

INDIA'S NATIONAL CERTIFICATION EXAMINATION FOR ENERGY MANAGERS AND ENERGY AUDITORS

EMAK Workshop
Paris, 26-27th January 2010



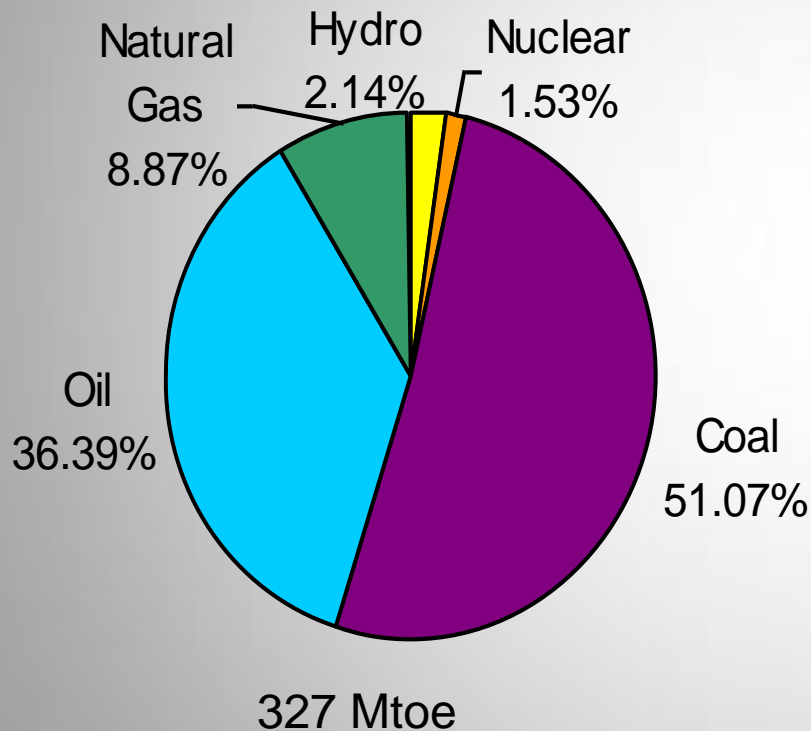
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INTRODUCTION

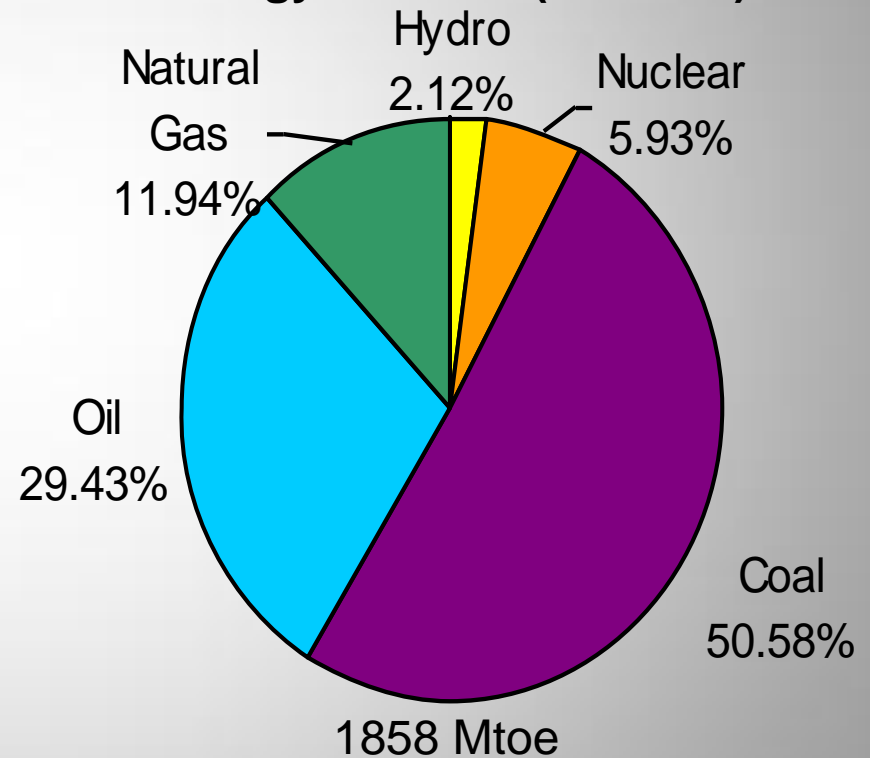
- India has made rapid strides towards economic self-reliance over the last few decades.
- Impressive progress has been made in the fields of industry, agriculture, communication, transport and other sectors necessitating growing consumption of energy for developmental and economic activities.

Indian Energy Sector

**Total Primary Commercial
Energy Demand (2003-04)**



**Total Primary Commercial
Energy Demand (2031-32)**



Energy requirement to increase at a CAGR of 6.4% (2004-2032) and coal to remain the mainstay

High import dependency to continue

(2031/32)

