EE&ECO Orientation – Hotel Industry

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Energy Management Centre-Kerala

Hotel Industry in India

- 4.4 million tourists visited India last year [tourism ministry]
- to accommodate about 350 million domestic travelers.
- India ranks 18th in business travel and will be among the top 5 in this decade [World Travel and Tourism Council, India]
- Demand to exceed supply by 100% soon

- MNC Hotel Industry giants flocking India forging JVs
- India is ranked 11th in the Asia Pacific region and 62nd overall, on the list of the world's attractive destinations

[Travel and Tourism Competitiveness Report 2009 by the World Economic Forum]

India ranked:

- 14th best tourist destination for its natural resources
- 24th for its cultural resources,

  with many World Heritage sites, both natural and cultural, rich fauna, and strong creative industries in the country.
- India bagged 37th rank for its air transport network.

Energy Scenario

- The Hospitality industry is one of the major energy and water intensive sectors a
- The country today faces an electrical energy supply gap of over 8% with peak shortages of about 11-12%.
- Concern on Price and availability of Fossil fuels
- Energy and Environment nexus

As an major energy end user Hotel Industry’ s role to del with this situation…

- **Enhance EE**
- **Identify and Implement ECOs**
- **Maximize renewable energy utilization**
- **Build capacity within the industry towards this**

ALL INDIA REGIONWISE GENERATING INSTALLED CAPACITY (MW) OF POWER UTILITIES INCLUDING ALLOCATED SHARES IN JOINT AND CENTRAL SECTOR UTILITIES

Installed Capcity Mix:

- ❖64% Thermal
- ❖24% Hydel
- ❖Balance
- ❖Nuclear and RES

(As on 31-01-10)

SL. NO.	REGION	THERMAL				Nuclear	HYDRO (Renewable)	R.E.S.@ (MNRE)	TOTAL
		COAL	GAS	DSL	TOTAL				
1	Northern	20552.50	3563.26	12.99	24128.75	1180.00	13310.75	2349.82	40969.32
2	Western	27015.50	8143.81	17.48	35176.79	1840.00	7447.50	4596.54	49060.83
3	Southern	17822.50	4392.78	939.32	23154.60	1100.00	11107.03	7936.57	43298.20
4	Eastern	16645.38	190.00	17.20	16852.58	0.00	3904.12	334.76	21091.46
5	N. Eastern	60.00	766.00	142.74	968.74	0.00	1116.00	204.16	2288.90
6	Islands	0.00	0.00	70.02	70.02	0.00	0.00	5.25	75.27
7	All India	82095.88	17055.85	1199.75	100351.48	4120.00	36885.40	15427.10	156783.98

Captive Genrating capacity connected to the Grid (MW) = 19509

Eco-Tax Reform

Tax Base: Income

Income Tax

Carbon Tax

Tax Base: Carbon

Income Tax

Carbon Tax

Changing Tax Base

Category wise electricity consumption in Kerala over the years

Category	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
LT Category						
Domestic	4004	4262	4668	5213	5603	5931
Commercial	879	948	1093	1246	1378	1502
Industrial	751	783	874	934	984	1015
Agricultural	202	191	190	220	231	225
Street Lights	166	183	208	229	249	294
Sub total LT	6001	6366	7032	7842	8444	8968
HT category						
HT I	1125	1238	1362	1436	1461	1326
HT II	130	141	130	135	138	107
HT-III	9	9	10	9	9	9
H- IV	304	339	378	431	507	579
EHT 66/110	1107	1036	1004	1070	1024	966
Railway Traction	46	44	58	72	109	142
Bulk Supply	188	212	296	335	357	317
Sub total HT	2910	3018	3238	3489	3605	3446
Total	**8911**	**9384**	**10270**	**11331**	**12050**	**12414**

WHAT IS EE&EC ?

EC :

•Reduce energy consumption

•Minimize wastage

e.g.: switch off

EE:

Reduce energy intensity without affecting output or comfort levels.

e.g.: energy efficient pumping system

EE contributes to EC

EE integral part of energy conservation policies, programs and projects.

Understanding Energy Use Pattern

Diagram, layout, list of centers/ equipments with specs

- EC Profile
  - Purchased Quantity; source; price
  - Self generation
  - Break up w.r.t;
  - Major consumption center, system, equipment [Heads]
  - Data collection, documentation
  - Metered, measured, estimated

How to go about?

