

# DRAFT
# ECONOMIC-TECHNICAL NORM FOR ENERGY AUDIT

Ho Chi Minh City, April 2026

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# 01

# OBJECTIVES, SCOPE, AND APPLICABLE SUBJECTS



# OBJECTIVES

- Propose economic-technical norms as a basis for developing prices and unit prices for public non-business services using the state budget in the field of industrial energy efficiency and conservation.
- Standardize the understanding of: scope of work; resource mobilization levels; and output quality requirements.
- Support management agencies, contracting entities, and service providers in having a common framework for organizing implementation, evaluating, and accepting services.
- Gradually contribute to enhancing the transparency and quality standards of energy audit services.

# SCOPE AND APPLICABLE SUBJECTS

**Scope**: Focus on energy audit consulting services in the field of industrial energy efficiency and conservation.

**Applicable subjects:**

- Public non-business units using the state budget: industrial promotion centers, energy conservation centers;
- Energy audit tasks and projects using the state budget;
- State management agencies;
- Private service providers (for reference).

# 02

# APPROACH AND BASIS FOR DEVELOPING THE DRAFT



# APPROACH AND BASIS FOR DEVELOPING THE DRAFT

- Developed according to 3 components: labor, machinery and equipment, materials
- Adhere to the service delivery process for energy audit
- Combine different methods:
  - Review of legal and technical documents;
  - Surveys of enterprises and consulting units;
  - Analysis, comparison, and synthesis of data;
  - Selective reference to existing documents.
- Ensure accuracy, completeness, and applicability.

# PRACTICAL BASIS OF ENERGY AUDIT ACTIVITIES

- Currently, there are 34 Industrial Promotion Centers/Energy Conservation Centers and nearly 50 private consulting units.
- The capacity among energy audit service providers remains uneven.
- Measurement and testing equipment show significant disparities.
  - Some units perform well (mainly centers in large provinces/cities and consulting firms with long-standing operations).
  - Some units only partially meet requirements or rely on subcontracting.
- Personnel:
  - Most units have a workforce size ranging from 11 to 20 people.
  - Fewer than 5 units have a large workforce (21–100 people).
  - A small number of centers are very small (≤5 people).

# 03

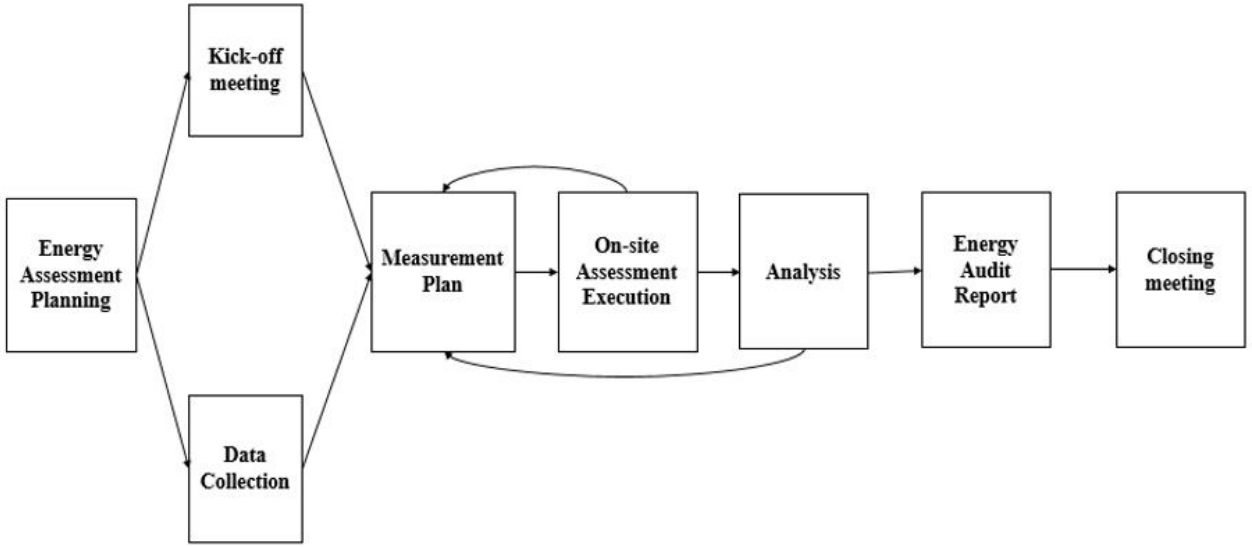
# TECHNICAL BASIS OF THE ECONOMIC-TECHNICAL NORMS



