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Manager Energy Projects
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NSW Department of Industry – Division of Resources and Energy
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Dear Manager Energy Projects

Energy Mad Submission on Proposed Amendments to the Energy Savings Scheme Rule of 2009

Thank you for the opportunity for Energy Mad to submit feedback on the proposed amendments to the *Energy Savings Scheme Rule of 2009* that were outlined in the NSW Energy Savings Scheme Rule Change Amendments Consultation Paper.

Energy Mad is listed on the Main Board of the New Zealand Stock Exchange and focuses solely on energy efficient lighting.

2.4 million homes have Energy Mad's "Ecobulb" energy saving light bulbs from 80 electricity utility projects, and from wholesale and retail distribution, in 14 countries (including New Zealand, Australia, the United States – 33 utility projects including a New York wide project – and Germany).

Over 1 million Australian homes have had Energy Mad's energy saving CFL and LED "Ecobulbs" installed through energy efficiency scheme, electricity utility and State Government projects in NSW, Victoria, Queensland, South Australia, the ACT and Western Australia.

Over 50 Accredited Providers currently (or have) purchase Energy Mad's Ecobulbs for their installation activities in the Victorian VEET, the South Australian REES, the ACT EEIS and the NSW ESS Schemes.

[More information about Energy Mad can be found in Section 5 of this document titled "About Energy Mad".]

We welcome the positive engagement with stakeholders that is demonstrated by this consultation process and we thank you for your work to further enhance the ESS.

This consultation on the proposed amendments to the *Energy Savings Scheme Rule of 2009* to implement the outcomes of the ESS Review is timely, because while the proposed amendments are a significant step forward, Energy Mad's analysis shows that few households will participate in the lighting portion of Schedule E of the HEER sub-method without further amendments to the ESS Rule.

1. Summary Feedback on Proposed Amendments to the Energy Savings Scheme Rule of 2009

Energy Mad's feedback on the proposed amendments to the Energy Savings Scheme Rule of 2009 applies to the lighting portion of Schedule E of the Home Energy Efficiency Retrofit (HEER) sub-method of ESS Rule §9.8, and can be summarized as follows:

1. We commend (and support) the proposed amendments to the bundling and Site Assessment requirements for the HEER sub-method.
2. We commend (and support) the proposed amendment to add the new activity of replacing an edison screw or bayonet lamp with an LED lamp for general lighting purposes into the HEER sub-method.

However, Energy Mad predicts that few households will participate in the lighting portion of Schedule E of the HEER sub-method without further amendments to the ESS Rule.

This is because Energy Mad's analysis, outlined later in this document, demonstrates that the proposed amendments to Schedule E of the HEER sub-method would actually increase the financial barriers for households to participate.

Energy Mad therefore recommends the following further amendments to Schedules E1, E3 and E11 of the HEER sub-method of the ESS Rule that would achieve the Objectives of the Act by encouraging energy saving activities and by assisting households and businesses to reduce electricity consumption and electricity costs, while resulting in a controlled lower rate of uptake for activities in Schedules in E1, E3 and E11 than that achieved in other comparable energy saving schemes with giveaway programs.

1. **For Activity Definition E1, we recommend adopting** the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.1 of this document, to replace ELV Halogen Downlights with Efficient Luminaires and / or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21D in the Victorian VEET Scheme.
2. **For Activity Definition E1, we recommend adopting** the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.2 of this document, to replace 240V Halogen Downlights with Efficient Luminaires and / or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21E in the Victorian VEET Scheme.
3. **For Activity Definition E1, we recommend that** the initial downlight light output requirement of 500 lumens remain unchanged.
4. **For Activity Definition E3, we recommend adopting** the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.3 of this document, to replace Parabolic Aluminised Reflector (PAR) Lamps with Efficient Luminaires and/or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21B in the Victorian VEET Scheme.
5. **For Activity Definition E3, we recommend that** the *"Initial Light output of the new End-User Equipment"* be replaced with the definition *"installation of a LED lamp that has a light output equivalent to the replaced lamp"* that is specified in the comparable lighting Schedule 21B in the Victorian VEET Scheme. This recommendation is made because of the wide variety of wattages and light outputs found in households for lamps covered by Activity Definition E3, and because this would harmonize with the comparable lighting Schedule 21B in the Victorian VEET Scheme.
6. **For Activity Definitions E1 and E3, we recommend that** only LED replacements be allowed, not CFLs, because LEDs are now the dominant energy saving technology relevant for these Activities.
7. **For Activity Definition E11, we recommend adopting** the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.4 of this document, to replace an Edison Screw or Bayonet mains voltage Incandescent Lamp of at least 25 watts or a Halogen Lamp of at least 18 watts, with a LED Lamp for General Lighting Purposes. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21A in the Victorian VEET Scheme.
8. **For Activity Definition E11, we recommend that** CFLs not be eligible for replacement with LEDs, because there is little further energy to be saved from replacing them with LEDs. This would harmonize with the lighting schedules of the Victorian VEET, South Australian REES and the ACT EEIS Schemes.
9. **For Activity Definition E11, we recommend adding** the requirement for *"installation of a LED lamp that has a light output equivalent to the replaced lamp"* that is specified in the comparable lighting Schedule 21A in the Victorian VEET Scheme. This recommendation is made because of the wide variety of wattages and light outputs found in households for lamps covered by Activity Definition E11, and because this would harmonize with the comparable lighting Schedule 21B in the Victorian VEET Scheme.

