Nandi Resources Generation Technology Private Limited

EnVERT®

Nandi Resources Generation Technology Private Limited, (NRGTPL) an EnVERT group company, had a modest beginning in 2006 as a 'concept to commissioning' solar solutions provider. Over the years, the company has been meticulously providing services from consulting companies on suitable solar technology, designing solar power plants, issuing Due-diligence reports to Owners and Lenders, conducting energy audits and industrial process heat solutions etc.

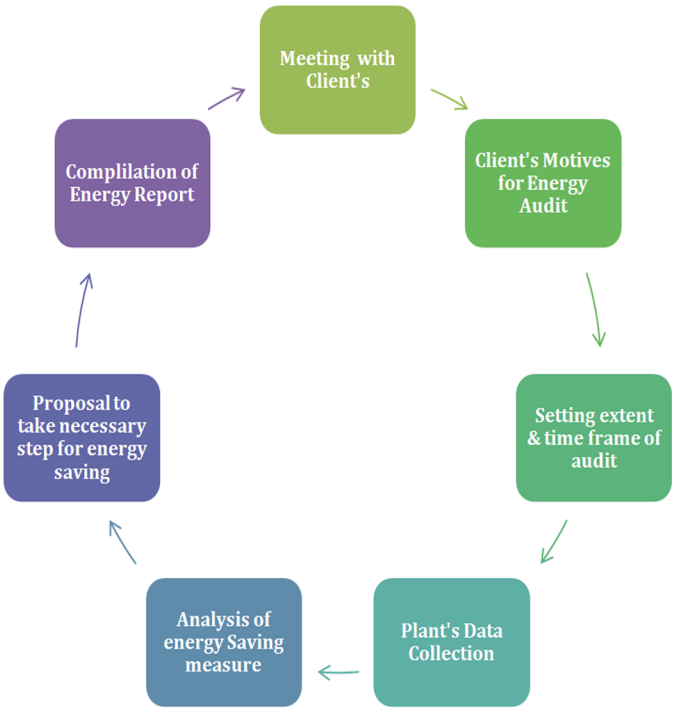
Nandi Resources Generation Technology Private Limited offers solution on Energy Audit in office buildings and factories for cost optimization through best practices and reducing the wastages of energy. The proposed solution is based on high-quality; high-performance NRGTPL offer that can help reduce energy consumption to a optimum level.

You can have confidence in the proposed approach because NRGTPL has assisted customers with the successful deployment of similar business solutions.

We look forward to work with your company to forge a strong and mutually beneficial business relationship in the coming days.

Flow chart of Energy Audit :

Following flow chart describes a brief overview of Energy Audit in general.



A typical energy audit scenario in a Casting Industry to review of present electricity and other fuel usage scenario and estimation of energy consumption in various load centers as given below:

Equipment	Process step	Type of energy
Cupola	Melting	Thermal (coke)
Casting	Melting, Moulding and core making, Sand plant, Lighting, compressor	Electic, Oil, Coke
Induction furnace	Melting	Electrical
Motors	Moulding, sand blasting, cooling tower, air compressors, pumps	Electrical
Others	Lighting	Electrical

Average distribution of energy consumption in Casting Industry:

To arrive at the energy consumption pattern is the main part of the energy audit process. The energy pattern given in Table is helpful in understanding the way energy is used in a foundry and helps to control energy cost by identifying areas where waste can occur and where scope for improvement may be possible. It is observed that melting consumes a major portion of total energy consumed.

Sl. No	Sections	Energy Consumption
1	Melting	70%
2.	Molding and core making	10%
3.	Sand plant	6%
4.	Lighting	5%
5.	Compressor	5%
6.	Other	4%

Electrical Distribution System:

- Review of present electrical distribution like transformer loading, cable loading, normal and emergency loads, electricity distribution in various areas/ floors etc.

- Study of Reactive Power Management and option for power factor improvement

- Exploring the Energy Conservation Options in electrical distribution system

Lighting System:

• Review of present lighting system, lighting inventories etc.

• Estimation of lighting load at various locations like different factories, pump house, washrooms, other important locations.

