LEED Plan:

A) Introduction:

LEED, Leadership in Energy and Environmental Design, is changing the way we think about how buildings and communities are planned, constructed, maintained and operated.

The LEED rating systems for New Construction and Major Renovations is a set of performance standards for certifying the design and construction of commercial or institutional buildings and high-rise residential buildings of all sizes, both public and private.

And due to the aforementioned, it will be used by the guideline the LEED V4.1 BD+C as the project considered to be a high-rise building, for a residential purpose. This is an optional review pathway available for a fee for LEED BD+C projects using LEED v4 and LEED 2009 that is focused on your intended design and construction strategies.

B) LEED certification involves four main steps:

1. **Register** your project by completing key forms and submitting payment;
2. **Apply** for LEED certification by submitting your completed certification application through and paying a certification review fee;
3. **Review.** Your LEED application is reviewed by Green Business Certification Inc. (GBCI); and

4. **Certify.** Receive the certification decision. If you've earned LEED certification: congratulations.

C) Weighting Process Rules:

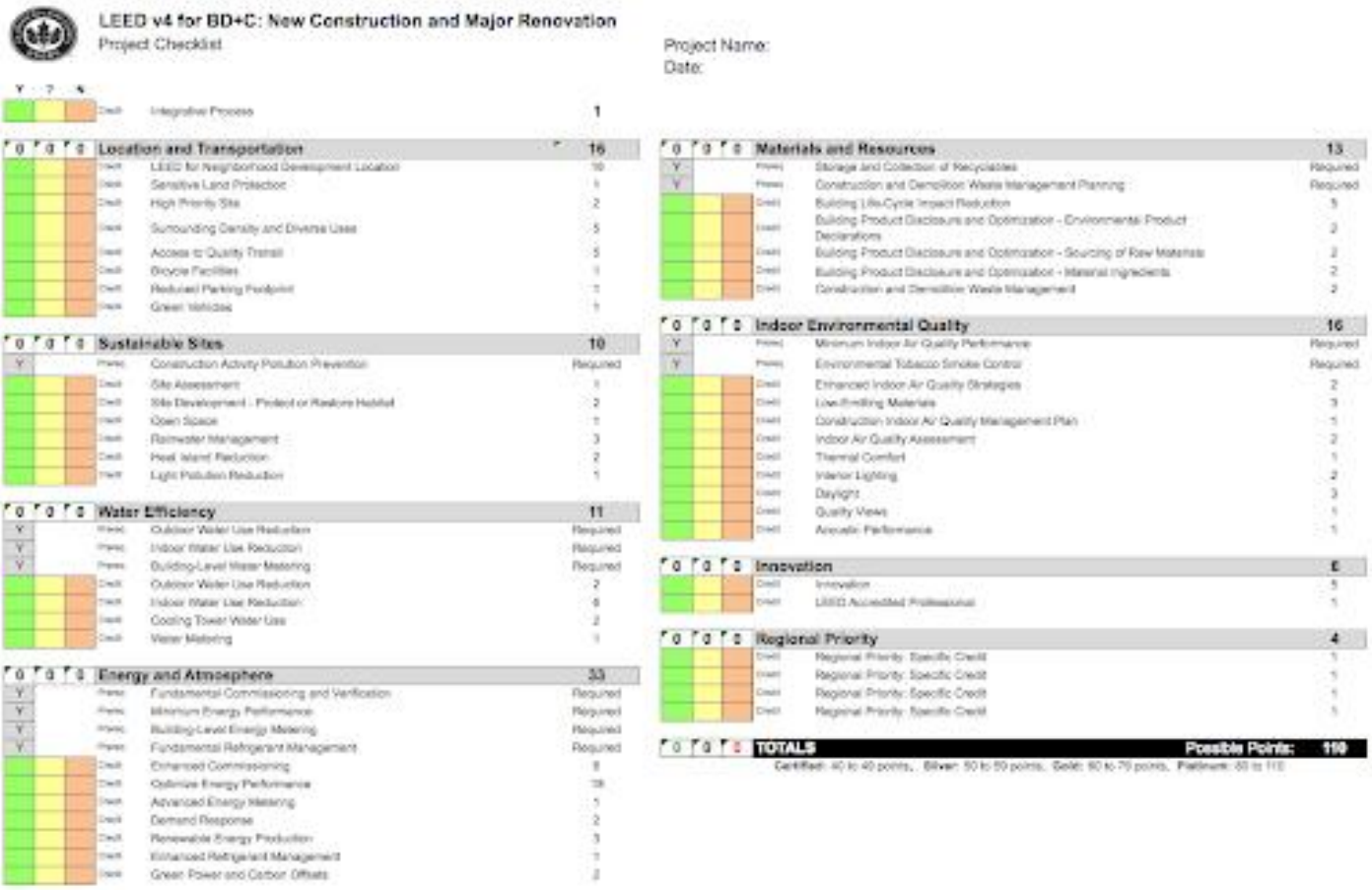
The LEED v4.1 BD+C New Construction credit weightings process is based on the following parameters, which maintain consistency and usability across rating systems:

- All LEED credits are worth a minimum of 1 point.
- All LEED credits are positive, whole numbers; there are no fractions or negative values.
- All LEED rating systems have 100 base points; Innovation in Design (or Operations) and Regional Priority credits provide opportunities for up to 10 bonus points.

