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SMART CITIES
BASICS OF AIRPORT ENERGY MANAGEMENT
ONLINE TRAINING BY KRISHNAJI PAWAR
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MODULE

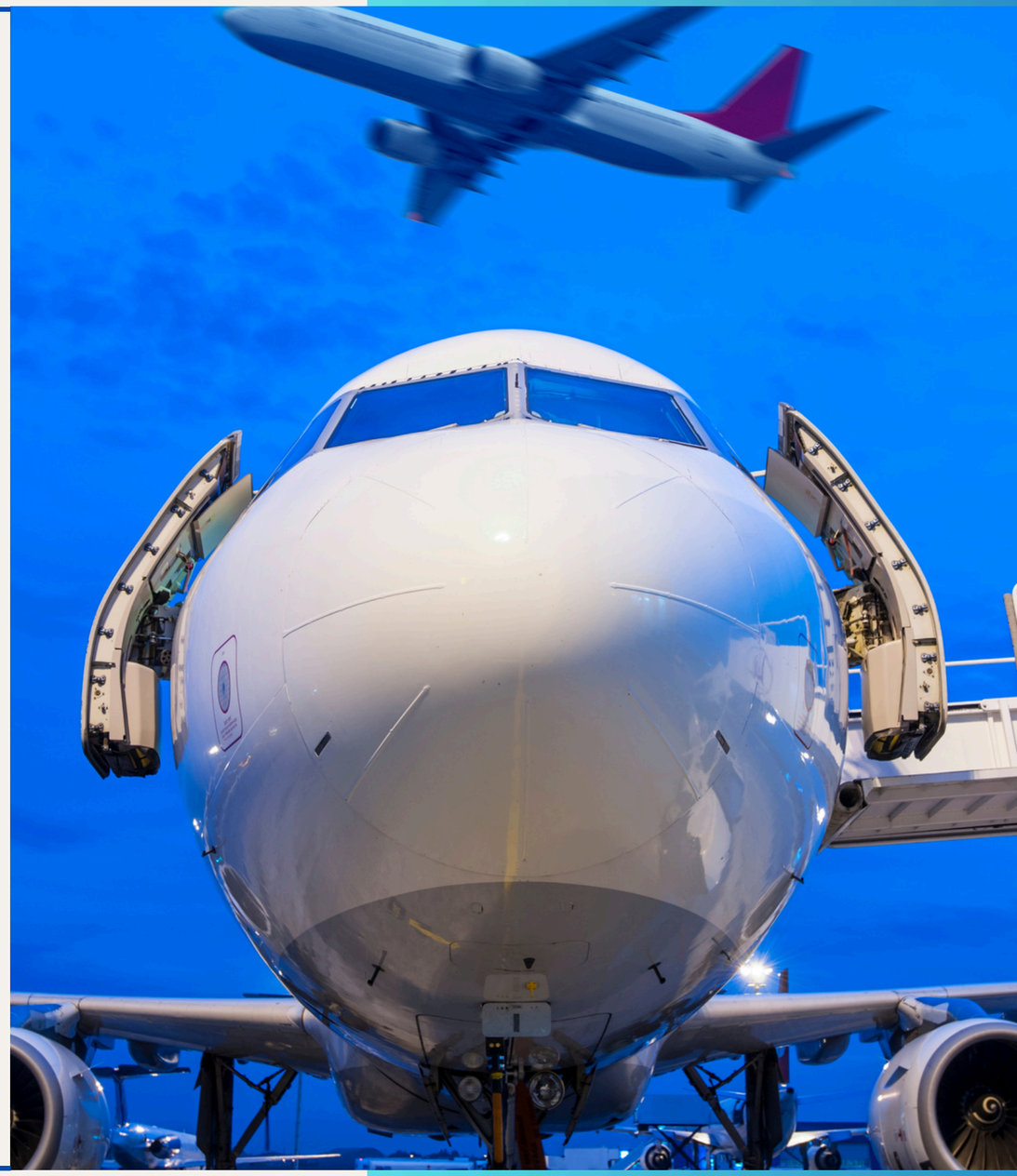
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Introduction and Course Outline

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BASICS OF AIRPORT ENERGY MANAGEMENT

This course covers airport energy management, focusing on energy conservation to promote sustainability in aviation. It outlines energy use in airport environments and emphasizes the need for efficient practices to reduce the environmental effects of air travel, particularly in terminal operations, ground services, and aircraft support systems.

