Public Consultation Paper: Review of the GEMS Power Transformer Determination

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Public Consultation Paper: GEMS Power (Distribution) Transformers Determination due to expire in 2023

## Purpose

This public consultation paper seeks input on the *Greenhouse and Energy Minimum Standards (Power Transformers) Determination 2012*, also known as the determination for distribution transformers (DTs). This determination is due to expire (sunset[[1]](#footnote-2)) on 1 April 2023. It is standard process for determinations to expire after 10 years, unless a review finds sufficient reason for the determination to be renewed.

Sunsetting requires government to consider whether a determination is still necessary. This is referred to as a ‘fitness-for-purpose’ test[[2]](#footnote-3) and is central to the sunsetting review process. A sunsetting review aims to assess whether the sunsetting instrument continues to have a purpose and is efficient and effective.

This determination was reviewed and was found to be both effective and efficient. There may be value in increasing the minimum energy performance standards (MEPS) to the higher energy performance standards (HEPS) level.

## Background

The Equipment Energy Efficiency (E3) Program enables collaboration between the Australian Government, states and territories and the New Zealand Government to deliver a single, integrated program on energy efficiency standards and energy labelling for equipment and appliances. The E3 Program undertakes a range of activities under the *Greenhouse and Energy Minimum Standards Act 2012* (the GEMS Act) in Australia and the *Energy Efficiency (Energy Using Products) Regulations 2002* in New Zealand, to improve the energy efficiency of appliances and equipment sold in Australia and New Zealand. These include energy rating labelling and setting MEPS.

The E3 Program is overseen by the Energy National Cabinet Reform Committee and advised on energy efficiency matters by the Energy Efficiency Advisory Team (EEAT) of officials from participating jurisdictions. The Commonwealth Department of Industry, Science, Energy and Resources (the Department), on behalf of EEAT, reviewed this determination and prepared this consultation paper.

The objective of determinations under the GEMS Act is to promote the development and adoption of products that use less energy or produce fewer greenhouse gases. The GEMS Act allows the Australian Government to set mandatory minimum efficiency requirements (MEPS) for products, to drive greater energy efficiency for regulated products. It also allows the Australian Government to set nationally-consistent labelling requirements, to increase Australians’ awareness of options to improve energy efficiency and reduce energy consumption, energy costs and greenhouse gas emissions. MEPS for DTs were introduced in 2004 and continued under the GEMS Act in 2012. The supporting standards are AS/NZS 60076.1:2014: *Power transformers -General* and AS 2374.1.2-2003 (R2016) *Power transformers - Minimum Energy Performance Standard (MEPS) requirements for distribution transformers*.

## Review of the Determination

The objective of the determination is to promote the adoption of more energy efficient distribution transformers to reduce energy costs and greenhouse gas emissions. This review used the following criteria to assess if the determination is still efficient and effective:

* Has there been a significant change in registration numbers and sales numbers?
  + This can provide information on shifts in the market over time and whether the product is becoming obsolete
* Is the determination still reducing energy use and greenhouse gas emissions?
  + It was beyond the scope of this review to determine greenhouse gas emissions savings, but high level energy savings have been estimated.
  + The range of efficiencies of registered products is also a metric for the effectiveness of the determination. A broad range of efficiencies indicates that the determination is likely to be preventing some inefficient products from entering the market.
* Are the financial benefits higher than the regulatory costs of the determination?
* If the determination is repealed, is there a risk that imports with lower energy efficiency will enter the market?

The DTs review is summarised in **Table 1** below. This review drew upon GEMS registration data and New Zealand sales data.