10. **For the Lighting Activity Definitions, we recommend** the addition of the 1.05 power factor multiplier if the power factor is 0.9 or more. This would harmonize with the lighting schedules of the Victorian VEET and the ACT EEIS Schemes.

The remainder of this document provides Energy Mad's detailed analysis and feedback on our recommended modifications to the proposed amendments to the Energy Savings Scheme Rule of 2009, that we believe would achieve the Objectives of the Act by encouraging energy saving activities and by assisting households and businesses to reduce electricity consumption and electricity costs

If you have any further questions about this submission, please contact Dr Chris Mardon (Managing Director, Energy Mad) at:

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2. Analysis to determine whether the HEER Schedule E Lighting Amendments will achieve the Objectives of the Act

2.1 The Objectives of the ESS under the Electricity Supply Act 1995 include:

- a. Creating a financial incentive to reduce the consumption of electricity by encouraging energy saving activities;
- b. Assisting households and businesses to reduce electricity consumption and electricity costs.

2.2 Using the data from the “*E3 Residential Lighting Report*” released in April 2013, Energy Mad calculates there are 69 million halogen, PAR and GLS incandescent and tungsten halogen lamps in NSW households (and a further large unquantified volume in NSW businesses) that could be replaced with LEDs through Activity Definitions E1, E3 and E11 of Schedule E of the Home Energy Efficiency Retrofit (HEER) sub-method of ESS Rule §9.8.

2.3 This excludes a further 37 million GLS CFL lamps, as Energy Mad recommends they should not be included in Activity Definition E11 because:

- a. These CFLs are already achieving 90% of the potential savings from the GLS incandescent bulbs they have replaced, with only a further 10% energy savings to be achieved by replacing those CFLs with LEDs;
- b. Therefore, based on the relative numbers and wattages of lamps in NSW, Energy Mad calculates that 93% of the remaining potential energy savings comes from replacing the halogen, PAR and GLS incandescent and tungsten halogen lamps in NSW households with LEDs, and only 9% comes from replacing GLS CFLs with LEDs.
- c. As a result, the expense to change these GLS CFLs to LEDs is not justified by the additional incremental energy savings.

2.4 The comparable lighting schedules to Activity Definitions E1, E3 and E11 of the Victorian VEET Scheme have delivered 13,100,000 MWh energy savings since 1 January 2009, and are still delivering significant energy savings for the VEET Scheme.

2.5 Based on the 69 million replacement lamp opportunity noted in Section 2.2 of this document, and based on the 13,100,000 MWh energy savings delivered by the VEET Scheme, Energy Mad believes that Activity Definitions E1, E3 and E11 of the HEER sub-method of the ESS Rule have the potential to generate significant energy savings for the ESS.

2.6 Energy Mad therefore agrees that the Objectives of the Act are still valid, because there is evidence of significant opportunity to save energy through energy efficiency, and because there remains a need for financial incentives to help overcome persistent market barriers to energy efficiency.

2.7 The purpose of the following analysis is to establish what impact the proposed amendments to the lighting portion of Schedule E of the HEER sub-method of the ESS Rule will have on increasing access for the residential sector and driving the sustainable growth of the energy efficiency market.

