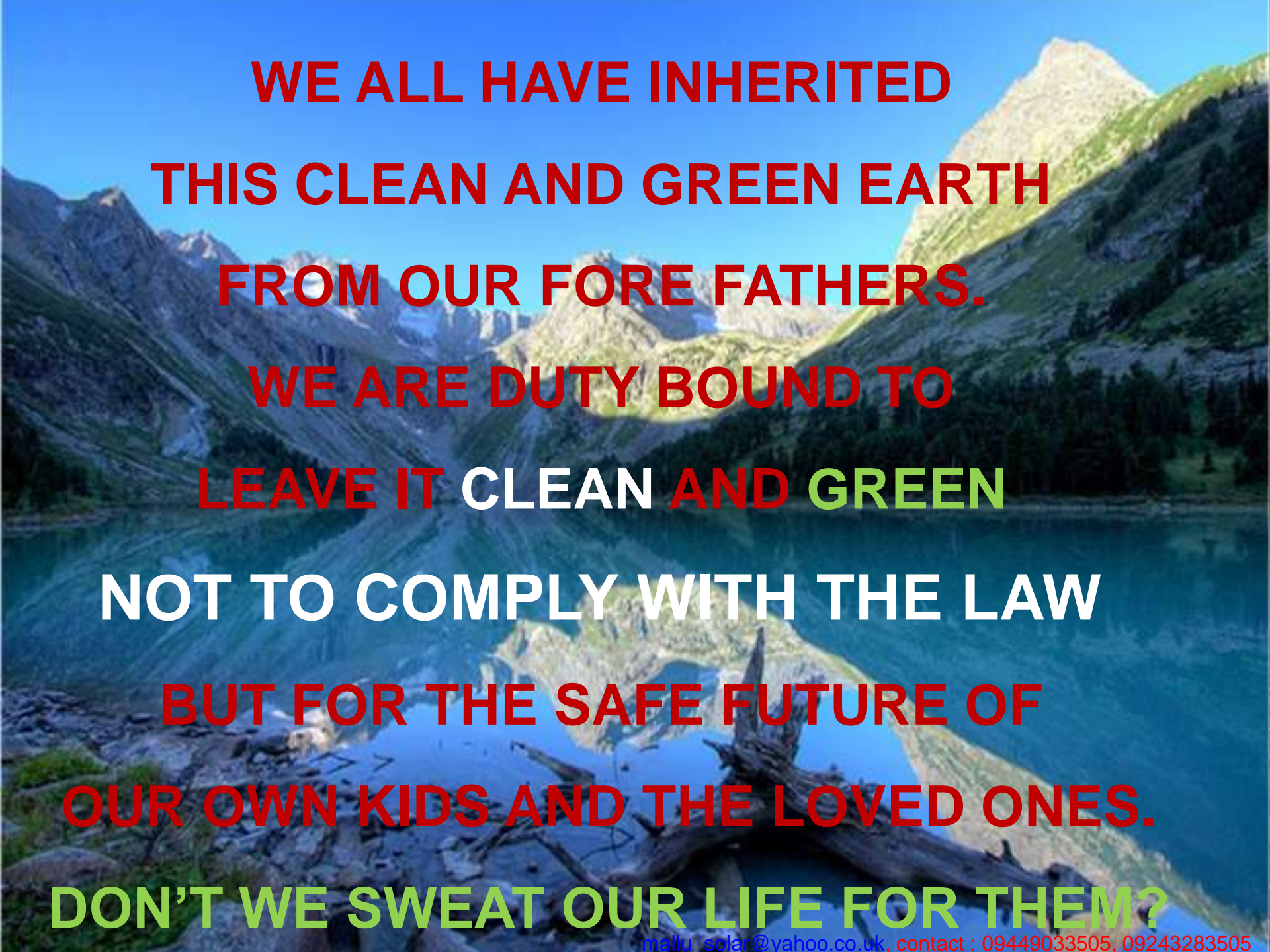


# SUNSHUBH RENEWABLES & RESEARCH CENTER.



**WELCOMES THE DELEGATES  
FOR THE HUMANITARIAN CAUSE TO KNOW WHAT IS ENERGY AUDIT?  
AND SHOP FLOOR OPPORTUNITIES.**





**WE ALL HAVE INHERITED  
THIS CLEAN AND GREEN EARTH  
FROM OUR FORE FATHERS.  
WE ARE DUTY BOUND TO  
LEAVE IT CLEAN AND GREEN  
NOT TO COMPLY WITH THE LAW  
BUT FOR THE SAFE FUTURE OF  
OUR OWN KIDS AND THE LOVED ONES.  
DON'T WE SWEAT OUR LIFE FOR THEM?**



We all consume energy in our day to day life, in our professional life - industries, offices, utilities etc.,

NOW DO WE NEED TO DEFINE ENERGY?