### Table 1: Criteria for review of the determination

|  |  |
| --- | --- |
| Change in registration numbers | Steady. Slight increase in 2017 |
| Change in sales | Steady |
| Objective of determination still applicable | Yes. Range of efficiencies and products at MEPS |
| Products are always compliant and easy to regulate | Yes, although compliance is ensured by buyers of DTs |
| Yearly regulatory cost of determination | Cost = $317,250. Benefit at least $1.5 million. Net benefit at least $1.2 million. |
| Risk of low efficiency imports | High |
| Determination effective and efficient | Yes |

## Cost Benefit Analysis

The cost benefit analysis has been calculated for the determination sunsetting, because this is the default if no other action is taken (**Tables 2** and **3** below). This cost benefit analysis is based on information provided by Blackburn in 2007[[3]](#footnote-4), the Consultation RIS in 2011[[4]](#footnote-5) and Deloitte in 2014[[5]](#footnote-6).

The 2011 Consultation RIS estimated that the determination was providing little savings at the time. The reasons included manufacturers reducing the efficiency of their products to the MEPS level when the determination was introduced. Another reason was companies importing DTs into Australia for their own use. At the time, MEPS applied at point of sale in Australia, not at time of import, so these DTs did not have to meet MEPS. However, all imported DTs are now covered under the GEMS Act and therefore subject to the determination.

Since 2011, there have also been changes to the electricity network, policies and costs that mean the determination does now provide an overall net benefit. These changes include the cost of electricity, increased photovoltaic generation and more pressure on electricity distribution companies to reduce their network capital costs.

GEMS registration data was analysed as part of the review. For oil-immersed DTs, the lowest energy efficiency transformers have an energy efficiency of MEPS. It is assumed that the efficiency of these products would be even lower if the MEPS were not in place. A different trend is seen with dry-type transformers with registrations having a higher efficiency than HEPS. It is therefore assumed that the determination is not influencing the efficiency of dry-type transformers.

An estimate of $1.5 million a year benefit was used for the cost benefit analysis to test if the determination is efficient. An estimate was used because there is insufficient information on the energy saved by the determination to do a detailed calculation.

### Table 2: Reduction in energy savings if the determination sunsets

|  |  |  |  |
| --- | --- | --- | --- |
| Cost of Energy (kWh) | Estimated probable increase in electricity consumption (transformer losses) over 1 year per product (kWh) | Sales per year in Australia and New Zealand | Estimated probable total reduction in savings per year |
| $0.30 | 334 | 15,000 | $1.53 million |

### Table 3: Reduction in regulatory costs if the determination sunsets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Administrative Cost to Business per year | Cost to Business Registration fees per year | Cost to Business testing per year | Government cost per year | Total reduction in cost per year |
| $10,500 | $11,700 | $288,750 | $6,300 | $317,250 |

#### Energy Efficiency of Distribution Transformers

The $1.5 million a year benefit was estimated from the following parameters:

there are approximately 15 thousand oil type transformers sold each year in Australia and New Zealand

increasing a 1000 kVA DT from MEPS to HEPS provides a 5.8 MWh per year energy savings (Blackburn, 2007)

average electricity costs estimated at 30 cents per kWh, noting 8.8 cents per kWh is used in New Zealand.

estimated 330kWh savings per product per year

#### Cost to Business

It is assumed there is no additional cost to business for new software, training or changes to administrative practices, because the determination has been in operation for many years. The cost of business registration and compliance was estimated to be $10,500 per year. The average cost of testing a product was assumed to be $19,250, with all registered products requiring testing.

#### Cost to Government

The estimated yearly government administration and compliance cost is $6,300. The average government cost per registration is $420, according to the 2017 GEMS fee review. The cost for compliance is zero, because there is no check testing or inspections of DTs. Testing of DTs for registration and sale is usually undertaken by the manufacturers, often at the factory. On site testing is conducted as part of general maintenance, so any difference between the marketed efficiency and the operational efficiency is monitored for the life of the product by the owner of the DT.

## Policy context

There are policy and financial incentives that discourage the purchase of energy efficient DTs. For example, property developers may put in cheaper, less efficient transformers, because their priority is lower capital costs and they are not responsible for paying the ongoing running costs.