2.8 Table 2.1 compares the calculated household cost to replace selected inefficient lamps under Schedule E of the HEER sub-method of the ESS Rule with efficient LEDs (see the column “*Household cost – ESS*”), versus the cost if the household were to undertake the most cost effective option themselves (see the column “*Household Cost – Retail*”).

Table 2.1 Comparative calculation of inefficient lamp ESS versus retail replacement options

Existing Lamp	Activity	W Existing	W New	MWh Calculated	MWh Deemed	# Lamps Replaced	Household cost ESS	Household Cost Retail
Tungsten Halogen ELV with Electronic Transformer	E1	35	5	0.90	0.33	10	\$200.04	\$105.00
Tungsten Halogen 240V	E1	50	5	1.35	0.45	10	\$134.60	\$105.00
Edison or Bayonet Lamp	E11	60	7	1.59	0.14	10	\$150.41	\$122.50

2.9 This analysis is based on the following assumptions:

- a. 10 inefficient lamps are replaced with the equivalent light output LED lamp and drivers/lamps with an efficiency of 80 lumens per watt and the lifetime of 30,000 hours required to have LEDs accepted for use in the ESS as part of the IPART Lighting Equipment Requirements of October 2014;
- b. “*MWh Calculated*” = 30,000 hours x (Watts existing lamp – Watts new lamp) / 10⁶, which is the actual lifetime MWh savings that will be achieved by installing the 30,000 hour lifetime LED;
- c. “*MWh Deemed*” are taken from the proposed MWh Savings Factors listed in Tables E1.1, and calculated for Activity Definition E11 using the formula Deemed Activity Electricity Savings = LCP of new lamp x (lumen efficacy of new lamp / 34.7 – 1) x 840 x 10 / 10⁶;
- d. For installations done using the ESS Rule (“*Household cost ESS*”), the lamp and driver/lamp installations done are compliant with the proposed amendments to Schedule E of the HEER sub-method of the ESS Rule and earn the proposed MWh Deemed Activity Electricity Savings Factors;
- e. For installations managed by a household outside the ESS Rule (“*Household Cost Retail*”), because an electrician is not required by a household to install halogen or globe LEDs, the household would choose the lower cost option if they were doing it themselves (namely purchasing the lowest cost relevant plug in or screw in LED lamps from retail outlets, and installing it themselves);
- f. The previous assumption is valid, as most households already purchase either:
 - a. The lowest cost inefficient replacement lamps available, often under the mistaken belief that halogen lamps are “*energy saving lamps*”; or if they chose to purchase energy saving lamps
 - b. The lowest cost relevant plug-in or screw-in energy saving lamps from retail outlets, and install it themselves. Few households currently use an electrician to install energy saving lamps;
- g. The “*Household cost ESS*” are calculated based on the lowest costs achieved for the equivalent activities being undertaken in the Victorian VEET Scheme, where the high volumes of installations have driven down the lamp and installation costs;
- h. An ESC price of \$20.00.

2.10 The key findings are:

- a. The Deemed Activity Savings Factors for the three calculated activities ranges from:
 - a. Just 9% of the calculated MWh savings over the lifetime of replacing a 60W GLS globe under Schedule E11 with the relevant 30,000 hour LED (0.14MWh versus 1.59MWh);
 - b. To 33% of the calculated MWh savings over the lifetime of replacing a 50W 240V tungsten halogen lamp under Schedule E1 with the relevant 6W, 30,000 hour LED lamp (0.45MWh versus 1.325MWh);

- c. To 37% of the calculated MWh savings over the lifetime of replacing a 35W ELV tungsten halogen lamp and driver under Schedule E1 with the relevant 6W, 30,000 hour LED lamp and driver (0.33MWh versus 0.90MWh).
 - b. For the three calculated activities, the “*Household cost ESS*” is significantly greater than the “*Household Cost Retail*”, ranging from:
 - a. 91% more expensive for the 35W ELV tungsten halogen lamp and driver replacement under Schedule E1 (\$200 versus \$105);
 - b. To 28% more expensive for the 50W 240V tungsten halogen lamp replacement under Schedule E1 (\$134 versus \$105);
 - c. To 23% more expensive for the 60W GLS globe replacement under Schedule E11 (\$150 versus \$123).
- 2.11 Despite Accredited Providers being able to leverage bulk lamp and installation costs, the two main reasons for the “*Household cost ESS*” being significantly greater than the “*Household Cost Retail*” are:
 - a. The cost from the requirement for an electrician to install the lamps, versus no electrician cost for the householder to install their own plug-in or screw-in lamps; and
 - b. For the 50W ELV tungsten halogen lamp and driver replacement, the extra lamp and electrician time costs from replacing the lamp and the driver.
- 2.12 Therefore, rather than achieving the Objectives of the Act by providing a financial incentive to reduce the consumption of electricity by encouraging energy saving activities and by assisting households and businesses to reduce electricity consumption and electricity costs, the proposed amendments of Schedule E of the HEER sub-method of the ESS Rule would actually increase the financial barriers for households to participate.
- 2.13 Energy Mad therefore predicts that few households will participate in the lighting portion of Schedule E of the HEER sub-method without further amendments to the ESS Rule.