D) LEED Categories:

Prerequisites and credits in the LEED V4.1 BD+C New Construction addresses 8 topics:

- Location and Transportation (LT);
- Sustainable Sites (SS);
- Water Efficiency (WE);
- Energy and Atmosphere (EA);
- Materials and Resources (MR);
- Indoor Environmental Quality (EQ);
- Innovation (IN); and
- Regional Priority (RP).



LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

Project Name:
Date:

Y	?	N			
			Integrative Process	1	

			Location and Transportation	16
			LEED for Neighborhood Development Location	16
			Sensitive Land Protection	1
			High Priority Site	2
			Surrounding Density and Diverse Uses	5
			Access to Quality Transit	5
			Bicycle Facilities	1
			Reduced Parking Footprint	1
			Green Vehicles	1

			Sustainable Sites	10
Y			Construction Activity Pollution Prevention	Required
			Site Assessment	1
			Site Development - Protect or Restore Habitat	2
			Open Space	1
			Rainwater Management	3
			Heat Island Reduction	2
			Light Pollution Reduction	1

			Water Efficiency	11
Y			Outdoor Water Use Reduction	Required
Y			Indoor Water Use Reduction	Required
Y			Building-Level Water Metering	Required
			Outdoor Water Use Reduction	2
			Indoor Water Use Reduction	6
			Cooling Tower Water Use	2
			Water Metering	1

			Energy and Atmosphere	33
Y			Fundamental Commissioning and Verification	Required
Y			Minimum Energy Performance	Required
Y			Building-Level Energy Metering	Required
Y			Fundamental Refrigerant Management	Required
			Enhanced Commissioning	6
			Optimize Energy Performance	18
			Advanced Energy Metering	1
			Demand Response	2
			Renewable Energy Production	3
			Enhanced Refrigerant Management	1
			Green Power and Carbon Offsets	2

			Materials and Resources	13
Y			Storage and Collection of Recyclables	Required
Y			Construction and Demolition Waste Management Planning	Required
			Building Life-Cycle Impact Reduction	5
			Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Building Product Disclosure and Optimization - Material Ingredients	2
			Construction and Demolition Waste Management	2

			Indoor Environmental Quality	16
Y			Minimum Indoor Air Quality Performance	Required
Y			Environmental Tobacco Smoke Control	Required
			Enhanced Indoor Air Quality Strategies	2
			Low-Emitting Materials	3
			Construction Indoor Air Quality Management Plan	1
			Indoor Air Quality Assessment	2
			Thermal Comfort	1
			Interior Lighting	2
			Daylight	3
			Quality Views	1
			Acoustic Performance	1

			Innovation	6
			Innovation	5
			LEED Accredited Professional	1

			Regional Priority	4
			Regional Priority: Specific Credit	1
			Regional Priority: Specific Credit	1
			Regional Priority: Specific Credit	1
			Regional Priority: Specific Credit	1

			TOTALS	Possible Points:	110
			Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110		

E) Perquisite Integrative Project Planning and Design:

1. Intent:

To support high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems.

2. Requirements:

Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems. Use the analyses described below to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents.

3. Preliminary Rating Goals:

As early as practical and preferably before schematic design, conduct a preliminary LEED meeting with a minimum of four key project team members and the owner or owner's representative. As part of the meeting, create a LEED action plan that, at a minimum:

- Determines the LEED certification level to pursue (Certified, Silver, Gold, or Platinum);
- Selects the LEED credits to meet the targeted certification level; and

- Identifies the responsible parties to ensure the LEED requirements for each prerequisite and selected credit are met.

F) Location and Transportation "LT" (14 Points):

1. Surrounding Density and Diverse Uses (5 Point):

1.1 Intent:

To promote walkability and transportation efficiency and reduce vehicle distance travelled. To improve public health by encouraging daily physical activity.

1.2 Requirements:

Surrounding Density:

Locate on a site whose surrounding existing density within a ¼-mile (400-meter) radius of the project boundary meets the values in Table below.

Separate residential and nonresidential densities		**Points BD&C (except Core and Shell)**
Residential density (DU/acre)	**Nonresidential density (FAR)**	
7	0.5	2
12	0.8	3

DU = dwelling unit; FAR = floor-area ratio.

Diverse Uses:

Construct or renovate a building or a space within a building such that the building's main entrance is within a ½-mile (800-meter) walking distance of the main entrance of four to seven (1 point) or eight or more (2 points) existing and publicly available diverse uses.

The following restrictions apply:

- No more than two uses in each use type may be counted (e.g. if five restaurants are within walking distance, only two may be counted).
- The counted uses must represent at least three of the five categories, exclusive of the building's primary use.

