Verified Energy Savings Related with the Activities of "Bureau of Energy Efficiency" for the year 2007-08

BUREAU OF ENERGY EFFICIENCY

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National Productivity Council
Lodhi Road, New Delhi

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SUMMARY OF VERIFIED ENERGY SAVINGS RELATED WITH ACTIVITIES OF "BUREAU OF ENERGY EFFICIENCY" FOR THE YEAR 2007-08

Programme	BEE Reference					NPC Verified				
	Electricity Saved (MU)	Equivalent (MTOE)	Avoided Generation (MW)	Thermal Energy Saved (MTOE)	Total MTOE Saved	Electricity Saved (MU)	Equivalent MTOE	Avoided Generation	Thermal Energy Saved (MTOE)	Total MTOE Saved
Standard & Labeling	1373.7	714,082	300	-	714,082	1425.8	484,261	260.4	-	484,261
National Energy Conservation Awards	1617.9	564,124	237	1,641,498	2,205,623	1612.3	438,061	236	1,641,498	2,079,559
As reported by State Designated Agencies	634.5	206,280	138.5	80,702	286,982	693.4	235,513	126.78	68,429	303,942
TOTAL	**3626.2**	**1,484,487**	**675.5**	**1,722,200**	**3,206,687**	**3731.5**	**1,157,835**	**623.1**	**1,709,927**	**2 ,867,762**

1.0 Introduction

The economic development of a country is often closely linked to its consumption of energy. Although India ranks sixth in the world so far as total energy consumption is concerned. It still needs much more energy to keep pace with its development objectives. India's projected economic growth rate is slated at 7.4 % in the period 1997-2012. This would necessitate commensurate growth in the requirement of commercial energy, most of which is expected to be from fossil fuels and electricity. India's proven coal reserves may last for more than 200 years, but the limited known oil and natural gas reserves may last only 18 and 26 years respectively, which is a cause of concern. The continued trend of increasing share of petroleum fuels in the consumption of commercial energy will lead to more dependence on imports and energy insecurity.

Therefore, a paradigm shift in approach to energy policy issues is needed - a shift from a supply dominated approach to an integrated approach incorporating a judicial mix of investment in supply side capacity, operational efficiency improvement of existing power generating stations, reduction of losses in transmission and distribution, end-use efficiency and renewable technologies. The policy goals and concepts will have to be shifted from energy conservation to energy efficiency, and from energy inputs to the effectiveness of energy use and energy services.

Recognizing the importance and benefits of energy efficiency, the government of India has enacted the Energy Conservation Act, 2001 which has come into force from 1st march, 2002.

Under the provisions of the Act, Bureau of energy Efficiency has been established with effect from 1st march, 2002 by merging the erstwhile Energy Management Centre of Ministry of Power. The Bureau would be responsible for spearheading the improvement of energy efficiency

of the economy through various regulatory and promotional instruments.

The mission of Bureau of Energy Efficiency (BEE) is to institutionalize energy efficiency services, promote energy efficiency delivery mechanisms, and provide leadership to improvement of energy efficiency in all sector of the economy. The esteemed management of the BEE, New Delhi had reposed confidence in the National Productivity Council (NPC) and consequently requested the NPC to undertake “Verification of Energy Savings related to the activities of Bureau of Energy Efficiency” spreaded throughout the country.

2.0 Methodology

2.1 Review of Documentation

The documents of all the programmes were reviewed for the analysis. In case of National Energy Conservation Awards scheme, all the data from the industries were reviewed, for the calculation of Energy Savings. In case of Standard & Labeling, the data from the report for Star rating of Air Conditioners, Refrigerators & Tube lights were reviewed, apart from this data from manufacturers was also reviewed for the calculation of Energy Savings. For Energy Savings through State Designated Agency's (SDA), data from the all the SDA's were collected and reviewed.

2.2 Review of Methodology

The methodology adopted by BEE/SDA for the calculation of energy savings for various programmes were reviewed and necessary corrections were made in the methodology for the calculations.