3. Impact of harmonizing the Deemed Energy Savings Factors with the VEET Scheme to achieve the Objectives of the Act for the HEER Schedule E Lighting Amendments

- 3.1 Few NSW households have replaced their halogen and GLS lamps with LEDs.
- 3.2 This is due to a combination of price and other market barriers.
- 3.3 Energy Mad believe that amendments can be made to Schedule E of the HEER sub-method of the ESS Rule that would achieve the Objectives of the Act by providing a financial incentive to reduce the consumption of electricity by encouraging energy saving activities and by assisting households and businesses to reduce electricity consumption and electricity costs.
- 3.4 Energy Mad calculates that the MWh Deemed Activity Electricity Savings Factors listed for Activity Definitions E1, E3 and E11 of the HEER sub-method of the ESS Rule appear to equate to the following:
- a. Activity Definition E1:
$$\text{MWh Saved} = 10,000 \text{ hours} \times (\text{Watts existing lamp} - \text{Watts new lamp}) / 10^6;$$
 - b. Activity Definition E3:
$$\text{MWh Saved} = 10,000 \text{ hours} \times (\text{Watts existing lamp} - \text{Watts new lamp}) / 10^6;$$
 - c. Activity Definition E11:
$$\text{MWh Saved} = 30,000 \text{ hours} \times (\text{Watts of CFL lamp} - \text{Watts equivalent light output LED}) / 10^6.$$
- 3.5 Energy Mad notes that the following should apply to the MWh Deemed Activity Electricity Savings Factors listed for Activity Definitions E1, E3 and E11 of the HEER sub-method of the ESS Rule:
- a. Activity Definition E1:
 - a. When these Savings Factors were initially developed, 10,000 hours was relevant to calculate the MWh savings because CFLs were the dominant energy saving lighting technology;
 - b. However, because LEDs will now be the dominant energy saving lighting technology for this Activity Definition, 30,000 hours should be used to calculate the MWh savings;
 - c. Energy Mad notes that while 30,000 hours equates to 30 years for the average usage of lamps in NSW households, this 30,000 hour lifetime energy savings will be achieved because:
 - i. The vast majority of household fittings will stay unchanged over the next 30 years;
 - ii. Households typically only change lamps when they blow; and
 - iii. Unlike incandescent, halogen and CFL lamps where their light outputs fall near the end of their respective lifetimes to as low as 50% of their initial light outputs, 30,000 hour accredited lifetime LEDs require a minimum of 70% of their initial light for accreditation; therefore
 - iv. It is likely that the vast majority of 30,000 hour LEDs installed will still be operating effectively after 30,000 hours of operation.
 - d. Specifying 30,000 hours would be consistent with the lifetime of 30,000 hours required to have LEDs accepted for use in the ESS as part of the IPART Lighting Equipment Requirements of October 2014;
 - b. Activity Definition E3:
 - a. When these Savings Factors were initially developed, 10,000 hours was relevant to calculate the MWh savings because CFLs were the dominant energy saving lighting technology;

- b. However, because LEDs will now be the dominant energy saving lighting technology for this Activity Definition, 30,000 hours should be used to calculate the MWh savings;
- c. This would be consistent with the lifetime of 30,000 hours required to have LEDs accepted for use in the ESS as part of the IPART Lighting Equipment Requirements of October 2014;
- c. Activity Definition E11:
 - a. These Savings Factors should be calculated based on replacing inefficient incandescent or mains voltage halogen lamps, not CFLs that are already achieving the bulk of the potential energy savings.

