



energy efficiency

Powered by K-Electric

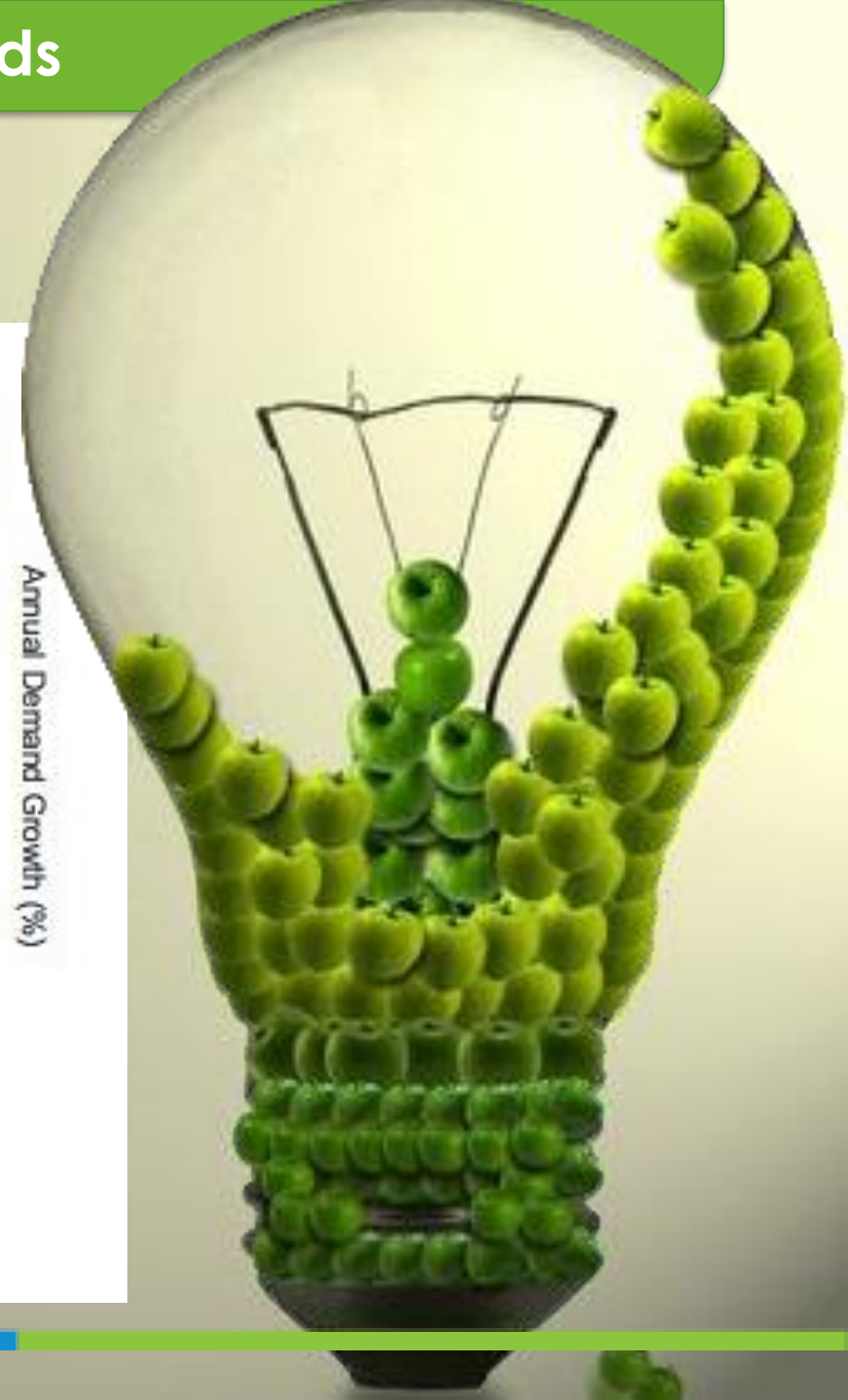
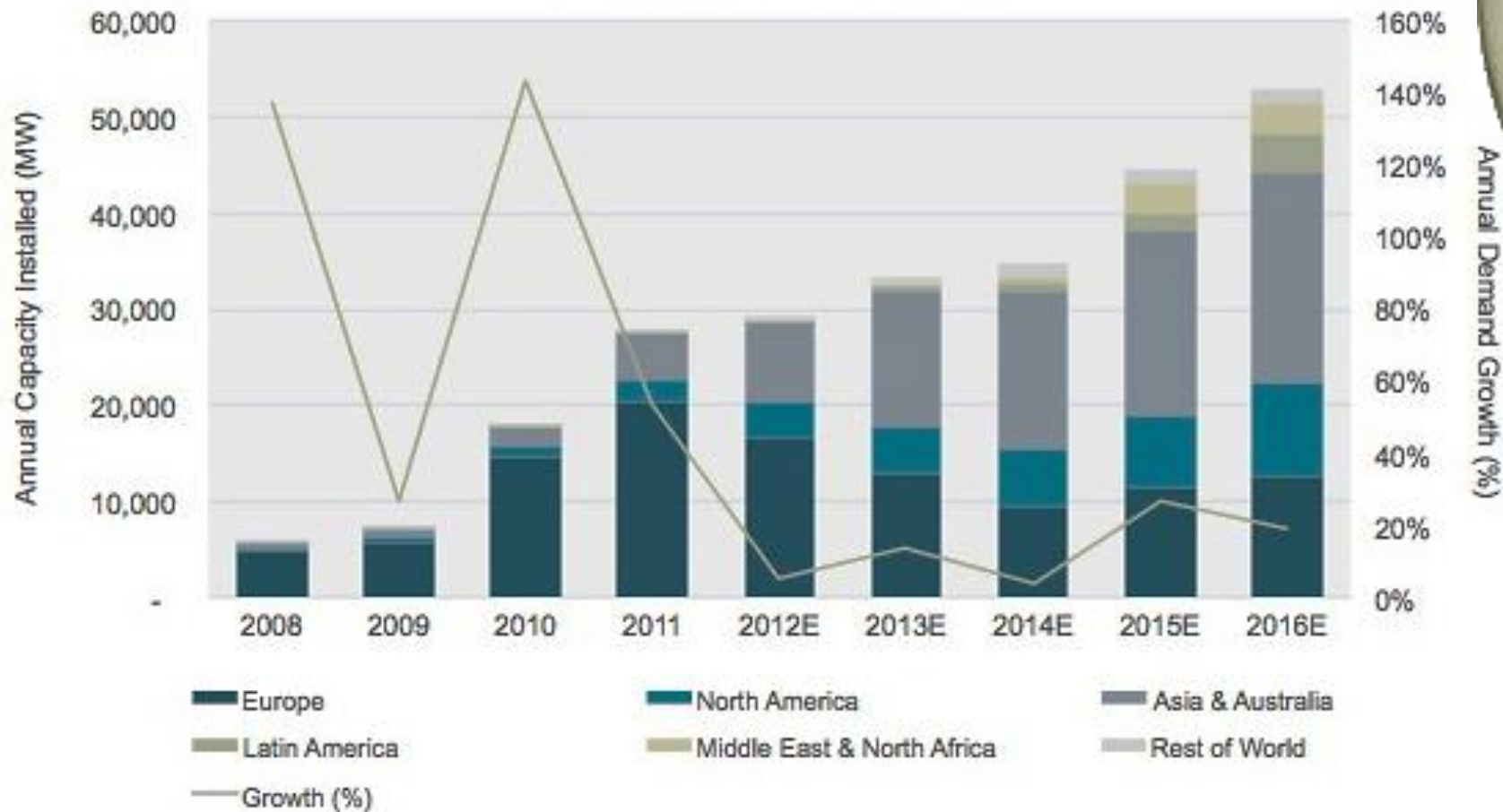