Vets Energy and Environment

# BASIS OF THE ECONOMIC-TECHNICAL NORMS

- Energy audit procedure according to the guidance of Circular 25/2020/TT-BCT;
- Energy audit procedure in TCVN ISO 50002:2015;
- Guidelines for high-quality energy audit applied in the VAS Program under DEPP3.




| Steps | Description |
|---|---|
| **Step 1** | Determination of audit scope |
| **Step 2** | Establishment of the audit team |
| **Step 3** | Estimation of timeframe and budget |
| **Step 4** | Collection of available data |
| **Step 5** | Field inspection and measurement<br>• Identification of strategic measurement points;<br>• Installation of measuring equipment |
| **Step 6** | Analysis of collected data<br>• Identification of energy saving potentials;<br>• Determination of investment costs;<br>• Data normalization;<br>• Ensuring normal operation of the technological line |

# ENERGY AUDIT PROCESS

| Step | Description |
|---|---|
| 1 | Preparation for the Energy Audit |
| 2 | Initial data collection |
| 3 | Preliminary data analysis |
| 4 | Kick-off meeting at the facility |
| 5 | On-site survey of current production processes and energy-using equipment |
| 6 | Data collection for developing the energy balance: mass balance and energy balance for production processes and auxiliary systems |
| 7 | Meeting to discuss survey and data collection results |
| 8 | Detailed on-site measurements |
| 9 | Energy audit team meeting to review on-site measurement results |
| 10 | Preliminary report on survey and on-site measurement results |
| 11 | Compilation and preliminary analysis of on-site measurement results |

| Step | Description |
|---|---|
| 12 | Development of the energy flow diagram |
| 13 | Analysis of results from the energy flow diagram |
| 14 | Proposal and techno-economic analysis of management measures |
| 15 | Proposal and techno-economic analysis of technical measures |
| 16 | Meeting to discuss techno-economic analysis results |
| 17 | Compilation and preparation of the energy audit report |
| 18 | Internal review and revision of the audit report by the audit team |
| 19 | Approval of the energy audit report at organizational level |
| 20 | Meeting with the audited facility to finalize and agree on the audit report |
| 21 | Revision of the report after the final agreement meeting |
| 22 | Final printing, certification of the energy audit report, and acceptance minutes |

# QUALITY CRITERIA FOR ENERGY AUDIT SERVICES

1. Criteria for compliance with procedures and professional content
2. Criteria for competency of the executing entity and specialists
3. Criteria for quality of output products
4. Criteria for completeness of records, documentation, and verifiability
5. Criteria for implementation schedule and responsiveness to management requirements

# QUALITY REQUIREMENTS FOR ENERGY AUDIT OUTPUTS

- Reflects the current energy usage status of the facility: Energy diagram, energy balance providing an overall perspective on the facility's energy efficiency.
- Has data and analysis with sufficient reliability.
- Identifies energy saving opportunities quantitatively.
- Proposes solutions appropriate to the current technology and operating conditions.
- Includes investment efficiency analysis for the proposed solutions.

# 04

# STRUCTURE OF THE ECONOMIC-TECHNICAL NORMS



# GENERAL STRUCTURE OF ECONOMIC-TECHNICAL NORMS FOR ENERGY AUDIT

**Unit of measurement:** 01 facility/enterprise subject to energy audit

**Norm components:**

- Labor norm
- Machinery and equipment norm
- Material norm

**Determination principles:**

- Adhere to the service delivery process
- Reflect the necessary consumption to complete the service meeting quality requirements

# LOGIC PHÂN NHÓM ÁP DỤNG ĐỊNH MỨC

**Logic for grouping based on energy consumption scale**

**Group 1:** from 1,000 to under 3,000 TOE

**Group 2:** from 3,000 to under 10,000 TOE

**Group 3:** from 10,000 TOE upwards

**Basis for grouping**

- Scale of energy-using systems
- Complexity of production lines
- Volume of survey and measurement work
- Demand for data analysis and solution development