ENERGY AUDIT :

Sec. 2, Definition (i) of Energy Conservation Act, 2001

> "EA means the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption"

Energy Use In Hotel

Delivered Energy :

- The common unit used in the hotels for specific delivered energy is : Kwh / m^2 / year

(converting all form of energy ,viz, electricity, fuel oil like HSD, LDO, FO, LPG, coal etc into one energy energy unit ‘kwh’.

- **Energy Costs**

- **The common unit used in the hotels for specific energy cost is Rupees / bedroom / year**

- **Energy costs vary with hotel size, type, region, contract and load profile.**

- **Unit prices tend to be lower for larger and more intensively serviced buildings**

BENCHMARKS :

Large hotels (more than 150)rooms with air- conditioning, laundry & indoor pool.

Efficiency rating	Good	Fair	Poor	Very poor
Delivered Energy (Kwh/ m^2/ year)	< 365	365-440	440-550	> 550

- **TYPICAL UTILITY CONSUMPTION IN HOTELS(Summary of 100 hotels of size 200 to 1000 Rooms**

- **Electricity = 65 %**
- **Water = 15 %**
- **Fuels = 12 %**
- **LPG(Kitchens) =6 to 7 %**

Energy and the Environment :

✓ **The burning of fossil fuels to generate energy, releases gases into the atmosphere. These include sulphur dioxide that gives rise to acid rain, and carbon dioxide that is the main contributor to the threat of global warming.**

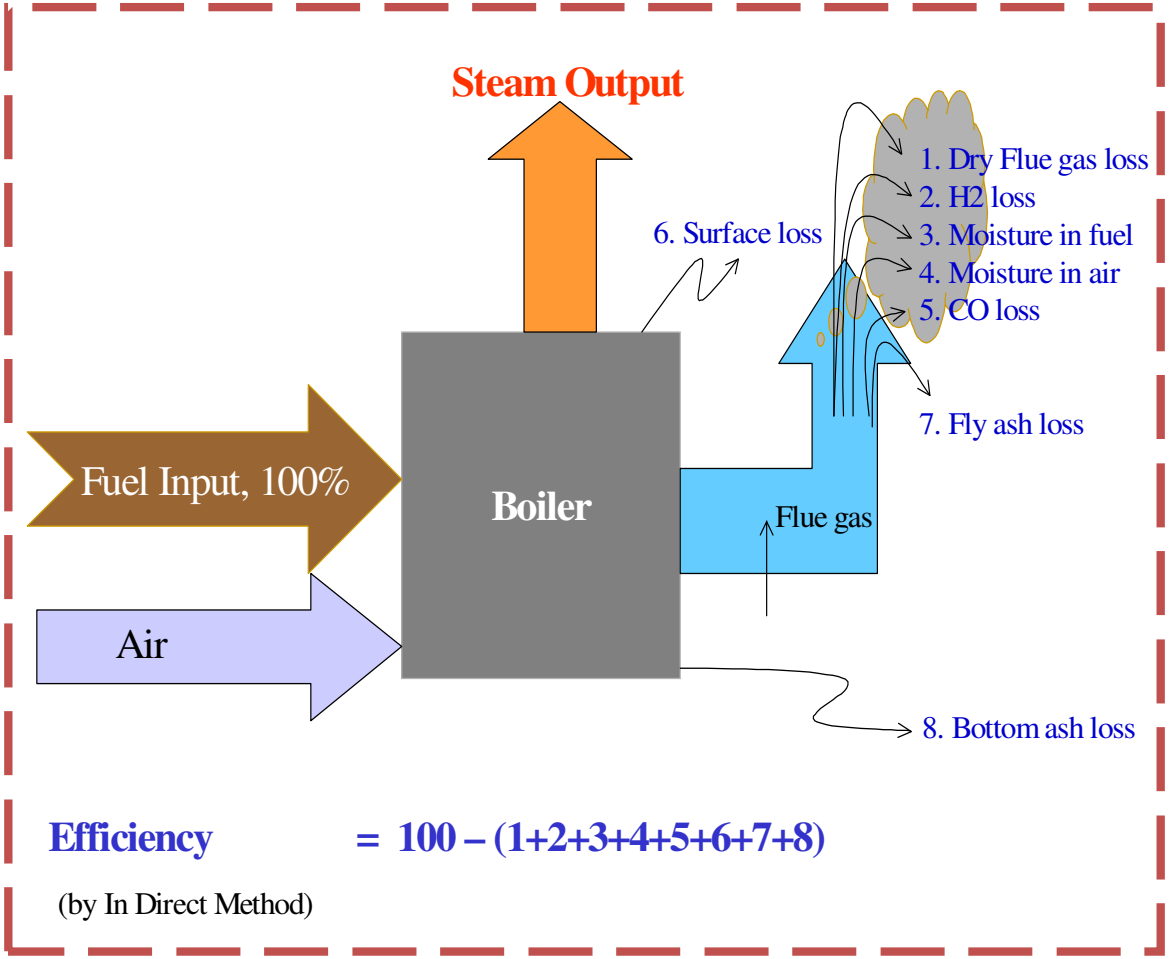
✓ **Factors to convert Consumption of fuels to emissions of carbon dioxide, in kg of carbon dioxide produced per kWh of fuel used are:**