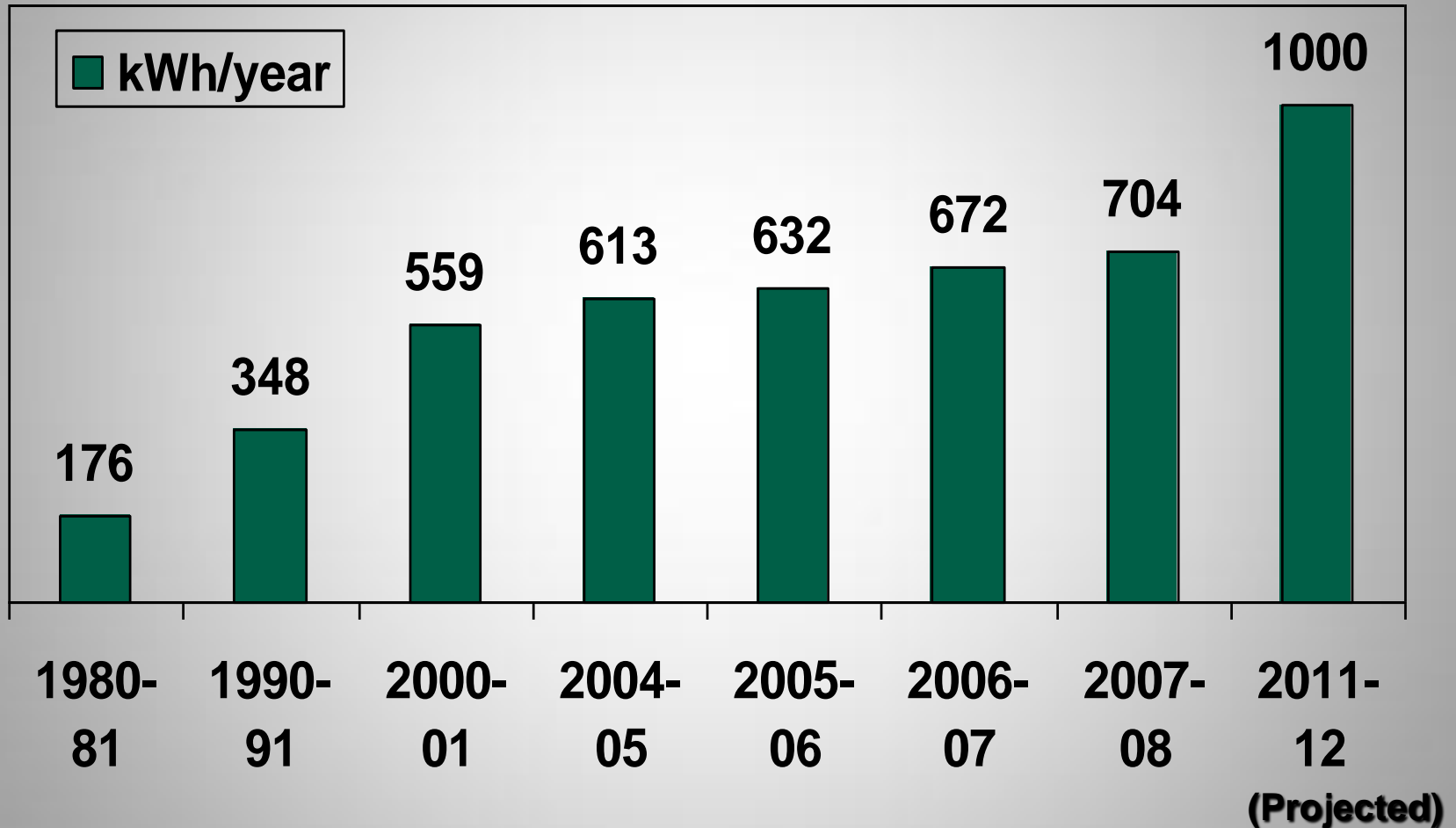
Present Status 06-07



Source: Planning Commission, 2006

PER CAPITA CONSUMPTION OF ELECTRICITY IN INDIA

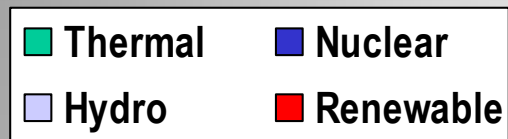
Growth Pattern



As per UN Methodology (Gross Electrical Energy Availability / Population)

GROWTH OF INSTALLED GENERATING CAPACITY IN INDIA

(figs. in MW)



* includes Likely capacity Addition of 14000 MW from Renewables during 11th plan period

Source: CEA

INTRODUCTION (contd.)

- Conventional source of energy such as coal, oil and gas are scarce and exhaustible.
- Energy prices will rise in the long run to reflect their relative scarcity and high cost of exploration and extraction.
- Hence, all attempts need to be made expeditiously to ensure the optimal use of the available resources so as to manage the viability and availability of energy use and supply.

Energy Efficiency in India

- Over the past 8 - 9 years energy efficiency in India has been increasing at a good trot, and energy intensity has declined by about 20-25%.
- This is due to a variety of reasons, including the fact that energy prices in India are fairly high both in absolute terms as well as in terms of the affordability relative to people's incomes.
- Yet there are places where energy efficiency opportunities continue to exist largely because of a range of market failures: information, risks and split incentives.
- This has led the Government of India through the Energy Conservation Act and the Bureau of Energy Efficiency to launch several programmes.



THE INDIAN ENERGY CONSERVATION ACT



- EC Act enacted in October 2001
- Five major provisions of EC Act relate to Designated Consumers, Standard and Labeling of Appliances, Energy Conservation Building Codes, Creation of Institutional Set up (BEE) and Establishment of Energy Conservation Fund
- Become effective from 1st March 2002
- Bureau of Energy Efficiency (BEE) operationalized from 1st March 2002.
- Energy efficiency institutional practices and programs in India are now mainly being guided through various voluntary and mandatory provisions of the Energy Conservation Act

MISSION OF BEE

Develop policy and strategies with a thrust on self regulation and market principles, within the overall framework of the EC Act with the primary objective of reducing energy intensity of the Indian economy.

DESIGNATED CONSUMERS

(A programme to initially focus on energy policy issues of energy efficiency improvement in organized sectors such as energy intensive industries and commercial sector through establishment of energy management system, capacity building of energy professionals, implementation of energy audits, establishments of specific energy consumption norms and support to consumers on providing information on authentic energy data)

- Schedule to EC Act provides list of 15 energy intensive industries and other establishments to be notified as designated consumers (DC). DCs to
 - Appoint or designate Certified energy managers
 - Get energy audits conducted by Accredited energy auditors
 - Implement techno-economic viable recommendations
 - Comply with norms of specific energy consumption fixed
 - Submit report on steps taken

Schedule to EC Act

List of Energy Intensive Industries and other establishments specified as designated consumers

- ☐ Aluminium;
- ☐ Fertilizers;
- ☐ Iron and Steel;
- ☐ Cement;
- ☐ Pulp and paper;
- ☐ Chlor Akali;
- ☐ Sugar;
- ☐ Textile;
- ☐ Chemicals;
- ☐ Railways;
- ☐ Port Trust;
- ☐ Transport Sector (industries and services);
- ☐ Petrochemicals, Gas Crackers, Naphtha Crackers and Petroleum Refineries;
- ☐ Thermal Power Stations, hydro power stations, electricity transmission companies and distribution companies;
- ☐ Commercial buildings or establishments;

	Notified Industry as Designated Consumers under Indian EC Act (as on date)
1)	Thermal Power Stations- 30,000 metric tonne of oil equivalent (MTOE) per year and above
2)	Fertilizer- 30,000 metric tonne of oil equivalent (MTOE) per year and above
3)	Cement- 30,000 metric tonne of oil equivalent (MTOE) per year and above
4)	Iron & Steel- 30,000 metric tonne of oil equivalent (MTOE) per year and above
5)	Chlor-Alkali- 12,000metric tonne of oil equivalent (MTOE) per year and above
6)	Aluminium- 7,500 metric tonne of oil equivalent (MTOE) per year and above
7)	Railways- One traction substation in each Zonal Railway , Production units and Workshops of Indian Railways having total annual energy consumption of 30,000 MTOE or more under Ministry of Railways
8)	Textile-3,000 metric tonne of oil equivalent (MTOE) per year and above
9)	Pulp & Paper-30,000 metric tonne of oil equivalent (MTOE) per year and above

Sector wise Distribution of Designated Consumers(DCs)

Sl. No	Name of the sector	No of DCs
1	Aluminium	9
2	Cement	104
3	Chlor Alkali	28
4	Fertilizer	25
5	Paper & Pulp	93
6	Thermal Power Stations	131
7	Railways	As notified
8	Steel	98
9	Textile	226
	Total	714 (exclusive of Railways)

National Certifications Examination for Energy managers and Energy Auditors

- The Government of India has specified the passing of the National level certification examination as the qualification for a Certified Energy Manager & Certified Energy Auditor
- BEE has been empowered by the law for directing designated consumers to designate or appoint certified energy managers.
- BEE has taken up the challenge of creating a cadre of professionally qualified energy managers with expertise in energy management, project management, financing and implementation of energy efficiency projects, and policy analysis under its National Action Plan , which was released to Nation by the Hon'ble Prime Minister of India in August,2002.
- The national level certification examination establishes a uniform criterion for the certification of energy managers/energy auditors and also ensures that services of qualified persons, having the requisite knowledge on the subject, are available to the industry.



One of the Thrust areas of BEE

1st Action Plan..

1. Indian Industry Programme for Energy Conservation:
Conduct of energy audit among the notified designated consumers by accredited energy auditors.
2. Demand Side Management
3. Standards and Labeling Programme
4. Energy Efficiency in Buildings and Establishments
5. Energy Conservation Building Codes
- 6. Professional Certification and Accreditation**
7. Manuals and Codes
8. Energy Efficiency Policy Research Programme
9. School Education
10. Delivery Mechanisms for Energy Efficiency Services

India Needs.....

- About 20,000 Certified Energy Managers
- About 10,000 Certified Energy Auditors

Energy Manager- Role & Duties

Energy Manager is a focal point of all the activities pertaining to energy management in the organization:

- Provides leadership in the development of policy on energy management action plan and plays a key role in the formulation of corporate energy policy.
- Performs the activities related with Plant Energy Management, project management, personnel management and financial management at the plant level.
- Prepares the information to be submitted to the Designated Agency with regard to the energy consumed and action taken on the recommendation of the accredited energy auditor.

Energy Auditors- Responsibilities and duties

- Carry out detailed energy audit
- Verify energy consumption and establish base line energy information
- Construct energy and material balance
- Perform efficiency evaluation of energy & utility systems
Compare energy norms with existing energy consumption levels.
- Identify and prioritization of energy saving measures
Analysis of technical and financial technologies and alternate energy sources.
- Report writing, presentation and follow up for implementation.

