



**EINCOPS**

Energy Efficiency in Industrial,  
Commercial and Public Sector

Danida Environmental Support Programme 2

**ONE-DAY WORKSHOP ON ENERGY  
AUDIT AND ENERGY AUDITOR  
CERTIFICATION SCHEME**

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# ACCREDITATION & CERTIFICATION

- **Accreditation** is an endorsement of an **organization's competence, credibility, independence and integrity** in carrying out its conformity assessment activities.
- **Accreditation** : third-party attestation related to a conformity assessment **body** conveying formal demonstration of its **competence** to carry out specific conformity assessment tasks.
- **Certification** is a third party attestation for related to **products, processes, systems**

# Benefits of being accredited

## ✓ **Building Trust**

- Increasing confidence in the quality of auditing products and services.

## ✓ **International Recognition**

- Increasing acceptance of organizations and companies accredited in the overseas market, through the various mutual recognition arrangements between accreditation bodies.

## ✓ **Risk Minimization**

- Reduction of the risk of providing unreliable services and products, increasing of the ability to meet the customers expectations.

# Benefits of being accredited

## ✓ **Cost Reduction**

- Cost savings, as a result of improved productivity, reduced downtime, reduction of re-testing, etc.

## ✓ **Demonstrate credibility**

- Highlight the demonstrated competence for the report or certificate through its sound management system and the use of trained and competence personnel.

# Indonesian Energy and Energy Conservation Policy

	Regulation	Description
1.	Law no. 30/2007 on Energy	<ul style="list-style-type: none"><li>▪ <i>Central and regional government as well as people should be responsible for the implementation of energy conservation program</i></li><li>▪ <i>Energy conservation is conducted from up to down stream</i></li><li>▪ <i>Government will provide <b>incentive and disincentive</b> for the energy efficiency and conservation implementation of energy consumer and producer of energy efficient equipment</i></li><li>▪ <i><b>International cooperation</b> in the energy sector to ensure national energy security, domestic energy supply and improving the national economy</i></li></ul>
2.	National Master Plan of Energy Conservation 2005	<ul style="list-style-type: none"><li>• <i><b>Decreasing energy intensity 1% per year until 2025</b></i></li></ul>

# Indonesian Energy and Energy Conservation Policy

	Regulation	Description
3.	<b>Presidential Instruction No. 2/2008 on Energy and Water Efficiency</b>	<i>Instructions to the head of central and regional governments :</i> <ul style="list-style-type: none"><li>▪ <b>To implement the energy and water efficiency measures in their institutions including air conditioning, electrical appliances, and official vehicles</b></li><li>▪ <b>To establish task force in each institution to monitor implementation of energy and water efficiency</b></li></ul>
4.	<b>Government Regulation No. 70/2009 on Energy Conservation.</b>	<ul style="list-style-type: none"><li>▪ <b>Obligation for high energy consumer (min 6000 TOE/year) to conduct audit energy periodically and appoint energy managers</b></li><li>▪ <b>Energy audit is conducted by internal energy auditors and/or by accredited body</b></li><li>▪ <b>Energy manager and energy auditor must have competence certificate as required by the legislation.</b></li><li>▪ <b>Obligation for producer of energy appliances to implement energy efficiency labeling</b></li></ul>

# Example of TOE Calculation

Energy Consumption/year	Demand	Multiplier factor	TOE
Electricity (MWh)	20,000	<b>0.0895</b>	$20,000 \times 0.0895 = 1,790$
LPG (ton)	10	<b>1.2446</b>	$10 \times 1.2446 = 12.45$
Diesel Oil (kilo liter) (Solar)	1,500	<b>0.9471</b>	$1,500 \times 0.0947 = 1,420.65$
Gasoline ( kilo liter) (Premium)	1,000	<b>0.8505</b>	$1,000 \times 0.8505 = 850.5$
Coal (ton)	4,000	<b>0.5516</b>	$4,000 \times 0.5516 = 2,206.4$

