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# Abu Dhabi Airport: Sustainable Airport in a Desert Environment

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# ESTIDAMA – The Core Program of Plan 2030



- ESTIDAMA, sustainability in English, was launched in May 2008 and is based on four pillars of sustainability
  - Environment - Economic - Social - Cultural
- Pearl Rating System
- Tailored to the region’s local weather and environment
- Sets the minimum standards and provides verification of a project’s sustainability performance throughout the project life-cycle: Design, Construction and Operations

## Benefits

- Reduce the demand for resources
- Achieve higher performance with reduced costs
- Increase return on investments
- Limit disruptions to natural resources
- Create healthier places to live, work, study and play

# Abu Dhabi Airports adopts ESTIDAMA

All capital projects target to achieve a 2 Pearl rating under the Pearl Building Rating System

The Midfield Terminal Building achieved 3 Pearl design rating and is now the highest rated airport in the GCC, and the largest singular building to ever be rated.

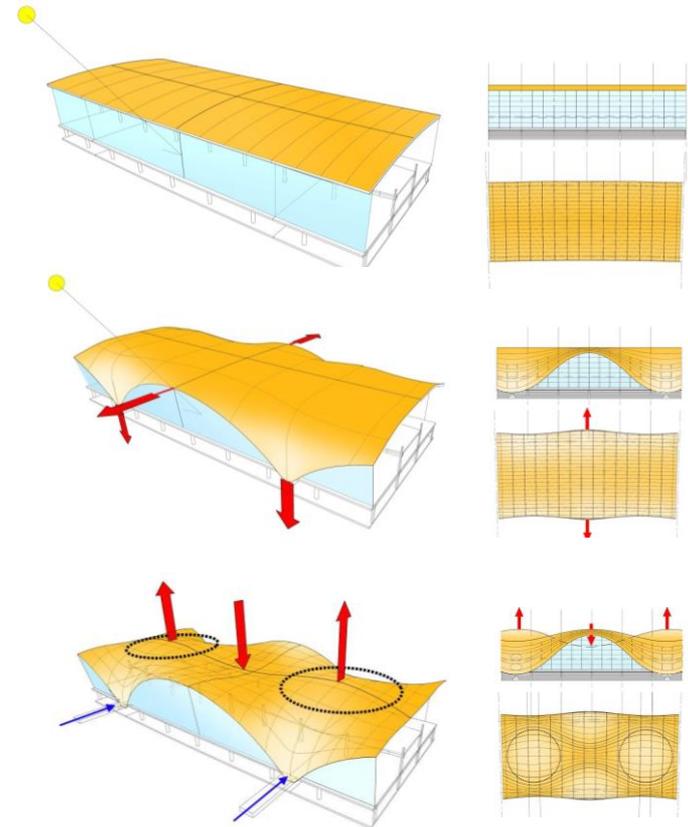
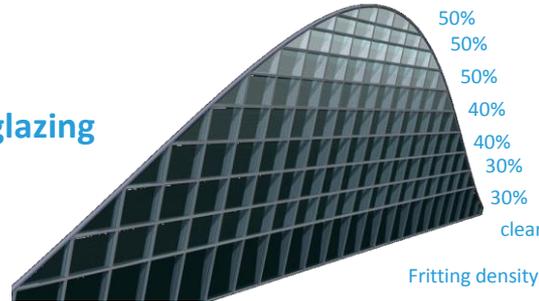


# The Midfield Terminal Building

## EFFICIENT BUILDING ENVELOPE DESIGN

The design of the MTB adopts a Climate Responsive approach to massing and orientation which achieves 45% reduction in external heat gain through:

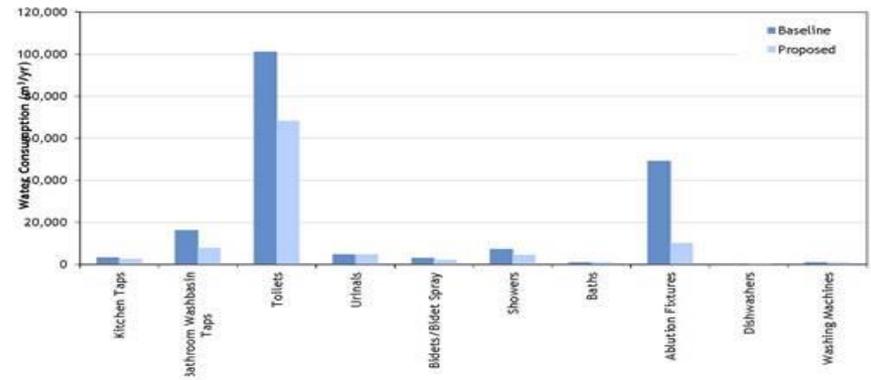
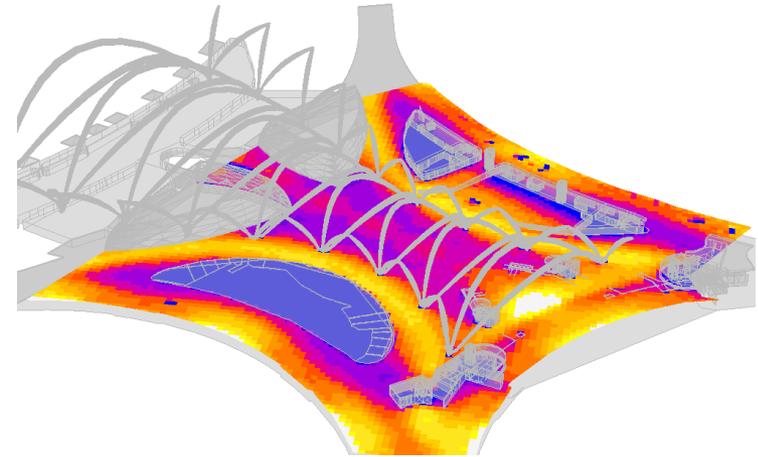
- Self shading facade
- High efficiency low-e double glazing
- High performance coatings
- Low U-value walls and roof