3.6 Energy Mad notes that the Victorian VEET Scheme:

- a. Has comparable lighting schedules to Activity Definitions E1, E3 and E11;
- b. Specifies MWh Savings Factors for up to 25,000 hours;
- c. Excludes CFL lamp replacements with LED lamps;
- d. Have delivered 13,100,000 MWh energy savings since 1 January 2009, and are still delivering significant energy savings for the VEET Scheme.

3.7 Energy Mad therefore believes that increasing the MWh Deemed Activity Electricity Savings Factors for Activity Definitions E1, E3 and E11 of the HEER sub-method of the ESS Rule to harmonize with those of the comparable lighting schedules in the VEET Scheme would provide the financial incentives to help overcome the current market barriers to energy efficiency.

3.8 The remainder of this document explores how harmonizing the MWh Deemed Activity Electricity Savings Factors to those 25,000 hour factors used in the Victorian VEET Scheme would provide the relevant financial incentives to help overcome the current market barriers to energy efficiency.

3.9 Energy Mad's following analysis applies to Schedule E Activity Definitions E1, E3 and E11.

3.10 Energy Mad is focusing on these Activity Definitions because:

- a. These are the Activity Definitions Energy Mad has expertise in;
- b. These activities are where the greatest household lighting energy savings potential exists;
- c. Significant volumes of LEDs have been installed under the comparable lighting activities in the VEET and REES schemes; and because
- d. Energy Mad have supplied significant volumes of our Ecobulb LEDs to Accredited Providers that have been installed in these comparable VEET and REES lighting activities.

3.11 Tables 3.1 through 3.4 provide the proposed MWh Deemed Activity Electricity Savings Factors for:

- a. Table 3.1: Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (ELV REPLACEMENTS);
- b. Table 3.2: Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (240V REPLACEMENTS);
- c. Table 3.3: Activity Definition E3 - Replace Parabolic Aluminised Reflector (PAR) Lamp with Efficient Luminaire and/or Lamp;

- d. Table 3.4: Activity Definition E11 - Replace an Edison Screw or Bayonet Incandescent or Mains Voltage Halogen Lamp with an LED Lamp for General Lighting Purposes.
- 3.12 These Savings Factors were based on the Victorian VEET Scheme proposed new 25,000 hour Schedule 21 Incandescent Lighting Schedule Savings Factors, where:
- VEET Schedule 21D corresponds to ESS Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (ELV REPLACEMENTS);
 - VEET Schedule 21E corresponds to ESS Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (240V REPLACEMENTS);
 - VEET Schedule 21B corresponds to Activity Definition E3 - Replace Parabolic Aluminised Reflector (PAR) Lamp with Efficient Luminaire and/or Lamp;
 - VEET Schedule 21A corresponds to ESS Activity Definition E11 - Replace an Edison Screw or Bayonet Incandescent or Mains Voltage Halogen Lamp with an LED Lamp for General Lighting Purposes.
- 3.13 The VEET Scheme Schedule 21 Incandescent Lighting Schedule MWh Savings Factors were chosen, because of the VEET Scheme Schedule 21 success in having generated 13,100,000 MWh savings since 1 January 2009.
- 3.14 These VEET Scheme Schedule 21 Incandescent Lighting Schedules are still delivering significant energy savings for the VEET Scheme.
- 3.15 The VEET Scheme MWh Savings Factors were calculated by converting the VEET Scheme Abatement Factors to MWh by dividing them by the Victorian Greenhouse Gas Abatement Coefficient.

Table 3.1 Proposed Savings Factor for Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (ELV REPLACEMENTS)

Savings Factors in MWh			
Minimum Efficiency (50lm/W)	High Efficiency 1 (60lm/W)	High Efficiency 2 (70lm/W)	High Efficiency 3 (80lm/W)
0.69	0.73	0.76	0.79

Table 3.2 Proposed Savings Factor for Activity Definition E1 - Replace Halogen Downlight with Efficient Luminaire and / or Lamp (240V REPLACEMENTS)

Savings Factors in MWh			
Minimum Efficiency (50lm/W)	High Efficiency 1 (60lm/W)	High Efficiency 2 (70lm/W)	High Efficiency 3 (80lm/W)
0.68	0.71	0.75	0.78