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BRIEF ABOUT ME

Krishnaji PAWAR



CEO & FOUNDER

Krishnaji Pawar is Founder & CEO of Beyond Smart Cities (since January 2020), where he previously led its Sustainability and Energy & Environmental Consultancy practices.

He develops sustainable design strategies for LEED and GSAS certification, airport sustainability, energy and water conservation, commissioning, environmental impact assessment, and environmental management systems across smart cities, smart buildings, and smart airports.

Since December 2007, he has led more than 17.7 billion ft^2 of green building and energy modelling consulting in the UAE, Qatar, Saudi Arabia, and India.

Learning Objectives

- Course Overview and Introduction
- Energy & Sustainability Perspectives
- Overview of energy use in airport environments
- Importance of conservation in aviation sustainability.
- Key energy consumption areas in airports
- Global trends in energy efficiency
- Energy Consumption Reduction Plan
- Benefits of energy management
- Summary and resources

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INTRODUCTION

- Airports are crucial for global transportation but consume large amounts of energy, which affects the environment.
- Airport energy management involves efficient energy use, reducing consumption, and utilizing cleaner energy sources.
- Importance of energy management includes:
  - Cost savings: Efficient usage can save airports millions annually.
  - Environmental benefits: Reduced energy use leads to lower pollution and aids in combating climate change.
  - Regulatory compliance: Effective management helps meet government energy and pollution regulations.

- Strategies for energy management include:
  - Energy audits to identify wasteful practices.
  - Upgrading to energy-efficient equipment, such as LED lighting.
  - Utilizing renewable energy sources like solar and wind power.
  - Implementing energy management systems to monitor and control usage.

- Effective airport energy management enhances efficiency and sustainability, contributing to a greener aviation industry.

BENEFITS OF ENERGY MANAGEMENT IN AIRPORTS

- Energy management in airports involves monitoring and controlling energy usage.
- Significant cost savings can be achieved through energy-efficient lighting and management software.
- Environmental benefits include reduced greenhouse gas emissions by using less energy and incorporating renewable sources like solar panels.
- Improved operations result from real-time monitoring that helps quickly identify and resolve equipment issues.
- Airports can enhance their reputation and customer loyalty by showcasing their commitment to sustainability through energy-saving initiatives.
- As operational pressures increase, effective energy management will be crucial for future airport performance.



ENERGY AND ENVIRONMENTAL ISSUES





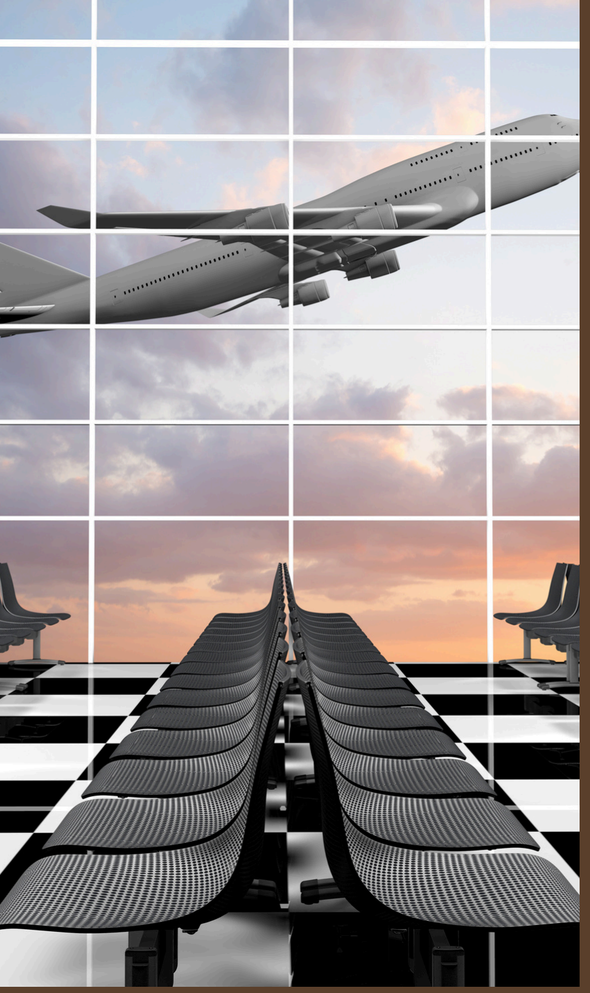
- The operating environment for airports has significantly changed over the last decade.
- National security concerns regarding energy resources have increased since September 11, 2001.
- There is a growing global demand for energy, particularly from developing nations like China and India.
- Electricity costs for airports have reached record highs due to rising natural gas prices and utility deregulation.
- Air pollutants from energy generation and fossil fuel combustion impact airports in U.S. EPA non-attainment areas.
- Greenhouse gas emissions from fossil fuels contribute to global warming.
- Airport managers face economic and political pressure to assess performance, reduce energy consumption, and lower environmental impact.