**ENERGY CONSERVATION
DEPARTMENT**
SAARC Session

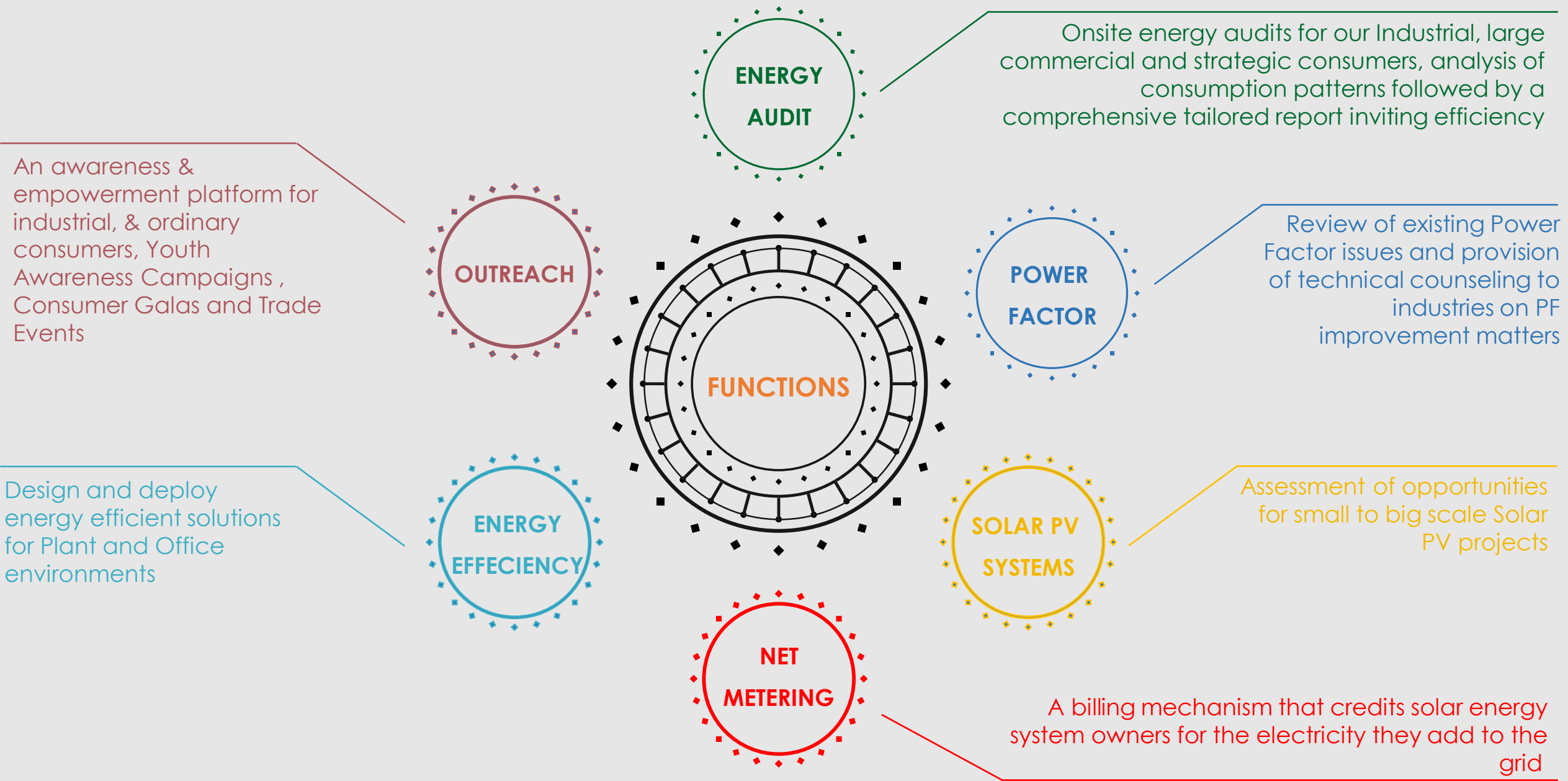
Global Energy Demand Trends

Global Demand Transition is Underway

The Market's New World Order



ENERGY CONSERVATION DEPARTMENT – KE



What is Energy Efficiency..??

- Reduced **Energy Waste**; Using less energy to perform the same task
- Reduced **Greenhouse Gas Emissions** and **Demand for Energy Imports**
- O&M and **Energy Management Plan** ensuring **Sustained Savings** and **Enhanced Performance Standards**



Technological Advancements in Industrial & Commercial Sectors

- Lightings
- Air conditioning (Inverters & VRF)
- Efficient solutions for high inductive loads (Motors/Comp/Heaters)
- Alternate energy sources (Wind/Solar)
- Process automation leading to higher efficiency
- Heat Rejection/Rooftop Insulation
- Smart Building MS – Automation & Monitoring



Salient features

Assessment of energy use as per ISO 50001 & ASHRAE 90.1

Recommendations

Establish ROI

Hyper Care

01. Outreach
Reaching out to consumers having the willingness and potential to contribute towards efficient lifestyle

02. Interaction
Initial meetings with interested clients to explore EA process & the associated benefits

03. Pre Survey Data Mining
Analysis of billing, load profiles & consumption patterns as a baseline for the audit processes



ENERGY AUDIT

06.

