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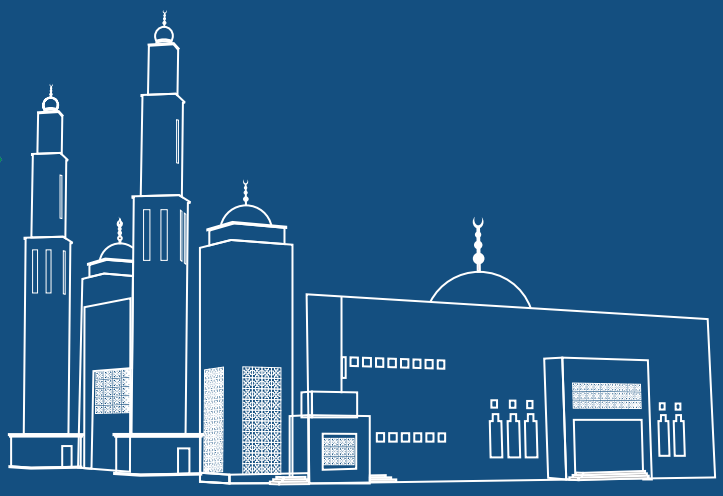
Advanced Electronics Company

العبيكان للحلول الرقمية
Obeikan
Digital Solutions

SMART MOSQUE SOLUTION



A WHITE PAPER BY
ADVANCED ELECTRONICS COMPANY

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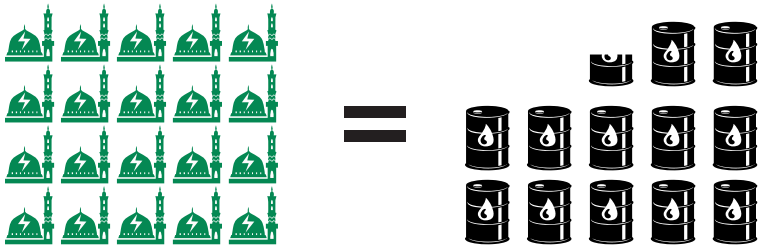
Smart Mosque:
Accessible, Actionable, and Digital

MOSQUES IN SAUDI ARABIA

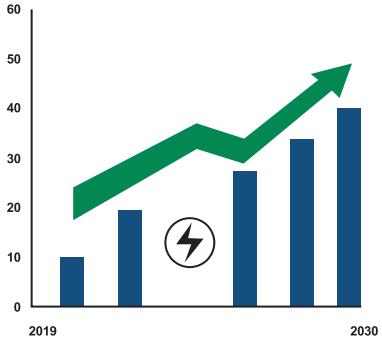
Over 90,000 mosques across the Kingdom consume 20.6 billion KWh of energy annually, which equals 12.5 million barrels of oil. [1]



20.6 billion KWh

12.5 million barrels of oil

40% ENERGY SAVING THROUGH SMART MOSQUE SOLUTION



What is a Smart Mosque?

Smart Mosque is an actionable and automated mosque that deploys digital technologies to offer enhanced experiences to worshippers. Besides this, smart mosque is equipped with AI and IoT sensors that interact with the visitors, improve internal and external safety, save energy, and track events and prayer timings.

ESSENTIAL ELEMENTS OF A SMART MOSQUE

- SPECIAL FEATURES
- PRAYER AND IQAMAH REMINDERS
- ENERGY AND WATER SAVING
- CENTRAL CONTROL TO IMAM
- TRANSMISSION OF PRAYER AUDIO AND LESSONS TO WOMEN'S SECTION

SMART MOSQUE: CONTRIBUTOR TO VISION 2030

ENERGY SAVINGS :
Use of Artificial Intelligence (AI) and Internet of Things (IoT) to reduce water and electricity consumption inside mosques.

VIBRANT SOCIETY: A society built on the ethos of enhancing the living standards of people.

DIGITAL TRANSFORMATIONS :
Using digital technologies to provide better experiences to worshippers.

[1] http://eprints.nottingham.ac.uk/48273/1/SET2017%20Full%20Manuscript%20-%20ALABDULLATIEF_140.pdf

Energy Dynamics of Smart Mosque

40% REDUCTION
IN ENERGY COSTS
THROUGH IOT AND AI

25%* REDUCTION
IN
WATER WASTAGE

10 % REDUCTION
IN
OPERATING COSTS

Mosque Sensors and Environment

ENVIRONMENTAL SENSORS:
Monitoring humidity, cooling, and temperature to ensure a healthy and pleasant atmosphere.