- **oil 0.29**
- **gas 0.21**
- **electricity 0.72**

✓ **A typical hotel releases annually about 160kg of CO_2, per square meter of floor area, equivalent to about 10 tonnes per bedroom.**

Boiler Efficiency Measurement Procedures

(B) BY IN DIRECT METHOD (η_{ID}) : [100 – (Sum of losses)]



HEATING SYSTEMS :

Steam Generation & Utilization

Energy Savings in Boilers:

A. Reduce Excess Air :

Potential Savings 5%

B. Decrease Flue gas Temp.

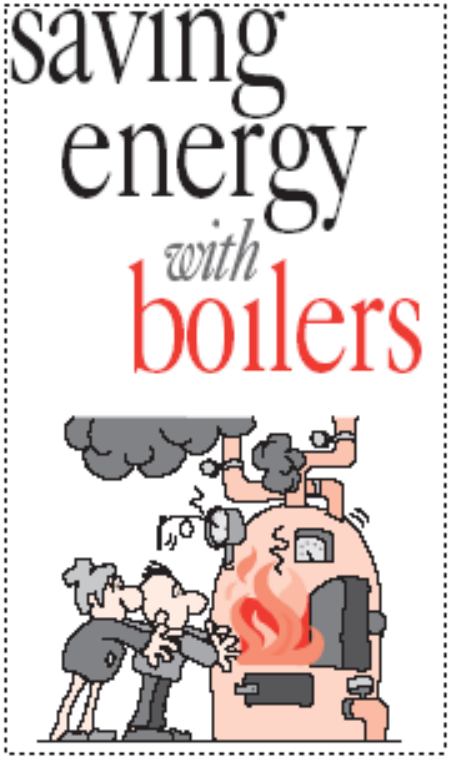
1 % excess fuel consumption for every 22°C rise in temp.

C. Reduce Boiler Pressure :

1% efficiency increase for every 5 Bar pressure reduction.

D. Increase Fuel Temp.:

Potential Savings 5%



HEATING SYSTEMS : Steam Generation & Utilization Contd….

E. Optimize Fuel Atomization Pressure :

Potential savings 1 %

F. Reduce Boiler Blow-down :

Potential savings 1%

- **Excessive blow-down due to poor water treatment.**
- **Excessive blow-down due to poor operating practice.**

F. Increase Feedwater Temperature :

Potential Savings 3%

- **Every 6° C rise in feed water temp. 1% fuel economy.**
- **Increase condensate recovery from process.**

HEATING SYSTEMS : Steam Generation & Utilization Contd....

G. Increase Combustion Air Temperature:

- ✓ **Potential savings 1 %.**
- ✓ **Every 22°C rise in air temperature 1% fuel economy.**

H. Reduce Scale & Deposits on Waterside :

- ✓ **Potential savings 2-5 %**
- **Inorganic scale and deposits reduce heat transfer.**
- **Notice by increase in flue gas temperature.**
- **Treat water according to requirement**

I. Recover heat from Blowdown :

- ✓ **Potential savings 1 %**
- **Preheat water by recovering heat from blowdown**
- **Flash the blowdown & take low pressure steam to feed tank.**

HEATING SYSTEMS : Steam Generation & Utilization Contd....