2.3 Visits to Stake Holders

For the data verification from the various stake holders, sample visit were made to the various stake holders. Data and the back up calculations were analyzed and necessary corrections were made for the energy saving calculations.

2.4 Conclusion

After review of all the methodologies adopted by BEE and review of data, necessary corrections were made in the calculations of Energy Savings.

3.0 About the BEE Schemes

3.1 **T**he major schemes that Bureau of Energy Efficiency is implementing during XI plan are**:**

(a) **Bachat Lamp Yojana** to promote energy efficient and high quality CFLs as replacement for incandescent bulbs in households.

(b) **Standards & Labeling Scheme** targets high energy end use equipments and appliances to lay down minimum energy performance standards.

(c) **Energy Conservation Building Code (ECBC)** that sets minimum energy performance standards for new commercial buildings.

(d) **Operationalising EC Act by Strengthening Institutional Capacity of State Designated Agencies (SDAs).** The scheme seeks to build institutional capacity of the newly created SDAs to perform their regulatory, enforcement and facilitative functions in the respective states.

In addition, four more schemes are under consideration. They are:

(a) **Agricultural and Municipal DSM** targeting replacement inefficient pumpsets, street lighting, etc.

(b) **Energy Efficiency in Small and Medium Enterprises** targeting 25 clusters

(c) **Institutional Strengthening of BEE** and other related energy efficiency institutions

(d) **Contribution to State Energy Conservation Fund**.

3.2 The Standards and Labeling (S&L) Programme have resulted in electricity saving of 1425.87 Million units, equivalent to avoided capacity generation of 260.4 MW.

3.3 The National Energy Conservation Award Programme has resulted in electricity saving of 1612.3 Million units, equivalent to avoided capacity generation of 236 MW. Apart from this, these programmes were able to reduce 2,205,623 MTOE of thermal energy.

3.4 The Energy Conservation & Demand Side Management (DSM) programmes at state level have resulted in electricity saving of 693

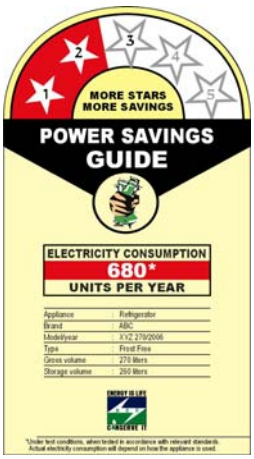
Million units, equivalent to avoided capacity generation of 126.7 MW. Apart from this, these programmes were able to reduce 68429 MTOE of thermal energy.

3.5 The ECBC programme has stimulated construction of commercial buildings with a potential saving of about 316 MW on completion.

3.6 The Bachat Lamp Yojana (BLY) is to be submitted to the CDM Executive Board (CDM-EB), Bonn this year for approval after the first two pilots, which are currently under consideration of CDM-EB, are registered. By the end of the year, about 10-12 projects are expected to be rolled out in various states thereby adding an estimated 10 million CFLs in the household sector. The programme coverage will be increased to all the states in the year 2009-10.

3.7 The Agriculture and Municipal DSM programme as well as the SME programme will be taken up this year. 350 investment grade audits (IGAs) in Agriculture and Municipal sector and about 600 IGAs in SME sector will be completed in 2 years time. In the year 2008-09, IGAs with identified savings equivalent to about 1000 MW of avoided thermal capacity will be prepared.

4.0 STANDARD & LABELING (S & L)



The standards and labeling programme was launched in May, 2006 on voluntary basis for Air Conditioners, Refrigerators and Tube lights. The labeled products, however, started to appear in the markets only in February-march, 2007. Almost 90% of Tube Light industry, 70% each of refrigerators and air conditioner industry has joined the scheme on voluntary basis, although the percentage of actual labeled products in the market in case of air conditioners is very low. The programme will be made mandatory during 2008-09. Distribution Transformers and Motors have been added to the list.