DTs are energized for 24 hours a day, so even small increases in DT efficiency can produce economic and environmental gains. This is because of the large numbers of transformers in service and their continuous operation. Energy efficient DTs are usually better quality and need less maintenance, but also cost more to manufacture because of higher material costs.

Australia and New Zealand have allocated management of the distribution network to distributors and the wholesale purchase and sale of electricity to retailers. In general, retailers pay for the use of the poles and wires to deliver energy to their customers and they also pay for all the energy losses incurred. While distributors bear no costs for energy losses, they still purchase energy efficient DTs and use the HEPS as the standard for purchasing DTs. Their incentives to purchase better quality DTs are to reduce maintenance costs and improve reliability. Distributors require approval from the Australian Energy Regulator for their annual expenditure allowances on their networks and receive financial incentives for spending less than this allowance.

## Policy Options

The main policy options for regulating the energy efficiency of DTs are: allow the determination to expire, renew the determination unchanged, expand the scope or increase MEPS.

### Allow the Determination to Expire

Allowing the determination to expire (sunset) may increase the overall energy use of DTs, because the MEPS appear to be preventing the sale of low efficiency products. In general, the efficiency of registered DTs has decreased since MEPS was introduced.

In Australia and New Zealand there is a split financial incentive for a distribution company to purchase a more energy efficient DT. In the absence of the necessary economic drivers, the GEMS determination ensures DT efficiency levels in the distribution networks are maintained.

### Renewing the Determination

Renewing the determination (rolling it over) with minimal changes would maintain the existing minimum energy efficiency levels. The registrations at the MEPS level indicate that the determination is effective and is still achieving its purpose.

### Increasing the MEPS and Scope

The option to increase the MEPS to the HEPS level has been reviewed multiple times, with the recommendations and cost benefit analyses supporting an increase. However, the option to increase the MEPS was never implemented.

There is an option to expand the scope of the determination. The determination covers DTs with power ratings from 10 kVA to 2500 kVA intended to be used on 11 kV and 22 kV networks. The consultation RIS in 2011 proposed including transformers up to 3150 kVA and system maximum voltage levels up to 36kV and DTs used in wind farms. A full consideration of expanding the scope of the determination was not part of this review, but may have value.

## Conclusions and Recommendations

Allowing the determination to sunset could increase DT energy losses. The MEPS and HEPS for DTs are still effective and efficient because the cost of the regulation is low, compared with the benefits and the MEPS are preventing less efficient products being sold.

If no further information is received from stakeholders, the review is likely to recommend that a full analysis is undertaken to determine the costs and benefits of increasing the MEPS and expanding the scope. Any changes to the determination would need to consider other policies and incentives influencing the purchase of energy efficient DTs. The determination is likely to be retained, pending any Regulatory Impact Statement process.

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1. [Explanation of sunsetting on the Attorney General’s website](https://www.ag.gov.au/legal-system/administrative-law/legislation-act-2003#sunsetting) [↑](#footnote-ref-2)
2. <https://www.ag.gov.au/sites/default/files/2020-07/Guide%20to%20Managing%20Sunsetting%20of%20Legislative%20Instruments.pdf> [↑](#footnote-ref-3)
3. Blackburn, T.R. Distribution Transformers: Proposal to Increase MEPS Levels, prepared for the Equipment Energy Efficiency Program, 2007 [↑](#footnote-ref-4)
4. Equipment Energy Efficiency Program, [Consultation Regulatory Impact Statement](https://obpr.pmc.gov.au/published-impact-analyses-and-reports/electricity-distribution-transformers-coag-consultation) - Review of Minimum Energy Performance Standards for Distribution Transformers, Commonwealth of Australia, 2011 [↑](#footnote-ref-5)
5. Deloitte Access Economics, Distribution Transformers social cost benefit analysis, prepared for the Australian Government 2014 [↑](#footnote-ref-6)