Certification Process

- Certification assesses an individual's competence in a particular Field.
- Competence is the ability to acquire and apply knowledge and skills through study and experience.
- Certification is a test of competence (not academic achievement)

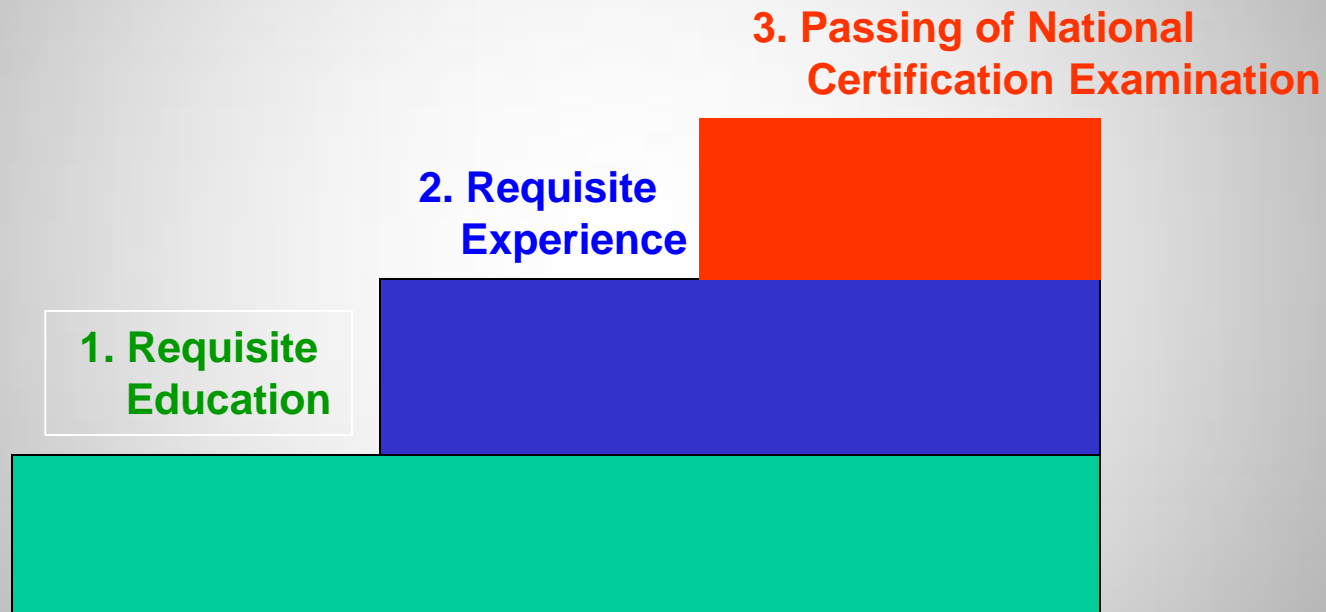
Benefits of Professional Certification

- When an individual becomes certified in a designated field, his/her professional achievement is recognized in the eyes of colleagues, as well as prospective employers and clients.
- Certification establishes a standard of professional competence which is recognized throughout the industry.
- Certification fosters professional development through encouragement of long-term career goals.
- Certification promotes quality through continuing education to assure a high level of competence in constantly changing fields

National Level Certification Examination - Need

- To establish a uniform criterion for the certification of energy managers/energy auditors
- To ensure that services of qualified persons, having the requisite knowledge on the subject, are available to the industry.

Establishment of the uniform criterion and quality services



Skills required for Effective Energy Manager/ Energy Auditors

- Plant Energy Management
- Project Management
- Financial Management
- Performance Assessment
- Personal Management
- Computer / Database Literacy

Who can write the Indian National Certification examination ?

Diversity of Education and Practical Experience

For Energy Managers:

Candidates appearing for Energy Managers certification examination should possess any one of the following qualifications: -

- i. **Graduate Engineer** (B.E / B.Tech) or equivalent with **3 years** of work experience
- ii. **Post Graduate Engineer** (M.E / M.Tech) or equivalent with **2 years** of work experience
- iii. **Graduate Engineer with Post Graduate degree in Management or equivalent** with **2 years** of work experience
- iv. **Diploma Engineer** or equivalent with **6 years** of work experience
- v. **Post Graduate in Physics or Electronics or Chemistry** with **3 years** of work experience

For Energy Auditors:

Candidates appearing for Energy Auditors certification examination should possess any one of the following qualifications: -

- i. **Graduate Engineer** (B.E / B.Tech) or equivalent with **3 years** of work experience.
- ii. **Post Graduate Engineer** (M.E / M.Tech) or equivalent with **2 years** of work experience.
- iii. **Graduate Engineer** with **Post Graduate degree in Management** or equivalent with **2 years** of work experience .

Energy Manager and Energy Auditor Examination: Scheme

Paper No	Name of the Paper	Duration	Max .Marks
1	General Aspects of Energy Management & Energy Audit.	3 Hrs	150
2	Energy Efficiency in Thermal Utilities	3 Hrs	150
3	Energy Efficiency in Electrical Utilities	3 Hrs	150
4	Energy Performance Assessment for Equipment and Utility systems (Open Book Examination)	2 Hrs.	100
<p>NOTE:</p> <p>1. Any candidate on passing the three papers (with a minimum score of 50%) i.e. Paper-1, Paper-2 & Paper-3 shall be eligible for award of Energy Manager Certification</p> <p>2.For Energy Auditor Certification, the candidate has to pass all four papers (with a minimum score of 50%)</p> <p>3.Certified Energy Auditor is also a Certified Energy Manager</p>			

Course Books

Following Course Books are specially developed for the candidates appearing for the examination :

Paper-1: General Aspects of Energy Management & Energy Audit

Paper-2: Energy Efficiency in Thermal Utilities

Paper-3: Energy Efficiency in Electrical Utilities

Paper-4: Energy Performance Assessment for Equipment and Utility Systems.

The Course books for Energy Auditors and Energy Managers are sent to all candidates on registration.

Book 1

*Guide book for
National Certification Examination for
Energy Managers and Energy Auditors*

General Aspects of Energy Management and Energy Audit

Book 2

*Guide book for
National Certification Examination for
Energy Managers and Energy Auditors*

Energy Efficiency in Thermal Utilities

Book 3

*Guide book for
National Certification Examination for
Energy Managers and Energy Auditors*

Energy Efficiency in Electrical Utilities



Bureau of Energy Efficiency
(A Statutory Body under Ministry of Power, Government of India)

4th Floor, Sewa Bhawan
R. K. Puram, New Delhi -110 066
www.bee-india

Book 4

*Guide book for
National Certification Examination for
Energy Managers and Energy Auditors*

Energy Performance Assessment for Equipment and Utility Systems



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www.bee-india

Supplementary Candidates

- Those candidates who could not appear /qualify in any paper are eligible to write the supplementary examination
- Exemption to the candidate is given for a particular paper, if he/she secures equal or more than 50% of the maximum marks in that paper.
- In the supplementary examination, the candidate has to secure a minimum of 50% of the maximum marks for qualifying in the examination.

Progress Achieved

- 9 National Certification examinations for Energy Managers and Energy Auditors have also been successfully conducted .
- The country has now about 6257 Certified Energy Managers, out of which 4943 are also qualified as Certified Energy Auditors, from the previous 8 examinations as the results for the 9th examination is expected to be announced on 8th February,2010
- 64 energy auditing agencies had been earlier temporarily accredited on the bases of their energy auditing capabilities and institutional set up.
- 4 Guidebooks have been prepared to assist energy professionals
- 4 Guidebooks are being currently revised based on the Revised Syllabus

Details of Registered & Certified Candidates

Year	Energy Auditor - Registered	Certified Energy Auditor	Energy Manager - Registered	Certified Energy Manager
2004	2193	468	715	348
2005	1707	689	461	155
2006	2294	867	538	223
2006 (on abolition of viva)	-----	599	0	0
Apr-07	2187	427	695	171
Nov. 2007	629	441	229	123
May 2008	1979	499	588	89
Nov. 2008	1464	477	512	113
May 2009	1741	497	623	93
Total	12453	4943 (39.7%)	3738	1314 (35.2%)

Progress Achieved-Contd.

