SITING OF BUILDING FOOTPRINT:
DESCRIPTION: UNIVERSITY BUILDING
IDEAL ORIENTATION OF SHADING PANELS WOULD RELY ON THE SUN ANGLES INHERENT TO THE SITE.

ORIENTATION OF PV PANELS ON ROOF IS PARALLEL TO THE GROUND, BUT ELEVATED, ABOUT 5 FEET

THE DATA RETRIEVED FROM THE SOLAR EXPOSURE OF THE SITE WOULD ALSO REVEAL THE SHADING NEEDS FOR THE BUILDING USERS
DESIGN SOLUTION OPTIONS:

UNIVERSITY BUILDING

PROPOSAL 1

INTEGRATION OF PHOTOVOLTAIC SCREENS TO BUILDING FAÇADE AS SHADING AND IN BUILDING COURTYARDS WHERE SOLAR SHADING IS REQUIRED;
PROPOSAL 1:

APPLICATION OF SHADING ELEMENTS IN THE COURTYARD AND CORRIDOR SEPARATION:

- AESTHETIC SOLUTIONS USING ARABIC PATTERNS
- LAYOUT OF PANELS AS A CURTAIN WALL OR AS A SCREEN ELEMENT

- SOLUTION REQUIRES A STRUCTURAL SUPPORT SYSTEM SIMILAR TO PREFABRICATED CURTAIN WALL SYSTEMS
- ORIENTATION TO THE SUN ANGLES WITHIN THE COURTYARD AND THE BUILDING FAÇADE
- ALL BIPV PANELS WITH SOLAR ABSORPTION CAPACITY TO BE PLACED ON ROOF
PROPOSAL 1:
APPLICATION OF PV PANELS AS SHADING ELEMENTS

BUILDING FOOTPRINT VIEW:

SHADING ELEMENTS ON COURTYARD SPACES BOTH ON LOWER + UPPER LEVELS AND INTERIOR CORRIDORS

BIPV PANELS ON ROOF
FIRST FLOOR PLAN

BUILDING IS CONNECTED TO THE UNIVERSITY BUILDING THRU AN INTERIOR PASSAGE ON THE FIRST FLOOR

ACCESS ON THE FIRST FLOOR IS PROVIDED ON SE, NE & NW SIDES

LINES OF SECOND & THIRD FLOOR ABOVE

SHADED CIRCULATION AREAS ON 3 SIDES
SECOND FLOOR PLAN
THIRD FLOOR PLAN
Diagrammatic detail for BIPV installation on facade:

- BIPV units with steel support system
- Curtain wall system cladding [sandwich panel-type with glass separation]
- 2 feet mechanical space to run cooling
- Trombe wall as thermal break from warm exterior to cool interior
DIAGRAMMATIC DETAIL FOR BIPV INSTALLATION ON COURTYARD COLUMNS:

- SHADING AREA CONVERTED FROM TRADITIONAL CORRIDORS
- SEPARATION BETWEEN COURTYARD AREA AND CLASSROOM ENTRANCES

- SHADING SCREENS
- GLASS SEPARATION
- MOUNTING UNITS
- MASONRY COLUMN
- ELECTRIC BOX
DIAGRAMMATIC DETAIL OF BIPV INSTALLATION ON SUN SHADING ELEMENTS:

- INDEPENDENT STRUCTURE MOUNTED ON EXISTING MASONRY WALL CONNECTED TO STRUCTURE AND TROMBE WALL

- STRUCTURAL SYSTEM CAN BE USED TO SUPPORT WIND BREAKING ELEMENT AND WIND CATCHERS FOR INDEPENDENT BUILDING VENTILATION

- CONNECTED TO TROMBE WALL AND CURTAIN WALL IN PROGRAM SPACES
**Product name**: High-efficiency single-crystal photovoltaic module

**Nickname**: SunVista

**Model name**: NT-167AK

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>Nominal power output (max.)</td>
<td>167 W</td>
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<tr>
<td>Nominal operating voltage (max.)</td>
<td>41.3 V</td>
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<tr>
<td>Nominal operating current (max.)</td>
<td>4.05 A</td>
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<tr>
<td>Nominal short-circuit current (max.)</td>
<td>4.4 A</td>
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<tr>
<td>Weight</td>
<td>14 kg (30.9 lbs)</td>
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<tr>
<td>Outside dimensions</td>
<td>1,200 x 802 x 55 mm (47&quot; x 31.6&quot; x 2.2&quot;)</td>
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<tr>
<td><strong>Product name</strong></td>
<td>High-efficiency single-crystal photovoltaic module</td>
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<tr>
<td><strong>Nickname</strong></td>
<td>SunVista</td>
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<tr>
<td><strong>Model name</strong></td>
<td>NT-167AK</td>
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<tr>
<td>Nominal power output (max.)</td>
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<tr>
<td>Module conversion efficiency</td>
<td>17.4%</td>
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<tr>
<td>Retail price (not including installation)</td>
<td>$1081.73</td>
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## ROOF INSTALLED PV PANELS: SPECIFICATIONS

<table>
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<tr>
<th></th>
<th>LN301-NT167AK</th>
<th>DUBAI 1908</th>
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<tr>
<td><strong>System designation</strong></td>
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<tr>
<td><strong>Photovoltaic capacity</strong></td>
<td>3.01 kW</td>
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<td><strong>PV modules</strong></td>
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<td>NT-167AK</td>
<td>NT-167AK</td>
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<tr>
<td><strong>Nominal power output (max.)</strong></td>
<td>167 W</td>
<td>167 W</td>
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<tr>
<td><strong>Number of modules</strong></td>
<td>18</td>
<td>11448</td>
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<td><strong>Power conditioner</strong></td>
<td>JH-S304</td>
<td>JH-3500V x 546</td>
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<tr>
<td><strong>Cables</strong></td>
<td>SZJC20 x 4</td>
<td>SZJC20 x 2544</td>
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<tr>
<td><strong>Area Covered</strong></td>
<td>17.3 m²</td>
<td>11,000 m²</td>
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INITIAL COST CALCULATIONS AND FEASIBILITY OF PV SCHEME:

Power Conditioners are used to produce electricity at a desired frequency at all times.

Approximate Total Cost for 11000 sqm (not including installation) =

$1,302,756.00 (for Power Conditioner, $2386.00 for each) +

$687,980.00 (for PV modules, $1081.30 for each) +

$88,786.00 (for cables, $34.90 for each)

= $2,079,522.00

Cost of Electricity in Dubai = $0.05 / kWh

The Installation will pay for itself in = 5 years (RUNNING 12 HRS A DAY)

With installation and other unforeseen problems, max payback period = 7 years