4.1 AIR CONDITIONERS

In order to estimate the savings of electricity from this programme, following methodology has been used:

- **BEE Methodology:**
  - The actual number of products manufactured in each Star category was taken from manufacturers
  - Irrespective value of actual product sold, average value of Energy Efficiency Ratio (EER) was considered.
  - The Star 0 (EER – 2.2) has been used as baseline for the calculation for Energy Savings by the star rated products.
  - Total Power Savings is the product of Savings by single product (With Average EER) in each star category and the total number of products sold
  - An average of 150 working days in a year was considered.
  - An average of 8 working hours in a day was considered.

Table 4.1: BEE Calculations for Energy Saving through Star Labeled Air Conditioners

Star Rating	Base EER	Power input	Avg. EER	Avg. Power input	Power saving (kW)	Total Energy saving in kWh	Total Qty Produced	Total Energy Saved (Million kWh)	Remarks
1 Star	2.2	2235	2.46	2002	0.23	279	52218	14.58	
2 Star	2.2	2102	2.63	1755	0.35	208	227468	47.30	Typographical Error, Correct Value is 94.6
3 Star	2.2	2006	2.83	1556	0.45	539	10683	5.76	
4 Star	2.2	2234	3	1636	0.6	718	11191	8.03	
5 Star	2.2	1699	3.18	1176	0.52	627	3640	2.28	
Total:							**305200**	**77.96**	Typographical Error, Correct Value is 125.2

- **NPC Methodology:**
  - The actual number of products sold in each Star category was taken from manufacturers
  - EER has been take individually for all the products sold
  - The Star 0 (EER – 2.2) has been used as baseline for the calculation for Energy Savings by the star rated products.
  - Total Power Savings is the sum of Power Savings from all the individual products sold.
  - An average of 150 working days in a year was considered.
  - An average of 8 working hours in a day was considered.

Table 4.2: Comparison of BEE & NPC Calculations for Energy Saving

Star Rating	BEE (Annual MU)	NPC (Annual MU)	Error
1 Star	14.58	15.79	+ 7.66%
2 Star	94.6 (Corrected)	99.5	+ 4.92%
3 Star	5.76	3.2	- 80.0%
4 Star	8.03	9.72	+ 17.39%
5 Star	2.28	2.03	- 12.32%
Total:	**125.26 (Corrected)**	**130.24**	**+ 3.82%**

- Based on these methodology it has been calculated that there will is an estimated savings of 130.24 Million units of electricity due to the sales of Star rated air conditioners. Due to reduction in electricity there will be

reduction in the requirement of the generation capacity, which is equivalent to 23.8 MW. Details for the same are shown in Table 4.3.

Table 4.3: Avoided Generation Capacity for Electricity

Item Reference	Units	BEE	NPC
Annual Electricity Saved	Million Units	125.26	130.24
No of AC Sold (Star + Non Star)	Million	2.1	2.1
No of AC Sold (Star Labeled)	Million	0.3	0.3
% of Star Labeled Sold	%	1.73% (Typing Error)	14.3%
T & D Losses considered	%	33.5%	20%
Plant Load Factor	%	78%	78%
Avoided Generation	MW	27.5 (Corrected)	23.8

4.2 Refrigerators

In order to estimate the savings of electricity from this programme, following methodology has been used:

- **BEE & NPC Methodology:**
  - The actual number of products sold in each Star category was taken from manufacturers
  - Yearly Energy Consumption has been take individually for all the products sold
  - The Star 0 has been used as baseline for the calculation for Energy Savings by the star rated products.
  - Total Power Savings is the sum of Power Savings from all the individual products sold.

Table 4.4: Comparison of BEE & NPC Calculations for Energy Saving

Star Rating	BEE (Annual MU)	NPC (Annual MU)	Error
1 Star	0	0	0.0%
2 Star	6.50	6.50	0.0%
3 Star	140.87	140.87	0.0%
4 Star	972.70	972.70	0.0%
5 Star	2.75	2.75	0.0%
Total:	**1122.83**	**1122.83**	**0.0 %**

- Based on these methodology it has been calculated that there will is an estimated savings of 1123.83 Million units of electricity due to the sales of Star rated air conditioners. Due to reduction in electricity there will be reduction in the requirement of the generation capacity, which is equivalent to 205 MW. Details for the same are shown in Table 4.5.