• Detailed lux level survey at various locations and comparison with acceptable standards.

• Study of present lighting control system and recommend for improvement.

• Analysis of lighting performance indices like Lux/m2, lux/ watt, lux/watt/m2 and comparison with norms of high rise buildings.

• Exploring the Energy Conservation Options (ENCON) in lighting system.

Heating, Ventilation & Air Conditioning System (HVAC System):

• Review of present HVAC system like central AC, split AC, package AC, Water Coolers and Air Heaters etc.

• Performance assessment of split AC and package AC system.

• Air Handling Units (AHUs) and cold insulation system of central AC.

• Analysis of HVAC Performance like estimation of Energy Efficiency Ratio (EER i.e. KW/TR), Specific Energy Consumption (SEC) of Chilled Water Pumps, Condenser Water Pumps etc. and comparison of the operating data with the design data.

• Exploring the Energy Conservation Options (ENCON) in HVAC system.

Water Pumping Systems:

• Review of water pumping, storage and distribution systems

• Performance assessment of all major water pumps i.e. power consumption vs. flow delivered, estimation of pump efficiency etc.

• Exploring the Energy Conservation Options (ENCON) in Water Pumping System.

• Exploring the ENCON options in electric drive system.

Motor Load Survey:

• Conducting the motor load survey of all drives to estimate the % loading.

• Exploring the ENCON options in electric drive system

Review of Energy Losses in Induction Furnace:

Estimation of different losses occur in an induction furnace include the following-

(i) radiation losses, (ii) coil losses, (iii) transmission losses, and (iv) lining-conducted heat losses.

Review of actual energy losses based on the number of factors like the following:

• Quality standard of the manufacturer
• Capacity of the furnace (batch size)
• Quality and size of batch material
• Operating practices.

Review of Energy Losses in Cupola furnace:

Different energy losses occur in a cupola include the following-

• Heat losses due to formation and combustion of carbon monoxide (CO)
• Sensible heat losses in flue gas
• Structural and unaccounted losses
• Losses due to calcination of limestone
• Heat in molten slag.

Others:

(i) Review of present maintenance practice, replacement policies and factory safety practices as applicable to high rising buildings and recommend for improvements.

(ii) Power factor and COP and energy efficiency of various energy consuming systems used in the factories for which energy audit shall be carried out along with specifications; make of testing equipments shall be used in the study as following-

• Equipment specification and the manufacturing process
• Overall yield of operation
• Degree of mechanization
• Type and quality of coke used
• Raw material quality
• Product type and mix
• Operating practices
• Housekeeping and maintenance practices.
• Plant capacity and utilization

Press Industries


College Campus


Consultancy


Melting Industries


Casting Industries


Boiler Industries


Agro Industries

Energy flow from input section to mechanical energy end-user section in a compressed air system:

The study of the energy flow from the input to the end user can be a first drive toward possible energy savings. The first inefficiency is due to the electric motor that drives the compressor. A traditional induction motor can operate at 90% top efficiency with diminishing values when departing from nominal speed. A modern permanent magnet motor offers a 95% efficiency over a wide operative speed interval.

A typical energy efficiency opportunities in Glass Industry:

Sector	Energy efficiency opportunities	
Pulp and paper – raw material preparation	• Cradle debarkers • Automatic chip handling and screening • Replace pneumatic chip conveyors with belt conveyors	• Bar-type chip screening • Use secondary heat instead of steam in de-barking • Chip conditioning
Chemical pulping – pulping	• Use of pulping aids to increase yield • Digester blow/flash heat recovery • Optimise the dilution factor control • Heat recovery from bleach plant effluents	• Continuous digester control system • Improved brownstock washing • Digester improvement • Chlorine dioxide heat exchange
Chemical pulping – bleaching	• Heat recovery from bleach plant effluents • Chlorine dioxide heat exchange • Improved brownstock washing	
Chemical pulping – chemical recovery	• Lime kiln oxygen enrichment • Improved composite tubes for recovery boiler • Lime kiln modification • Recovery boiler deposition monitoring	• Lime kiln electrostatic precipitation • Quaternary air injection • Black liquor solids concentration
Mechanical pulping	• Refiner improvements • Increased use of recycle pulp • Refiner optimisation for overall energy use • Heat recovery from de-inking plant • Pressurised groundwood • Fractionation of recycled fibers	• Continuous repulping • Thermopulping • Efficient repulping rotors • Drum pulpers • Heat recovery in thermomechanical pulp
Paper making	• Advanced dryer controls • Waste heat recovery • Control of dew point • Vacuum nip press • Energy efficient dewatering – rewetting • Shoe (extended nip) press	• Dryers bars and stationary siphons • Reduction of blow through losses • Belt drying • Reduction air requirements • Air impingement drying • Optimising pocket ventilation temperature