CERTAINLY NOT!!

But certainly the way to evaluate, the way we consume energy.

The process of 'energy use' evaluation is **ENERGY AUDIT**.

**Energy is red, ENERGY AUDIT is not.**

It is safe, it is user friendly, it is the cure for future accidents, it is the reliever at the time of hard & strain full work.



What are the types of energy audits?

We have walk in audit,  
We have preliminary audit,  
We have detailed audit.

What next?

We have post implementation  
i.e., result confirmation audit.

A scenic landscape featuring a large, rugged mountain peak in the background, a river in the foreground, and lush green trees. The sky is blue with some clouds. The text is overlaid on the image in a red, outlined font.

Energy audit is a way to avoid the possible accidents.

Energy audit is a means to avoid frequent breakdowns.

Energy audit is a means to increase productivity.

Energy audit is a means to reach back home safe and sound.

Energy audit is a way to increase the bond of friendship within the various departments.

Energy audit is a means to gain the confidence of the fellow workers, showing a great concern for their life safety.

Energy audit is a way to celebrate the results with our co-workers.

Energy audit is a step towards celebration times.

**ENERGY AUDIT IS CERTAINLY NOT THE WAY AND/OR A TOOL TO PIN POINT MISTAKES OR FIND FAULTS WITH OUR CO-WORKERS.**



The pointers of importance in energy audit are :

**MANAGEMENTS REQUIREMENTS –**

**LEAST OR NIL INVESTMENT.**

**SUPERVISORS REQUIREMENTS –**

**TROBLE FREE OPERATION.**

**OPERATORS REQUIREMENTS –**

**COMFORTABLE OPERATING  
CONDITIONS.**

## WHAT ARE THE POSSIBILITIES OF SAVING ENERGY IN BUILDINGS, HOSPITALS AND LARGE COMMERCIAL COMPLEX.

The major consumption of energy in these sectors varies based on the size of the establishment,

Hospitals - Steam for sterilization,  
Air conditioning for comfort,  
Fans and Lighting,  
Steam for washing and hot water generation.

Buildings & malls- General lighting and task Lighting.  
Centralised Air conditioning.  
Compressors.

Possibilities of saving energy are -

Combined generation of Power, followed by heat and the waste heat for air conditioning and hot water applications.

Lighting applications can be evaluated based on the application and necessary recommendations can be made.

Waste can be used as fuel wherever required & possible.



Possible resources are :

Multi fueled generators, these generators can use LPG, CNG, Producer Gas, Bio gas from hospital waste & excreta.

The power generated can be used to drive various devices, like fans, light, and other applications.

The heat which is in the form of hot water and CO<sub>2</sub> gas can be used for generation of steam.

The waste hot gas which is in the low grade can be further used for feeding in to the VAM chamber to get chilled water at 7°C.

The chilled water can further be used for storage and the room cooling applications.

Although the initial capital expenditure is too high, the potential to recover the cost is also very attractive, not to forget the CARBON POINTS for emission trading. which can attract the funding agencies as well.

Periodical maintenance in most of the cases doesn't exist at all.

The responsibility of the maintenance is considered to be the job of maintenance department,

The production departments roll in energy savings is not considered to be important, on the contrary it is the users who are responsible for energy saving and they should be present in all such workshops.

GENTLEMEN, YOU HAVE BEEN SEEING THE  
BEAUTIFUL SCENERIES ALL ALONG THIS  
PRESENTATION.

THEY EXIST AS OF NOW, THEY COULD **VANISH**,  
IF OUR ENERGY CONSUMPTION GOES UNCHECKED.

**THESE COULD BE POSTERS ON THE WALL.**

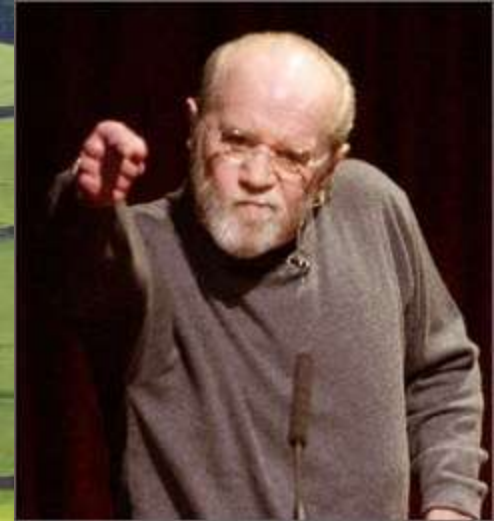
LET US NOT CREATE SUCH A SITUATION.  
LET US NOT ALLOW THE GLOBAL WARMING TAKE  
OVER OUR NATURAL BEUTY.