Table 4.5: Avoided Generation Capacity for Electricity

Item Reference	Units	BEE	NPC
Annual Electricity Saved	Million Units	1122.83	1122.83
No of Refrigerators Sold (Star + Non Star)	Million	4.5	4.5
No of Refrigerators Sold (Star Labeled)	Million	2.81	2.81
% of Star Labeled Sold	%	55.56 %	62.44%
T & D Losses considered	%	33.5 %	20%
Plant Load Factor	%	78%	78%
Avoided Generation	MW	245	205

4.3 Tube Lights

In order to estimate the savings of electricity from this programme, penetration of Star Labeled 36W Fluorescent Tube Light (FTL) were considered. Data from the manufacturers were collected for Star labeled products. In the year 2007-08, there were 36 Million 36W Tube lights were sold in comparison to 65 Million 40W tube lights. Thus there was an electricity savings of 4W for 36 Million FTL for approximately 1200 hours of operation in each year per FTL. There is an estimated savings of about 172.8 Million units by the sales of 36 Million star labeled FTL's.

- Due to reduction in electricity there will be reduction in the requirement of the generation capacity, which is equivalent to 31.6 MW. Details for the same are shown in Table 4.6.

Table 4.6: Avoided Generation Capacity for Electricity

Item Reference	Units	BEE	NPC
Annual Electricity Saved	Million Units	172.8	172.8
T & D Losses considered	%	33.5%	20%
Plant Load Factor	%	78%	78%
Avoided Electricity Generation	MW	62.06 (Typing Error, Corrected Value is 38 MW)	31.6

4.4 Over all S & L Programme

The Standards and Labeling (S&L) Programme have resulted in electricity saving of 1425.87 Million units, equivalent to avoided capacity generation of 260.4 MW. Details are shown in Table 4.7

Table 4.7: Avoided Generation Capacity for Electricity

Item Reference	Units	AC	Refrigerators	Tube Lights	Total
Annual Electricity Saved	Million Units	130.24	1122.83	172.8	1425.87
Avoided Electricity Generation	MW	23.8	205	31.6	260.4
Equivalent Fuel Saved	MTOE	44232.7	381341	58687.2	484261

5.0 NATIONAL ENERGY CONSERVATION AWARDS SCHEME (NECA)

Ministry of Power, through BEE, organizes the annual energy conservation awards function on the occasion of National Energy Conservation Day on the 14th December. These awards recognize innovation and achievements in energy conservation by the Industry; Commercial Buildings, Railways and help raise awareness about the need and efficacy of energy conservation and efficiency. The Hon'ble President of India, Smt. Partibha Devisingh Patil, presented the Awards to forty two (42) industrial units, buildings and Zonal Railways selected from 384 nominations received. The awards are recognition of the demonstrated commitment to energy conservation and efficiency.

5.1 Methodology Adopted

- The award scheme is voluntary and participation is invited through a national announcement in the mass media. A template of filing the nominations has been prepared and the applicants are required to send the data in them.

- The nomination received by BEE are then evaluated for completeness and thereafter it is examined by an expert committee comprising of officers drawn from CEA, NPC, BIS, Industry Association, etc, under the overall supervision of BEE.

- The claim of the industry is verified by relevant documents, or if need be, by inspection.