1.3 Our Improvement:

Surrounding Density

Our project is constructed on a site that conforms to a minimum development density of 250,000 square meters (500-Raduis) requirement since the Tower area is not highly congested area with a lot of residents as shown in figure below.

Diverse uses

Al-Alamien Towers main entrance is constructed within 800 meters walking distance of the main entrances of eight and more existing and publicly available diverse uses such as:

- **Service:** HSBC and National Bank of Egypt (330m);
- **Community serving retail**: Seif Pharmacy (200m);
- **Service:** Agora café (250m) and Volo's café (220m);
- **Service:** Baby Dry clean (330m);
- **Food retail:** Seven Days Supermarket (350m);
- **Civic and community facilities:** Al-Alamein World War II Military Museum (120m);
- **Service:** Arab investment bank (300m);
- **Community serving retail:** Misr Pharmacy (160m);
- **Civic and Community Facility:** Police Station (400m); and
- **Food retail:** Chili's, (مشويات الملك فاروق), Golden fish, Studio Masr and KFC.

The counted uses must represent at least three of the five categories, exclusive of the building's primary use. This is achieved as shown in the below figure below.

Table 1. Use Types and Categories

Category	Use type
Food retail	Supermarket
	Grocery with produce section
Community-serving retail	Convenience store
	Farmers market
	Hardware store
	Pharmacy
	Other retail
Services	Bank
	Family entertainment venue (e.g., theater, sports)
	Gym, health club, exercise studio
	Hair care
	Laundry, dry cleaner
	Restaurant, café, diner (excluding those with only drive-thru service)
Civic and community facilities	Adult or senior care (licensed)
	Child care (licensed)
	Community or recreation center
	Cultural arts facility (museum, performing arts)
	Education facility (e.g., K—12 school, university, adult education center, vocational school, community college)
	Government office that serves public on-site
	Medical clinic or office that treats patients
	Place of worship
	Police or fire station
	Post office
	Public library
	Public park
	Social services center
Community anchor uses (BD&C and ID&C only)	Commercial office (100 or more full-time equivalent jobs)
	Housing (100 or more dwelling units)

Acquired Points = 5 Point

G) Sustainable Site “SS” (8 Points):

1. Heat Island Reduction (6 Points):

1.1 Intent:

To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.

1.2 Requirements:

Use any combination of the following strategies.

1. Non-roof measures;
2. High roof reflectance; and
3. Vegetated roof.

High-Reflectance Roof:

Use roofing materials that have an SRI equal to or greater than the values in the table. Meet the three-year aged SRI value. If three-year aged value information is not available, use materials that meet the initial SRI value.

	Slope	Initial SRI	3-year aged SRI
Low-sloped roof	≤ 2:12	82	64
Steep-sloped roof	> 2:12	39	32

Vegetated Roof:

Install a vegetated roof.

Non-roof Measures:

- Use the existing plant material or install plants that provide shade over paving areas (including playgrounds) on the site within 10 years of planting. Install vegetated planters. Plants must be in place at the time of occupancy permit and cannot include artificial turf;
- Provide shade with structures covered by energy generation systems, such as solar thermal collectors, photovoltaic, and wind turbines;
- Provide shade with architectural devices or structures that have a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation;
- Provide shade with vegetated structures;

- Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation; and
- Use an open-grid pavement system (at least 50% unbound).

1.3 Our Improvement:

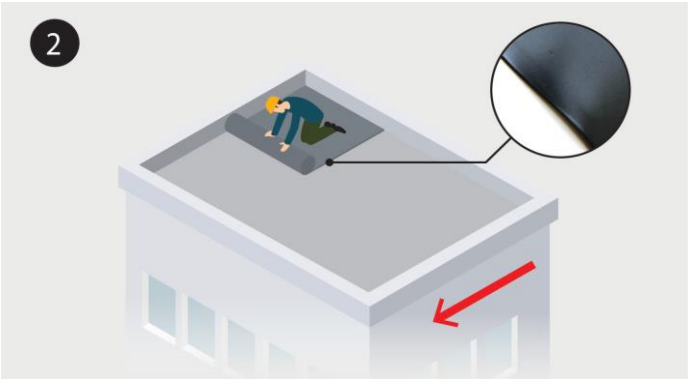
We chose to install a vegetated roof that covers 50% of the roof area of the Tower and install solar panels over the 75% of the roof of the Podium.