- Three interactive Websites (www.energymanagertraining.com) (www.bee-india.nic.in) (www.em-ea.org) are in place.
- More than 5000 visitors visit these websites daily
- More than 5000 engineers, including CEMs and CEAs participated in 77 nos. of workshops (Taskforces/Life Long Learning Programme) and other programmes on energy efficiency
- 7 Manuals and energy auditing codes for utility equipment are in place for CEMS and CEAs
- Guidelines for the Conduct of Energy Audit of Thermal Power Stations prepared for Certified Energy Auditors prepared



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A statutory body under Ministry of Power, Government of India

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National Energy
Conservation Awards

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Useful Downloads

Events

BEE Programs

On Line E-filing for Standards and
Labeling Programme

Compare Labeled Product

e-Filing of Energy Returns/Awards

Photo Gallery

Bachat Lamp Yojana

Agricultural Demand Side
Management

Municipal Demand Side
Management

Designated Consumer

Small & Medium Enterprises

Electricity Act 2003

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EA/EM Exams

9th National Certification Examination for Energy Managers and Energy Auditors - (for Supplementary Candidates only) December 2009

For Advertisement December 2009 (pdf format, 69 kb)

[DOWNLOAD](#)

For Prospectus December 2009 (pdf format, 203 kb)

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Online Registration

For Online Application Dec 2009 only at <http://www.aipnpc.org>

Exam Centers

[Not available](#)



9th Examination Updates - May 2009

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[4th](#)

[3rd](#)

[2nd](#)

[1st](#)

[List of certified Energy Managers & Energy Auditors](#)

Comments invited for the on the Draft regulations

Gazette of India - Bureau of Energy Efficiency Notification dated 15th July 2009 Comments invited for the on the Draft regulations for **Certification Procedure for Energy Managers** - Regulations, 2009 Objections or suggestion, if any, may be addressed to the Director General, Bureau of Energy Efficiency, 4th Floor, Sewa Bhavan, R. K. Puram, New Delhi – 110 066.

[Part III Sec 4.118 dated 15-07-2009](#) (11Mb -scanned pdf format)


AJAY MATHUR, Director-General



9th National Certification Examination for Energy Managers and Energy Auditors (for Supplementary Candidates only)- December 2009

9th National Certification Examination for Energy Managers & Energy Auditors – December 2009

[Examination Centres and Venues](#)



BUREAU OF ENERGY EFFICIENCY (BEE)

(A Statutory body under Ministry of Power, Government of India)

**9th NATIONAL CERTIFICATION EXAMINATION FOR
ENERGY MANAGERS AND ENERGY AUDITORS
(for Supplementary Candidates only) – December, 2009**

As per the Energy Conservation Act 2001, it is mandatory for the designated consumers to designate or appoint an Energy Manager (under clause 14(f)). Bureau of Energy Efficiency (BEE) has been empowered to specify the qualification criteria and procedures for the certification of Energy Managers and qualifications for Accredited Energy Auditors.



The National Certification Examination for Energy Managers and Energy Auditors



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- [Question Papers - 2004,2005,2007,2008](#)
- [Model Question Paper-2006](#)
- [Model Test Series1 Questions & Solution](#)
- [Questions & Solutions - November 2008](#)
- [Questions & Solutions - May 2009](#)

List of Certified Energy
Managers and Certified
Energy Auditors
[Click Here](#)

**RESULTS OF 8th
EXAMINATION IS
DECLARED**

Attention:
REGISTERED CANDIDATES !
Please click here to update your
Contact Information.

9th NATIONAL CERTIFICATION EXAMINATION FOR ENERGY MANAGERS AND ENERGY AUDITORS

Exam Dates: 19th & 20th DEC 2009

(For Supplementary and Upgradation candidates only)

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materials in areas of energy, environment, plant engineering,
industrial engineering besides free video clips on cleaner
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[For various Energy Acts Click Here](#)

