

Energy Conservation (Energy Management Practices)
(Amendment) Regulations 2018

Detailed Requirements for New Industrial Facilities & Facilities Undergoing Major Expansions



Objective

To inform industry on the detailed requirements for:

- 1) Energy efficiency opportunities assessment (EEOA) for new facilities & major expansions (“New Ventures” (NV))
- 2) Energy performance measurement (EPM) for New Ventures

1 Background

Background

Energy Conservation Act

Mandatory Energy Management Practices under Energy Conservation Act (ECA)

- Mandatory energy management practices introduced in Apr 2013
- Energy-intensive users in the industrial sector* consuming 54 TJ or more of energy each year must:
 - appoint a SCEM-certified energy manager
 - monitor and report energy use and GHG emissions annually
 - submit energy efficiency improvement plan and review it annually

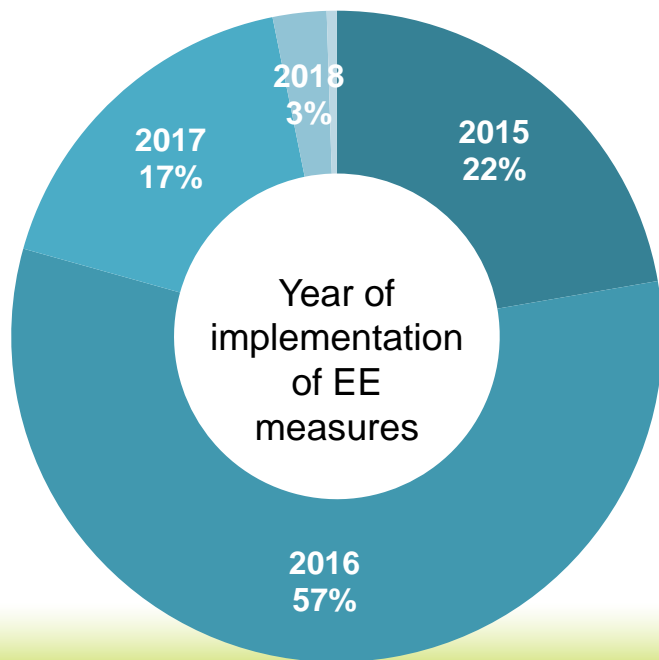
* (1) Manufacturing & related services (2) Supply of electricity, gas, steam, compressed air & chilled water (3) Water supply & sewage & waste management

Background

Findings From Energy Conservation Act



Industrial



✓ Findings from 2016 submissions by industrial companies under ECA

- More than 60% of energy consuming systems' performance were **estimates**
- Most common industrial energy consuming systems, e.g. chilled water and compressed air systems were operating at sub-optimal efficiencies
- Slight increase in EE improvement rate between 2014 and 2015, much room for higher improvement rates
 - Actual annual EE improvement rate was 0.4% in 2014 and 0.6% in 2015
 - Belgium and the Netherlands have managed to achieve industrial EE improvement rates of 1-2% annually

Enhanced Industrial Energy Efficiency Requirements

- Energy Conservation (Energy Management Practices) (Amendment) Regulations 2018 was gazetted on 28 Sep 2018

Requirement	Details
Energy efficiency opportunities assessment for new ventures	<p><u>All new energy-intensive facilities & major expansions i.e. $\geq 54\text{TJ/yr}$ (from 1 Oct 2018)</u></p> <ul style="list-style-type: none">• Design phase<ul style="list-style-type: none">✓ Review facility design, develop economically feasible energy/carbon efficiency measures for incorporation into the new facility and report findings
Energy performance measurement requirements for new ventures	<p><u>All new energy-intensive facilities & major expansions i.e. $\geq 54\text{TJ/yr}$ (from 1 Oct 2018)</u></p> <ul style="list-style-type: none">• Design and construction phase<ul style="list-style-type: none">✓ Plan for and install instruments and meters at system level• Operations phase<ul style="list-style-type: none">✓ Report energy use and energy performance indicators based on measured data<ul style="list-style-type: none">➤ Cover energy-consuming systems that account for at least 80% of total consumption

