined in Section 5.4.

## 5.2 Achieved benefits

The Concept Consulting “analysis of [EECA’s] sales data found little discernible evidence of significant shifts in purchasing behaviour towards more efficient appliances”, requiring an estimate to be made based on the sales data and some market research carried out as part of the review. Using an estimate of an average 0.5% increase in efficiency due to the label, the greenhouse gas savings between 2013 and 2016 are expected to have been around 3,400 tCO<sub>2</sub>e.

## 5.3 Value-for-money

The cost-benefit analysis results are summarised in Table 3 and the assumptions are outlined in Appendix Two.

*Table 3: Cost-benefit analysis results for ENERGY STAR from 2013 to 2016*

Metric	Description	Value	Comments
Net present value		-\$13.5M	This increases to \$3.9M when windows are removed
Benefit-cost ratio	PV all benefits/PV all costs	0.46	This increases to 1.61 when windows are removed
ROI-Government	PV public (government) benefits/PV public (government) costs	0.10	This decreases to 0.09 with windows removed

## 5.4 Programme future

As a result of the Concept Consulting evaluation EECA plans to:

- Retire product categories that show low benefits, and serve no other strategic purpose.
- Subject new categories to an improved assessment process aligned to EECA’s Operating Model.
- Reduce programme costs to EECA and Programme Partners through:
  - default registration of ENERGY STAR products covered by E3 Programme as part of the yearly sales data collection process
  - simplification of product registration process
  - remove ENERGY STAR only brand marketing and integrate into overall products marketing strategy
- Improve programme evaluation and market intelligence by collecting sales information for all ENERGY STAR products categories.

These proposed actions will improve the net benefit of the ENERGY STAR programme by increasing the benefits and significantly reducing the costs, so that there is only a small marginal cost over the regulatory E3 programme costs.

It will also provide additional benefits to EECA over and above the current programme by providing robust data on non-regulated product categories, to allow EECA to evaluate any future case for regulatory intervention, and improve the accuracy of New Zealand residential energy end use modelling (The Residential Baseline Study) at low cost.

## 6 Lead organisation

EECA is both willing and has proven capability having run the programme since 2005. ENERGY STAR clearly fits within EECA's mandate under the *Energy Efficiency and Conservation Act 2000* to promote "practices and technologies that further energy efficiency". EECA is also well placed to deliver this programme given EECA's role in promoting energy efficiency and the linkages in the administration of the E3 Programme (MEPS and MEPL). There is no other government agency more appropriate to lead.

There are private sector organisations that have endorsement marks for products, such as Canstar and Consumer NZ. However, they are not focused on energy efficiency and their endorsements are not based on rigorous testing standards. They are unable to offer search-cost minimisation services of a scale and breadth that would match that of a central government initiative.

## 7 Conclusions

It is difficult to determine the effectiveness and impact of ENERGY STAR, given other EECA interventions in the market (MEPS and MEPL) and due to historical data issues. Overall, however, ENERGY STAR does not appear to provide sufficient value additional to the Equipment Energy Efficiency Programme.

In some cases, ENERGY STAR could provide additional value to MEPS and MEPL, such as where:

- a consumer's purchase decision is driven by energy use (ENERGY STAR is most effective for products that consumers perceive to be high energy using)
- products are unlikely to be regulated, or for which regulation will take a long time to implement
- MEPS or MEPL do not meet consumer requirements (e.g. residential heat pumps where performance changes substantially in different climate zones, or LED lights where product quality was an issue).

For heat pumps, there is anecdotal evidence that ENERGY STAR sets standards for products with industry; for example, suppliers import higher efficiency heat pumps into New Zealand in response

to ENERGY STAR<sup>7</sup>. ENERGY STAR also provides a high standard to signal the future direction of energy efficiency standards.

The challenges of measuring the programme's value will be addressed with plans to collect sales and energy performance data for ENERGY STAR products for which EECA currently has no such data outside of MEPS and MEPL. This will enable better assessment of ENERGY STAR's impact outside of MEPS and MEPL.