Total demand per year

**6,289 TOE**

## 6.7 Comparison of Energy Manager or/and Energy Auditor Certification Schemes in Several Countries

No	Description	Japan	Singapore	India	US	Australia	Denmark
1	Administrator	Ministry of Economy, Trade and Industry (METI)	National Environment Agency (NEA) and Institution of Engineers, Singapore (IES)	Bereau of Energy Efficiency	Association of Energy Engineers (AEE)	Depart. Of Climate Change & Energy Efficiency	Danish Energy Authority
2	Examination Body	Energy Management Examination & Training Center, the Energy Conservation Center – Japan (ECCJ)	SCEM Monitoring Committee	National Productivity Council (NPC)	Certified Energy Auditor (CEA) Board	No examination is required. Registration to the Greenhouse & Energy Data Officer	Bureau Varitas Certification
3	Certification Body	METI & ECCJ	NEA & IES	National Certifying Agency (NCA)	AEE	Depart. Of Climate Change & Energy Efficiency	Bureau Varitas Certification
4	Professional certification	<b>Qualified Energy Manager</b>	<b>Certified Energy Manager of Singapore (CEMS)</b>	<b>Energy Manager (EM) &amp; Energy Auditor (EA)</b>	<b>Certified EM &amp; EA</b>	<b>Registered Greenhouse &amp; Energy Auditor</b>	<b>Certified Energy Management System</b>
5	Certification level	Type 1 & Type 2 Energy Managers	Associate & Professional	-	-	Category 1, 2 & 3.	-
6	Eligibility Criteria	Attend qualification courses (7 days) and pass national exam. Require at least 1 (one) years of practical experience in the rational use of fuel/electricity.	At least 2 years work experience and complete SCEM course within 1 years.  <b>Associate</b> : Diploma + 3 years work experience <b>Professional</b> : Degree + 3 years work experience + 2000 word report.	1. BE/B.Tech + 3 years work experience. 2. ME/M.Tech + 2 years work experience. 3. BE/B.Tech with post graduate in Management + 2 years work experience. 4. Diploma + 6 years work experience. 5. Post graduate in Science + 3 years work experience. For EM is from (1) – (5) and for EA is from (1) to (3) only.	- 4 year degree in engineering; - 3 –days live seminar on Auditing training program or online seminar (over 6 days); - Meeting specific education and/or experience criteria - Passing written examination.	- Knowledge of auditing; – Knowledge of audit team leadership and assurance; – Knowledge of audit team leadership; - Knowledge of assurance (successful completion of training course)	European Standard EN 16001
7	Examination Papers	i. Heat ii. Electricity	1. General aspects of energy management & energy audit 2. Energy efficiency in building sector 3. Energy efficiency in industrial sector	i. General aspects of energy management & energy audit ii. Energy efficiency in thermal utilities iii. Energy efficiency in electrical utilities iv. Energy performance assessment for equipment & utility systems (open book) For EM is from (i) – (iii) and for EA is from (i) to (iv).	- Energy management	- NA -	-



# EXAMPLE : I N D I A

## Mandatory Annual Energy Audit for the following Indian's industries

1	Aluminium	9	Chemicals
2	Fertilizer	10	Railways
3	Iron & Steel	11	Port Trust
4	Cement	12	Transport sector
5	Pulp & Paper	13	Petrochemicals, gas crackers, petroleum refineries
6	Chlor - Alkali	14	Thermal power stations, hydro power stations
7	Sugar	15	Commercial buildings
8	Textile		

# India Berau of Energy Efficiency

- BEE (Berau of Energy Efficiency) has been empowered to specify the qualification criteria and procedures for the certification of Energy Managers and qualifications for Accredited Energy Auditors.
- The passing of the **National level certification examination** is the qualification for an Energy Manager to be appointed or designated as Certified Energy Manager.
- For accreditation of Energy Auditors, certified Energy Auditor may be one of the prerequisites, besides other criteria for consideration for accreditation.

# Energy Manager & Energy Auditor

- Every designated Industry should nominate one officer as Energy Manager. He/she should obtain Manager Certificate issued by National Productivity Council who are authorized by Bureau of Energy Efficiency to conduct Exam and issue certificate.
- Energy Auditors are accredited as Energy Experts, who are authorized to conduct independent energy auditing, conducts exams for them on behalf of BEE and issues certificates under National Certification Authority (NCA).

# Role of Energy Manager

- To establish an energy conservation cell and prepare annual activity plan.
- To develop and manage training program for energy efficiency at operating levels.
- To Initiate activities to improve monitoring and process control to reduce energy costs.
- To coordinate implementation of energy audit /efficiency improvement projects through external agencies.
- To provide information to BEE & Designated Agency of the respective States.