Table 3.3 Proposed Savings Factor for Activity Definition E3 - Replace Parabolic Aluminised Reflector (PAR) Lamp with Efficient Luminaire and/or Lamp

Savings Factors in MWh			
Minimum Efficiency (50lm/W)	High Efficiency 1 (60lm/W)	High Efficiency 2 (70lm/W)	High Efficiency 3 (80lm/W)
0.70	0.73	0.76	0.79

Table 3.4 Proposed Savings Factor for Activity Definition E11 - Replace an Edison Screw or Bayonet Lamp with an LED Lamp for General Lighting Purposes

Savings Factors in MWh			
Minimum Efficiency (50lm/W)	High Efficiency 1 (60lm/W)	High Efficiency 2 (70lm/W)	High Efficiency 3 (80lm/W)
0.58	0.63	0.65	0.67

- 3.16 The following provides the comparable analysis to that provided by Table 2.1 of this document, but using the proposed VEET Scheme Schedule 21 MWh Savings Factors, to establish the impact they would have when applied to the lighting portion of Schedule E of the HEER sub-method of the ESS Rule on increasing access for the residential sector and driving the sustainable growth of the energy efficiency market.
- 3.17 Using the VEET Scheme MWh Savings Factors listed in Tables 3.1 through 3.4 of this document, Table 3.5 compares the calculated household cost to replace selected inefficient lamps under Schedule E of the HEER sub-method of the ESS Rule with efficient LEDs (see the column “Household cost ESS”), versus the cost if the household were to undertake the most cost effective option themselves (see the column “Household Cost Retail”).

Table 3.5 Comparative calculation of inefficient lamp ESS versus retail replacement options using VEET Scheme Savings Factors

Existing Lamp	Activity	W Existing	W New	MWh Calculated	MWh Deemed	# Lamps Replaced	Household cost ESS	Household Cost Retail
Tungsten Halogen ELV with Electronic Transformer	E1	35	5	0.90	0.79	10	\$90.00	\$105.00
Tungsten Halogen 240V	E1	50	5	1.35	0.78	10	\$90.00	\$105.00
Edison or Bayonet Lamp	E11	60	7	1.59	0.67	10	\$90.00	\$122.50

- 3.18 This analysis is based on the following assumptions:
- 10 inefficient lamps are replaced with the equivalent light output LED lamp and drivers/lamps with an efficiency of 83 lumens per watt and a lifetime of 30,000 hours;
 - “MWh Calculated” = 30,000 hours x (Watts existing lamp – Watts new lamp) / 10⁶, which is the actual lifetime MWh savings that will be achieved by installing the 30,000 hour lifetime LED;
 - “MWh Deemed” are taken from the proposed MWh Savings Factors listed in Tables E1.1, and calculated for Activity Definition E11 using the formula Deemed Activity Electricity Savings = LCP of new lamp x (lumen efficacy of new lamp / 34.7 – 1) x 840 x 10 / 10⁶;

- d. For installations done using the ESS Rule (*"Household cost ESS"*), the lamp and driver/lamp installations done are compliant with Schedule E of the HEER sub-method of the ESS Rule and earn the proposed VEET Scheme MWh Deemed Activity Electricity Savings Factors;
- e. For installations managed by a household outside the ESS Rule (*"Household Cost Retail"*), because an electrician is not required by a household to install halogen or globe LEDs, the household would chose the lower cost option if they were doing it themselves (namely purchasing the lowest cost relevant plug in or screw in LEDs from retail outlets, and installing it themselves);
- f. The previous assumption is valid, as most households already purchase either:
 - a. The lowest cost inefficient replacement lamps available, often under the mistaken belief that halogen lamps are *"energy saving lamps"*; or if they chose to purchase energy saving lamps
 - b. The lowest cost relevant plug-in or screw-in energy saving lamps from retail outlets, and install it themselves. Few households currently use an electrician to install energy saving lamps;
- g. The *"Household cost ESS"* are calculated based on the lowest costs achieved for the equivalent activities being undertaken in the Victorian VEET Scheme, where the high volumes of installations have driven down the lamp and installation costs;
- h. An ESC price of \$20.00;
- i. A household co-payment of \$90.