05

# ECONOMIC-TECHNICAL NORMS DRAFT



Vets Energy and Environment

# LEVEL OF ENERGY AUDITORS

| Position | Level | | | | | | | | | | | | Additional Requireme |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Energy Auditor | Engineer Level 2 | Engineer Level 3 | Engineer Level 4 | Engineer Level 5 | Engineer Level 6 | Engineer Level 7 | Engineer Level 8 | Engineer Level 9 | | | | | |
| Lead Energy Auditor | Lead engineer level 1 | Lead engineer level 2 | Lead engineer level 3 | Lead engineer level 4 | Lead engineer level 5 | Lead engineer level 6 | Lead engineer level 7 | Lead engineer level 8 | | | | | Possess an Energy Auditor Certificate |
| Senior Energy Auditor | Senior engineer level 1 | Senior engineer level 2 | Senior engineer level 3 | Senior engineer level 4 | Senior engineer level 5 | Senior engineer level 6 | Senior engineer level 7 | Senior engineer level 8 | | | | | |
| Technician | | | Engineer level 1 | | | | | | | | | | |
| | Technician level 1 | Technician level 2 | Technician level 3 | Technician level 4 | Technician level 5 | Technician level 6 | Technician level 7 | Technician level 8 | Technician level 9 | Technician level 10 | Technician level 11 | Technician level 12 | |

# TE NORMS FOR GROUP 1000 – 3000 TOE

Applied to the group of facilities with the lowest energy consumption scale among the three groups.

Ensures full implementation of all energy audit steps.

Includes:

- Direct labor force
- Basic measurement and testing equipment
- Necessary materials and supporting tools

  This serves as the baseline norm group for comparison with the remaining groups.

# LABOR NORMS FOR GROUP 1000 – 3000 TOE

| No. | Labor Norm | Norm (hours) | Norm (converted to man-days) | Note |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| I | Direct Labor Norms | | | |
| 1 | Engineer level 1 | 2,172 | 271.50 | Energy auditor |
| 2 | Lead engineer level 3 | 779 | 97.38 | Lead energy auditor |
| 3 | Technician level 3 | 392 | 49.00 | Technician |
| II | Indirect Labor Norms (Management, Support) | | | |
| 1 | Specialist/ Engineer level 4 | 568.31 | 71.04 | 17% of Direct Labor |

# EQUIPMENTS NORMS FOR GROUP 1000 – 3000 TOE

| No. | Equipment Name | Rated Hours (hours) | Standardized Work Units |
|---|---|---|---|
| 1 | Desktop computer | 0 | 0 |
| 2 | Laptop | 2,646 | 330.75 |
| 3 | A4 black & white printer | 8 | 1 |
| 4 | Projector | 11 | 1.375 |
| 5 | 4-seat passenger car | 128 | 16 |
| 6 | Specialized energy audit measurement instruments | 128 | 16 |
| 7 | Mobile phone | 24 | 3 |

**Specialized Energy Audit measuring equipment includes but is not limited to:**

- Clamp ammeter
- Multimeter
- Power analyzer / Power quality analyzer
- Infrared thermometer
- Lux meter (illuminance meter)
- $CO_2$ concentration meter
- Flue gas analyzer / Exhaust gas analyzer
- Hygro-thermo-anemometer / Temperature, humidity, and air velocity meter
- Ultrasonic flow meter
- Infrared thermal imaging camera
- SHGC meter / Heat gain meter (Solar Heat Gain Coefficient meter)