Detailed Requirements for New Ventures

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A. EEOA

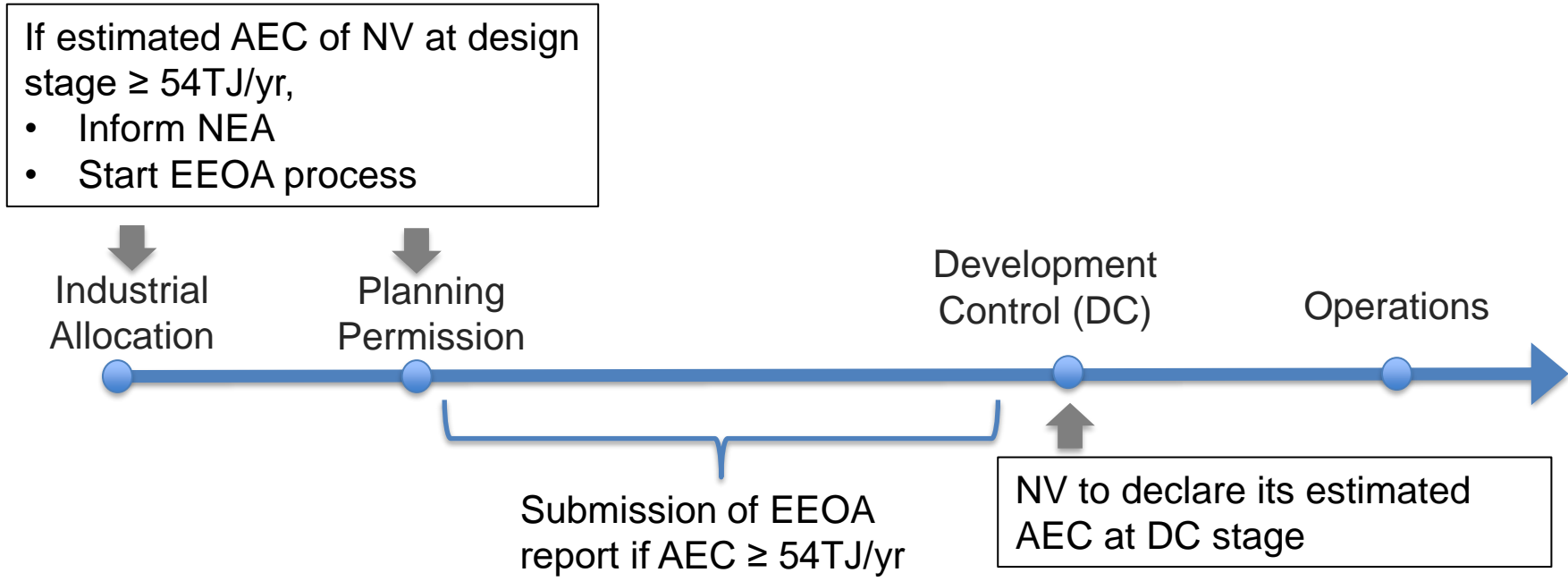
- Overview of Submission Process and Timeline
 - Eligibility to submit EEOA report
 - Checklist for Development Control (DC) clearance
 - Estimation of Annual Energy Consumption (AEC)
 - Submission of EEOA report
 - Approval of EEOA report
 - Reminders and safeguards on EEOA and EPM requirements
- EEOA Process

B. Energy Performance Measurement

Overview of Submission Process and Timeline

- i. Company to comply with EEOA requirement before issuance of DC Clearance.
- ii. Company to declare New Venture's estimated Annual Energy Consumption (AEC) at DC stage.
- iii. Once company know that the estimated AEC is likely $\geq 54\text{TJ}$, they should inform NEA and comply with the EEOA requirement.

Overview of Submission Process and Timeline



Eligibility to submit EEOA report

1. Planning permission (PP) to URA is applied on or after 1 Oct 2018
2. Business activity of NV is carried out at a single site and from one of the following industry sectors:
 - I. Manufacturing and manufacturing related services
 - II. Supply of electricity, gas, steam, compressed air and chilled water for air-conditioning
 - III. Water supply and sewage and waste management
3. Estimated annual energy consumption of NV is ≥ 54 TJ based on 24 hours per day, 365 days of operations at 100% of design production capacity.