Let's pledge to leave behind clean and green earth. To do this, we need to initiate reduce our energy consumption.

And dear friends it starts with me, you. You are the initiators, you have the steering, you have the breaks and the accelerator too.

It is you and only you who can initiate the energy conservation practices to see our children hale, healthy and smiling. Lets leave the world the way it was gifted to our forefathers.



# Key areas in energy sectors:

- **Lighting**
  - Task Lighting — Critical & General tasks.
  - General Lighting — Specific & General tasks.
  - yard Lighting.
  - Flood Lighting.
- **Heating**
  - Room Temperature.
  - Hot Water.
  - Steam Generation — Sterilisation & washing systems.
- **Cooling**
  - Room Temperature / Comfort cooling.
  - Water cooling.
  - Storage — Medical/General.
- **Drives**
  - Motors, Pumps, Compressors,
- **Accessories**
  - Computers.
  - UPS system
  - Control drives.

# Lightings wrt Power factor.

Near unity power factor, energy efficient lighting units are –

- CFL's & T5 tubes,
- LED's –
- Induction Lightings.

The bottom two two will be over taking the existing fittings.

# LIGHTINGS

The Advantages are,

Uninterrupted lighting – no on off sequence.

More energy efficient ie, low power consumption –

More

Lumen/W ratio.

The induction light will not be heating up the illuminated space which is a parameter to be considered in designing the Air Conditioner Load.

# Sources of low PF and harmonics are

- **POWER FACTOR:**

Over sized motor driven devices,

Electromagnetic controlled devices like Sodium Vapor lighting and the CFLs, Tube lights etc.,

- **HARMONICS:**

UPS systems.

VFD's

Loose electrical connections which induce spikes.

# Impact of low PF and Harmonics.

- Low power factor will induce:  
Voltage variation with in the establishment.  
You will find dimming of some lighting systems more often.
- Harmonics will cause,  
Abrupt failures of electrical appliances.  
frequent failure of communication network.

# TRIGENERATION

- COMBINED –  
POWER, HEAT & CHILLING POSSIBILITIES.

Cost of power generation Rs.7 to 8/\_ per unit after excise & VAT, which when en-cashed will be 20% less.

Cost of cooling is less by 95%.

Cost of hot water is totally free. Cost of steam generation will be down to the extent of 50% based on the ratings.



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- Assuming the
  - Cost of power @ Rs.6.80
  - 40% as loading by air chilling system
  - 100 units as base energy consumption.
    - The existing system will cost Rs.680/-
  - In trigeneration system the figures are
  - Cost of fuel Rs.55/- per KG of LPG, 30/- for CNG.
  - With LPG the lpg required for 1 KW is 180gms, cost of power is Rs.8.80.
  - For the proposed 62% of the energy needs,
    - cost of energy will be revised to Rs.546/-

**Savings are 20% over existing energy cost not accounting incurred against hotwater/steam generation and the backup power supply mechanism**

The benefit of zero toxic gases which are emitted by Gas fired systems are additional parameters to be considered.

The chilled air is always the fresh air and no air circulation is in place unlike in conventional air conditioning system.

??????????...

- To meet the room cooling and warming requirements, what one can look for is natural, earth tunneling system which can fetch us a difference of 3-4% oC. Which reduces energy demand by great extent.

Eg., all historical buildings.

# HEATING SYSTEM.

- TRIGENERATION CAN BE USED TO MEET THE INCREASED HEAT DEMAND AND REDUCED CHILLING DEMAND DURING WINTER PERIOD
- Steam generation can be at reduced cost for meeting the sterilization and washing loads.
- Can also be used to meet the supply of warm water from the residual waste heat after all possible extraction.

A scenic landscape featuring a calm lake in the foreground, a line of green trees in the middle ground, and rolling hills and mountains in the background under a bright blue sky with scattered white clouds. The scene is reflected in the water.

Thank you  
&  
See you again !!!

**in your shop floor,  
working together to lookout for the  
possibilities of energy conservation.**

# Thank You

Gentleman send your views and quarries to :

[mallu\\_solar@yahoo.co.uk](mailto:mallu_solar@yahoo.co.uk)

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