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AIRPORT ENERGY MANAGEMENT RESEARCH NEEDS

- Most airport facility managers have implemented energy-efficient upgrades like HVAC systems, building controls, and high-efficiency lighting.
- Investments in energy improvements are often costly and compete with other capital projects.
- Research from the Texas LoanSTAR program indicates retrofit savings may fall short of projections without close monitoring and verification.
- There is insufficient emphasis on low- or no-cost energy-saving techniques such as operations and maintenance (O&M) and building optimization.
- Quantitative benchmarking of energy savings potential at airports is rare, relying on broad statements and lacking empirical data.
- There is no established list of accepted energy-saving best practices for the airport industry.





KEY DEFINITION & MEANING

The process of overseeing and controlling energy use to improve efficiency and reduce costs.



Sustainability

The ability to maintain practices that do not harm the environment, ensuring resources are available for future generations.

Efficiency

The ability to achieve maximum productivity with minimum wasted effort or expense.

Energy Audit

An assessment that evaluates how much energy an airport uses and identifies ways to improve energy efficiency.

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- Energy Management System (EMS): A systematic process for planning, monitoring, and controlling energy consumption to improve efficiency and reduce costs. Often follows the ISO 50001 standard.
- Energy Efficiency: Using less energy to perform the same task (e.g., upgrading to LED lighting).
- Energy Conservation: Efforts to reduce or avoid energy consumption (e.g., behavioral changes, optimizing operations).
- Greenhouse Gas (GHG) Emissions: The release of gases like CO2 into the atmosphere, which airports aim to manage and mitigate through energy actions.
- Scope 1 Emissions: Direct emissions from sources owned or controlled by the airport, such as fuel for boilers and owned vehicles.
- Scope 2 Emissions: Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the airport.
- Net-Zero/Carbon Neutrality: The goal of balancing carbon emissions with removal or simply not emitting any (net zero).
- Airport Carbon Accreditation (ACA): An industry-specific certification program that recognizes airport efforts to manage and reduce their carbon footprint.



- HVAC (Heating, Ventilation, and Air Conditioning): Major energy consumers in airport buildings, often targeted for efficiency improvements.
- Building Automation Systems (BAS): Technology that automatically controls and monitors building functions like lighting, HVAC, and security to optimize energy use.
- Ground Support Equipment (GSE): Vehicles and equipment used on the apron (airside) to service aircraft (e.g., baggage carts, pushback tugs). Many are being electrified.
- Renewable Energy: Energy from sources that are naturally replenished, such as solar, wind, and geothermal.
- On-site Generation: Producing energy, often renewable (e.g., solar panels), within the airport's premises to reduce reliance on the external grid.
- Power Purchase Agreements (PPAs): Contracts to buy electricity from renewable sources, often off-site, for long-term price stability and sustainability.
- Combined Heat and Power (CHP) / Central Utility Plant: A facility that generates both electricity and useful heat from a single fuel source, increasing overall efficiency.
- Battery Energy Storage Systems: Technology used to capture and store excess energy (especially from intermittent renewables like solar) for later use.



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