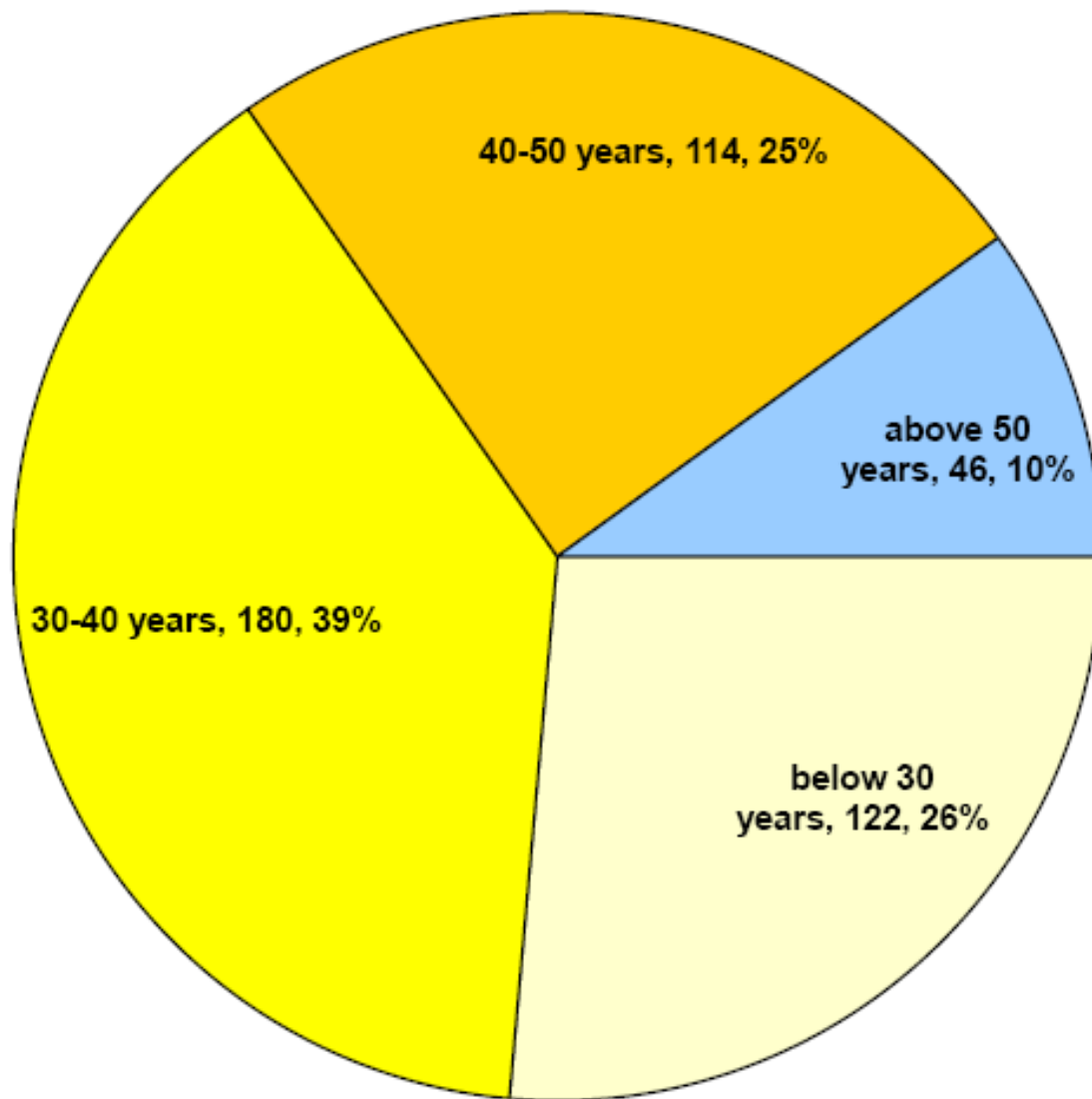


Exam Feedback Analysis 2009

**8th National Certification Examination
for
Energy Managers & Energy Auditors**

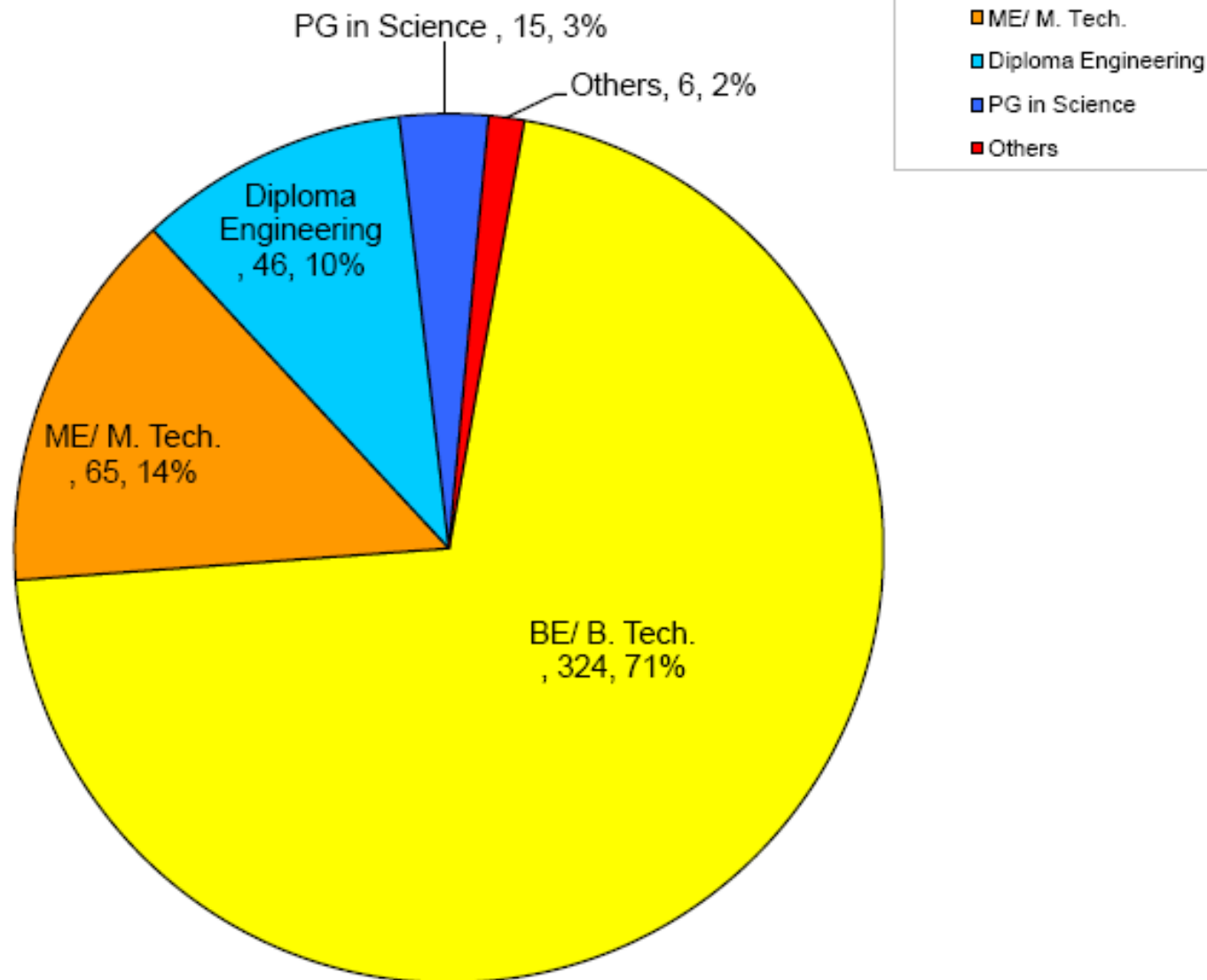
23 - 24 May 2009

Age of candidates

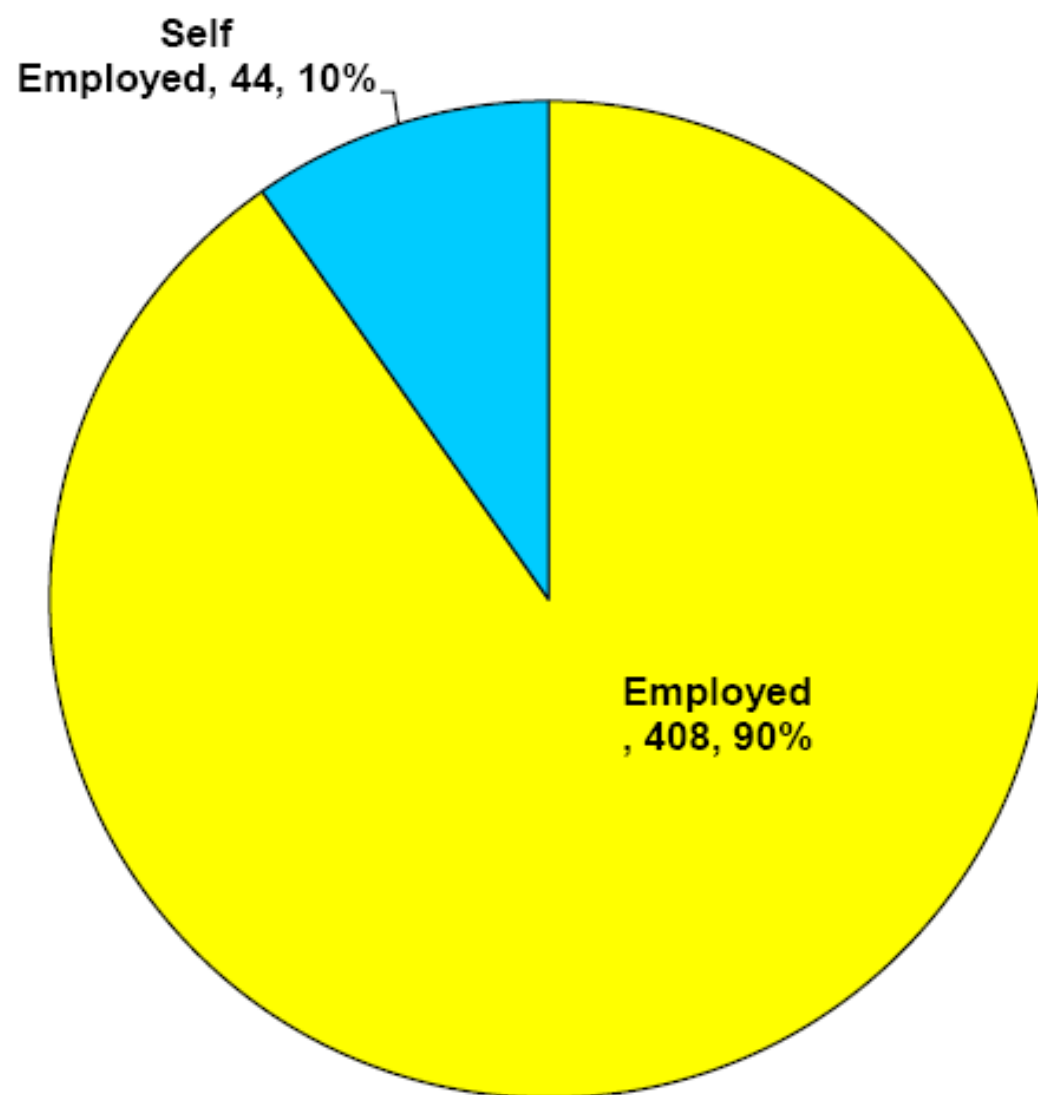


- below 30 years
- 30-40 years
