Hotels- Optimizing Energy Consumption during Low Occupancy

A Case Study
Agenda

1. FARNEK : COMPANY INTRODUCTION

2. GCC Tourism Sector: Occupancy forecast

3. Introduction to the study

4. Energy consumption: Trends & Recommended Actions

5. Waste generation : Trends & Recommended actions

6. Best Practice Recommendations
Farnek is the UAE’s leading technology and sustainability-driven facilities management service provider.

40 years of operations in the UAE

Farnek delivers professional Facilities Management services across several sectors including: Aviation, Hospitality, Banking, Retail, Shopping Malls, Telecom, Residential, Commercial, Infrastructure, Government, Education, Leisure, and Entertainment.

ABOUT US

- Green Globe- MENA Partner >10 years
- 100+ Hotels certified according to Green Globe Standards
- Hotel Optimizer: Specialist of Hotel Benchmarking in Energy & Waste
- Certified Energy Auditors & ESCO
- Waste Consultants
- Carbon Management specialists

![Company Introduction](image)

- Technology |
- Sustainability |
- Innovation |
- Cleaning |
- Maintenance |
- Security |
- Sustainability consultancy |
- Hitches & Glitches

- 8,000+ employees.
- 2,500+ customers
- 55+ services in-house

- active in all 7 Emirates
- 200+

- Technology | Sustainability | Innovation | Cleaning | Maintenance | Security | Sustainability consultancy | Hitches & Glitches

- Projects

- Awards

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2. GCC TOURISM SECTOR: OCCUPANCY FORECAST

3. Introduction to the study


5. Waste generation: Trends & Best Practices

6. Best Practice Recommendations
Reasons for low occupancy trends

- Airlines still not fully operational
- Lower oil prices and reduced production output - affecting GCC
- Manpower downsize & budget constraints (corporates)
- Guest confidence low
- Reduced customer budgets
- Expo 2020 postponed
GCC Selected Cities – Annual Occupancy Forecast 2019 vs 2020

Average projected occupancy for 2020 is 40%

Source: HVS Middle East
Latest Update: May 7 2020
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Occupancy & Energy: Common questions raised

- Is there a relation between occupancy & utility consumption?
- How can I make sure my hotel operates efficiently during low occupancy?
- What systems should I adjust during low occupancy?
- How can I prepare my property to be more energy efficient during a next uncertainty crisis?
- How much can I save?
Objectives of the study

01 Analyze degree of correlation between low occupancy & utility consumption

02 Establish existing performance base load & identify the improvement opportunities

03 Predict consumption vs achievable savings

04 Identify opportunities for utility reductions & cost savings

05 Recommend practices to adapt to low occupancy periods

06 Identify monitoring solutions to improve performance
Overview of the participating properties

25 Hotels (Hotel Optimizer) consistent data

4-5 star ratings

City-Resort Hotels

Beirut, Egypt, Jordan, Bahrain, KSA, Qatar, Dubai, Oman
Study Time Line

Normal Occupancy vs Low Occupancy Year to Year Comparison

March 2019 vs 2020

April 2019 vs 2020

May 2019 vs 2020
Data Collection source: **Hotel Optimizer (100+ hotels)**

**Web based input / Output analysis**

- Energy
- Water
- Materials
- Emissions/ CO2
- Waste Water
- Waste
The field will be adapted to reflect a specific facility and any other special requirements exclusive for the facility.

### Monthly Data Entry

- Electricity
- Water
- Fuel
- Laundry
- Waste
Analysis Methodology

Are sqm 57,273
Number of rooms: 393
Occupancy: 74.6%
Guest Nights: 49,646
F&B Covers: 61,806
Conference Guests: 5,360
Temperature: 22.3 °C
Cooling degree days 658

TRUE
ENERGY & WATER
SAVING PERFORMANCE?

Area sqm 57,273
Number of rooms: 393
Occupancy: 54.2%
Guest Nights: 36,864
F&B Covers: 45,262
Conference guests 3,728
Temperature: 21.5 °C
Cooling degree Days 607

Same
Same
-27%
-26%
-27%
-30%
-3.6%
-7.7%
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Parameters evaluated

- Water
  - Guest Rooms

- Electricity
  - Common areas
  - F & B
  - Laundry
  - Pool
  - Boiler
  - Irrigation

Evaluation parameters

- Monthly kWh/Guest Night
- Monthly RTh/Guest night
- Potable water/Guest nights
- Fresh Air requirement/Guest room
- Exhaust air requirement/Guest room
Hotels has exhibited **good reduction** in water consumption corresponding to occupancy reduction.

- Occupancy reduction- 62% & water reduction- 43%
Hotel: Occupancy Dependent Loads (Electricity)

70% of facility electrical load is dependent on Occupancy.

66% of cooling load has dependency on occupancy.