Report

Present comprehensive energy audit report with consumer

05.

Post Survey Analytics

Evaluate the current energy pattern & compare it with international best practice.

04.

Field Audit

Experienced EC teams carry out physical site survey specific to each customer's need

03.

Pre Survey Data Mining

Analysis of billing, load profiles & consumption patterns as a baseline for the audit processes

02.

Interaction

Initial meetings with interested clients to explore EA process & the associated benefits

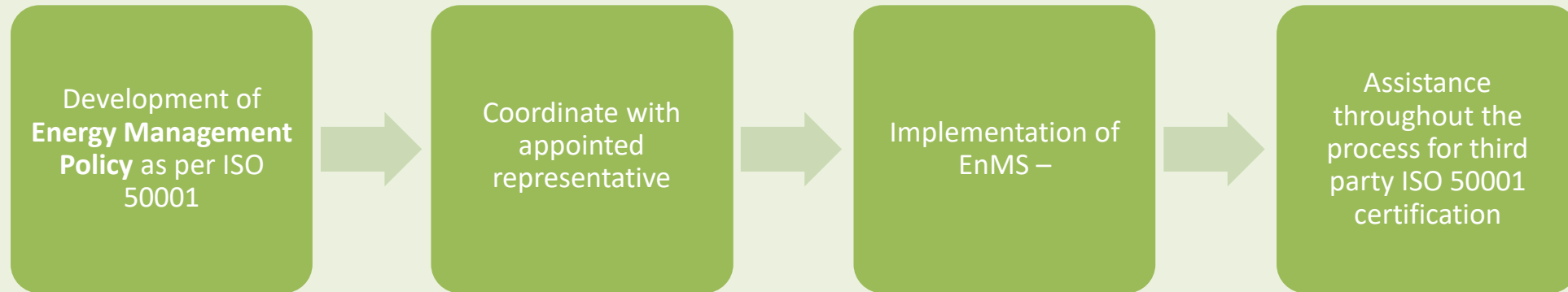
01.

Outreach

Reaching out to consumers having the willingness and potential to contribute towards efficient lifestyle

ISO 50001 CERTIFICATION FOR KE CONSUMERS

HOW KE SUPPORTS ORGANIZATIONS FOR ISO 50001



Act: take actions to continually improve performance of the energy management system

Plan: establish the objectives and processes necessary to deliver results in accordance with organization's energy policy

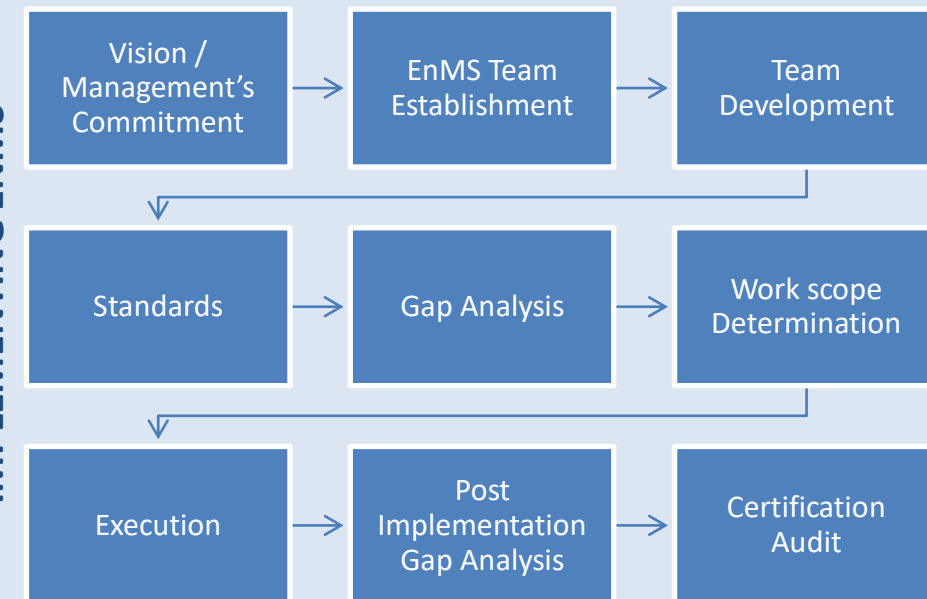
ENERGY MANAGEMENT SYSTEMS (ENMS)

ENMS is a series of processes based on PDCA cycle, enabling use of data to improve energy performance, improve operational efficiencies, decrease energy intensity, and reduce environmental impacts. It serves as a basis for investments in energy efficiency.

