ENERGY SAVINGS FOR BUSINESS

Investing to keep businesses competitive

ESB Small Producers Energy Efficiency Deployment (SPEED)

High Efficiency Engine Checklist

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Version 1.0

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INTRODUCTION

This document is intended as a guide to support the submission of accurate and complete high efficiency engine project applications. All applicants with high efficiency engine projects should ensure the application meets the SPEED Eligibility Requirements set out in the Participant Terms and Conditions, Contractor Code of Conduct and Eligible Measures List. The applicant must submit the requested documentation and answer the questions contained within this document.

This checklist includes guidance for what needs to be entered in each input field at Step 4 and Step 5 of the Application process. Step 5 specifically describes which documents need to be uploaded and their purpose.

GUIDANCE ON APPLICATIONS

The following sections provide guidance on high efficiency engine applications, ensuring that they are complete, accurate and comprehensive.

The applicant and/or contractor will also need to provide the following information in Step 4 and Step 5 of the application submission, as further described in the tables below.

STEP 4 OF PRE-PROJECT APPLICATION: HIGH EFFICIENCY ENGINES

- Engine upgrade for natural gas carbureted engines
  - One or more of the following is changed, improved or upgraded:
    - Heads
    - Pistons
    - Intercooler/turbo
    - Camshaft
    - Fuel system
    - Combustion system
    - Control system
  - For changes, improvements, upgrades to the fuel systems, temporary, reversable substitution of lower carbon fuels or feedstock (including electricity, hydrogen, biomass, biofuels, and gaseous fuels) are not eligible
  - GHG (CO_2 equivalent) emissions must go down after installation of engine upgrade compared to pre-installation scenario
- New engine replacing old engine for natural gas carbureted engines
  - Old engine must be replaced and removed from operation
  - For new engines, temporary, reversable substitution of lower carbon fuels or feedstock (including electricity, hydrogen, biomass, biofuels, and gaseous fuels) are not eligible
  - GHG (CO_2 equivalent) emissions must go down after installation of new engine compared to old engine

Please note the other eligibility criteria in the SPEED Eligible Measure List.

Application Tip: Please ensure the documentation provided in Step 5 supports the information in the application fields below. Please note that at the pre-project stage, on-site measurements are not required. Instead, simulation data or estimates based on other sources (historical data, published studies, specification sheets etc.) can be used. If the incentive application is approved, on-site measurements will be needed at the post-project application.

The estimated values for the hours of operation and the load of the engine should be based on a typical year of production. This assumption should be used consistently between the pre-project and post-project scenarios.

Field	What to Enter	How Data or Input Provided is Used
Quantity	Enter the number of engines being installed. If multiple engine projects are installed, please ensure the application data for them is the same. Otherwise, please enter them separately.	• Calculate eligible incentive. • Project review and QA/QC.

Old Engine Rich Burn or Lean Burn?	Enter whether the old engine operates as rich burn or lean burn.	• Project review and QA/QC.
Old Engine Manufacturer	Enter the name of the old engine manufacturer.	• Project review and QA/QC.
Old Engine Model Number	Enter the old engine model number.	• Project review and QA/QC.
Old Engine Serial Number	Enter the old engine serial number.	• Project review and QA/QC.
Old Engine Age (Years)	Enter the age of the old engine in years.	• Project review and QA/QC.
Old Engine Size (hp)	Enter the size of the old engine in hp. This is the maximum output of the engine.	• Project review and QA/QC.
Old Engine Mechanical Efficiency (%)	Enter the mechanical efficiency of the old engine as a percentage. This should be the design value of the engine at the peak load.	• Project review and QA/QC
Old Engine Estimated Average Engine Load Factor (%)	Enter the estimated average load factor of the old engine as a percentage.	• Project review and QA/QC.
Old Estimated Engine Annual Operating Hours (hours)	Enter the estimated engine annual operating hours of the old engine.	• Project review and QA/QC.
New Engine Rich Burn or Lean Burn?	Enter whether the new engine operates as rich burn or lean burn.	• Project review and QA/QC.
New Engine Manufacturer	Enter the name of the new engine manufacturer.	• Project review and QA/QC.
New Engine Model Number	Enter the new engine model number.	• Project review and QA/QC.
New Engine Serial Number	Enter the new engine serial number.	• Project review and QA/QC.
New Engine Size (hp)	Enter the size of the new engine in hp. This is the maximum output of the engine.	• Project review and QA/QC.
New Engine Mechanical Efficiency (%)	Enter the mechanical efficiency of the new engine as a percentage. This should be the design value of the engine at the peak load.	• Project review and QA/QC
New Engine Estimated Average Engine Load Factor (%)	Enter the estimated average load factor of the new engine as a percentage.	• Project review and QA/QC.

