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| **Submission for the Creation of a New Activity or Amendment of an Existing Activity under the ESI Scheme** |
| **Applicant details** |
| Date of submission | 10 December 2015 |
| Company name(if applicable) | Yanmar Energy Australia Pty Ltd |
| ABN/ACN(if applicable) | ABN 27 160 990 643 |
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| **Summary of proposal**Please provide evidence, data or references to justify all claims made.The suggested elements of a response are provided in italics. The text in italics may be deleted in the submission. |
| **Category of proposed activity** | Gas Powered Reverse Cycle Air Conditioning. |
| **Confidentiality statementMUST BE COMPLETED**In lodging a submission, parties acknowledge the Department's right to engage consultants and contractors to assist in the assessment process, and to disclose information (that might otherwise be identified as confidential by a party) to such persons for those purposes. | This submission is not confidential.  |
| **Briefly describe new or amended activity**Maximum 100 words. | Gas Powered Reverse Cycle Air Conditioning can be used to both heat and cool buildings. These units are split systems and use a gas powered engine to drive the air conditioning compressors, rather than an electric motor. Models range from 14kW up to 85kW. Large buildings use multiple units. An electric 56kW outdoor unit will draw around 74amps whereas a 56kW gas powered outdoor unit will only draw around 6amps, a reduction of 90%. All equipment inside the building is the same as an electric system and performs the same way, so it’s very familiar for end users. |
| **Estimate the average annual energy savings for an average installation of that activity** | **AVERAGE INSTALLATION**The average commercial installation would use three systems, with the majority of these using either 56kW or 85kW outdoor units. These systems can be used in commercial buildings ranging anywhere in size from single level up to twelve storey buildings.The average residential installation would use one 18kW system. The smallest model is 14kW. This smallest model would have the capacity to fully air condition the average three bedroom home.**DEEMING OR PROJECT BASED**Deeming is the most appropriate method of rewarding this activity when units are installed in preference to new electric reverse cycle because average greenhouse gas savings for each model air conditioner outdoor unit can be reliably calculated.A different deeming rate would be appropriate when installing to replace central electric heating.**PROPOSED SAVINGS**Commercial Air Conditioning Based on existing customer usage patterns, commercial air conditioners have been shown to operate for an average of 2,425 hours per annum. Using a mid-sized Outdoor Unit as an example, the results for a 56kW unit are as follows:Electric unit: 18,454kWh/yr 24.5 Tonnes of CO2/yrGas Powered unit: 58,055kWh/yr 11.0 Tonnes of CO2/yrEmissions reduced by 13.5 tonnes/yr = 40% savingPlease refer to the attached file named Commercial Air Conditioning for detailed calculations.Please refer to the attached Yanmar and Mitsubishi Electric product brochures for consumption figures.Residential Air ConditioningBased on expected usage patterns, residential air conditioners will operate for around 1,260 hours per annum. Using the smallest gas powered Outdoor Unit as an example, the results for a 14kW unit are as follows:Electric unit: 5,380kWh/yr 7.2 Tonnes of CO2/yrGas Powered unit: 14,981kWh/yr 3.6 Tonnes of CO2/yrEmissions reduced by 3.6 tonnes/yr = 50% savingPlease refer to the attached file named Residential Air Conditioning for detailed calculations.Please refer to the attached Yanmar and Mitsubishi Electric product brochures for consumption figures.Central Electric HeatingBased on expected usage patterns, residential central electric heating systems will operate for around 900 hours per annum. Using a mid-sized system as an example, the results for a 31.5kW unit are as follows:Electric unit: 29,880kWh/yr 39.7 Tonnes of CO2/yrGas Powered unit: 21,060kWh/yr 4.8 Tonnes of CO2/yrEmissions reduced by 34.9 tonnes/yr = 88% savingPlease refer to the attached file named Central Electric Heating for detailed calculations.Please refer to the attached Yanmar product brochure for consumption figures.  |
| **Demonstrate that the activity is likely to be additional to business as usual (BAU)** | There is a significant cost premium to purchase gas powered units over the electric equivalent. This is predominantly due to the cost of producing the gas engines. This price premium is currently a significant barrier and it is expected that the value of VEET certificates will enable a large number of users to choose the low emission gas option over the traditional electric units.The heating and cooling provided by gas powered reverse cycle systems is equivalent to the electric alternative and in many cases will have lower running costs, so there is no reason why users would remove it or use other devices. |
| **List the key variables that should be considered to ensure the activity best represents the delivered energy savings** | Models are available for both Natural Gas and LPG but the emissions results are similar.The gas powered outdoor units have a similar product life to that of the electric equivalent, which is 15 to 20 years. |
| **List all existing product standards which support the claims for energy savings or related matters** | Gas powered reverse cycle air conditioners have been manufactured in Japan for over 25 years and are covered by the Japanese Industrial Standard JIS B 8627-1Gas Engine Driven Heat Pump Air Conditioners. |
| **Ensuring savings are valid** | The gas powered units are a Type B Appliance, so each installation is already verified by an approved Type B inspector. This means there will be no additional administration required. |
| **Protecting health and safety** | Installation can only be carried out by qualified tradespeople. There are no additional risks associated with the indoor unit installation as these are the same equipment as an electric system. Installation of the gas powered Outdoor Unit must comply with the Gas Installation Standard AS 5601 and is inspected at the time of Type B Approval. |
| **Other benefits and issues** | Approximate costs of the three examples used in this submission are as follows:56kW Commercial System capital cost of $40,000 and installation cost of $40,000.14kW Residential System capital cost of $17,000 and installation cost of $8,000.31.5kW Heating System capital cost $28,000 and installation cost of $15,000.Sales of gas powered reverse cycle systems in Victoria could reach 50 systems per annum. |