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Best Practices for Energy- efficiency in Guest Rooms : Contd....

GUEST ROOM ENERGY BENCHMARK FIGURES :

(per occupied Guest Room per year)

Energy Efficiency rating	Good	Fair	Poor
Electricity (Kwh)	< 1825	1825 - 2550	> 2550
Water (liters/guest)	< 260	260 - 330	> 330
Energy for Hot Water (Kwh)	< 1825	1825 - 2200	> 2200

Best Practices for Energy- efficiency in Laundry :

Assess Current energy consumption in Laundry:

- Install sub-meters for all utility
- Calculate monthly energy consumption per kg linen
- Compare with benchmarks & assess energy saving

Energy Efficiency rating	Good	Fair	Poor
Electricity (Kwh)	029 –0.35	0.35 – .44	> 0.44
Steam (Kwh)	1.5- 1.8	1.8 – 2.0	> 2.0
Total Energy Kwh)	1.8-2.2	2.2-2.5	> 2.5
Water (liters)	23 - 26	28 -30	> 30

Best Practices for Energy- efficiency in Kitchens.

Assess Current Energy Performance in KITCHENS :

- Sub- meter all energy inputs ,gas, steam electricity to kitchens
- Convert all energy to eqv. Kwh.
- Calculate monthly energy consumption per cover. Multiplying factor to be used as per outlet being served.
- Compare actual figures with Benchmarks – assess improvement

Benchmarks for KITCHENS

Energy Efficiency rating	Good	Fair	Poor
Energy for Cooking, dish wash, cold stores (Kwh)	< 3	3.0 – 4.5	> 0.45
Energy – Heating, light, ventilation , hot water (Kwh)	<1	1 – 1.5	> 1.5
Water (liters)	<35	35 - 45	> 45

Best Practices for Energy- efficiency in Kitchens Contd...

- Multiplying Factors Kitchens :

Food Service :	Factor
Chinese Restaurant	2.0
A-la- Carte Restaurant	1.6
Coffee Shop	0.8
Banquet	0.7
Staff Restaurant	0.3
Snack bar, tea lounge	0.2

Energy Campaign for Hotel and Catering Industry [E-HotCat]

- to the aim of mitigating climate change by reducing the emissions of Green House Gases.
- achieved by various means e.g. Energy Efficiency, Energy Conservation, Utilisation of Renewable Energy among others.
- these measures can be promoted in the Hotel and Catering Sector by a campaign aiming at providing awareness and sharing management and technological advices in this regard.

This is an ongoing programme by:

- BMU – Federal Ministry for Environment Nature Conservation and Nuclear Safety, Germany; Adelphi Consult GmbH

In association and participation With

- MoP, MNES, MoT, NPC, EMC,TERI, CII, Hotel and Restaurant Associations, Tourism Org.

EE&EC

- Savings add directly to profit
- Reduced emissions
- Reduced effluent
- Conserves resources
- Reduced maintenance
- Improved comfort
- Green Hotel
- Budget Hotel

