**Energy Efficiency OPPORTUNITIES ASSESSMENT REPORT FOR < ProJect Name> at < address>**

**sUBMITTED FOR ASSESSMENT PERIOD < XXXX TO YYYY>**

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| **CORPORATION** |
| Corporate Name: |
| UEN: |
| Corporation Address: |
| Postal Code: |

|  |  |  |
| --- | --- | --- |
| **ENDORSEMENT** | | |
| As the chief executive who is principally responsible for the management and conduct of the business of the above corporation, I hereby endorse the Energy Efficiency Opportunities Assessment Report. I declare that the information included in this report is, to the best of my knowledge, correct and in accordance with the *Energy Conservation Act Chapter 92C* and *Energy Conservation (Energy Management Practices) Regulations 2013*. | | **Name of Chief Executive:** |
| **Signature:** |
| **Designation:** |
| **Date:** |
| **DECLARATION BY Certified EEO ASSESSOR** | | |
| I declare that this report is prepared on behalf of the above corporation.  The measurements and data reported are reasonably accurate as of the time when the EEOA is conducted. The information included in this report is, to the best of my knowledge, correct and in accordance with the *Energy Conservation Act Chapter 92C* and *Energy Conservation (Energy Management Practices) Regulations 2013.* | | **Name:** |
| **Signature:** |
| **EEOA assessor certification number:** |
| **Designation:** |
| **Company:** |
| **Email:** |
| **Date:** |
| **CONTACT PERSON** | | |
| For any queries on this report, please contact:- | **Name:** | |
| **Designation:** | |
| **Phone Number:** | |
| **Email address:** | |

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# **Executive Summary**

<Provide summary of key findings in the EEOA report and submit Tables 1 and 2 using the Excel template.>

Table 1: **Scope of EEOA**

Table 2: **Summary of all Energy Efficiency Opportunities Identified**

# **Overview of Registered Corporation and EEOA Plan**

## General Information on Relevant Business Activity

<Provide a general description of the registered corporation including type of business activity assessed in this EEOA, business objectives, size of the facility, type of products and business-as-usual plant capacity, etc.>

### Type of business activity

### Type of products produced

### Plant capacity (total and by-product produced)

### Plant layout

<Provide plant layout with proposed location and arrangement of every proposed energy consuming systems estimated to consume a total of at least 80% of the estimated annual energy consumption of the business activity.>

## Description of the EEOA

<Provide a description of the EEOA with the following sub-categories.>

### Methods and processes to be used to conduct the assessment

<Indicate the assessment methods or techniques used.>

### Ranking of EEOs

<Provide the ranking criteria used to evaluate the potential for EEOs to be implemented. The ranking criteria can include payback period, GHG abatement potential, productivity improvement etc.>

### Members of assessment team, including role and experience

### Scope of EEOA

<Provide block, process or energy flow diagrams that show the transfer of energy commodities, feed and products between energy consuming systems. The diagrams provided must be aligned with Table 3 in the excel template. Submit Table 3 using the Excel template.>

# **Details of Assessment**

Energy Consuming System Analysis and Energy Efficiency Opportunities Identification and Evaluation

<Analysis is required for each energy consuming system (including end use systems that obtain energy from transformative systems) that makes up 80% of the total energy consumption as listed in Table 1. Start a new table for each energy consuming system.>

<In EEO identification and evaluation, identify EEOs for energy consuming systems that make up at least 80% of the estimated annual energy consumption by considering the following:

a) Best available technologies and best operating practices, e.g. waste heat recovery, pinch analysis for heat integration, usage of VSD motors;

b) Alternative technology choices, e.g. alternative choices of solvent and catalyst for reaction, optimization of reaction or separation pressures and temperatures;

c) Location and arrangement of equipment to allow opportunities such as heat transfer between processes; and

d) Changing operating or maintenance strategy to adopt best practices

The process of identification and analysis of EEOs for each system shall be detailed in the table below.>

## Energy Consuming System: <Reaction train 1>

|  |
| --- |
| **Description of System:** |
| **Base case/ Existing system details:**   * + - * Report the energy commodities and products/feed measurements flowing in and out of the energy consuming system.       * Trends / graphical presentation of measurements should be presented here with explanation on the operating conditions during the data collection process within the assessment period       * Measurement data to be shown in appendix for verification       * Provide block, process or energy flow diagram that shows the transfer of energy commodities, feed and products within energy consuming systems and between sub-energy consuming systems.       * Provide Sub-Energy Consuming Systems balance in excel template as a table (Refer to Table 4 in excel template). Engineering estimates can be used for mass and energy balance between sub-energy consuming systems. |
| **Total specific energy consumption of existing system:** |
| **Specific energy commodity consumption of existing system:**  <Provide a list below with respect to each fuel or energy commodity per feed or product of the system, and state the timeframe that the data is collected.> |
| **Derivation of energy consumption from measured variables (if any):**  <Provide related correlation graphs or formulas from specific datasheets and show the derivation of the figures in Table 3 if applicable.> |