# The Midfield Terminal Building

## ENERGY & WATER EFFICIENCY

- Extensive energy modeling demonstrated **14.5% overall energy use reduction**
  - 22% reduction for lighting
  - 27% reduction for cooling
  - 60% reduction for the Baggage Handling System
  
- The building also features:
  - Day lighting control system
  - Occupancy and temperature sensors
  - Energy efficient fixtures and equipment including all IT & security systems, vertical transportations, Baggage Handling System, and other appliances
  - High quality envelope system
  
- Water demand calculations demonstrated **45% overall reduction in water demand** through the careful use of efficient water fixtures



# The Midfield Terminal Building

## INTELLIGENT BUILDING SYSTEMS

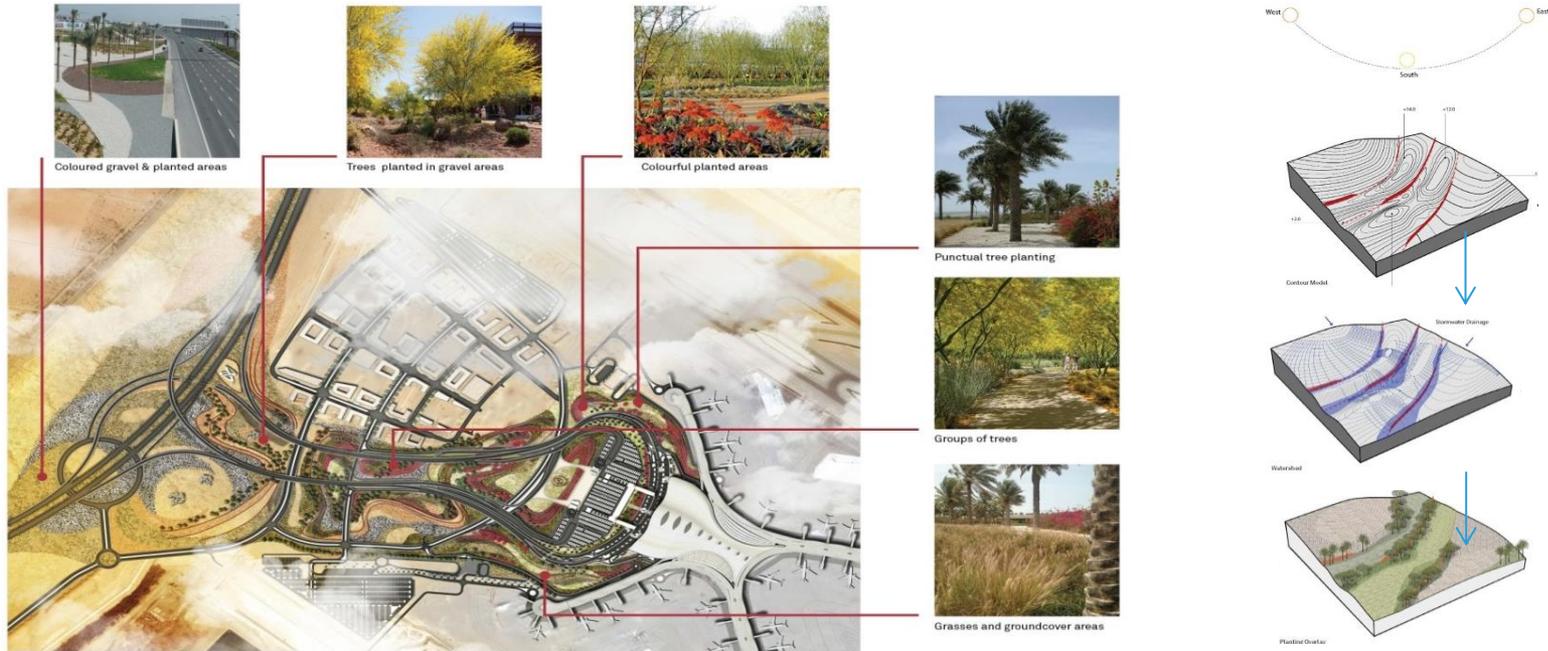
- A sophisticated building management system and an advanced energy measurement and targeting system are in place to record, monitor, analyze and report on the energy performance of the building
- Water monitoring system is also in place to record water consumption and detect any leaks
- End uses are monitored separately which allows for a better understanding through trending and planning of future improvements through forecasting