Check: monitor and measure processes against energy policy, objectives, targets, legal obligations and other requirements to which the organization subscribes, and report the results

Do: implement the processes

PROCESS FLOW FOR IMPLEMENTING ENMS



CLIENTS WORKED WITH

Some Strategic handshakes

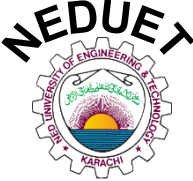
Energy Audits

500+ energy audits conducted

60 MW saved

162,675 tons of CO2 reduced



 GOVERNOR HOUSE 61 kW	 CM HOUSE 347 kW	 SYNDH ASSEMBLY 228 kW	 SYNDH SECRETARIAT 143 kW	 SIND CLUB SINCE 1971 380 kW	 151 kW	 IBA 478 kW	 MEEZAN BANK 65 kW
 ICAP 58 kW	 SGS 60 kW	 NEDUET 600 kW	 MALC ESTABLISHED 1956 MARIE ADELAIDE 27 kW	 Dawlance 460 kW	 Hilton PHARMA 96 kW	 asia PETROLEUM 267 kW	 KGS 416 kW
 PSO Pakistan State Oil 2300 kW	 GENERAL TYRE 300 kW	 UNIVERSAL CABLES Pakistan 280 kW	 Lady Dufferin Hospital 33 kW	 Brookes 44 kW	 PAKISTAN DEFENCE OFFICERS HOUSING AUTHORITY HOME FOR DEFENDERS 38 kW	 HBL 210 kW	 UNIVERSITY OF TECHNOLOGY 110 kW

SMALL SCALE RENEWABLE ENERGY STRATEGIC CLIENTS



947 kW
Projects
Completed

1,540 kW
Projects
Counseled

785.45 tons
of CO2 p.a.
reduced

Over **2.5 MW**
consultancy provided



360 kW



55 kW



407 kW



143 kW



102 kW



Karachi Grammar School

150 kW



110 kW



10 kW



CHIEF MINISTER HOUSE

35 kW



5 kW



600 kW



350 kW

An aerial photograph of a city at night, heavily tinted with a green color. The image shows a dense urban landscape with numerous buildings and lights. A prominent, tall, modern skyscraper with a distinctive perforated facade stands out in the lower right quadrant. A dark, semi-transparent horizontal band runs across the center of the image, serving as a background for the text.

CASE STUDIES



ENERGY EFFICIENCY TARGETS

Potential energy savings
25% optimization per year

Potential financial savings
1.5 million rupees per year

Potential CO2 reduction
32 metric tons per year

Before
audit

46,116 kWh

Monthly average units
consumed

After
Audit

39,118 kWh

Monthly average units
consumed

6,998 kWh

Per month savings

PKR 500,000

Investment



ENERGY EFFICIENCY TARGETS

Potential energy savings
38% optimization per year

Potential financial savings
2.5 million rupees per year

Potential CO2 reduction
128 metric tons per year

Before
Audit

234,509 kWh

Monthly average units
consumed

After
Audit

157,654 kWh

Monthly average units
consumed

76,855 kWh

Per month savings

ENERGY EFFICIENCY TARGETS

Potential energy savings
34% optimization per year

Potential financial savings
6.9 million rupees per year

Potential CO2 reduction
128 metric tons per year



Before
Audit

45,633 kWh

Monthly average units
consumed

After
Audit

42,459 kWh

Monthly average units
consumed

3,174 kWh

Per month savings

PKR 300,000

Investment

- Technical sessions for our industrial and commercial consumers.



An aerial photograph of a city at night, heavily tinted with a green color. The city lights are visible, and a prominent building with a dome is seen in the upper center. A semi-transparent black banner runs horizontally across the middle of the image, containing the text 'ENERGY EFFICIENCY IN KE' in white, bold, uppercase letters.