- 40-50 years
- above 50 years

Qualifications



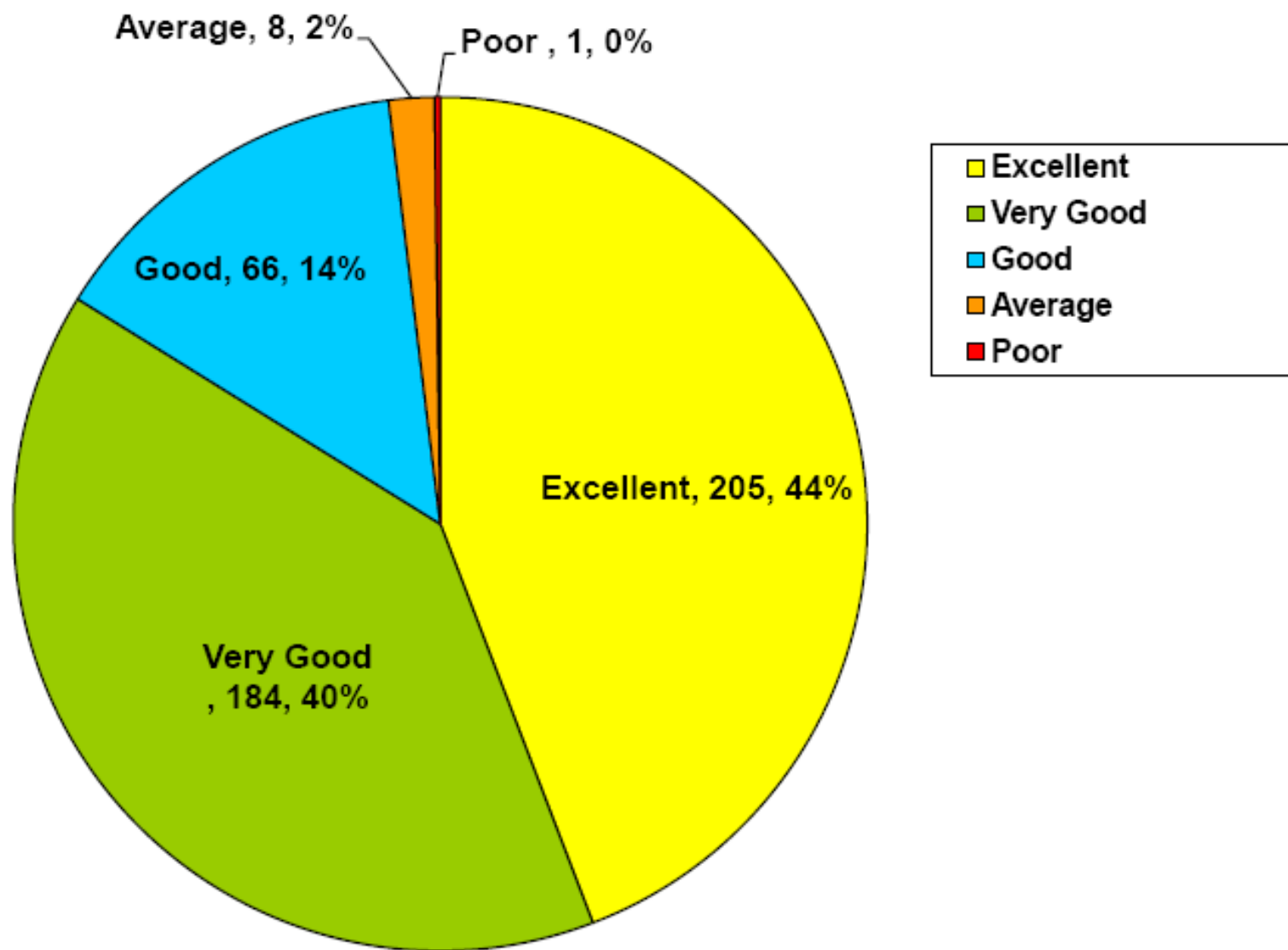
Employment Status



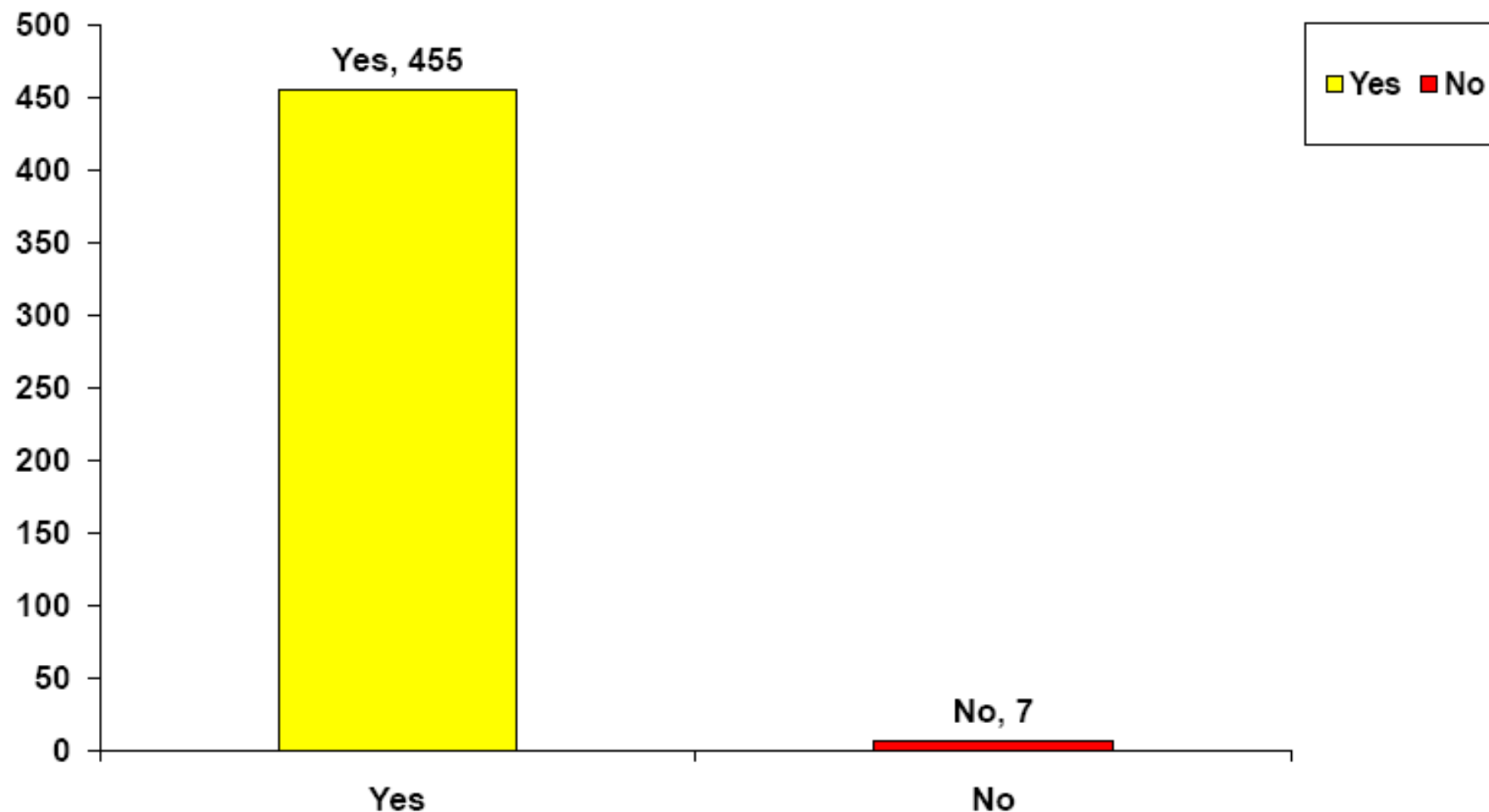
Employed

Self Employed

Q1 How do you rate the overall process of certification of EM/ EA by BEE

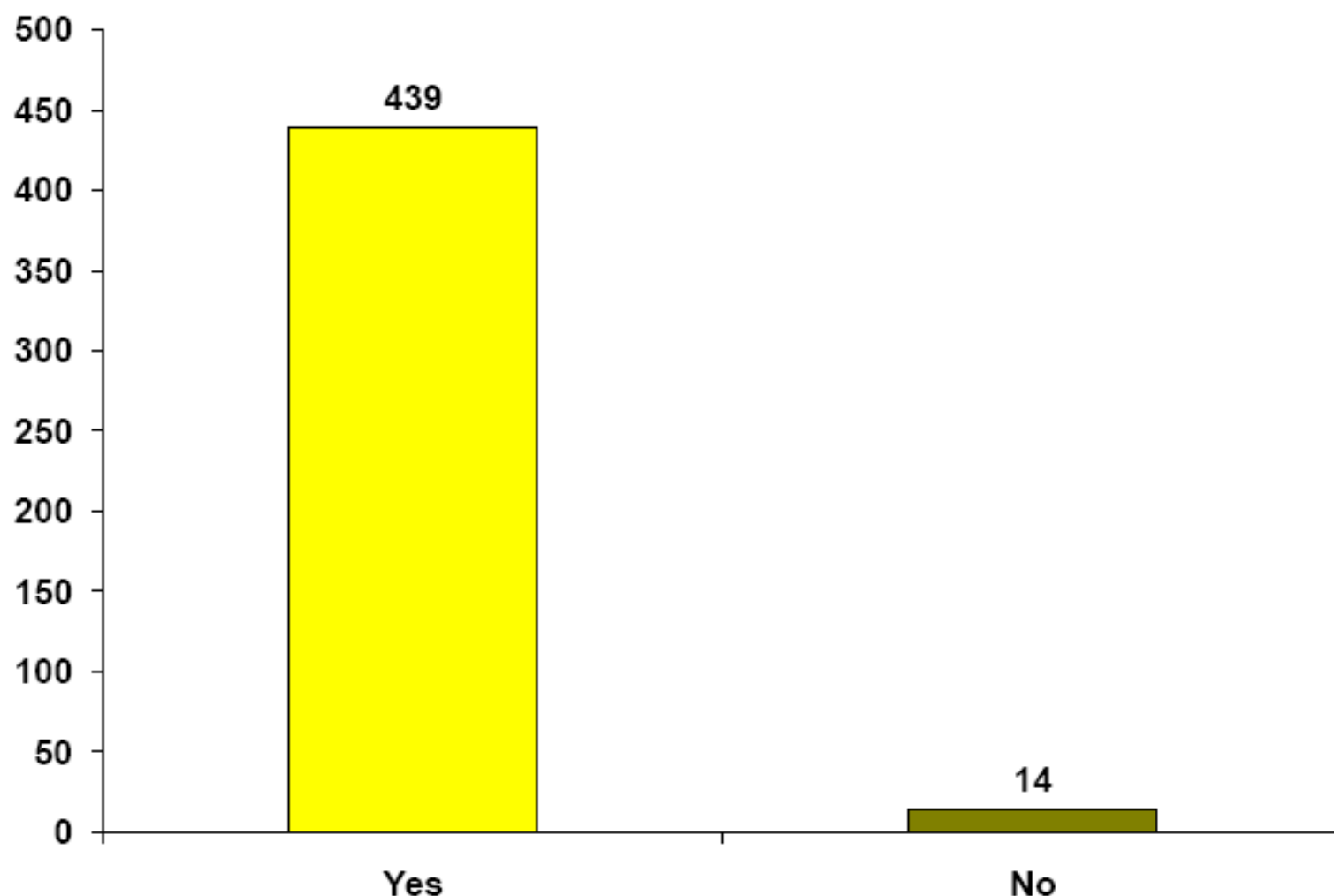