Estimation of Annual Energy Consumption (AEC)

- The AEC shall be aggregated from all energy consuming systems of the entire new business activity/premises or expansion of any existing business activity/premises as per New Venture definition in Section 26A(4) of the Energy Conservation Act.
- **Estimated AEC is based on**
 - a) **24 hours per day, 365 days of operations; and**
 - b) **Operating at 100% design production capacity of the new venture;**
- The AEC of the New Venture is the total energy consumption derived from all fuel and energy commodities (e.g. Natural gas, Liquid Fuel oil, Electricity, Steam, etc) used to provide or produce energy within the New Venture's boundary.

Estimation of Annual Energy Consumption (AEC)

- NV may write to NEA to seek clarification for **retrofit projects** that fall under the EEOA requirements with supporting reasons such as if the retrofit results in no change in designed production rate at 100% capacity within the PP boundary.
- If EEOA report is not required , NEA will issue a letter which must be submitted during DC application with AEC declared $\geq 54TJ$.

Checklist for Development Control (DC) clearance

- Download EEOA Declaration Form from NEA website.
(<https://www.nea.gov.sg/our-services/building-plan/overview>)
- Qualified personnel (QP) appointed under section 8 or 11 of the Building Control Act (Cap.29) in respect of the building works for the facility (NV) is required to fill up and submit the EEOA Declaration Form at DC application.

Submission of EEOA report

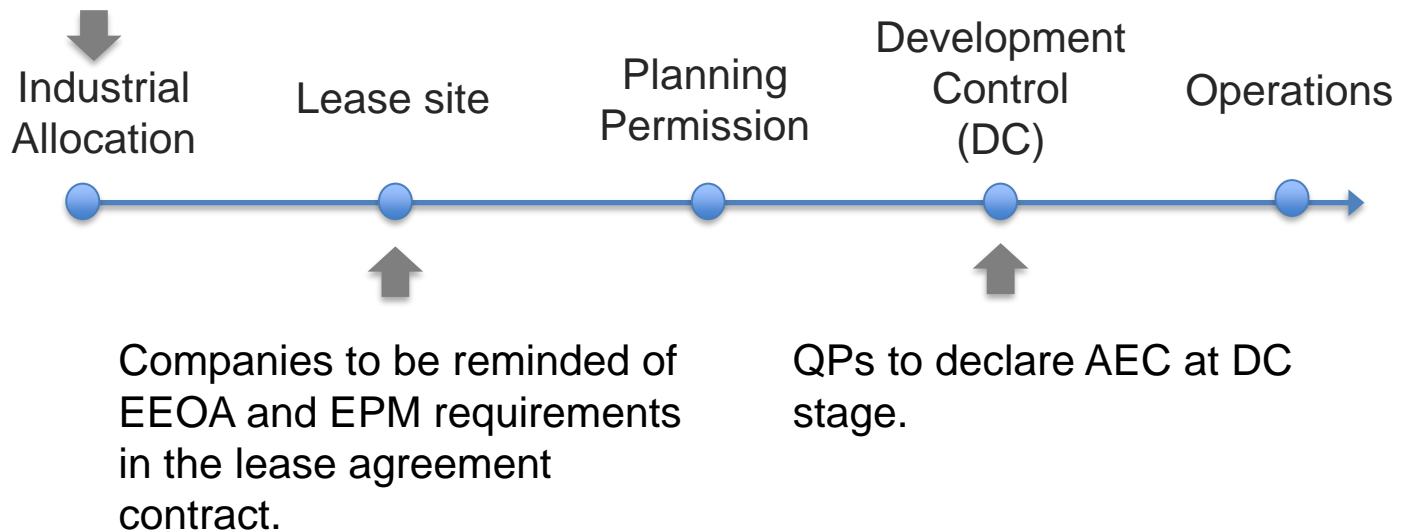
- For New Ventures who are eligible to conduct EEOA, Qualified or Authorised Person (QP/AP) is required to submit the EEOA report.
 - Submit EEOA report and excel template to NEA for approval via email. Encryption of EEOA report and files with Netrust is encouraged.
 - Report must be signed off by the person principally responsible for conducting EEOA.
 - Report must be endorsed by Chief Executive of New Venture.
 - Data used for the EEOA must be kept for at least 5 years from the date of CSC clearance.