Hotel: Electricity Breakdown

- Chiller: 37%
- Guest rooms: 23%
- FAHU & Exhaust Fans: 10%
- Swimming pool system: 2%
- AHU+ Common area: 8%
- Lobby & Other Common area: 4%
- Chiller Auxilliaries: 10%
- Kitchen & Restaurant: 8%

Hotel - Cooling load: Breakdown

- Hot water system heat load: 9%
- Fresh air heat load: 7%
- Infiltration through Walls & Windows: 34%
- Internal heat load: 44%
- Kitchen heat load: 1%
- Occupancy heat load: 5%
Occupancy & Electricity -2018 vs 2019 vs 2020

**2018 – 2019**
- Average occupancy is 70%
- With occupancy reduction corresponding energy reduction is noticed if occupancy does not fall below 50%

**2020**
- Average occupancy is 25% (Mar to May)
- Electrical consumption remains high even with decreased occupancy
Existing & Predicted energy performance

<table>
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<tr>
<th>Description</th>
<th>March</th>
<th>April</th>
<th>May</th>
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</thead>
<tbody>
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<td>Number of hotels</td>
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<td>Best performers (Nos)</td>
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<tr>
<td>Under performers (Nos)</td>
<td>17</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

Energy Consumption Vs Occupancy Reduction

- Electricity (Without adaptive adjustments)
- Electricity (With Adaptive adjustments)
- Observed trend (Average)

56% reduction
27% reduction
Occupancy vs electricity consumption: 2019 vs 2020 (normal vs low occupancy)

- Average occupancy reduction: 63%
- Electricity reduction 2019 vs 2020: 36% (16.8 GWh)
- Possible reduction: 48% (5.4 GWh), 2.4 Million AED
- Possible CO2 reduction: 2,400 Tonnes
Energy Consumption forecast 2020 : Best Occupancy pick up

- Average occupancy prediction-2020 : 40%
- Average Electricity consumption with present trend : 44,700 MWh
- Average electricity consumption proposed: 37,000 MWh
- 7,500 MWh more reduction possible from the current performance trend (Savings of 3.4 Million AED)
- Possible CO₂ reduction: 3,300 Tonnes
Energy Consumption forecast 2020: Least occupancy

- Average occupancy prediction-2020: 30%
- Average Electricity consumption with present trend: 41,300 MWh
- Average electricity consumption proposed: 29,800 MWh
- 11,500 MWh more reduction possible from the current performance trend (Savings of 5.2 Million AED)
- Possible CO₂ reduction: 5,000 Tonnes
Recommended actions / Best practices implemented

**Chiller plant**
- Energy Management plan
- Strategic room deployment
- Low occupancy set points
- Effective Utilization of chiller plant
- Demand based chilled water set points
- Wet bulb based cooling tower operation

**Other Systems**
- Thermostat locking
- Kitchen exhaust fan operational control
- Pool covers
- Pool back wash optimization
- Temperature optimization of pool water system

**Ventilation system & FCUS**
- Optimization of FAHU Systems
- Dew Point based fresh air supply
- Set point Optimization-Corridor
- Taking advantage of VSDs
- Intermittent FCU & FAHU operation
Energy Handbook

The handbook can be downloaded from www-hotel-optimizer.com
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Evaluation Parameters

- Occupancy
  - Guest nights
  - General waste
  - Food waste
  - Recyclables
  - Total waste costs

Waste Generation Ratio
*Normal vs Low occupancy*
A hotel guest generates about 1kg (2lb) of waste per night – International Average

Kg/guest night range for Dubai Hotels (Hotel Optimizer)

- 1 to 1.5 kg
- 1-3 kg
- 3 to 6 kg
- 6-11 kg
- 11-34 kg

Average - 5

Best

Very poor
Occupancy vs waste generation: 2019 vs 2020 (normal vs low occupancy)

- Average occupancy reduction: 71.2%
- Waste reduction 2019 vs 2020: 40%
- Irrespective of guest generation; a baseload of general waste exists
- If baseload waste is managed: 30% more reduction is possible.

No strong correlation cannot be established.
Factors influencing waste baseload generation during low occupancy

**Staff Activities**
- Waste from staff apartments
- Office operations

**Waste collection**
- Skips collected empty or half empty
- Weight of waste calculated based on skip collection

**Food waste**
- Staff catering waste
- Outside catering waste

**Stock Management**
- Expired/spoiled foods
- Store stock clearance

By addressing these factors hotels can reduce their baseload waste thus achieving reduction in waste generation as well as cost savings during low occupancy periods.
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6. BEST PRACTICE RECOMMENDATIONS
Best Approach

Monitoring
- Monthly utility consumption
- Waste generation
- Compared to previous year
- Calculate how much savings could have been achieved

Web based platform

Assessment
- Are your assets performing well?
- Measuring performance
- Is there any wastage?
- Which are the potential areas of savings?
- Which are the activities that generate waste?

Energy Audits

Preventive maintenance
- Keep up with scheduled tasks
- Predicting consumption patterns with established baselines

Efficient FM service

Best Approach
Farnek Solutions: Hotel Optimizer

- Web based platform
- 2-5 star hotels
- Energy, Water, Waste, Carbon & Operational costs monitoring
- Performance comparison – Quarter to Quarter, Year to Year
- Benchmarking
- Genuine Performance Monitoring – How much you could have reduced
- Alerts, Review & Consultation by Energy & Waste Consultants

- Clients on average achieve annual savings of 5% within initial years.
- Consumption reduced by 5-10% during initial year
- Best performers that achieved water and/or energy saw an additional profit of US$100,000 per year
Farnek Solutions: Remote Energy Auditing

Spend Less & Save More

- Safest way to do energy audits in the light of access restrictions
- Suitable for locations that does not have energy auditors
- Low cost as compared to onsite audit
- Fast report delivery
- Easy to be handled by customers
- Less CO2 emissions
Save Energy. Save More

For more information visit  www.hotel-optimizer.com

For any enquiries please mail  Optimizer@farnek.com