Vegetated roof:

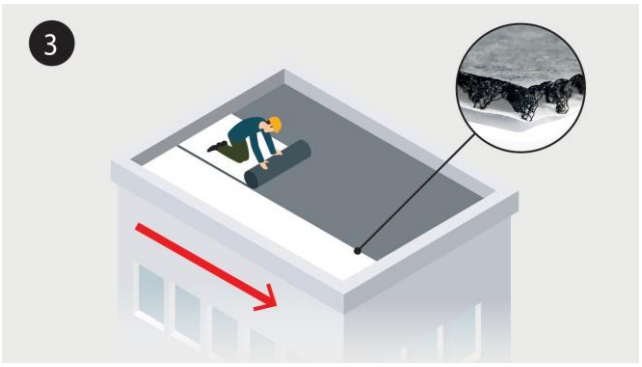
- Roof area = 1,450 m2
- 50 % of the roof area = 0.5 ×1,450 = 725 m2
- Cost of vegetated roofs = 400 LE /m2
- Therefore, the total cost of installing vegetated roof on 50% of the roof area = 400 × 725= 290,000 LE

The basic anatomy of a green roof consists of vegetation, growing medium, filter membrane, drainage layer, waterproof/root repellant layer, roofing membrane support for plantings above, thermal insulation, vapor control layer, and structural roof support. Each of these layers performs a specific function to keep the plants alive and to protect the structure beneath.

STEP 1 (Clean the roof):
Clean the roof and remove dirt, waste or other materials. Check that the waterproof roof covering is not damaged, to make sure that the roof is waterproof.



STEP 2 (Apply root barrier foil):
If the roofing is not root-resistant, it is necessary to use a root barrier foil. Apply the root barrier foil in the direction of the arrow. Make sure the foil joins well by means of an overlap of 50 cm.



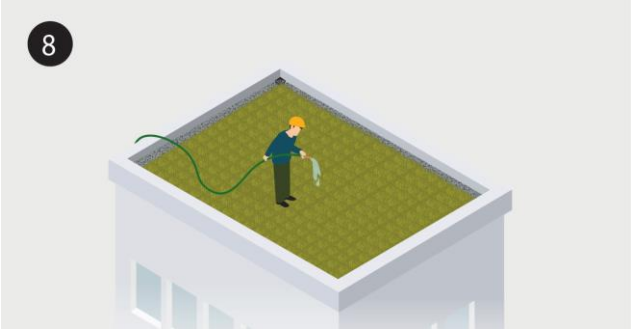
STEP 3 (Apply drainage layer):
Roll out the drainage rolls perpendicularly over the root barrier foil (see the direction of the arrow). If necessary, prepare the cutting of the drainage to size on the ground or take measures to cut safely. Never cut directly on the roofing.

STEP 4 (Apply separation profile):
The separation profile serves as a separation between the green roof and the gravel strip. Place the profile at least 20 to 30 cm from the roof edge, with the base on the side of the gravel strip.

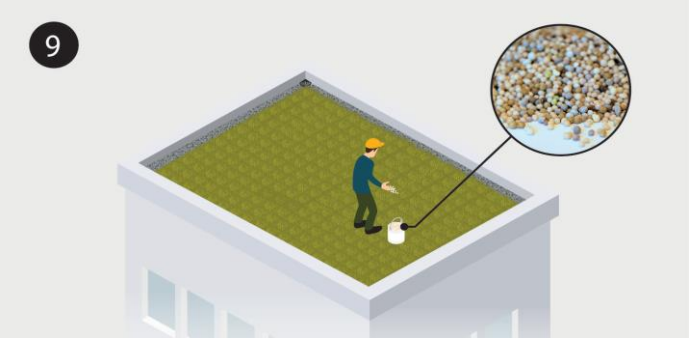
STEP 5 (Apply gravel):
Apply a bulb wire grille or inspection pit over the existing rainwater drainage pipes before the gravel layer is applied. Apply the gravel between the separation profile and the roof edge. Bring the gravel layer to the same level of the separation profile.

STEP 6 (Apply substrate roll):
Roll the substrate roll perpendicularly over the drainage rolls (see the direction of the arrow). Ensure that the substrate roll joins well without overlap.

STEP 7 (Apply vegetation blankets):
Carefully roll out the vegetation blankets perpendicularly over the substrate roll (see the direction of the arrow).
Start with the end of the vegetation blanket on top. Carefully roll the end of the blanket back and make sure it is in the correct position at the start of the track. If necessary, cut the blanket at the end of the track with a pair of scissors or cut-to-size knife. Never cut directly on the roofing. Make sure that the vegetation blankets join well without overlap. Any bare patches can be filled with residual pieces of the vegetation blanket



STEP 8 (Irrigate):
Water the vegetation blankets immediately after installation, until the substrate roll is completely water saturated. This is necessary for the rooting of the vegetation blankets in the underlying substrate layer.
Water the green roof regularly when the roof is installed during a dry period.
If the green roof is installed in a warm climate, it may be necessary to install an irrigation system.



STEP 9 (Maintenance and fertilization).