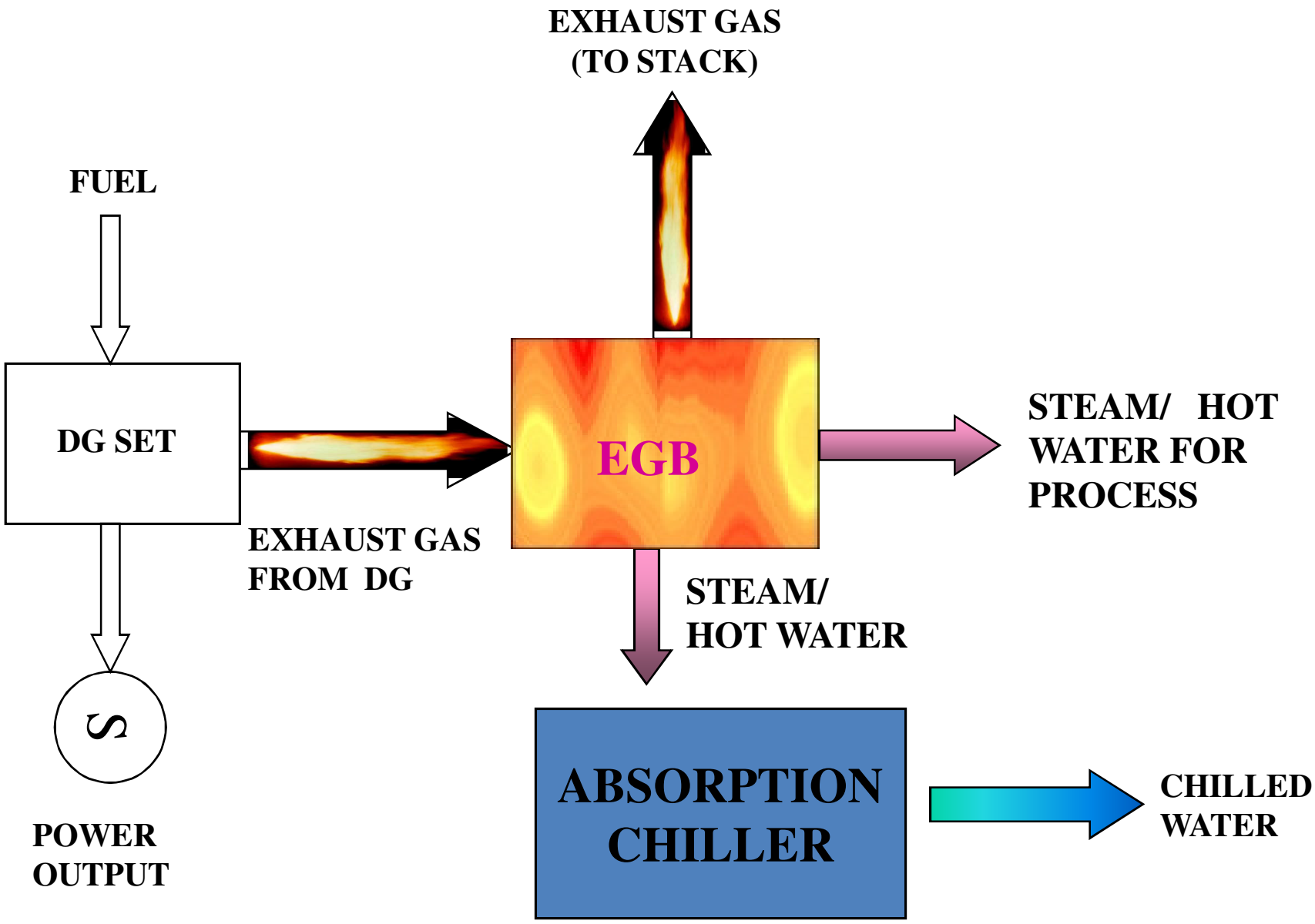
Co-Generation:

Generation of at least two different forms of energies from a single energy source

Tri-generation:

Generation of at least three different forms of energies from a single energy source

TRI-GENERATION



ENRGY STAR-labeled, or high-efficiency

Equipments/appliances significantly reduce Energy Use

Vending

- efficient than standard models, incorporating more efficient compressors, fan motors and lighting systems.

- install a plug-in device that powers down the unit when the area is vacant and monitors the

- temperature to ensure product is always cold without running the cooling system as often.

travelers are more profligate in their use of water
than the local population…

- A survey of water consumption showed that while a country dweller consumed 140 litres of water a day and a city dweller 250 litres, the average tourist used 440 litres and a luxury golf resort 880 litres for each visitor.

Tour operators often check a hotel's fresh and waste water management processes as a part of their contract

- Hotels put water to a wide of range of uses,
  - 5 per cent estimated to go to drinking and cleaning food.
  - Some goes to guests taking showers and washing;
  - some to irrigating gardens and golf courses;
  - filling swimming pools and Jacuzzis;
  - cooling and decorative use such as fountains;
  - irrigating land used to produce food for tourists.
- Water accounts for 15 per cent of the total utility bill of many hotels.