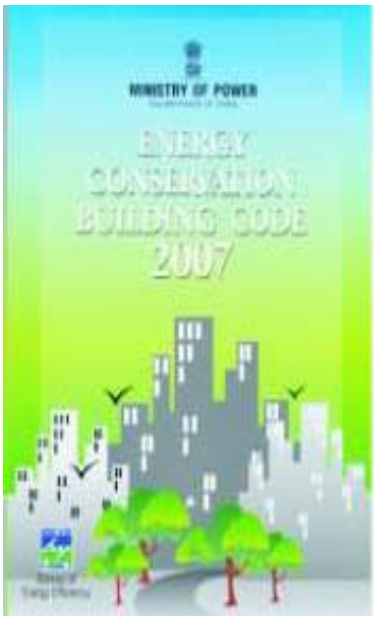
- The recommendations of the technical committee are then considered by an inter-ministerial National Award Committee under the chairmanship of Secretary, Ministry of Power.

5.2 As the questionnaires are collected in the August – September in each year for the awards, thus energy savings are of 2006-07. For 2007-08, data will be collected in Aug-Sept 2008. In order to estimate the savings of electricity from this programme, anticipated savings from each industry for the year 2007-08 were taken. Energy Savings from the award scheme is shown in Table 5.1.

Table 5.1: Avoided Generation Capacity for Electricity

Savings Achieved	**2006-07**	**2007-08 (Expected)**
In all the Sectors (Million Units)	1617.9	1612.3
Avoided Electricity Generation Capacity Addition (MW)	237	236
Factor for Avoided Capacity	$\frac{\text{Million Units x 1000}}{365 \text{ x } 24 \text{ x } 0.78}$	

6.0 ENERGY CONSERVATION BUILDING CODES (ECBC)



Energy Conservation Building Codes (ECBC) set minimum energy performance standards for commercial buildings. Under section 14 (p) of the Energy Conservation Act, 2001, Central Government has powers to prescribe ECBC for commercial buildings (at present having a connected load of 500 KW) or building complex for efficient use of energy and its conservation. The state governments have the flexibility to modify ECBC to suit local or regional needs. The ECBC was launched by Hon'ble Minister of Power on 27th May, 2007 and is presently in vogue on voluntary basis. ECBC is expected to be made mandatory in future.

A list of 306, ECBC complaint commercial buildings along with the relevant details like connected load, contract demand, covered area, etc. has been collected for 4 out of 5 climate zones. These are at various stages of construction. The expected reduction of energy use by an ECBC complaint building, based on monitored and verified results from some of these buildings, indicate 25-40% energy saving. The results are indicated hereunder:

Table 6.1: List of ECBC Buildings

Climatic Zone	No. of Buildings	Total Covered Area (m^2)	Contract Demand (kVA)	Connected Load (KW)
Composite	115	16,473,722	1,157,000	925,600
Hot & Dry	4	84,585	36,350	29,080
Temperate	43	10,668,330	333,452	266,762
Warm & Humid	144	49,131,927	1,517,253	1,213,802
Total	**306**	**76,358,564**		**2,435,244**

Taking a conservative estimate of savings at 20% in energy use of these buildings as compared to non-ECBC buildings, the avoided capacity as a result of this code is estimated at around 316 MW. That is, in a business as usual scenario, an additional 316 MW of connected load would be required for these buildings. However, as indicated above, actual monitoring and verification will be undertaken on completion of the projects. Details about the calculation for the Energy Savings are shown in Table 6.2

Table 6.2: Avoided Generation Capacity for Electricity

Item Reference	**BEE Calculation**	**NPC Calculation**
No of Buildings	306	306
Total Connected Load	2435 MW	2435 MW
Actual Load (65% of Connected Load)		1582 MW
Energy Saving Potential	25-46%	20%
Total Energy Saving Potential	300 MW	316 MW

7.0 ENERGY SAVINGS RELATED STATE DESIGNATED AGENCIES

The Energy Conservation Act was enacted in 2001 to spearhead the improvement in energy efficiency of the economy through various promotional and regulatory measures. State Designated Agencies (SDAs) are statutory bodies set up under section 15 of the Energy Conservation Act (EC Act), 2001 at the state level to implement the Act. They are the nodal agencies at state level that need to coordinate and cooperate with BEE at the central level to ensure a balanced implementation of the Act in the country. Although no direct energy saving target has been put for the central scheme for building capacity of SDAs, they have been encouraged to take up energy efficiency projects with due monitoring and verification. The action plan of SDAs prepared is a step in this direction.