# MATERIAL NORMS FOR GROUP 1000 – 3000 TOE

| No. | Materials name | Unit | Technical Specifications | Materials norm | | |
|---|---|---|---|---|---|---|
| | | | | Usage | Recovery rate | Consumption |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 | A4 printing paper | Ream | 1 ream A4 size = 500 sheets, 70GSM | 2,00 | 0% | 2,00 |
| 2 | A4 cardstock paper | Ream | 1 ream A4 size = 100 sheets, 70GSM | 0,20 | 0% | 0,20 |
| 3 | A4 black printer toner | Box | HP laser toner cartridge, or equivalent | 0,40 | 0% | 0,40 |
| 4 | Adhesive tape | Roll | File binding tape | 0,50 | 0% | 0,50 |
| 5 | Stapler | Unit | Handheld stapler | 1,00 | 90% | 0,10 |
| 6 | AA battery | Unit | AA battery or equivalent | 10,00 | 0% | 10,00 |
| 7 | 9V battery | Unit | Square 9V battery (e.g., Panasonic) or equivalent | 5,00 | 0% | 5,00 |
| 8 | Tool set: Specify tools included: pliers, screwdrivers, ladder, ... | Set | | 1,00 | 90% | 0,10 |

# TE NORMS FOR GROUP 3000 – 10000 TOE

**Applicable to facilities with larger scale and more diverse equipment systems.**

**Compared to Group 1:**

- Increased scope of on-site survey
- Increased demand for measurement and data consolidation
- Increased technical analysis requirements
- Increased need for more detailed solution evaluation

**Reflects more clearly the need for energy balance establishment and system analysis.**

# LABOR NORMS FOR GROUP 3000 - 10000 TOE

| No. | Labor norm | Norm (hours) | Norm (converted to man-days) | Note |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| I | Direct Labor Norms | | | |
| 1 | Engineer Level 1 | 3.031 | 378,88 | Energy Auditor |
| 2 | Lead engineer level 3 | 1.096 | 137,00 | Senior Energy Auditor |
| 3 | Technician level 3 | 588 | 73,50 | Technician |
| II | Indirect Labor Norms (Management, Support) | | | |
| 1 | Specialist/ Engineer Level 4 | 801,55 | 100,19 | 17% of Direct Labor |

# EQUIPMENTS NORMS FOR GROUP 3000 - 10000 TOE

| No. | Equipment Name | Usage Norm (hours) | Usage Norm (converted to man-days) |
|---|---|---|---|
| 1 | Desktop Computer | 0 | 0 |
| 2 | Laptop | 3,698 | 462.25 |
| 3 | A4 Black & White Printer | 16 | 2 |
| 4 | Projector | 13 | 1.625 |
| 5 | 4-seat Passenger Car | 188 | 23.5 |
| 6 | Specialized Energy Audit Equipment | 188 | 23.5 |
| 7 | Mobile Phone | 32 | 4 |

**Specialized energy audit measurement equipment includes but is not limited to:**

- Clamp ammeter
- Multimeter
- Power analyzer
- Infrared thermometer
- Lux meter (illuminance)
- $CO_2$ meter
- Flue gas analyzer
- Humidity, temperature, and anemometer
- Ultrasonic flow meter
- Thermal imaging camera
- Solar heat gain coefficient (SHGC) meter

# MATERIAL NORMS FOR GROUP 3000 - 10000TOE

| No. | Materials name | Unit | Technical Specifications | Material norms | | |
|---|---|---|---|---|---|---|
| | | | | Usage | Recovery rate | Consumption |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 | A4 printing paper | Ream | 1 ream A4 size = 500 sheets, 70GSM | 2,00 | 0% | 2,00 |
| 2 | A4 cardstock paper | Ream | 1 ream A4 size = 100 sheets, 70GSM | 0,20 | 0% | 0,20 |
| 3 | A4 black printer toner | Box | HP laser toner cartridge, or equivalent | 0,40 | 0% | 0,40 |
| 4 | Adhesive tape | Roll | File binding tape | 0,50 | 0% | 0,50 |
| 5 | Stapler | Unit | Handheld stapler | 1,00 | 98% | 0,02 |
| 6 | AA battery | Unit | AA battery or equivalent | 15,00 | 0% | 15,00 |
| 7 | 9V battery | Unit | Square 9V battery (e.g., Panasonic) or equivalent | 8,00 | 0% | 8,00 |
| 8 | Tool set: Specify tools included: pliers, screwdrivers, ladder, ... | Set | | 1,00 | 86% | 0,14 |

# TE NORMS FOR GROUP > 10000 TOE

Applicable to large-scale energy users with multiple critical systems, requiring higher resources in terms of:

- Specialized human resources
- Quantity and duration of measurement equipment usage
- Time for survey, data processing, and normalization
- Volume of analysis and solution development

Technical depth must be ensured.