A typical energy efficiency opportunities in Pulp and Paper Industry:

Sector	Energy efficiency opportunities	
Pulp and paper – raw material preparation	• Cradle debarkers • Automatic chip handling and screening • Replace pneumatic chip conveyors with belt conveyors	• Bar-type chip screening • Use secondary heat instead of steam in de-barking • Chip conditioning
Chemical pulping – pulping	• Use of pulping aids to increase yield • Digester blow/flash heat recovery • Optimise the dilution factor control • Heat recovery from bleach plant effluents	• Continuous digester control system • Improved brownstock washing • Digester improvement • Chlorine dioxide heat exchange
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A typical energy efficiency opportunities in Vehicle Assembly Plant:

Sector	Energy efficiency opportunities	
Vehicle assembly – painting	• Minimise stabilisation periods • Reduce air flow in pain booths • Utilise heat recovery • Efficient ventilation system • Efficient oven type • Infrared paint curing • UV paint curing • Microwave heating	• Wet on wet paint • New paint – powders • New paint – powder slurry coats • Ultrafiltration / reverse osmosis for waste water cleaning • Carbon filters and other volatile carbon organic removers • High pressure water jet system
Vehicle assembly – body weld	• Computer control • High efficiency welding / inverter technology • Multi-welding units	• Frequency modulated DC welding machine • Hydroforming • Electric robots
Vehicle assembly – stamping	• Variable voltage controls • Air actuators	

A typical energy efficiency opportunities in Pharmaceutical Industry:

Sector	Energy efficiency opportunities	
Pharmaceutical – R&D	• Fume cupboard controls • Variable speed driven fans • Energy efficient clean rooms	
Pharmaceutical – Primary manufacturing	• Close-system sterilisation • Variable flow control for process air • Energy efficient agitation	
Pharmaceutical – Secondary manufacturing	• Variable speed driven fans • Variable speed driven vacuum • Multiple effect evaporation	• Optimise the operation of pharmaceutical water generation • Recover and reuse water from water treatment plant for other applications

A typical energy efficiency opportunities in iron & steel Industry:

Sub-Sector/Product	Energy efficiency opportunities	
Iron making – blast furnace	• Injection of pulverised coal • Injection of natural gas • Injection of oil • Injection of plastic waste • Injection of coke oven gas and basic oxygen furnace gas • Charging carbon composite agglomerates • Top pressure recovery turbines	• Recovery of blast furnace gas • Top gas recycling • Improved blast furnace control • Slag heat recovery • Pre-heating of fuel for hot stove • Improvement of combustion in hot stove • Improved hot stove control
Steelmaking – Basic oxide furnace	• Recovery of BOF gas and sensible heat • Variable speed drive on ventilation fans • Ladle pre-heating	• Improvement of process monitoring and control • Efficient ladle heating programme
Steelmaking – EAF	• Variable speed drives • Oxy-fuel burners / lancing • Post combustion of flue gasses • Improving process control • Direct current are furnace	• Scrap pre-heating • Waste injection • Air tight operation • Bottom stirring / gas injection
Casting and refining	• Integration of casting and rolling • Lade pre-heating • Tundish heating	
Metal shaping	• Use efficient drive units • Gate communicated turn off inverters • Installation of automated lubrication system	
Hot rolling	• Recuperative or regenerative burners • Flameless burners • Controlling oxygen levels • Variable speed drives on combustion air fans • Hot charging	• Integration of casting and rolling • Proper reheating temperature • Process control in hot strip mill • Heat recovery to the product • Waste heat recovery from cooling water
Cold rolling	• Continuous annealing • Reducing losses on annealing line	• Reduced steam use in the acid pickling line • Inter-electrode insulation in electrolytic pickling line