# Eligibility Criteria of Energy Managers

- Graduate Engineer (BE / B.Tech) or equivalent with 3 years work experience.
- Post graduate engineer (ME / M.Tech) or equivalent with 2 years work experience.
- Graduate Engineer with post graduate degree in Management or equivalent with 2 years work experience.
- Diploma Engineer or equivalent with 6 years of work experience.
- Post graduate in Science with 5 years work experience.

# Role of Energy Auditors

- To carryout detailed energy audit.
- To quantify energy consumption and establish base line energy information.
- To construct energy and material balance.
- To perform efficiency evaluation of energy and utility systems.
- To compare energy norms with existing energy consumption levels.
- To identify and priorities energy of saving measures.

# Eligibility Criteria for Energy Auditors

- Graduate Engineer (BE / B.Tech) or equivalent with 3 years of Work experience.
- Post graduate Engineer (ME / M.Tech) or equivalent with 2 years of work experience.
- Graduate Engineer with post Graduate Degree in Management or equivalent with 2 years of work experience

# Examination Papers

Exam is conducted by *National Productivity Council (NPC)*.

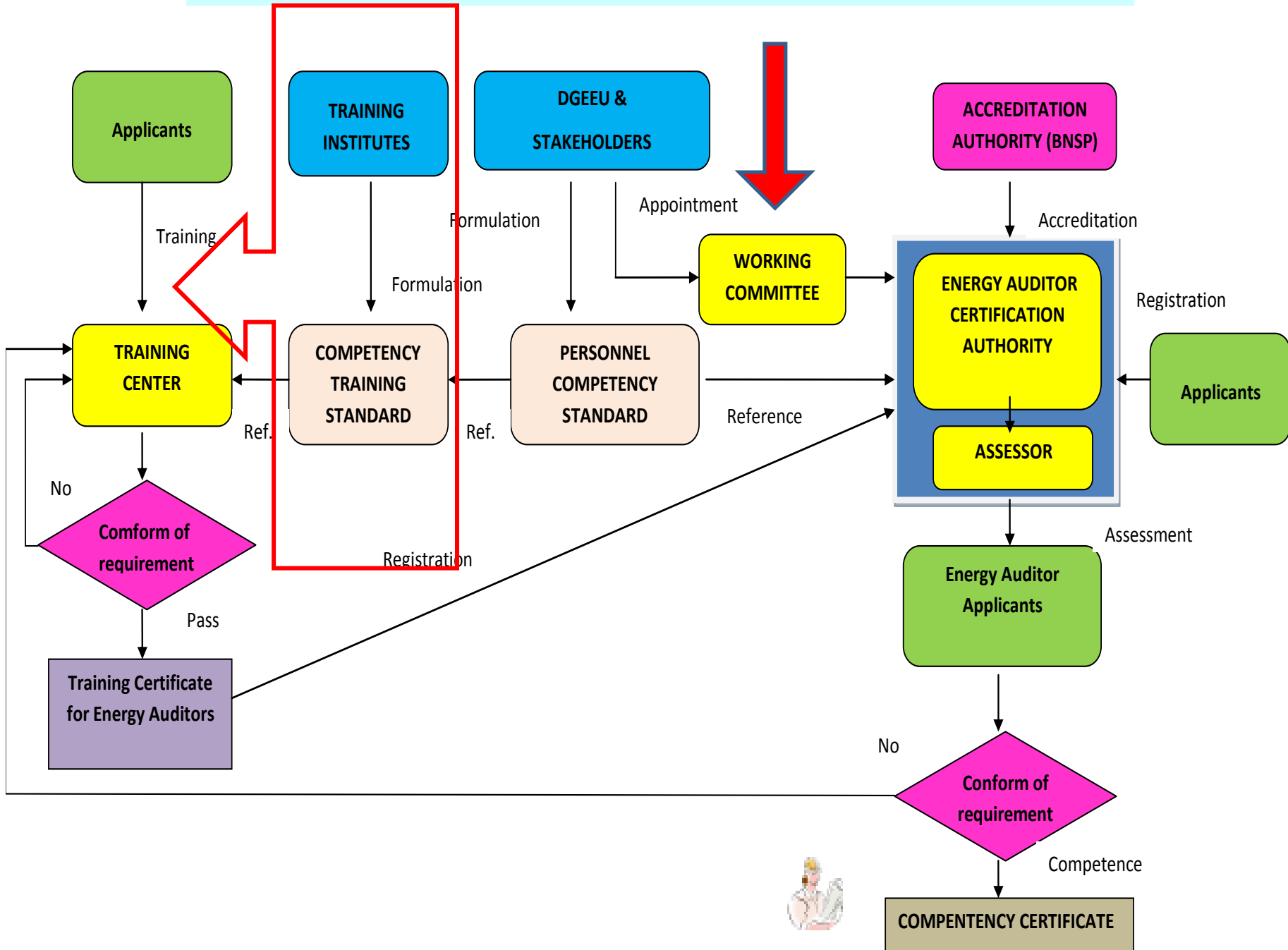
- **Paper-1** : General Aspects of Energy Management & Energy Audit for EM & EA ;
- **Paper-2** : Energy Efficiency in Thermal Utilities for EM & EA ;
- **Paper-3** : Energy Efficiency in Electrical Utilities for EM & EA ;
- **Paper-4** : Energy Performance Assessment for Equipment & Utility Systems (open book examination)
- Paper 1,2 and 3 are common for Energy Managers & Energy Auditors. Any candidate, qualifying in these three papers will be eligible for Energy Manager Certification.
- For **Energy Auditor Accreditation**, the candidate has to qualify in all the four papers. The degree of difficulty in paper 4 will be comparatively much higher than other papers.
- **More information** : <http://www.bee-india.nic.in> and <http://www.aipnpc.org>