ENERGY EFFICIENCY IN KE

Bin Qasim Power Station - II



At BQPS-II...

- ***First ever plant in Pakistan to achieves ISO 50001 certification.***

Gross installed capacity of 248 MW 8% total plant auxiliary power consumption.

BQPS II used the vision and insight of KE energy conservation to develop and roll out and EnMS as per ISO 50001 guidelines.

KORANGI POWER COMPLEX



KPC used the vision and insight of KE energy conservation to develop and roll out and EnMS as per ISO 50001 guidelines.

KPC has developed a plant-wide energy policy, and made major changes in lighting and AC.

S.I.T.E. GAS TURBINE POWER STATION



SGTPS develop plant wide energy policy

Major changes were made to HVAC & Lighting that together accounted for 75% + energy used at SGTPS



TRANSFORMER SWITCHGEAR WORKSHOP

TSW through energy policy implementation achieve energy efficiency in its process areas.
Load optimized by the maintaining of PF, installation of VFDs, Inverter and LED technologies.
Installing 300 kW solar PV system.



ITG & PROCUREMENT BUILDING OF KE

AUTOMATION SYSTEM SAVING 20,000+ MONTHLY ENERGY UNITS

KE IT & procurement building have been achieved energy efficiency through installation of building automation system.

30% reduction in energy consumption in both buildings by automation system.

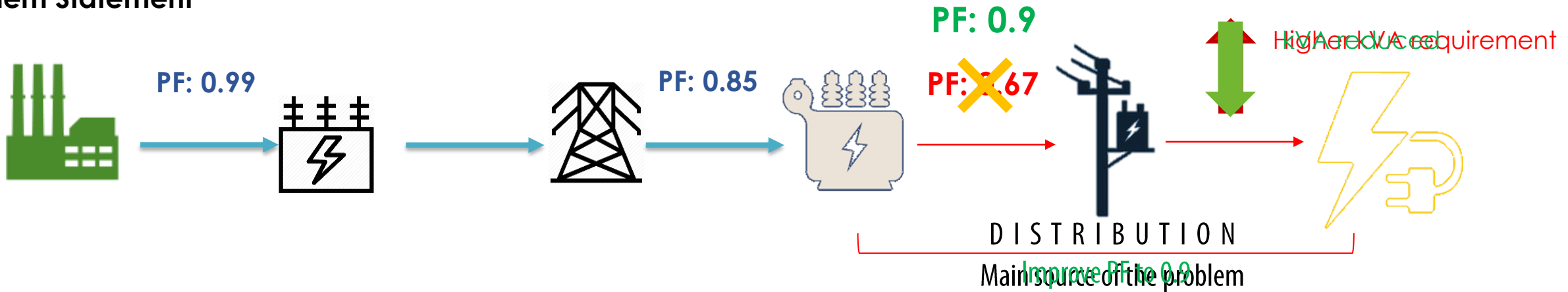


Features...

- *Complete system designed in-house*
- *State of the art structure*
- *Annual production target of 302,000 kWh exceeded*

350 kW Solar Carport at KE head office

Problem Statement



PF Survey for Consumers

- We conduct PF survey for our industrial consumers.
- We recommend the consumers for the power factor improvement remedies.

Benefits

- Correcting poor PF can significantly reduce load on transformers and conductors
- Improves voltage regulation and stability of network
- Reduced line losses due to higher currents
- Lower kVA to cater the same load



Use LED lighting.
Payback – 1 to 2 months

In industrial buildings, lighting accounts for approximately **10%-20%** of the total energy used. Deploying efficient lamp technologies such as LEDs can increase savings by **80%**.

Implement Process Automation and Energy Management System.
Payback – 1 to 4 years

Improved automation in plants can save up to **80%** energy. It can increase productivity, decrease downtime and minimise maintenance requirements while reducing energy consumption. Automation also aids in data collection for metering and instrumentation required for the Energy Management System.



Use high efficiency motors with Variable Speed Drives.
Payback – 3 to 12 months

Motors are very energy-intensive. Energy-efficient motors pay back their purchase price within a few months.

Small reductions in the speed of Variable Speed Drives (VSDs) can optimise the voltage and frequency supply to the motor. Matching the speed of the motor to the actual load demand can produce significant energy savings. An effective motor management policy with VSDs can be implemented, resulting in further savings.