OCCUPANCY SENSORS:
Detection of human presence to automatically turn on or switch-off the lights and other devices.

MOTION SENSORS:
Detection of movement of people in an area and transfer of information to the central controller unit.

WEATHER :
Staying abreast with external weather conditions to regulate temperature inside mosques.

CONTROL ROOM:
Centralised monitoring of all the energy controls and systems within mosques.

LIGHTING CONTROL:
Smart and efficient lighting systems with automated reminders for prayer and iqamah.

CLIMATE CONTROL:
Adaptability to the immediate physical environment conditions.

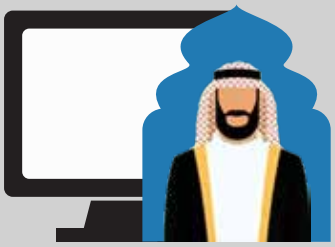
WATER CONTROL:
Preventing water-wastage by installing smart faucets and taps that function only during prayer times.

2.9 BN SAR can be saved in just 10 years by converting 6,600 medium to large mosques into smart mosques.

Based on implemented solution at Al Obeikan Mosque*

Unique Features of Smart Mosque

CENTRAL CONTROL TO IMAM



SMART THERMOSTATS AND LOCKS

FIRE ALARMS AND CCTV

MOBILE APP AND DASHBOARD

TRACKING MOSQUE VISITORS

PRAYER TIMINGS, MOSQUE EVENTS, AND ADJUSTMENTS

AUTOMATED UPDATE OF PRAYER TIMINGS

MANAGEMENT OF ISLAMIC EVENTS

ADAPTATION TO AREA REQUIREMENT FOR FRIDAY PRAYERS

ADJUSTMENT OF MOSQUE TEMPERATURE WHEN THE MOSQUE RECEIVES MORE VISITORS ON FRIDAY

COMFORTABLE MOSQUE ENVIRONMENT

SMART DOORS WITH SENSORS

SMART OUD DISSIPATERS

PRESENCE-SENSING LIGHTS AND BULBS

AUTOMATED COOLING

Smart Mosque:
Earning Key Reward Points for the Kingdom

SUPREMACY IN EMBRACING AUTOMATION, IOT, AND AI

AUTOMATIC ADJUSTMENT OF TEMPERATURE

OPTIMIZED PARKING SPACES

QURAN INVENTORY MANAGEMENT

UNIFIED MOSQUE MANAGEMENT CENTER

ENHANCED PHYSICAL SECURITY

VIDEO SURVEILLANCE AND MONITORING

MONITORING ENTRY AND EXIT OF PEOPLE

MINIMIZING ARCHITECTONIC IMPACT OF MOSQUE STRUCTURE

USE OF DATA INSIGHTS TO IMPROVE MOSQUE SAFETY

DATA MINING TO ANALYSE RECURRING PATTERNS

PROVIDING DATA TO AUTHORITIES

DATA ANALYSIS FOR BETTER MANAGEMENT OF SECURITY, SAFETY, ENERGY, AND COMFORT

Al-Obeikan Mosque: Ideal Prototype for Smart Mosques in KSA [2]

Zones	:	2 Zones (One large zone for Friday Prayers, and a smaller zone for daily prayers)
Total Area	:	Area for Friday Prayer: 30x30m
Daily Area	:	16.5x20m
Door	:	Nine large doors (door size : 2.4m x 2 m)
Window	:	12 windows (size: 2 x 3m) 18 windows (size: 1 x 1m)
Height	:	9m
No. of AC Units	:	8 Large Units
No. of Lights	:	206 light unit 208 fluorescent tube
No. of Refrigerators	:	6 Units

MEN PRAYING AREA

WOMEN PRAYING AREA

FIRST FLOOR AREA

SECOND FLOOR AREA

[2] http://www.iiis.org/CDs2017Summer/papers/SA115HQ.pdf

CONCLUSION

The Kingdom of Saudi Arabia has undergone rapid advancements across several industries and sectors, including security, digitisation, automation, and public welfare. Smart mosques are a reflection of Saudi Arabia's growth across the aforementioned fronts as these mosques encapsulate a wide array of features and services.

Transforming the huge number of mosques in the Kingdom into smart mosques would position Saudi Arabia as the pioneer of IoT and digital technologies in the Islamic world.

As Saudi Arabia aims to bring about digital transformations across all industries and sectors, it is important to ensure that the huge number of mosques in the Kingdom also embrace digital technologies and energy-saving techniques.