Benefits:

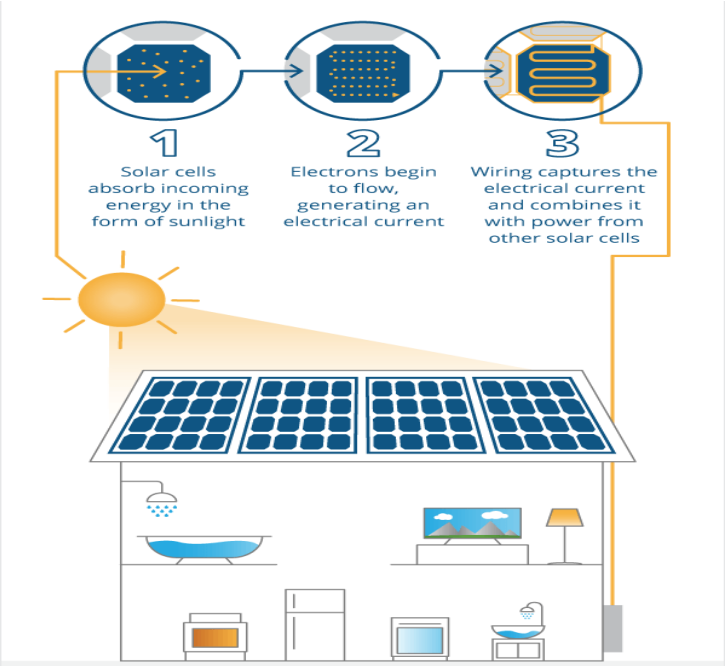
There are many potential benefits associated with extensive vegetative roofs. These include:

- Controlling storm water runoff;
- Improving water quality;
- Mitigating urban heat-island effects;
- Prolonging the service life of roofing materials;
- Conserving energy;
- Reducing sound reflection and transmission;
- Improving the aesthetic environment in both work and home settings; and
- Mitigation of wildlife.

Solar Panels:

Solar panels work by absorbing sunlight with photovoltaic cells, generating direct current (DC) energy and then converting it to usable alternating current (AC) energy with the help of inverter technology. AC energy then flows through the home's electrical panel and is distributed accordingly. Here are the main steps for how solar panels work for your home:

1. Photovoltaic cells absorb the sun's energy and convert it to DC electricity;
2. The solar inverter converts DC electricity from your solar modules to AC electricity, which is used by most home appliances;
3. Electricity flows through your home, powering electronic devices; and
4. Excess electricity produced by solar panels is fed to the electric grid.



What type we will use?

To get an accurate picture of how much energy a solar panel can produce, you have to first take into account what type of panel technology is being used. If you were to find a solar provider and look through the products that they offer, you would probably find 2 types of solar panels: monocrystalline and polycrystalline. Here are some features of each technology.

Monocrystalline	**Polycrystalline**
Higher efficiency	Lower efficiency
More expensive	Less expensive
Better performance in high temperatures and shady conditions	Less efficient at higher temperatures
Output loss in percent per year 0.47 to reach 43-years	Output loss in percent per year 0.61 to reach 33-years

As you can see, each type of panel has its pros and cons. Polycrystalline, however, is a newer technology and will become more efficient over time, but if you were looking to generate the most power in the smallest amount of space, monocrystalline would be the way to go. The panel technology is the first factor in the panel's production abilities.

So, our decision here is to use Monocrystalline PV due to the Spacing, Efficiency, and the service life.

It is simplest to mount your solar panels at a fixed tilt and just leave them there. But because the sun is higher in the summer and lower in the winter, you can capture more energy during the whole year by adjusting the tilt of the panels according to the season.

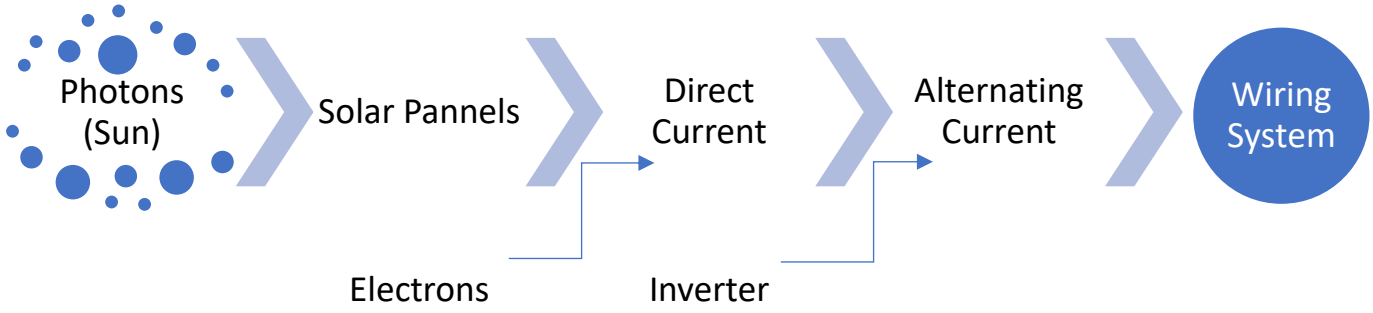
We assume that the panel is fixed, or has a tilt that can be adjusted seasonally. (Panels that track the movement of the sun throughout the day can receive 10% (in winter) to 40% (in summer) more energy than fixed panels. we will assume the installations are on a perfect south-facing roof with an optimal tilt angle given the latitude at which the panel