## 8 Recommendations

It is recommended that EECA:

- narrow its focus to the best opportunities for energy efficiency, including reviewing existing product categories
- consider setting ENERGY STAR as a criterion in government procurement
- consider alternative, industry-led standards if ENERGY STAR only provides value for heat pumps
- consider getting industry to contribute financially to EECA's administration of ENERGY STAR

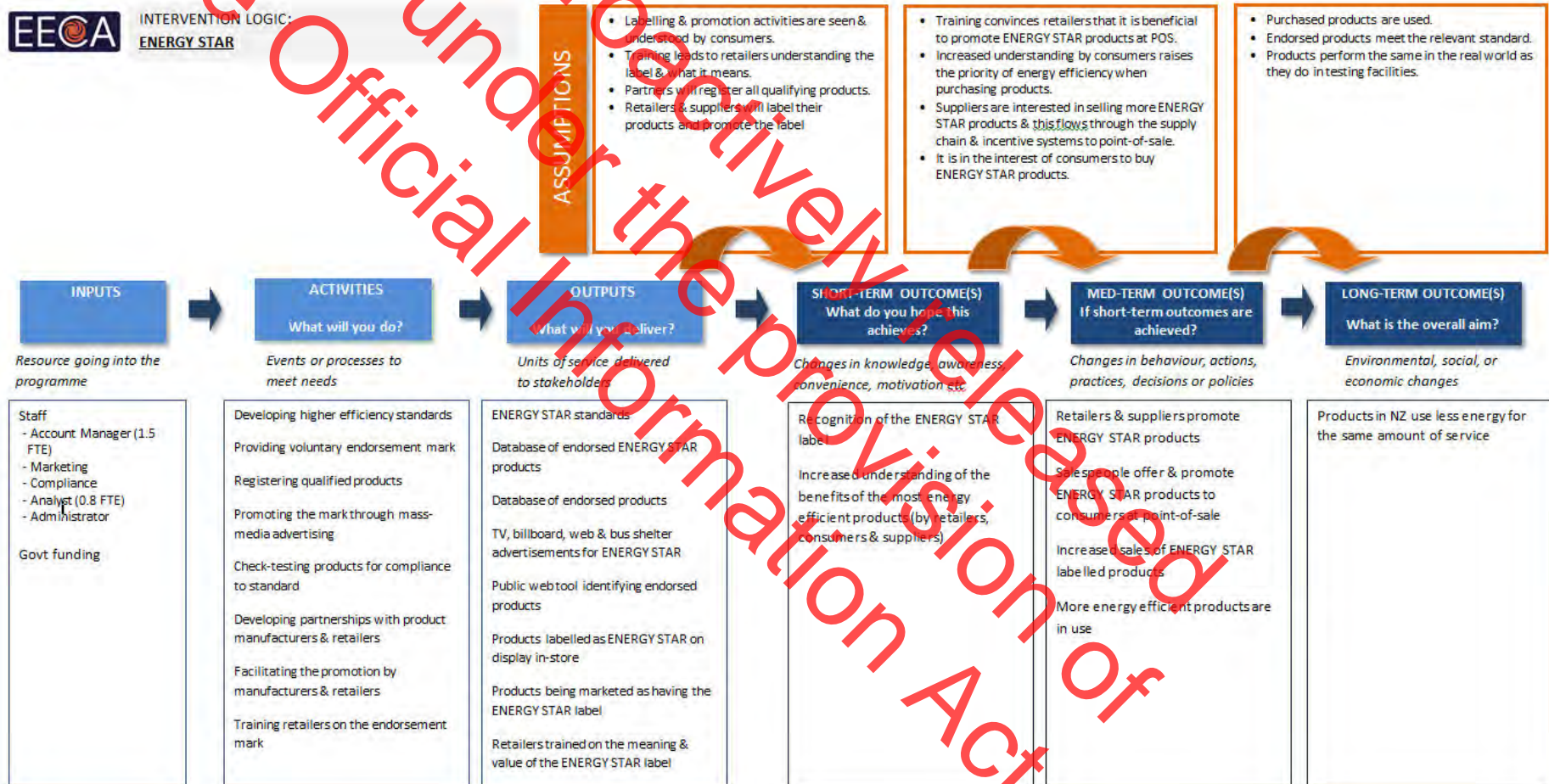
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<sup>7</sup> For example, EECA has received an email from a prominent supplier asking for future ENERGY STAR heat pump requirements in order to inform "new model development".



## 9 Appendices

### 9.1 Appendix One - Intervention logic



## 9.2 Appendix Two – Cost-benefit analysis summary

### 1 Scope

This analysis assesses the quantifiable outcomes of EECA's ENERGY STAR programme for the previous three financial years<sup>8</sup>. General assumptions applied in the analytical framework used in this review:

- EECA costs include all direct internal costs but not the general EECA overheads allocated to the programme.
- All third party costs are included. These consist of any additional costs resulting from the purchase by consumers of more energy efficient appliances.
- Future benefits accruing beyond 2015/16 for appliances purchased during the previous three years are included.
- Cash flows are expressed in NZ\$2016 discounted at the default Treasury rate of 7%.