## HIGH QUALITY INDOORS

- Increased ventilation with CO<sub>2</sub> sensors
- Low emitting materials including paints, coatings, hard and wood flooring, carpets, ceilings and all associated finishes
- High frequency lighting and no incandescent lamps

# The Midfield Terminal Building



## LANDSCAPING & OUTDOORS QUALITY - A MICROCLIMATIC DESIGN

- More than 85% of all pedestrian walkways are shaded
- 100% of car parking spaces are shaded
- More than 70% of the plants comprise native, adaptive, drought or saline tolerant species
- Average irrigation demand: 2l/m<sup>2</sup>/day

# The Midfield Terminal Building - Construction

## SUSTAINABLE APPROACH TO CONSTRUCTION

Abu Dhabi Airports has developed, in coordination with the Environment Agency of Abu Dhabi (EAD), the UPC and the ESTIDAMA Team, Sustainability & Environmental Construction Standards that address the local environmental factors to:

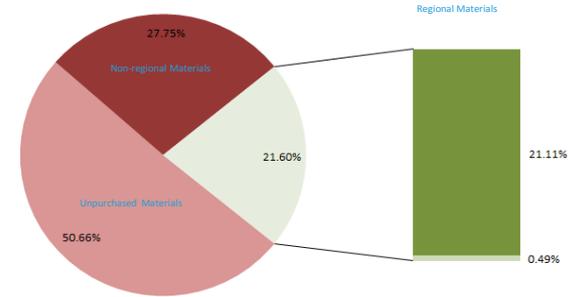
- Protect Soil & Site Resources
- Protect Water Resources
- Limit Energy & Fuel Consumption
- Limit Air Quality Emissions
- Promote Sustainable Materials
- Control Construction Noise Impact
- Promote Health & Welfare
- Promote Social & Cultural Responsibility



# The Midfield Terminal Building - Construction

## ACHIEVEMENTS

- 100% of all structural and reinforcing steel have recycled content
- 20% of total materials by cost value are sourced regionally
- Only recycled aggregate is used for backfilling
- 70% of all timber used on site is certified by FSC
- 96% waste diversion from landfill rate
- 20% reduction on water consumption achieved through the use of recycled water



Initiative	Key Measures
Protect Water Resources	<ul style="list-style-type: none"> <li>• Use non-potable water for dust suppression, mixing of concrete, aggregate wash down, landscape irrigation and backfill consolidation</li> </ul>
Limit Energy & Fuel Consumption	<ul style="list-style-type: none"> <li>• Select fixtures and machinery on the basis of performance or energy consumption rates</li> <li>• Plan and consolidate trips and avoid congested periods</li> </ul>
Limit Air Quality Emissions	<ul style="list-style-type: none"> <li>• Fuel – all diesel-powered vehicles and equipment of 50+ HP must utilize Ultra Low Sulfur Diesel (ULSD) fuel</li> <li>• Equipment Technology Requirements – all but the newest (Euro-4 and Euro-5) off-road diesel equipment must install and/or retrofit with emissions control devices</li> </ul>
Training program	<ul style="list-style-type: none"> <li>• More than 65,000 people trained, including workers, suppliers, visitors, etc.</li> </ul>

Emissions Standards			
Pollutant	Emission Standards in lbs/MWh		
	Installed On or After Jan. 11, 2006	Installed On or After Jan. 1, 2008	Installed On or After Jan. 1, 2012
Nitrogen Oxides	2.2	1.0	0.6
Nonmethane Hydrocarbons	0.5	0.5	0.3
Particulate Matter (liquid-fueled reciprocating engines only)	0.7	0.7	0.07
Carbon Monoxide	10.0	10.0	2.0
Carbon Dioxide	1,900	1,900	1,650

■ New distributed generators must meet the following standards:



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# Midfield Terminal Construction Progress

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## What's next?

- The success of this high-performance building not only depends on how it is designed and built, but also on how well it is managed
- Occupants and users will also be responsible for a large percentage of the MTB's resources consumed
- Sustainable operations related programs and KPIs will have to be adequately developed to ensure effective and sustainable use of this state of the art infrastructure

MONTREAL, CANADA, NOVEMBER 29-30, 2017



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Thank you