## INDONESIA : Present Situation of Energy Auditor Certification Scheme

1. Up to today, there is **NO** Energy Auditor Certification Authority (Badan/Otoritas Sertifikasi Auditor Energi) available, although Competency Standard for Energy Manager and Energy Auditor have been discussed in Consensus Forum by a Standardization Committee;
2. The need to have government and stakeholders support s for initiation of the establishment of an energy auditor certification authority/body .
3. Government, i.e. DGNREEC (EBTKE) should provide a budget for *Energy Conservation Fund or Budget* as the “working capital” and support by others energy producers/ suppliers, energy users, associations, NGOs, donors, etc.

# OPTION FOR ENERGY AUDITOR CERTIFICATION SCHEME



**STAKEHOLDERS**

**REPRESENTATIVES**

**Policy Side :**  
DGEEU  
BAPPENAS  
KLH  
Univeristies

**Energy Supply Side :**  
Pertamina  
PLN  
Chevron, etc.

**User Side :**  
Industries  
Commercial buildings  
Privates

**Professional Accreditation institutions :**  
BNSP

**Business Side :**  
NGO's Association, etc.

**Sponsor/Donor :**  
Danida, etc.

**TRAINING INSTITUTES**

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Universities  
R&D Institutions  
R &D Industries  
Associations"]; style A fill:#cccccc; style B fill:#ffffff; style C fill:#ffffff;
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**REPRESENTATIVES**

Badiklat ESDM  
Universities  
R&D Institutions  
R &D Industries  
Associations

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4. DGEEU and stakeholders should appoint a **Working/Technical Committee** *for Energy Auditor Certification Authority/Body* establishment;
5. DGNREEC and stakeholders (and Working Committee if necessary) should formulate Personnel Competency Standard and Competency Training Standard (together with Training Institutes).
6. In Indonesia, the accreditation should come from Badan Nasional Sertifikasi Profesi (BNSP)

## Conclusions & Suggestions

1. The need to have government and stakeholders support for initiation of “an energy auditor certification authority/body “ establishment;
2. Government, i.e. DGNREEC should provide a budget for *Energy Conservation Fund or Budget* as the “working capital” and support by energy producers/suppliers, energy users, associations, NGOs, donor countries (if necessary) etc.
3. It is suggested that the accreditation should come from Badan Nasional Sertifikasi Profesi (BNSP)
4. DGNREEC and stakeholders should appoint **Working/Technical Committee** for *Energy Auditor Certification Authority/Body* establishment
5. It is hope that this workshop participants will support the initiation toward the establishment of energy auditor authority/body.



**EINCOPS**

**Thank You**

**Terimakasih**

**Maturnuwun**