### 2 Costs

- EECA direct costs are taken from EECA's budget for the ENERGY STAR programme.
- The additional costs of more efficient appliances are drawn from Concept Consulting's recently completed review of the ENERGY STAR programme<sup>9</sup>. This review included a survey of appliance retail prices and corresponding energy efficiencies to identify any significant changes in price with increased appliance efficiency. Little other New Zealand information is available for the range of appliances included in the programme. These are private costs.

### 3 Benefits

- The principal benefit from the programme is reduced energy consumption from the purchase of more efficient appliances. Improvements in appliance efficiency are taken from Concept's report which estimated the overall change in appliance energy efficiencies due to the influence of ENERGY STAR. This utilised EECA's detailed records of MEPS and MEPL appliances. Consequently, Concept's analysis was limited to ENERGY STAR products which were also subject to MEPS and MEPL standards. These energy savings are private benefits.
- Reduced carbon dioxide emissions can be directly associated with the fuel savings. This is a public benefit.
- MBIE's price monitors have been used for deriving economic prices for fuels. Market prices have been used for fuels not included in the monitors and all future prices are maintained at the 2016 level. Carbon dioxide prices are set at the average value of an NZU in each year of the programme and valued at \$25 per tonne thereafter.

Costs and benefits are summarised in the table below.

<sup>8</sup> For consistency with the Top 200 and Next 1000 reviews which were undertaken for the same period.

<sup>9</sup> Review of ENERGY STAR Prepared for EECA, Concept Consulting Group Ltd, June 2016

	2013	2014	2015	2016	2017	2018	2019	2020
<b>Energy Saved PJ</b>	0.000	0.015	0.031	0.046	0.046	0.046	0.046	0.046
<b>CO2 Reduction tpa</b>	0	564	1140	1718	1718	1718	1713	1703
<b>Expenditure \$ million nominal</b>								
EECA	-1.13	-1.23	-1.19	0.00	0.00			
Third Party Expenditure	-6.13	-6.16	-6.09	0.00	0.00			
Value of Energy Saved \$ million nominal	0.00	0.35	0.71	1.06	1.06	1.06	1.06	1.05
Value of Emissions Reduction \$ million nominal	0.00	0.00	0.01	0.03	0.04	0.04	0.04	0.04

#### 4 Outputs

Key conclusions for the ENERGY STAR programme over the last three years, using the marginal appliance costs and energy efficiencies determined by Concept Consulting:

- The net present value of the programme is -\$13.5 million. This result is skewed by the high incremental costs estimated for rated windows products relative to the corresponding energy savings. If windows are excluded from the analysis the programme net present value increases to \$3.9 million.

		2013	2014	2015	2016	2017	2018	2019	2020
<b>Cash Flow: \$2016 million</b>	<i>PV 2016 \$M</i>								
EECA Costs	-4.048	1.146	-1.200	-1.186	0.000	0.000	0.000	0.000	0.000
Third Party Costs	-21.028	6.222	-6.013	-6.095	0.000	0.000	0.000	0.000	0.000
Energy Saved	11.128	0.000	0.340	0.706	1.060	1.060	1.060	1.057	1.050
CO2 Reduction	0.406	0.000	0.003	0.011	0.026	0.043	0.043	0.043	0.043
Net Present Value	-13.542								
<b>Ratios</b>									
All Benefits/All Costs	0.46								
Public Benefits/Public Costs	0.10								
Public Benefits/Private Benefits	0.04								
Private Costs/Public Costs	5.20								

- The net present values correspond to a benefit to cost ratio in the order of 0.46:1 and 1.6:1 including and excluding the window products, respectively.
- The ratio of public benefits to public costs is in the order of 0.10:1 and remains largely unaffected by the exclusion of the window products.
- Concept's analysis valued electricity saving on a time of use basis rather than the long run marginal cost used by EECA. Applying the former values into this analysis will increase the benefit cost ratio to 0.62:1 and 2.1:1 with and without windows. The public benefit to public cost ratio remains virtually unchanged.

The Concept "analysis of [EECA's] sales data found little discernible evidence of significant shifts in purchasing behaviour towards more efficient appliances" requiring "guesstimates" to be made, based on the sales data and some market research carried out as part of the review. Similarly, Concept found little evidence of a correlation between appliance costs and efficiencies for some product categories. Retail prices were analysed which do not necessarily reveal the true marginal economic cost, a task exacerbated by an environment wherein retail prices

generally follow a year on year downward trend<sup>10</sup>. For the purposes of this analysis, Concept's mid-range assumptions regarding marginal appliance costs and improvements in overall efficiency of appliance sales due to ENERGY STAR have been used.

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<sup>10</sup> "Achievements of appliance energy efficiency standards and labelling programs, A Global Assessment", IEA; and "Greenhouse and Energy Minimum Performance (GEMS) Impact Analysis", Department of Industry, Innovation and Science (Australia)