A typical energy efficiency opportunities in cement Industry:

Sector	Energy efficiency opportunities	
Cement production – raw materials preparation	• Efficient transport systems (dry process) • Slurry blending and homogenisation (wet process) • Raw meal blending systems (dry process) • Conversion to closed circuit wash mill (wet process)	• High-efficiency roller mills (dry process) • High-efficiency classifiers (dry process) • Fuel Preparation: Roller mills
Clinker production (wet)	• Energy management and process control • Seal replacement • Kiln combustion system improvements • Kiln shell heat loss reduction • Use of waste fuels • Conversion to modern grate cooler • Refractories	• Optimize grate coolers • Conversion to pre-heater, pre-calciner kilns • Conversion to semi-dry kiln (slurry drier) • Conversion to semi-wet kiln • Efficient kiln drives • Oxygen enrichment
Clinker production (dry)	• Energy management and process control • Seal replacement • Kiln combustion system improvements • Kiln shell heat loss reduction • Use of waste fuels • Conversion to modern grate cooler • Refractories • Heat recovery for power generation • Low pressure drop cyclones for suspension	• pre-heaters • Optimise grate coolers • Addition of pre-calciner to pre-heater kiln • Long dry kiln conversion to multi-stage • pre-heater kiln • Long dry kiln conversion to multi-stage • pre-heater, pre-calciner kiln • Efficient kiln drives • Oxygen enrichment
Cement production – finish grinding	• Energy management and process control • Improved grinding media (ball mills) • High-pressure roller press • High efficiency classifiers • General Measures • Preventative maintenance (insulation, compressed air system, maintenance) • High efficiency motors • Efficient fans with variable speed drives	• Optimisation of compressed air systems • Efficient lighting • Product & Feedstock Changes • Blended Cements • Limestone cement • Low Alkali cement • Use of steel slag in kiln • Reducing fineness of cement for selected uses

Green Audit mandated by University Grant Commission:

The objective of the Green Audit is to ensure that the carbon and water foot prints are optimised in line with the environmental sustainability as mandated by National Accreditation Council. The objectives of the audit were to evaluate the adequacy of the management control framework of Environment Sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. In order to assess on the carbon footprint issue, a detailed energy audit was conducted to determine how and where energy is used and to identify methods for energy savings. There is now a universal recognition of the fact that new technologies and much greater use of some that already exist provide the most hopeful prospects for the future. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of these technologies and options. Considerations of efficiency, accountability, transparency and ethics are important in both the public and private sector. However, it is arguable that they are more so in the public sector and government, as their primary purpose is to promote the public good. Public assets of the whole society, including natural and social goods, are entrusted to the state and, therefore, the need to protect them in the long term is more pressing than for businesses which have a more limited responsibility to their shareholders. Governments are responsible for the outcomes for society in general, as well as their own direct policy or organisational impacts on them. For these reasons, existing sustainability reporting frameworks for the private sector are not adequate to the needs of the public sector or national government. There are certainly lessons to be learnt, but these are not one-way. Sustainability reporting in any sector should also draw on the planning, monitoring and reporting frameworks in the private sector to understand where and how elements of sustainability are already addressed, perhaps under a different name and, hence, where the gaps may be. Measurement Sustainability planning, action and reporting have grown greatly in recent years. Environmental sustainability has received the most attention as there is growing evidence of an urgent need for change in this area. But there is also general consensus that environmental sustainability cannot be achieved except in tandem with social and economic change. The measurement of environmental sustainability in isolation, then, does not seem sufficient. Greater attention needs to be paid to understanding how other elements of sustainability could also be measured, in order to ensure they also receive action and attention. This measurement could be, but does not necessarily need to be, in financial terms.