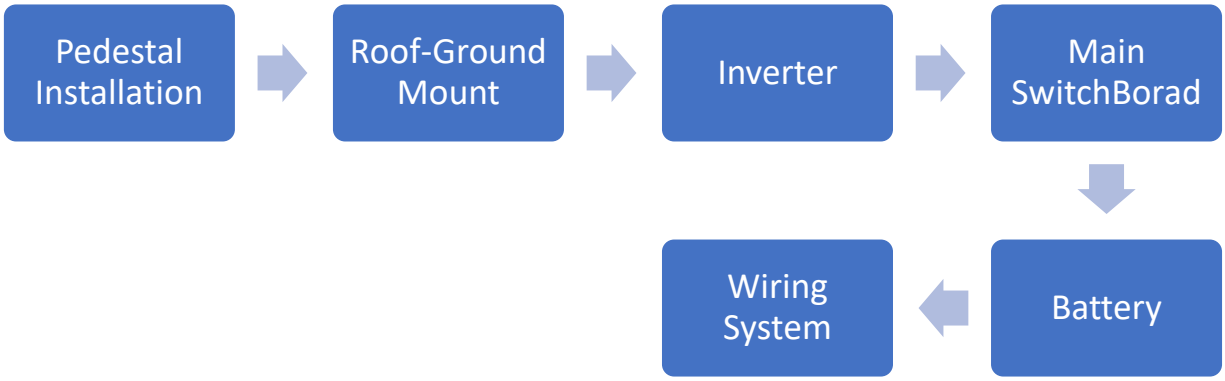
is being installed as Egypt is on Northern Hemisphere, the best direction to face solar panels is south because it gets maximum sunlight.

The mounting structure must be slightly tilted. Angle of the tilt could be between 18 to 36 Degree. Many companies use a solar tracker to increase the conversion efficiency.

Construction Method:

Developed bellow two charts to illustrate easily how the Sun lights convert to an electrical behavior, then the second chart describe how the solar panels will be constructed and installed in the roof of the Podium.





Points to be cleared:

- The pedestal will be a plain concrete with size (300x300 mm) with also ratios of cement, sand, and aggregate of 1:2:4;
- The distance between the two pedestals will be 1.8-meter related to the panel wattage used;
- The panels will be connected in series connection, the Positive (+) Wire is of one PV module is connected to the Negative (–) Wire of another module, this type of wiring increases the voltage match with the battery bank.

- The Positive wire from the solar panel is connected to the Positive terminal of the inverter and the Negative wire is connected to the Negative terminal of the inverter;
- Battery is needed in off grid solar system to store electricity backup; and
- a normal plug is used to connect to the main power switch board. An output wire is connected with electric board that supplies electricity to the Tower.

Neat Calculations for the size:

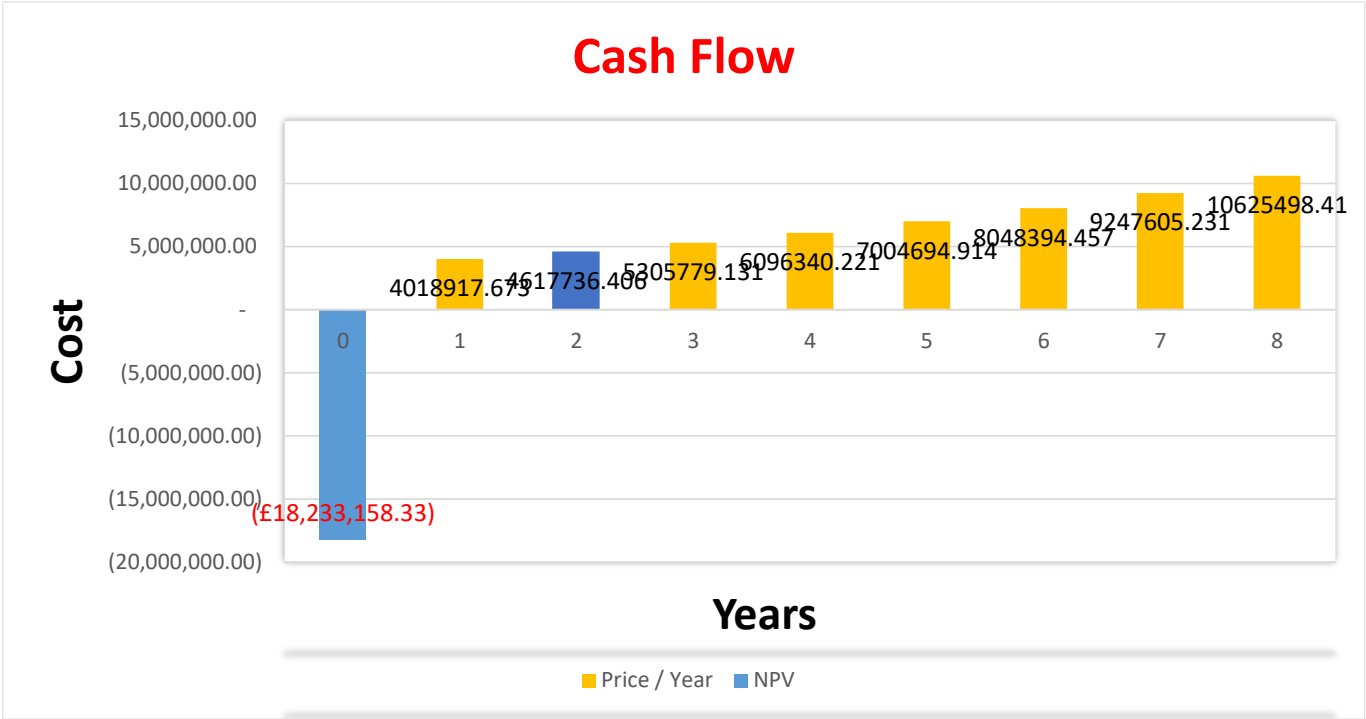
Part I:

- Roof area = 40,000 m2;
- Due to the heavy Equipment in the roof of the Podium we can take 75% of the area left the other to Cooling towers, Equipment, and entrance to the access of the roof;
- 75% of the roof area = 0.75 ×40,000 = 30,000 m2;
- Area of panel used = 20 ft2 (39x65 inches);
- Area of array of panels = 400 ft2 (38 m2);
- One array is equal to 20-panels; and
- Panel produce 400-watt in hour, while array produce 5000-watt in hour.

Part II:

- Therefore, number of arrays needed = 30,000/38= 790 array of panels.
- Each panel produces 250 watt/ hour, by considering that the panel works for 7 hours per day, and efficiency 85 %, therefore the total output for all panels equals: 250×7×0.85= 1.4875 KW/ day.
- In month = 1.4875 ×30= 44.625 KWH/Month per one panel;
- For the whole area = 44.625×790×20= 705,075 KWH/Month of our production;
- There are 10-apartment in the Floors that consist of 40-Typical Floors;
- The monthly average of usage is a range from 500 to 1000 KWH/Month, taken it to be 767 KWH/Month;
- Total Monthly production in the Tower (No Equipment) = 767×10×40 = 306,800 KW/Month;
- Taking into consideration the heavy equipment in both the 17th floor and the roof to be assumed as a percentage of 57% of the household;
- Total Monthly production in the Tower = 306,800×1.57= 481,676 KWH/Month;
- The table below show the average price per each KWH in Egypt according to the last update made in 1st July of 2019;
- In addition to the selling of electricity to the surrounding countries, the electricity is already sold to the Egyptian consumers (household, commercial and industrial users) with different prices available. For household consumers, the coming prices are as illustrated in the picture above.

Net Cash Flow for the Solar Panels



Just to reach the initial cost of the Solar Panels, it will take almost 8-years to get the initial cost of the solar panels by the Normal Electricity. It appears that it will be a huge savings as if we used the Solar Power System that will last about 43-years, the following point declare the net present value of the Solar panels and Normal Electricity after 8-years of usage of the normal electricity:

- NPV of Normal Electricity = 18,233,158.33 L.E;
- NPV of solar plant = 17,830,300.00 L.E; and
- Savings (over 9-years only) = 402,858.33 L.E.

Acquired Points = 6 Point

H) Water Efficiency “WE” (13 Points):

1. Outdoor water-use reduction (6 Points):

1.1 Intent:

To reduce outdoor water consumption.

1.2 Requirements:

Reduce outdoor water use through one of the following options. Non-vegetated surfaces, such as permeable or impermeable pavement, should be excluded from landscape area calculations. Athletic fields and playgrounds (if vegetated) and food gardens may be included or excluded at the project team’s discretion.

Option 1. No Irrigation Required:

Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period.

OR

Option 2. Reduced Irrigation:

Reduce the project’s landscape water requirement (LWR) by at least 50% from the calculated baseline for the site’s peak watering month. Reductions must first be achieved through plant species selection and irrigation system efficiency as calculated in the Environmental Protection Agency (EPA) Water Sense Water Budget Tool.

Additional reductions beyond 30% may be achieved using any combination of efficiency, alternative water sources, and smart scheduling technologies.

1.3 Our Improvement:

Based on our project, the landscape area is 5,000 m2 (53,819.55 square feet). 4,500 m2 (48437.6 square feet) of which are turfgrass which is irrigated using rotors, the rest are trees irrigated with dripping system (76 m2). Using the EPA Water Sense Water Budget Tool, the LWR was calculated and found to be 286,854 gallons/month.

Average of ETo in Egypt found to be 8 inches/year (0.0219178 inches/day).

Baseline = ETo × A× Cu

Where: ETo = Local reference evapotranspiration (inches/month) A = Landscaped area (square feet) Cu = Conversion factor (0.6233 for results in gallons/month).

LWA= 70.0×Baseline; Where: LWA = Landscape water allowance (gallons/month).