3.19 The key findings are:

- a. The Deemed Activity Savings Factor for the three calculated activities now ranges from:
 - a. 42% of the calculated MWh savings over the lifetime of replacing a 60W GLS globe under Schedule E11 with the relevant 30,000 hour LED (0.69MWh versus 1.59MWh);
 - b. To 57% of the calculated MWh savings over the lifetime of replacing a 50W 240V tungsten halogen lamp under Schedule E1 with the relevant 6W, 30,000 hour LED lamp (0.79MWh versus 1.35MWh);
 - c. To 87% of the calculated MWh savings over the lifetime of replacing a 50W ELV tungsten halogen lamp and driver under Schedule E1 with the relevant 6W, 30,000 hour LED lamp and driver (0.78MWh versus 0.90MWh).
- b. For the three calculated activities, the *"Household cost ESS"* is now less than the *"Household Cost Retail"*, ranging from:
 - a. 14% less expensive for the 50W ELV tungsten halogen lamp and driver replacement and the 50W 240V tungsten halogen lamp replacement under Schedule E1 (\$90 versus \$105);
 - b. To 26% less expensive for the 60W GLS globe replacement under Schedule E11 (\$90 versus \$123).

3.20 Energy Mad therefore predicts that harmonizing the MWh Savings Factors in Schedules E1, E3 and E11 of the HEER sub-method of the ESS Rule with the relevant VEET Scheme Schedule 21 Incandescent Lighting Schedules would achieve the Objectives of the Act by encouraging energy saving activities and by assisting households and businesses to reduce electricity consumption and electricity costs.

3.21 **It is important to note that the co-payment required by households will result in a controlled and much lower rate of uptake for activities in Schedules in E1, E3 and E11 than that achieved in other comparable energy saving schemes with giveaway programs.**



- 3.22 As a result, activities in Schedules E1, E3 and E11 would deliver a valuable contribution of energy savings, rather than being the dominant energy saving activities that they are in the energy saving schemes with giveaway programs.

4. Recommendations for HEER Schedule E Activity Definitions E1, E3 and E11

Based on the information provided and the analysis undertaken earlier in this document, Energy Mad provides the following recommendations for the proposed amendments to the lighting portion of Schedule E of the HEER sub-method of ESS Rule §9.8:

- 4.1 For Activity Definition E1, Energy Mad recommends adopting the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.1 of this document, to replace ELV Halogen Downlights with Efficient Luminaires and / or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21D in the Victorian VEET Scheme.
- 4.2 For Activity Definition E1, Energy Mad recommends adopting the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.2 of this document, to replace 240V Halogen Downlights with Efficient Luminaires and / or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21E in the Victorian VEET Scheme.
- 4.3 For Activity Definition E1, Energy Mad recommends that the initial downlight light output requirement of 500 lumens remain unchanged, because:
 - a. Specifying a lower light output risks household dissatisfaction with a lack of light;
 - b. Good quality halogen replacement luminaire and lamp LEDs currently available are achieving 500 lumens with a wattage of just 7W;
 - c. The South Australian REES Scheme has maintained their 500 lumen initial downlight light output requirement for their comparable lighting schedule, with no detrimental impact on the large volume of installations undertaken in that schedule;
 - d. The ACT EEIS Scheme has recently raised the minimum initial downlight light output requirement for their comparable lighting schedules;
 - e. The Victorian VEET Scheme has recently proposed to raise the minimum initial downlight light output requirement for their comparable lighting schedules;
 - f. As a result of 4.3 a) through e) above, there is no evidence that lowering the minimum initial downlight output requirement will open up access to significant energy savings opportunities for NSW households.
- 4.4 For Activity Definition E3, Energy Mad recommends adopting the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.3 of this document, to replace Parabolic Aluminised Reflector (PAR) Lamps with Efficient Luminaires and/or Lamps. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21B in the Victorian VEET Scheme.
- 4.5 For Activity Definition E3, Energy Mad recommends that the *“Initial Light output of the new End-User Equipment”* be replaced with the definition *“installation of a LED lamp that has a light output equivalent to the replaced lamp”* that is specified in the comparable lighting Schedule 21B in the Victorian VEET Scheme. This recommendation is made because of the wide variety of wattages and light outputs found in households for lamps covered by Activity Definition E3 and because this would harmonize with the comparable lighting Schedule 21B in the Victorian VEET Scheme. Energy Mad also notes that the *“Initial Light outputs of the new End-User Equipment”* listed in Table E3.1 are up to 100% greater than those measured for actual PAR Lamps found in the Australian market, because of the large reduction in light output from the reflectors on PAR lamps relative to the comparable wattage non-reflector incandescent lamps.
- 4.6 For Activity Definitions E1 and E3, Energy Mad recommends that only LED replacements be allowed, not CFLs, because LEDs are now the dominant energy saving technology relevant for these Activities.