Install efficient heating and cooling technology.
Payback – 2 to 5 years

Heating and cooling use around **20%-40%** of a building's energy. Replacing old boilers and chillers with modern versions can reduce energy usage.

A modern condensing boiler operates at an efficiency of **95%**, whereas a conventional boiler has an efficiency of only **80%**. A recommended chiller's Coefficient of Performance (COP) should be around 6. A higher COP figure means less energy is required — thus, reducing costs.



Improve power controls and power factor.
Payback – 1 to 4 years

Power factor correction can improve the usable power available to the equipment, thus, maximising its efficiency. Recommended power factor as per NEPRA guidelines is 0.9. Power Factor Improvement panels can:

- Increase current carrying capacity of the factory's electrical network.



- Stabilise network voltage.
- Decrease the electricity bill by avoiding low power factor penalties.

Active Harmonic Control removes noise from power lines while saving energy and reducing deterioration of electrical equipment. By scheduling production during off-peak hours and managing electricity tariffs, you can use energy when it is cheaper.

K-Electric has taken a special initiative to address the issue of low power factor which is the root cause of additional penalties in your monthly bills.

Power Factor is defined as the ratio between active power and apparent power. It must be maintained up to a value of 0.95.

The correct value of power factor can save you from paying monthly penalties and enable us to reduce overloading of network infrastructure, and enhance system capacity.



Steps that can be taken to improve Power Factor:

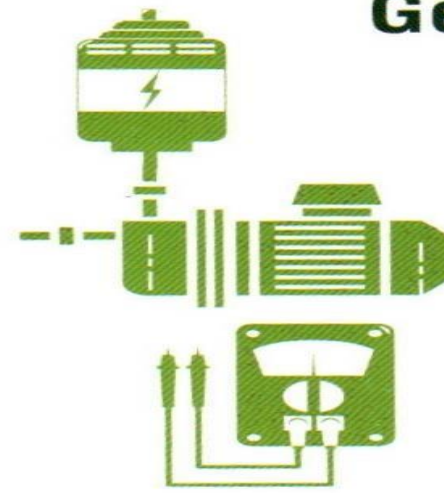


Immediate Steps

1. Installation of capacitor banks
2. Adequate sizing of capacitor banks according to load
3. Proper switching mechanism for supply of adequate reactive power

Note:

The capacitor size should be kept at a minimum of 7.5 or 12.5 KVAR at first and last stages.



General Guidelines

1. Use branded motors and avoid using rewound motors.
2. Replace standard motors with energy-efficient motors.
3. Use synchronous motors instead of induction motors.
4. Minimise operation of idling or lightly loaded motors.
5. Avoid operation of equipment above its rated voltage.
6. Vendor should be PEC registered.

Consumers can approach our energy conservation department for guidance and determination of best options including the following services:



Contact details are given at the back.

1. Technical assistance in PF determination and counselling sessions
2. Fault diagnosis of existing capacitor banks
3. Recommendations and implementation strategies for PF improvement

Once your power factor is maintained between **0.9 and 1.0**, the quality of power supply to your premises will be greatly improved. It will further result in a **reduction of tripping cases** and complaints, **improvement in voltage stability**, **improvement in energy efficiency and life of appliances**, and last but not least the elimination of power factor penalties.



Use LED bulbs instead of CFLs or conventional incandescent bulbs. LED lights can save up to **60%** load on average and last up to 10 times as long as conventional incandescent lights.



Use inverter ACs instead of conventional ACs. Inverter ACs can save up to 50% AC load i.e. 1440 kWh per year. When purchasing an inverter AC, opt for DC inverter based components. Set your AC thermostat settings between 24°C and 26°C.



Switch off, unplug and save. Turn off unnecessary appliances such as lights, fans, and ACs, especially during peak hours. Appliances continue to consume energy on standby mode.



Use motion sensor switches and timers. Install motion sensors and timers to avoid leaving electrical appliances switched on around the clock.



Heat Rejection Sheets. Use Heat Rejection Window Sheets. These sheets allow maximum sunlight to enter the building while simultaneously blocking heat, creating a comfortable working environment and saving electricity costs.

Energy
Efficiency
at Workplace



2-year
payback

80%
less heat
& glare

30%
off HVAC
energy costs*

*HVAC: Heating, Ventilation and Air Conditioning

Thank you