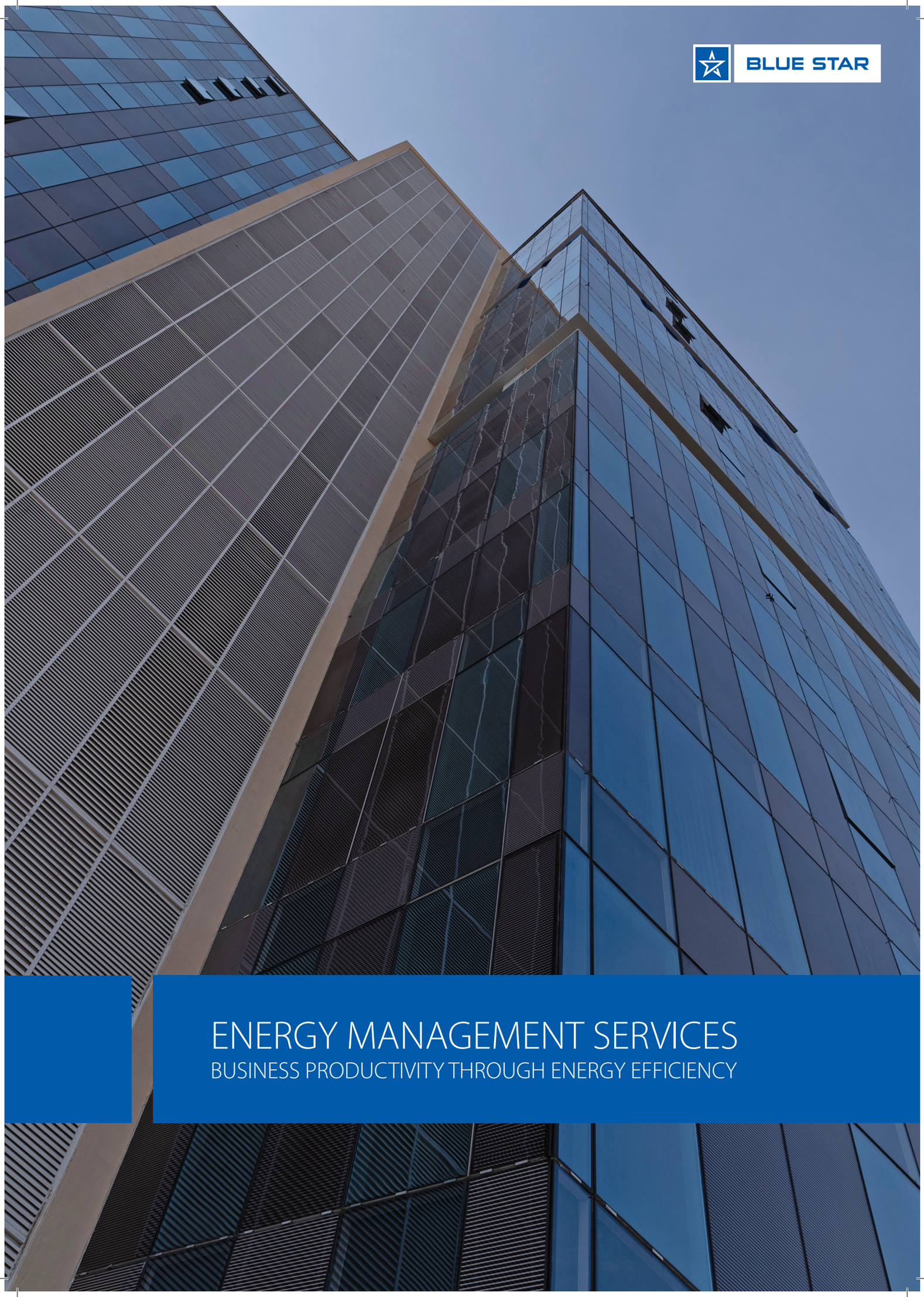


BLUE STAR

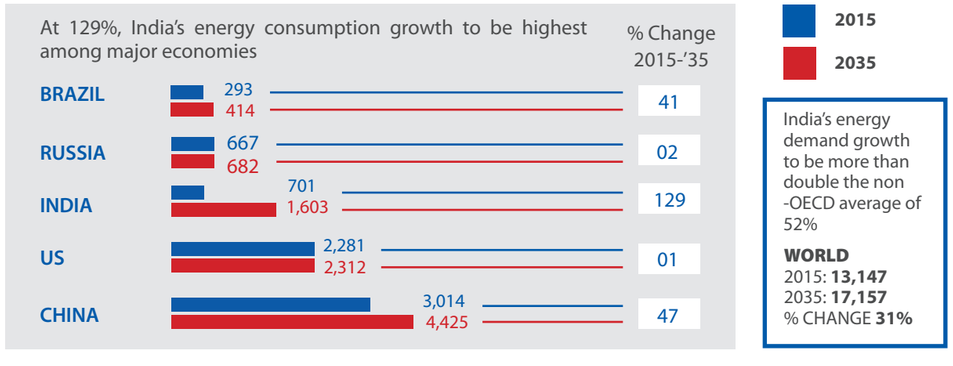
ENERGY MANAGEMENT SERVICES

BUSINESS PRODUCTIVITY THROUGH ENERGY EFFICIENCY

INTRODUCTION

With a population of 1.2 billion, India desperately needs energy to fuel its economic growth. As per FDI research, the energy demand in India is expected to grow by 95% by 2030. India does not possess sufficient energy resources to cater to either the current or future requirements.

Total primary energy consumption (units in Mtoe)



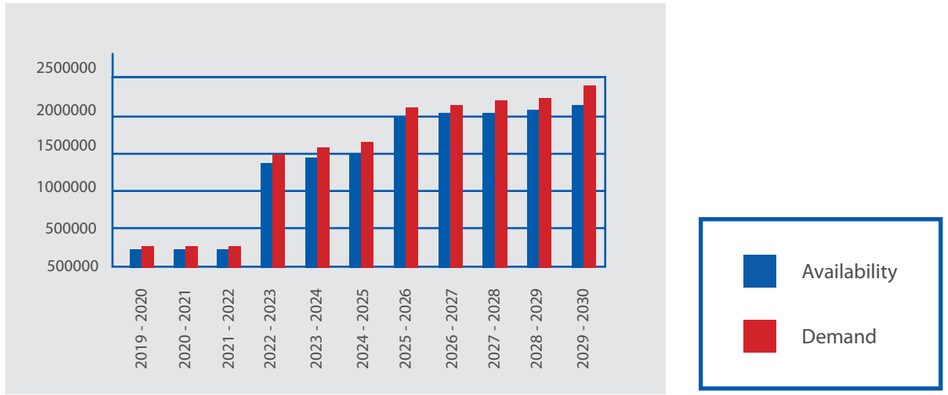
Need For Energy Management Solutions

India's energy consumption to grow faster than other major economies. Across the world, energy demand will increase by about 30% by 2035. Natural gas consumption will grow faster than either oil or coal, expanding at 1.6% per year. India, Asia's 2nd biggest energy consumer since 2008, has overtaken Japan in 2015 as the world's 3rd largest oil consuming country, behind the US and China.

India's energy consumption is set to grow 4.2% per year by 2035, faster than that of all major economies in the world, according to BP Energy Outlook.

Given this background, it's imperative that at a 6% GDP growth, the gap between India's energy requirement and energy availability will broaden by 2030.

Estimated Energy Demand and Availability in India by 2030



ENERGY MANAGEMENT SOLUTIONS FROM BLUE STAR

Global demand for energy is on a rise and so are energy prices. Various energy audits have proved that there is a potential to save atleast 20-30% of the total energy that's consumed. Threat of climate change and limited availability of resources is forcing governments to introduce strict environmental regulations and is making companies look for energy-efficient solutions and optimisation services.