Q2 Do you feel that the knowledge acquired through certification process will be useful in strengthening your energy management and auditing capabilities.



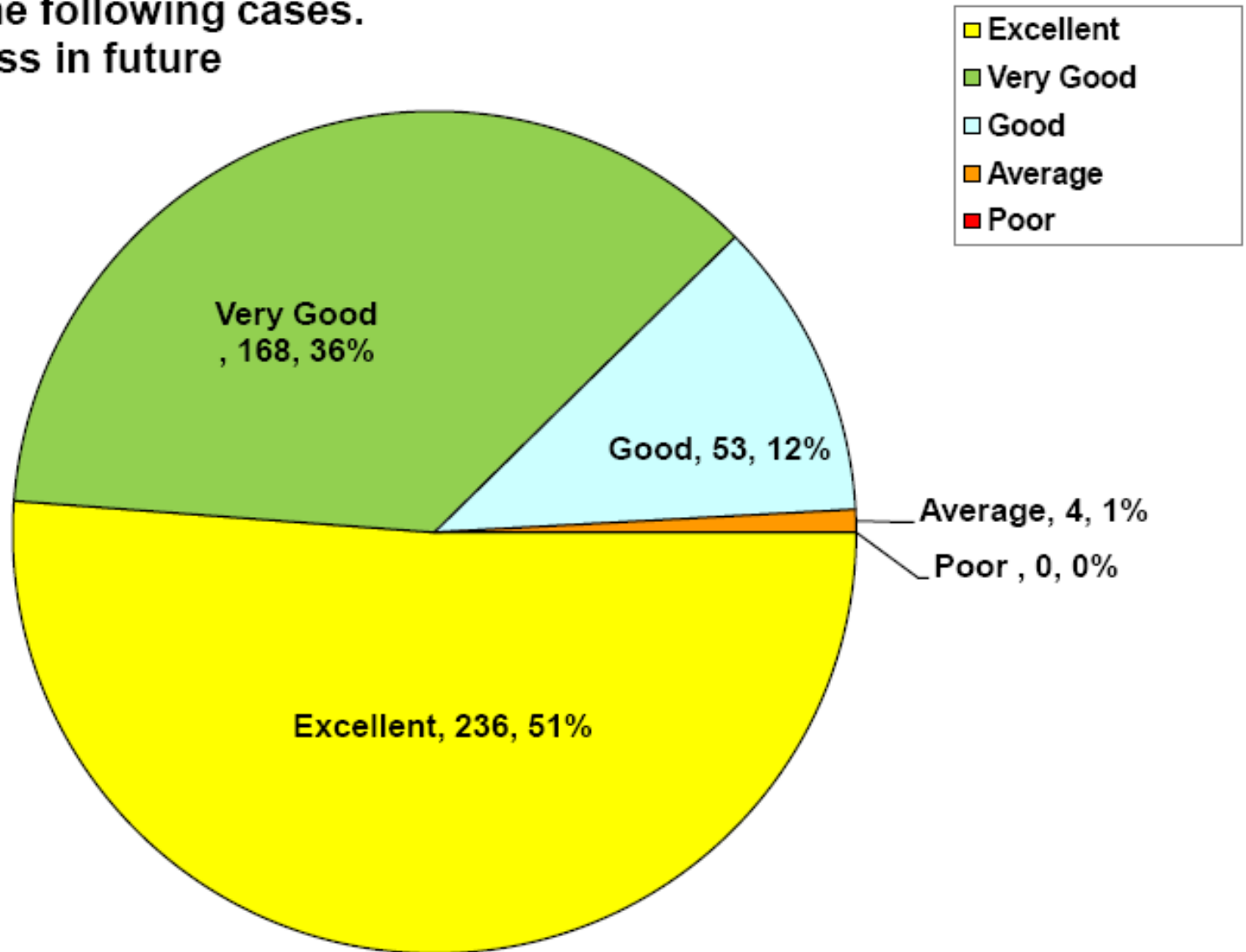
Q3 If employed, whether the knowledge acquired through this certification will be helpful to your company.