7.1 Delhi Transco Limited

In Delhi, the mandatory use of Compact Fluorescent Lamp (CFL) in all Government offices and buildings avoided a capacity addition of 50 MW. This was a result of replacing approximately 6.0 lacs 60 W incandescent lamps with 15 W CFLs in the State of Delhi. The introduction of solar water heaters having capacity of 2 lacs litres per day in commercial and the domestic sector in place of geysers resulted in savings of around 10 MW. The capacity addition avoided in the State of Delhi as a result of these initiatives is 50.3 MW or 275.02 MU or 93403 MTOE.

7.2 Maharashtra Energy Development Agency

In Maharashtra, the industries accounted for an electrical energy savings of 26.8 Million kWh and a thermal energy savings of 51440 MTOE. The savings achieved in oil equivalent is 60549 MTOE.

7.3 Renewable Energy Department, Haryana

By making the use of energy efficient CFLs and T-5 tubelights mandatory in Government offices the State of Haryana achieved a savings of 3 MW. This was achieved by replacement of around 80,000 incandescent lamps with CFLs and another 80,000 conventional tube lights with T-5 tube lights. In the domestic sector the introduction of approximately 5 lacs CFLs resulted in a savings of 11 MW. The introduction of solar water heaters of capacity 1 Lakh litre per day in commercial and the domestic sector in place of geysers resulted in savings of around 1 MW. Replacement of around 3090 inefficient agricultural pump sets with energy efficient pump sets resulted in a savings of around 1.4 MW. The capacity addition avoided in the State of Haryana as a result of these initiatives is 13.7 MW or 74.89 MU or 25434 MTOE.

7.4 Gujarat Energy Development Agency

By making the use of energy efficient CFLs and T-5 tubelights in the state of Gujarat under the GoG Mandatory Energy Audit Program provided savings potential to the tune of 176.8 Million kWh was obtained. The capacity addition avoided in the State of Gujarat as a result of these initiatives is 32.34 MW or 176.8 MU or 60045 MTOE.

7.5 Energy Management Centre, Kerala

Energy Management Centre, Kerala was visited by NPC officials to verify the data reported by Kerala SDA. Kerala reported the summary of energy savings achieved by the 21 industrial units. It has been observed that few industries have also reported there savings in the National Energy Conservation Awards. Thus energy savings from them were subtracted from the total savings from these programmes. This result in electrical savings of 50.67 Million kWh and thermal savings of 1416 MTOE.

7.6 Karnataka Renewable Energy Development Limited

Karnataka reported an electrical energy savings of 21.77 MkWh and a thermal energy savings of 13154 MTOE. This result in a total savings of 20548 MTOE.

7.7 Chief Electrical Inspectorate, Govt. of Tamil Nadu

In Tamil Nadu, the energy intensive industries have achieved an electrical energy savings of 48.9 MkWh and an avoided thermal energy savings in terms of oil equivalent of 2417 MTOE.

7.8 Chhattisgarh State Renewable Energy Development Agency

Chhattisgarh State Renewable Energy Development Agency (CREDA) was visited by NPC officials to verify the data reported by Chhattisgarh SDA. The State of Chhattisgarh various initiatives were undertaken in the areas of community lighting systems, decentralized energy system and solar water heating system. The net capacity addition avoided in the State of Chhattisgarh as a result of these initiatives is 3.02 MW or 16.49 MU or 5600.4 MTOE.

Apart from the above activities, CREDA is doing various activities in the Renewable energy area, such as Bio gasifiers, bio diesel plant and coal washery projects. With these activities, CREDA are able to reduce fossil fuel to considerable level.