Blue Star, with over seven decades of Project Management experience offers expert energy management solutions to the corporate and commercial sectors.

Some of the services that are offered by Blue Star are:

Performance Contracting

- Suggesting capital improvements to save energy and use the expected utility and operational savings to offset the cost of the upgrades.
- Guaranteed energy saving.
- Compliance with international performance measurement and verification protocol and ASHRAE guidelines for measurement and verification of the proposed savings.

Energy Modeling of Buildings

- Energy modeling of buildings, which will help at the design stage of the building, to identify energy-efficient and economical measures that can be implemented in the building.
- Suggesting different combinations of energy conservation measures which can be simulated in the software even before implementing them.

Carbon Footprint Study

- Help determine the present green house gas emissions.
- Provide specific solutions to reduce emissions.
- All forms of emissions that occur are included in determining carbon emissions. Carbon emissions from refrigerant use, transporation, waste, among other things, are considered while evaluating the carbon footprint study.

Power Quality Audit

- Measurements of harmonics, sag, swells and other power quality parameters in each feeder and comparing it with the IEEE requirement, and providing the solutions to meet the standard requirements.

Power Plant Energy Audit

- Performance assessment of Boilers (Packaged, Travelling grade, AFBC, CFBC, Pulverized fuel firing) and its accessories.
- Performance assessment of Steam Turbines and its accessories.

Blue Star is focused on energy optimisation in power plant energy audit. Any specific area which will have impact on energy efficiency of the system as a whole are studied and reported with possible measures of improvement.