# LABOR NORMS – GROUP >10000 TOE

| STT | Labor norm | Norm (hours) | Norm (converted to labor-days) | Notes |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| I | Direct labor norms | | | |
| 1 | Engineer level 2 | 4.883 | 610,38 | Energy auditor |
| 2 | Lead engineer level 3 | 1.722 | 215,25 | Lead energy auditor |
| 3 | Technician level 3 | 984 | 123,00 | Technician |
| 4 | Engineer level 4(*) | 48 | 6,00 | Applicable when additional measurement points need to be installed. |
| 5 | Technician level 5(*) | 48 | 6,00 | |
| II | Indirect labor norm (management, support) | | | |
| 1 | Specialist/Engineer, grade 4 | 1.290,13 | 161,27 | 17% direct labor |

**Note:**

(*): Applicable only to plants with large boiler systems or large industrial furnaces that require installation of additional measurement points (e.g., thermal power plants, cement plants, steel plants, etc.).

# EQUIPMENTS NORMS FOR GROUP ABOVE 10000TOE

| No. | Equipments | Basic technical specifications | Norm (hours) | Norm (converted to shifts) |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 1 | Desktop computer | | 0 | 0 |
| 2 | Laptop | | 5.871 | 733,88 |
| 3 | Black-and-white A4 printer | | 24 | 3 |
| 4 | Projector | | 20 | 2,5 |
| 5 | 4-seat car | | 324 | 40,5 |
| 6 | Specialized energy measurement equipment set | | 324 | 40,5 |
| 7 | Mobile phone | | 32 | 4 |
| 8 | Welding machine (*) | | 48 | 6 |
| 9 | Cutting machine(*) | | 48 | 6 |

**The specialized energy measurement equipment includes, but is not limited to:**

- Clamp ammeter
- Multi meter
- Power analyzer
- Infrared thermometer
- Lux meter (illuminance meter)
- $CO_2$ concentration meter
- Flue gas analyzer
- Hygrometer, thermometer, anemometer (humidity, temperature, air velocity meter)
- Ultrasonic flowmeter
- Infrared thermal imaging camera
- Insulation resistance teste

**Notes:**

(*): Applicable only to plants with boiler systems or large industrial furnaces that require additional measurement points to be installed (e.g., thermal power plants, cement plants, steel plants, etc.).

# MATERIAL NORMS FOR GROUP > 10000TOE

| No. | Material Name | Unit | Technical Requirements | Usage | Recovery Rate | Consumption |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 | A4 printing paper | Ream | 1 ream of A4 paper = 500 sheets, 70 GSM | 2.00 | 0% | 2.00 |
| 2 | A4 cover paper | Ream | 1 ream of A4 paper = 100 sheets, 70 GSM | 0.20 | 0% | 0.20 |
| 3 | Black A4 printer ink | Box | HP laser ink cartridge or equivalent | 0.40 | 0% | 0.40 |
| 4 | Adhesive tape | Roll | Paper/document adhesive tape | 0.50 | 0% | 0.50 |
| 5 | Stapler | Unit | Handheld stapler | 1.00 | 98% | 0.02 |
| 6 | AA battery | Unit | AA battery or equivalent | 20.00 | 0% | 20.00 |
| 7 | 9V battery | Unit | Panasonic 9V square battery or equivalent | 12.00 | 0% | 12.00 |
| 8 | Tool set: pliers, screwdriver, ruler, etc. | Set | | 1.00 | 80% | 0.20 |
| 9 | Steel pipe Ø10x1” | m | | 22 | 0% | 22 |
| 10 | Welding electrode | kg | | 18 | 0% | 18 |

**Notes:**
(*): Applicable only to plants with boiler systems or large industrial furnaces that require additional measurement points to be installed (e.g., thermal power plants, cement plants, steel plants, etc.).

# 06

# DISCUSSION



# QUESTIONS

1. Is the classification into three TOE thresholds appropriate?
2. Is the list of tasks within each norm group complete?
3. Are the mobilization levels of labor, equipment, and materials realistic?
4. Is the scope of excluded cost items clear and reasonable?
5. What additional content should be included to enhance practical applicability?

# THANK YOU