waterless urinals

- **Reduce water consumption (conventional urinals use 4-6 liters per flush for flushing 250-300 ml. Urine, saving of 16-24 liters of Water per day per person, assuming four visits for flushing 1-1.2 liter of urine).**
- **Reduction in carrying capacity of sewer lines by saving water and urine by urine reuse.**
- **Excellent nutrient recovery by recycling urine as liquid fertilizer in gardens, fields etc.**
- **Reduced nutrient pollution of aquatic environment by recycling the urine.**
- **Economical in comparison to flushed urinals**
- **Simple and easy to maintain.**
- **Easy to construct design can be used in villages.**
- **Social acceptance is generally very high since many men hardly notice the difference.**
- **Odors should be the same or less than the conventional urinals.**
- **Retrofitting/up gradation in water flushed urinals**

waterless urinal

- There are two varieties of waterless urinal: cartridge based and non cartridge based units.
- Cartridge based units use a replaceable cartridge pre-filled with sealing liquid. These units are periodically replaced as the sealing liquid is slowly eroded or degraded.
- Non Cartridge based systems work by simply introducing the sealing liquid into the drain hole and allowing it to naturally settle into the correct position.
- Waterless urinals were introduced to the world by the **Waterless Company in 1992**. The first urinal used what was called an EcoTrap cartridge.
- Others manufacturers which started producing them almost a decade later include: Falcon Waterfree Technologies, Sloan Valve Company, Duravit, Kohler and many others.
- Waterless urinals are also becoming increasingly popular as **the green building movement** takes hold with certification programs such as LEED.

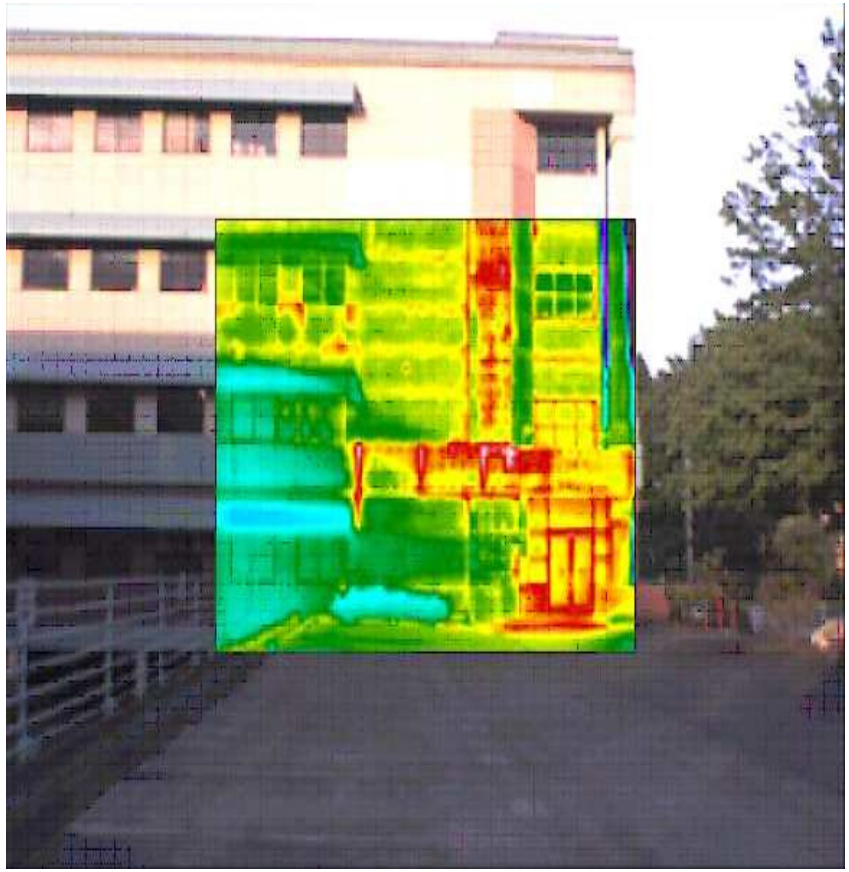
LPG STOVES Star Rating Index

Thermal Efficiency (%)	**Star Level**
>=68 & <=69.5	One star
>69.5 & <= 71	Two Star
>71.5 &<= 72	Three Star
>72.5 &<=74	Four Star
>74	Five Star

Thermal Imaging testing

• Heat losses in buildings can account for up to 50% of the total energy consumption and comes from air leakage through chimneys, attics, wall vents and badly sealed windows/doors, etc. Energy Efficiency

•To identify areas of energy waste infrared imaging has quickly become a valued tool in identifying problems related to energy loss, missing insulation, inefficient HVAC systems, radiant heating, water damage on roofs, and much more. A thermal imaging camera identifies patterns of heat loss that are invisible to the naked eye..



Save Energy Save our Planet

Thank You!