Compressed Air Systems Audit

- Compressed air system performance assessment - Free Air Delivery (FAD) test
- Compressed air leakage estimation

Compressed air is an expensive utility due to high electricity cost. Blue Star is mainly focused on optimisation of air consumption in a plant that can a have significant effect on the energy consumption of the plant.

ASHRAE ENERGY AUDITS: LEVEL I AND LEVEL II

ASHARE Level I: Walk-through Analysis

A level I audit by Blue Star includes the preliminary energy usage analysis and a site visit by an engineer. A report is generated detailing low cost/no cost measures and potential capital improvements. An ASHARE Level I audit also satisfies one of the pre-requisites for the USGBC's LEED rating system for existing buildings.

ASHARE Level II: Energy Survey and Analysis

A level II audit is more detailed, entailing energy calculations and financial analysis of proposed energy efficiency measures. The financial analysis or life cycle analysis allows the facility owner to truly understand the financial benefits of incorporating energy efficient measures. This type of energy audit also gets additional points under LEED for existing buildings.

Air and Water Balancing

- A TAB specialist performs air and hydronic measurements on the HVAC systems and adjusts the flows as required to achieve optimum performance of the building's environmental equipments.
- Both of these activities are performed with the expertise of our NEBB (National Environmental Balancing Bureau, USA) certified professionals.

Thermography

- Perform infrared thermography of electric panels in the premises.
- Analyse the thermal information by using non-contact thermal imaging devices, so that maintenance personnel can take appropriate action to correct the problem which avoids losses resulting from plant shutdowns, and increases the life and efficiency of the machines.

Eddy Current Testing

- Detection of surface cracks and sub-surface damage in cooler and condenser copper tubes. This is done with high-end eddy current testing machines.

HVAC Inspection For Assessing The Cleanliness of Commercial HVAC Systems

The role of the HVAC inspector is to assess the cleanliness of the HVAC system, which is defined by the presence of dirt, obstructions, excess moisture, and microbial contamination that might affect system performance or occupant health and comfort. The inspection involves visual examination of critical HVAC system components using cameras and scopes where necessary. The inspector (if qualified) also reports observations regarding potential operational malfunctions or other maintenance needs that are observed during the course of the inspection.

In general, an HVAC inspection is undertaken so that the client will know whether, the HVAC system performance is compromised due to the build-up of particulate or microbiological contaminants or due to physical degradation of key HVAC system components. Blue Star helps clients to do their kind of inspections too.

Green Building Certification

Blue Star is a founding member of the Indian Green Building Congress (IGBC).

Certified professionals in Blue Star enable the building owners of new as well as existing buildings to go for IGBC and LEED Certification.

Services offered under this are:

- Feasibility study
- Commissioning services
- Energy modeling
- Complete support of the project throughout the certification process.

Retro-commissioning

- Retro-commissioning is a process to improve the efficiency of an existing building's equipment and systems.
- We will resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life due to ageing of equipment or due to change in building usage.
- This can produce significant cost savings in existing buildings. Savings vary depending on the building size, age and location, and the scope of the retro-commissioning process.

Advantage of Blue Star

- Blue Star Ltd. is a founding member of IGBC
- Blue Star's Energy Managemnet cell is ISO certified
- Blue Star is a Grade II credited ESCO by BEE

Indian Green Building Council
Greening India since 2001

ENERGY IS LIFE
BEE
CONSERVE IT

NEBB

NADCA

- This cell has a team of IGBC Accredited Professionals, BEE certified Energy Managers and Auditors, Certified indoor Air Quality Managers, and NEBB certified TAB professionals, Certified professionals from National Air Duct Cleaners' Association (NADCA-USA).
- A core team of Energy Management Professionals who have hands-on experience in auditing and building energy simulation.
- Team of Indoor Air Quality Auditors for comfort cooling applications.
- Equipped with high-end equipments/instruments for measurement and verification which include below tools:
  - Three-phase power and harmonics analyser
  - Ultrasonic flowmeter
  - Infrared Thermal Imaging Camera
  - Thermocouple Thermometer
  - Differential Pressure Gauge
  - Digital Manometer
  - Digital RH meter
  - Lux Meter
  - Electronic Flow hood
  - Hot wire anemometer
  - Refrigerant Analyser
  - Borescope
  - Flue Gas Analyser
- Team of Testing, Adjusting and Balancing (TAB) experts.
- Sophisticated softwares analysis.
- Expertise for designing Energy Efficient Designs of HVAC Systems.
- Adherence to Modern Installation Practices.
- Hands-on experience for third-party commissioning.

Some of our esteemed customers for whom we have conducted detailed Energy Audits, Air and Water Balancing and Green Building Certification:

BLUE STAR

BUILT ON TRUST™

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