7.9 Non-Conventional Energy Development Corporation of Andhra Pradesh Limited

The State of Andhra Pradesh reported a savings of 0.30 Million kWh which is equivalent to Rs. 15.606 Lakhs by a hospital and a savings of 1.74 MkWh equivalent to Rs. 88.536 lacs. The net capacity addition avoided in the State of Andhra Pradesh as a result of these initiatives is around 0.37 MW or 2.04 MU or 692.8 MTOE.

7.10 Kerala and Chhattisgarh SDA were visited and data from other SDA's were collected and reviewed for the energy saving calculations. Total Electricity savings are shown in Table 7.1

Table 7.1: Electricity Savings related to SDA activities (In Million Units)

	Energy Efficient Lighting	**Commercial Buildings**	**Demand Side Management**	**Industries**	**Total**
1. Delhi	229.18	-	45.84	-	275.02
2. Maharashtra	-	-	-	26.82	26.82
3. Haryana	63.93	-	10.96	-	74.89
4. Gujarat	-	7.7	-	169.1	176.8
5. Kerala	-	-	-	50.81	50.81
6. Karnataka	-	-	-	21.77	21.77
7. Tamil Nadu	-	-	-	48.95	48.95
8. Chhattisgarh	3.1	-	13.39	-	15.5
9. Andhra Pradesh	-	2.04	-	-	2.04
TOTAL (MU)					693

7.11 It has been observed that few industries have applied in both State & National Energy Conservation Awards. Thus to avoid the double savings, energy savings from state awards were subtracted for those industries which applied for the state also. After necessary corrections Electricity savings are shown in Table 7.2

Table 7.2: Electricity Savings related to SDA activities (In Million Units)

	BEE Report	**Duplicate entries due to EC Awards**	**Actual Savings**
1. Delhi	275.02	-	275.02
2. Maharashtra	47.76	20.94	26.82
3. Haryana	74.89	-	74.89
4. Gujarat	88.5	Typing Error	176.8
5. Kerala	59.82	9.01	50.81
6. Karnataka	21.77	-	21.77
7. Tamil Nadu	48.95	-	48.95
8. Chhattisgarh	15.5	Calculation Error	16.49
9. Andhra Pradesh	2.29	Typing Error	2.04
TOTAL	**634**		**693**

7.11 There is an estimated electricity saving of 693 Million units related with the activities of SDA and thermal savings of 68,429 MTOE. Thereby total savings of 303,942 MTOE has been achieved due to the activities of SDA. Details for the same are shown in Table 7.3

Table 7.3: Total Energy Savings related with SDA activities

Item Reference	Units	BEE	NPC
Annual Electricity Saved	Million Units	634	693
T & D Losses considered	%	33.5 %	20%
Plant Load Factor considered	%	78%	78%
Avoided Generation	MW	138.5	126.7
Equivalent Thermal Savings	MTOE	206404.5	235513
Thermal Savings	MTOE	80578.2	68429
Total Thermal Savings	MTOE	286982.7	303942

7.11 During the visits to SDA and data collection, it has been observed that apart from the above programmes with quantifiable savings, SDAs are also involved in various other Energy Conservation activities which can not be quantified. These activities involve various programme such rural awareness for energy efficiency in house hold, awareness programmes for school and other awareness campaigns.

Conversion Factors

S. No	Item Reference	Equivalent to
1	1 kWh	860 kCal
2	1 TR	3024 kCal/hr
4	1 CFM	1.697 m3/hr
5	1 kg/cm2	98.08 kPa
6	1 kg/cm2	10 mWC
7	1 BTU	0.252 kCal
8	1 kCal	4.179 kJ

Abbreviations

AC	Air Conditioning
TR	Ton of Refrigeration
EER	Energy Efficiency Ratio
FTL	Fluorescent Tube Light
CFL	Compact Fluorescent Lamp
KWh	Kilo Watt Hour (Unit of Electricity)
MW	Mega Watt
KVAh	Kilo Volt Ampere Hour
MU	Million Unit (kWh)
BEE	Bureau of Energy Efficiency
SDA	State Designated Agency
NPC	National Productivity Council
S & L	Standard & Labeling