- 4.7 For Activity Definition E11, Energy Mad recommends adopting the MWh Deemed Activity Electricity Savings Factors, listed in Table 3.4 of this document, to replace an Edison Screw or Bayonet mains voltage Incandescent Lamp of at least 25 watts or a Halogen Lamp of at least 18 watts, with a LED Lamp for General Lighting Purposes. This would harmonize the MWh Deemed Activity Electricity Savings Factors with those used for the comparable lighting Schedule 21A in the Victorian VEET Scheme.
- 4.8 For Activity Definition E11, Energy Mad recommends that CFLs not be eligible for replacement with LEDs, because there is little further energy to be saved from replacing them with LEDs. This would harmonize with the lighting schedules of the Victorian VEET, South Australian REES and the ACT EEIS Schemes.
- 4.9 For Activity Definition E11, Energy Mad recommends adding the requirement for *“installation of a LED lamp that has a light output equivalent to the replaced lamp”* that is specified in the comparable lighting Schedule 21A in the Victorian VEET Scheme. This recommendation is made because of the wide variety of wattages and light outputs found in households for lamps covered by Activity Definition E11, and because this would harmonize with the comparable lighting Schedule 21B in the Victorian VEET Scheme.
- 4.10 For the Lighting Activity Definitions, Energy Mad recommends the addition of the 1.05 power factor multiplier if the power factor is 0.9 or more. This would harmonize with the lighting schedules of the Victorian VEET and the ACT EEIS Schemes.

5. About Energy Mad

Energy Mad's goal is to **“save enough electricity to power New Zealand for one year!”**

Energy Mad has achieved the following successes that has got it 40% of the way towards achieving this goal:

- 5.1 Developed and sourced the ultra-high performance CFL and LED *“Ecobulbs”* that replace incandescent and halogen lamps.
- 5.2 2.4 million homes have Energy Mad's Ecobulb energy saving light bulbs from 80 electricity utility projects, and from wholesale and retail distribution, in 14 countries (including New Zealand, Australia, the United States – 33 utility projects including a New York wide project – and Germany).
- 5.3 Over 1 million Australian homes have had Energy Mad's energy saving CFL and LED Ecobulbs installed through energy efficiency scheme, electricity utility and State Government projects in NSW, Victoria, Queensland, South Australia, the ACT and Western Australia.
- 5.4 Over 50 Accredited Providers currently (or have) purchase Energy Mad's Ecobulbs for their installation activities in the Victorian VEET, the South Australian REES, the ACT EEIS and the NSW ESS Schemes.
- 5.5 Developed and implemented 37 New Zealand residential and commercial Ecobulb CFL projects with government, 25 electricity utilities, 450 supermarket stores and 240 Shell New Zealand convenience stores. 5.0 million Ecobulbs were sold and installed, with 57% of New Zealand homes having purchased five or more Ecobulb light bulbs each.
- 5.6 These New Zealand Ecobulb projects used funding from 25 electric utilities and the New Zealand government. They involved direct mail to utility customers, along with innovative point of sale displays.
- 5.7 They included developing the innovative monitoring methodology to measure the peak load, electricity savings, and carbon dioxide emission reductions arising from the Energy Mad Ecobulb projects. These projects were independently verified to the Clean Development Mechanism of the Kyoto Protocol.
- 5.8 Supplied energy saving bulbs to all 8,000 Walgreens (the world's second largest retailer) United States stores.
- 5.9 Globally Energy Mad's Ecobulbs have saved 726MW of electricity generating capacity, \$4.0 billion from customer's electricity bills and 8.4 million tonnes of carbon dioxide.
- 5.10 Being New Zealand's fastest growing company in by winning the 2007 Deloitte *“Fast 50”* Award.
- 5.11 New Zealand award winners for business, energy efficiency, sustainability and clean technology, and innovation.
- 5.12 Listed on the Main Board of the New Zealand Stock Exchange in October 2011.

Further information about Energy Mad can be found <http://www.energymad.com/>.

Kind Regards



Dr Chris Mardon
Managing Director, Energy Mad