Yes No

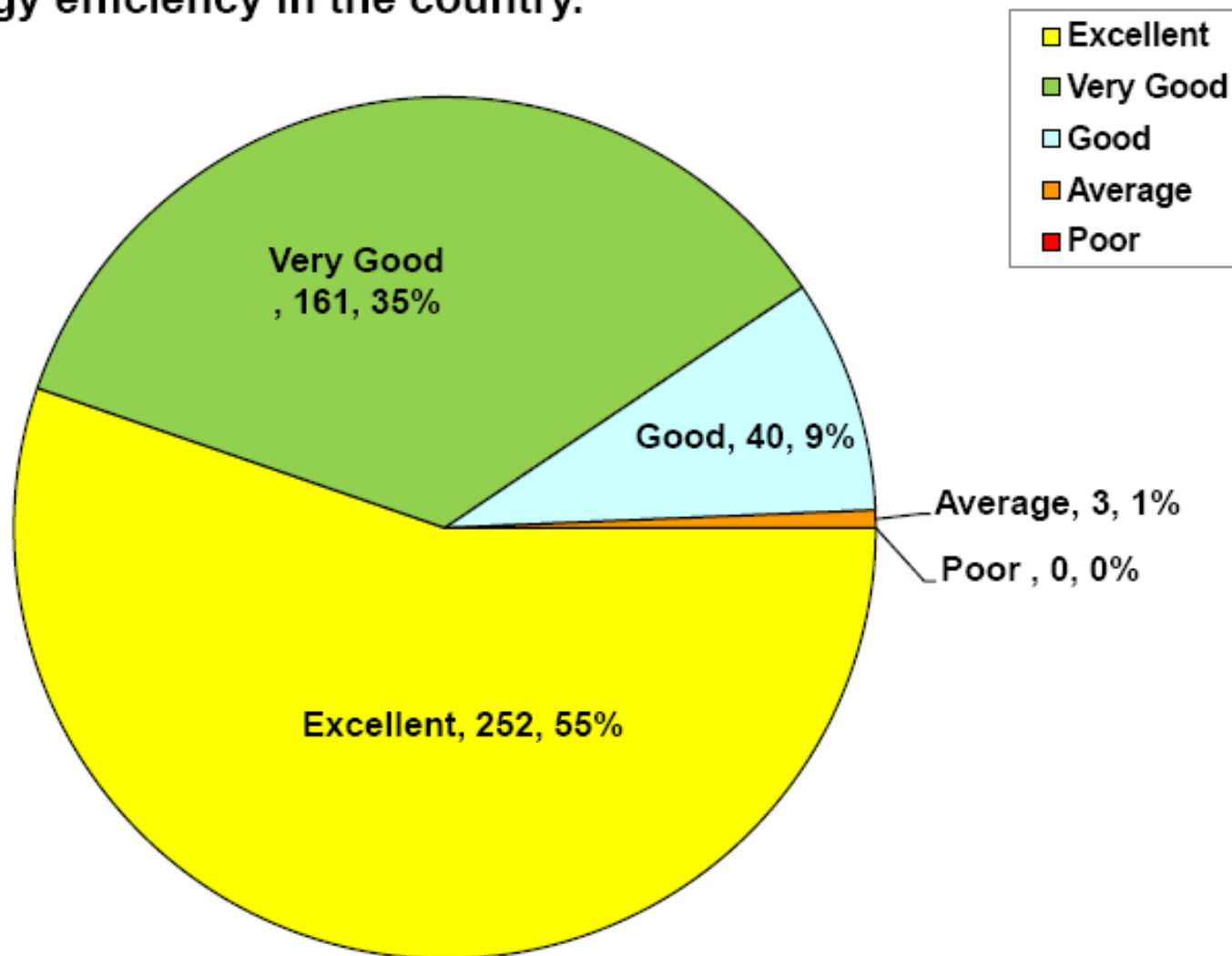


Q4. How do you rate the course material/ books provided by BEE in the following cases.

c Usefulness in future



Q5. How do you rate BEE initiative of undertaking the certification process and its usefulness in the promotion of energy efficiency in the country.



Other Indian Institutes/ Universities offering Courses on Energy Management/Energy Engineering

1. Annamalai University, Annamalai Nagar (Tamil Nadu)
2. Banaras Hindu University, Varanasi - 221005 (Uttar Pradesh)
3. Bharatidasan University, Tiruchirapali-624 024(Tamil Nadu)
4. College of Engineering Anna University Guindy, Chennai -600 025
5. Devi Ahilya Vishwavidyalaya ,Nalanda Parisar, R.N.T. Marg, Indore -452001 (Madhya Pradesh).
6. Indian Institute of Social Welfare and Business Management Kolkata-700073, (West Bengal)
7. Indian Institute of Technology (IIT-Delhi) Delhi, Hauz Khas, New Delhi – 110016
8. Jadavpur University,188, Raja S.C. Mullick Road, Kolkata 700 032
9. JNTU College of Engg., Mahavir Marg, Hyderabad 500 028 (Andhra Pradesh)

Source: Employment News

Other Indian Institutes/ Universities offering Courses on Energy Management/Energy Engineering (Contd.)

10. Kumaraguru College of Technology Chinnavedampatti (Po), Coimbatore- 641 006
11. Maulana Azad College of Technology (Regional Engineering College), Bhopal - 462007 (Madhya Pradesh)
12. National Institute of Technology, Calicut (Formerly Regional Engineering College Calicut)
13. Punjab University, Chandigarh -160 014
14. Rajiv Gandhi Prodyogiki Vishwavidyalaya Airport Bypass Road, Gandi Nagar, Bopal, (Madya Pradesh) -462036
15. National Institute of Technology, Tiruchirappalli, Formerly Regional Engineering College,Tiruchirapali -620015 (Tamil Nadu)
16. School of Energy Studies Department of Physics, University of Pune, Ganeshkhind, Pune- 411007 (Maharashtra)
17. Tezpur (Central) University, Napam, Tezpur- 784028 (Assam)
18. Vellore Engineering College,Katpadi-Tiruvalam Road, Vellore North Arcot- Ambedkar dist.- 632 007 (Tamil Nadu)

Source: Employment News

Institutes /Universities offering correspondence course in Energy Management/ Energy Conservation

1. Annamalai University, Annamalai Nagar (Tamil Nadu)
2. Devi Ahilya Vishwavidyalaya, Nalanda Parisar, R.N.T. Marg, Indore -452 001 (Madhya Pradesh)
3. Distance Education Department ,University of Hyderabad, Hyderabad (Andhra Pradesh)

Source: Employment News

CONCLUSION

- With the conclusion of global climate summit in Copenhagen, future professionals can take the hint- '*Climate change awaits solutions and implementers to measure and curb the mindless energy consumption.*'
- Within a framework of policies, focusing on optimal utilization of energy resources, energy manager profession is set to become one of the hottest professions in the near future.
- In demand are energy managers and energy auditors who will not only track and save energy, but also help slay its planet-unfriendly by-products like greenhouse gas emissions.
- The revolution to engage energy managers and energy auditors has already started in Indian industry, thanks to the Indian National Certification Examination for Energy Managers and Energy Auditors

CONCLUSION- Contd.

- Certified energy managers as internal lobbyist and accredited energy auditors as an external lobbyist in tandem can influence top management decision on implementation of energy efficiency projects.
- The expertise of these two entities is para-mount to a successful implementation of energy efficiency projects and efficient operation bringing in energy efficiency improvement in the industry.
- The capacity building of energy managers and energy auditors through National Certification Examination route will have a long-term impact on the Indian economy by making it less energy intensive.

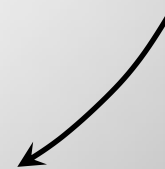
We all have our personal doomsday scenarios with respect
to an extremely “energy hungry” world

**It is never too late to practice energy
modesty and efficiency otherwise...**

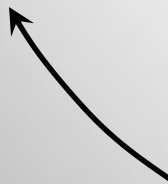
Year 1900



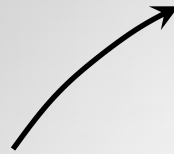
Year 2000



Year 2020



Year 1800
Year 2050



The history repeats itself scenario



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