New Estimated Engine Annual Operating Hours (hours)	Enter the estimated engine annual operating hours of the new engine.	• Project review and QA/QC.
Engine Estimated BSFC, LHV - Prior to Project (BTU/bhp-hr)	Enter the estimated BSFC based on LHV in BTU/bhp-hr prior to project. This should align with the value provided in the software simulation.	• Project review and QA/QC.
Engine Estimated Fuel Consumption - Prior to Project (m^3/year)	Enter the estimated engine fuel consumption in m^3/year prior to project. This should align with the value provided in the software simulation.	• Project review and QA/QC.
Engine Estimated NOx Emissions - Prior to Project (tonnes/year)	Enter the estimated NOx emissions in tonnes/year prior to project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO Emissions - Prior to Project (tonnes/year)	Enter the estimated CO emissions in tonnes/year prior to project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CH$_4$ Emissions - Prior to Project (tonnes/year)	Enter the estimated CH$_4$ emissions in tonnes/year prior to project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO$_2$ Emissions - Prior to Project (tonnes/year)	Enter the estimated CO$_2$ emissions in tonnes/year prior to project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO$_2$e Emissions - Prior to Project (tonnes/year)	Enter the estimated CO$_2$ equivalent emissions in tonnes/year prior to project.	• Project review and QA/QC.
Engine Estimated BSFC, LHV - Post Project (BTU/bhp-hr)	Enter the estimated BSFC based on LHV in BTU/bhp-hr post project.	• Project review and QA/QC.
Engine Fuel Consumption – Post Project (m^3/year)	Enter the estimated engine fuel consumption in m^3/year post project.	• Project review and QA/QC.
Engine Estimated NOx Emissions - Post Project (tonnes/year)	Enter the estimated NOx emissions in tonnes/year post project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO Emissions - Post Project (tonnes/year)	Enter the estimated CO emissions in tonnes/year post project. If this value is unknown, please list 0.	• Project review and QA/QC.

Engine Estimated CH_4 Emissions - Post Project (tonnes/year)	Enter the estimated CH_4 emissions in tonnes/year post project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO_2 Emissions - Post Project (tonnes/year)	Enter the estimated CO_2 emissions in tonnes/year post project. If this value is unknown, please list 0.	• Project review and QA/QC.
Engine Estimated CO_2e Emissions - Post Project (tonnes/year)	Enter the estimated CO_2 equivalent emissions in tonnes/year post project.	• Project review and QA/QC.
Equipment Provider	Enter the name of the engine equipment provider.	• Project review and QA/QC.
Packaged or Custom Project?	Enter if the engine project is packaged (off the shelf/ part of an established series or if it is custom).	• Project review and QA/QC.
Engine Project Specification Sheet	Upload the specification sheet for the engine project. If it is a packaged upgrade or new engine, please upload the specification sheet. If it a custom upgrade, please upload the specification sheet for the individual components being upgraded and a description of the entire project.	• Project review and QA/QC.
Estimated Efficiency Improvement (%)	Enter the estimated efficiency improvement in fuel consumption from the project. This should align with the values provided from the two software simulations.	• Project review and QA/QC.
Estimated Lifespan for Engine Project (Years)	Enter the estimated lifespan that the engine project will last for. This should include any consideration where the technology becomes obsolete/must be replaced due to changes in emissions requirements, equipment failure or other issues.	• Project review and QA/QC.

Equipment & Material Costs	Enter equipment and material costs as indicated on the invoice / final quote.	• Calculate eligible incentive. • Project review and QA/QC.
Labour Cost	Enter labour costs as indicated on the invoice / final quote.	• Calculate eligible incentive. • Project review and QA/QC.
Design Cost	Enter design costs and include all other costs as indicated on the invoice / final quote. This should include any costs for on-site visits that are required in the post-project application.	• Calculate eligible incentive. • Project review and QA/QC.