Approval of EEOA report

- NEA will review and grant approval based on the scope and quality of EEOA report
 - NEA may provide advice for NVs' consideration
 - To expedite the approval process, engage NEA early for discussion, during the Concept Engineering and FEED stages
- A clearance certificate for EEOA report will be issued to the QP after the report is approved by NEA.

Reminders on EEOA and EPM requirements

Companies to indicate if the energy bill of New Venture cost \geq \$500,000 annually at 100% designed production capacity. This serves as a quick indicator that estimated AEC might be \geq 54TJ per year



EEOA Process

Develop EEOA Plan & Identify EE Opportunities

Develop EEOA Plan

1. Scope, objective, timeframe, workflow, assessment method and members of assessment team

Identify EE Opportunities

1. Identify energy efficiency opportunities during the Concept Engineering stage, considering:
 - i. Optimum methods or processes to produce outputs
 - ii. Alternative technology choices
2. Identify energy efficiency opportunities, for energy-consuming systems that make up at least 80% of the total energy consumed, as calculated in the FEED stage, considering:
 - i. Location and arrangement of equipment to allow opportunities such as heat transfer between processes
 - ii. Best available technology and best operating practices
 - iii. Alternative technology choices
3. Provide justification for base case in Concept engineering and FEED stage eg: based on industry norm, existing sister plant.

EEOA Plan

Identify EE
Opportunities

Evaluate and
Shortlist

Design

EEOA Process

Evaluate and Shortlist Feasible EE Opportunities

Evaluate Feasibility

1. Assess feasibility of implementing each EE opportunity identified, based on the following criteria:

Financial Metrics

- i. Cost of investment
- ii. Operations cost
- iii. Annual energy savings as compared to a proposed option
- iv. Financial savings
- v. Payback period or internal rate of return

Other Metrics

- i. Annual carbon emissions
- ii. Other criteria, economic or otherwise, where appropriate
- iii. Other non-Energy benefits (e.g. productivity gains)
- iv. Potential interactions between various opportunities

Shortlist Feasible EE Opportunities

1. Incorporate shortlisted EE opportunities into a final design
2. Calculate energy and greenhouse gas savings from each of these EE opportunities incorporated

EEOA Plan

Identify EE
Opportunities

Evaluate and
Shortlist

Design

EEOA Process

Incorporate Opportunities into Design

Develop Design: Facility Details

1. Layout, energy balance and process flow diagram of the New Venture
2. Expected annual energy consumption, by type(s) of fuel or energy commodity
3. Expected quantity of output(s)
4. Expected specific energy consumption (energy consumed divided by output)
5. Expected annual greenhouse gas emissions

Develop Design: Details¹ For Each Energy-Consuming System²

1. Type and description of system
2. Projected annual energy consumption, by type(s) of fuel or energy commodity
3. Projected output
4. Projected specific energy consumption
5. Projected annual greenhouse gas emissions

¹ Similar to current requirements for Energy Use Report under ECA

² Where the aggregate energy consumption of these systems shall not be less than 80% of the calculated total energy consumption of the new venture

EEOA Plan

Identify EE
Opportunities

Evaluate and
Shortlist

Design

Proposed Detailed Requirements for New Ventures

2

A. EEOA

B. Energy Performance Measurement

- Eligibility & Declaration
- Reporting Requirements

Energy Performance Measurement For New Ventures Eligibility & Declaration

Eligibility

1. Companies operating New Ventures (NVs) will be subjected to the energy performance measurement requirement if:
 - a. They apply for Planning Permission for the NV on or after 1 Oct 2018;
and
 - b. Are from one of the relevant industry sectors; and
 - a. NV is designed to consume $\geq 54\text{TJ}$ of energy annually based on 24 hours per day, 365 days of operations at 100% of design production capacity.

Energy Performance Measurement For New Ventures Reporting Requirements

When the NV is regulated under the ECA as a Relevant Business Activity:

The company that has operational control over the New Venture **must report:**

1. Total energy consumption of the NV, and must be expressed as a **measured value**
2. At least **80%** of the NV's energy consumption at **system¹-level**
 - a. Energy consumption, intended output and specific energy consumption figures of these systems **must** be expressed as a **measured value**

¹ As defined in the Energy Conservation (Energy Management Practices) Regulations 2013

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