|  |  |  |
| --- | --- | --- |
| **Energy Consuming System :** <Reaction train 1 > | | |
| **Energy efficiency opportunities (EEO)** | **Estimated energy savings and greenhouse gas abatement** | **To be implemented? (Y/N)** |
| EEO 1:  <Description of EEO, should tally with S/N 1 in Table 2> |  |  |
| EEO 2:  <Description of EEO, should tally with S/N 2 in Table 2> |  |  |
| EEO 3:  <Description of EEO, should tally with S/N 3 in Table 2 > |  |  |
| **Total specific energy consumption after implementation :** | | |
| **Rationale**  Report the analysis for each EEO, which shall include:   * + - Description/discussion of each EEO identified on how it can reduce energy consumption and improve energy performance relative to the base case and how it compares with best available technologies and benchmarks in energy efficiency     - Provide description and additional benefits if there are any interactions and dependencies with other EEOs     - Estimated cost of investment     - Estimated cost of operations     - Estimated annual energy savings and annual greenhouse gas emissions compared to the system in the base case     - Estimated financial savings     - Payback period or internal rate of return and other non-energy efficiency benefits (such as productivity or reliability), if any     - Proposed implementation timeline     - Future changes in production generation capacity, if any     - An explanation if EEO was not implemented | | |
| **Methodology**  Report methodology on how energy savings were calculated, how project cost was derived including type and source of data used, basis for calculations, estimates and assumptions, and its accuracy, etc. Base case for all EEOs presented above have to be measured or derived from measured variables. | | |

## Energy Consuming System: <Cooling fan>

|  |
| --- |
| **Description of System:** |
| **Base case/ Existing system details:**   * + - * Report the energy commodities and products/feed measurements flowing in and out of the energy consuming system.       * Trends / graphical presentation of measurements should be presented here with explanation on the operating conditions during the data collection process within the assessment period       * Measurement data to be shown in appendix for verification       * Provide block, process or energy flow diagram that shows the transfer of energy commodities, feed and products within energy consuming systems and between sub-energy consuming systems.       * Provide Sub-Energy Consuming Systems balance in excel template as a table (Refer to Table 4 in excel template). Engineering estimates can be used for mass and energy balance between sub-energy consuming systems. |
| **Total specific energy consumption of existing system:** |
| **Specific energy commodity consumption of existing system:**  <Provide a list below with respect to each fuel or energy commodity per feed or product of the system, and state the timeframe that the data is collected.> |
| **Derivation of energy consumption from measured variables (if any):**  <Provide related correlation graphs or formulas from specific datasheets and show the derivation of the figures in Table 3 if applicable.> |

|  |  |  |
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| **Energy Consuming System:** <Cooling fan> | | |
| **Energy efficiency opportunities (EEO)** | **Estimated energy savings and greenhouse gas abatement** | **To be implemented? (Y/N)** |
| EEO 4  <Description of EEO, should tally with S/N 4 in Table 2 > |  |  |
| EEO 5:  <Description of EEO, should tally with S/N 5 in Table 2 > |  |  |
| EEO 6:  <Description of EEO, should tally with S/N 6 in Table 2> |  |  |
| **Total specific energy consumption after implementation :** | | |
| **Rationale**  Report the analysis for each EEO, which shall include:   * + - Description/discussion of each EEO identified on how it can reduce energy consumption and improve energy performance relative to the base case and how it compares with best available technologies and benchmarks in energy efficiency     - Provide description and additional benefits if there are any interactions and dependencies with other EEOs     - Estimated cost of investment     - Estimated cost of operations     - Estimated annual energy savings and annual greenhouse gas emissions compared to the system in the base case     - Estimated financial savings     - Payback period or internal rate of return and other non-energy efficiency benefits (such as productivity or reliability), if any     - Proposed implementation timeline     - Future changes in production generation capacity, if any     - An explanation if EEO was not implemented | | |
| **Methodology**  Report methodology on how energy savings were calculated, how project cost was derived including type and source of data used, basis for calculations, estimates and assumptions, and its accuracy, etc. Base case for all EEOs presented above have to be measured or derived from measured variables. | | |

# **Instrument Records**

<Fill Table 5 on the monitoring instruments used for obtaining data for the EEOA. Provide measurements and data points that were used in the EEOA as an Appendix. The Appendix should clearly indicate the data measurements for each ECS assessed and EEO identified in the EEOA.>

Table 5: Instrument Specifications for EEOA Measurements

# Conclusion and Recommendations

<Provide a conclusion of the EEOA and recommendations (if any).>

# Document History

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| --- | --- | --- |
| **Revision** | **Date of change** | **Changes made** |
| R0 | Feb 2020 | First release |
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