STEP 5 OF PRE-PROJECT APPLICATION: HIGH EFFICIENCY ENGINES

Field	What to Enter	How Data or Input Provided is Used
Cost Quote	Quote or invoice should be itemized to include quantity, brand, model numbers for equipment, applicant name, contractor name, facility address and date (Sample quote provided in the Appendix). Costs should be indicated separately for: • Equipment and Material • Labour • Design and Others • Taxes	• Cross-reference against provided costs. • Calculate eligible incentive. • Project review and QA/QC.
Workplan	Please upload the completed Workplan template.	• Project review and QA/QC.
Pre-Project Photo	Please upload a photo of the equipment before the installation of the project.	• Project review and QA/QC.
Simulation of Performance/Estimate of Energy Savings and Emissions Reduction	Please upload two PDF documents from simulation software such as EngCalc or GERP that outline the pre-project and post-project scenarios respectively. The PDF documents should support the values provided in the application fields in Step 4 (previous step of the application) for the pre-project and post-project scenarios.	• Project review and QA/QC.

Other Documentation	Please upload any other documentation that you think will be helpful for the review.	• Project review and QA/QC.

There may be additional documentation that we request during the review process.

POST-PROJECT APPLICATION: HIGH EFFICIENCY ENGINES

Note that for the post-project application, you will be required to confirm that no changes were made from the pre-project application, unless an Application Change Approval Notice was issued by ERA. You will need to confirm Actual Costs for the project.

In terms of additional documents required, you will need to provide evidence of the following:

- Invoice for Project Costs
- Proof of Payment for Project Costs
- Post-Project Photo
- On-Site Measurement Data
- Conditions stated in the Notice of Pre-Approval

Please upload any other documentation that you think will be helpful for the review. There may be additional documentation that we request during the review process. Please note that if the on-site measurement data changes the estimated performance of the project for energy savings and emissions reduction substantially, the incentive reservation may be updated to reflect the on-site measurement data.

Participants may be subject to a QA/QC check and may be asked for additional documentation or to facilitate a site visit.

APPENDIX

Quotes should be itemized to include quantity, brand, model numbers for equipment, applicant name, contractor name, facility address and date. Costs should be indicated separately for:

- Equipment and Material
- Labour
- Design and Others
- Taxes

A sample quote is provided below:

Company Logo	Company Address:	xxxx			
	Website:	xxxx			
	Phone:	xxxx			

PROJECT NAME:	XXXX		Project Start Date:	xxxx
			Project Completion Date:	xxxx

Applicant Company:	xxxx			
Applicant Name:	xxxx		Quote #:	xxxx
Facility Address:	xxxx		Date:	xxxx
Phone:	xxxx			

Measure #1

Fixture Description	LITHONIA CPANL 2X4 40/50/60LM 40K M2	DLC	PMS5PPS6	
Measure Description	LED 2x4 Recessed Light Fixture - 4,500 – 5,999 Lumen Output	QTY	63	
Measure Equipment/Material Costs			$	6,538.71
Measure Labour Costs			$	13,251.74
Measure Design/Other Costs			$	-
		Measure Total Costs	$	19,790.45

Measure #2

Motor Description	ILA7080-H Siemens Semiotics 10 hp			
Measure Description	Premium efficient motor –ODP-10 hp	QTY	1	
Measure Equipment/Material Costs			$	934.10
Measure Labour Costs			$	123.11
Measure Design/Other Costs			$	50.00
		Measure Total Costs	$	1,107.21

Measure #3

Sensor Description	Occupancy Sensor			
Measure Description	Fixture Mounted Sensor	QTY	305	
Measure Equipment/Material Costs			$	15,250.00
Measure Labour Costs			$	-
Measure Design/Other Costs			$	-
		Measure Total Costs	$	15,250.00

Total

Total Equipment/Material Costs	$	22,722.81
Total Labour Costs	$	13,374.85
Total Design/Other Costs	$	50.00
Total Project Cost	$	36,147.66
GST	$	1,807.38
Total Cost w/ GST	$	37,955.04