WaterSense New Home Specification: Water Budget Tool (V 1.02)

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1 of the specification.
Please refer to the WaterSense Water Budget Approach for additional information.

Your Name:	Al-Alamien Towers
Builder Name:	KWA
Lot Number/Street Address:	Petrol Road, Wadi El Natroun/Alamein Road and International Coastal Road
City, State, Zip Code:	Al-Alamien
Peak Watering Month:	July
Is an irrigation system being installed on this site?	yes

This worksheet determines if the designed landscape meets the water budget.

If the landscape water requirement is LESS than the landscape water allowance, then the water budget criterion is met.
If the landscape water requirement is GREATER than the landscape water allowance, then the landscape and/or irrigation system needs to be redesigned to use less water.

STEP 3A - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2

LWA 176,126 (gallons/month) **LWR** 286,854 (gallons/month)

STEP 3B - REVIEW THE TOTAL AREA OF TURFGRASS* IN THE DESIGNED LANDSCAPE FROM STEP 2B

The designed landscape contains 53,820 **square feet of turfgrass.*** **This is** 100% **of the landscaped area.**

*This includes the area of any pools, spas, and/or water features, designated by WaterSense to be counted as turfgrass.

OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?

NO If YES, then the water budget criterion is met.
If NO, then the landscape and/or irrigation system needs to be redesigned to use less water.

The designed landscape water requirement is a -14% reduction in water use from the baseline calculated in Part 1.

Our strategy is to change the landscape from turfgrass to groundcover this will reduce the LWR to 63,861 gallons/month and there is a reduction in water use from the baseline by 75%.

WaterSense New Home Specification: Water Budget Tool (V 1.02)

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1 of the specification.
Please refer to the WaterSense Water Budget Approach for additional information.

Your Name:	Al-Alamien Towers
Builder Name:	KWA
Lot Number/Street Address:	Petrol Road, Wadi El Natroun/Alamein Road and International Coastal Road
City, State, Zip Code:	Al-Alamien
Peak Watering Month:	July
Is an irrigation system being installed on this site?	yes

EPA WaterSense

This worksheet determines if the designed landscape meets the water budget.

If the landscape water requirement is LESS than the landscape water allowance, then the water budget criterion is met.
If the landscape water requirement is GREATER than the landscape water allowance, then the landscape and/or irrigation system needs to be redesigned to use less water.

STEP 3A - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2

LWA 176,126 (gallons/month) **LWR** 63,861 (gallons/month)

STEP 3B - REVIEW THE TOTAL AREA OF TURFGRASS* IN THE DESIGNED LANDSCAPE FROM STEP 2B

The designed landscape contains 0 **square feet of turfgrass.*** **This is** 0% **of the landscaped area.**

*This includes the area of any pools, spas, and/or water features, designated by WaterSense to be counted as turfgrass.

OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?

YES If YES, then the water budget criterion is met.
If NO, then the landscape and/or irrigation system needs to be redesigned to use less water.

The designed landscape water requirement is a 75% reduction in water use from the baseline calculated in Part 1.

Acquired Points = 6 Point

I) Energy and Atmosphere “EA” (3 Points):

1. Renewable Energy (3 Points):

1.1 Intent:

To reduce the environmental and economic harms associated with fossil fuel energy and reduce greenhouse gas emissions by increasing self-supply of renewable energy and the use of grid-source, renewable energy technologies and carbon mitigation projects.

1.2 Requirements:

Use on-site renewable energy systems, procure renewable energy offsite, or purchase Energy Attribute Certificates (EACs) or carbon offsets to meet or offset annual building greenhouse gas emissions.

1.3 Our Improvement:

- Number of solar panels used = 15,800 panels.
- Each panel produces 250 watt/ hour, by considering that the panel works for 7 hours per day, and efficiency 85 %, therefore the total output for all panels equals: 250×15,800×7×0.85= 23,502.5 KW/ day.
- The average electricity consumption is estimated based on comparing with the Tower and Podium to be 40,000 KW/day
- Percentage of on-site renewable energy = (23,502.5/40,000) *100 = 58.75%

Acquired Points = 3 Point

J) Materials and Resources “MR” (7 Points):

1. Construction and Demolition Waste Management (2 Points):

1.1 Intent:

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

1.2 Requirements:

Recycle and/or salvage nonhazardous construction and demolition materials

1.3 Our Improvement:

Do not generate more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building’s floor area.

Acquired Points = 2 Point

K) Indoor Environmental Quality “EQ” (7 Points):

1. Low-emitting materials (1 Points):

1.1 Intent:

To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

1.2 Requirements:

This credit includes requirements for product manufacturing as well as project teams. It covers volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in seven categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials.

1.3 Our Improvement:

Product Category Calculations:

VOCs (volatile organic substances) are traditionally used as solvents in paints& coatings products. These substances can give chronic health effects and contribute to high levels of ozone and smog at ground level, and they are therefore regulated in many countries. Over recent decades, Jotun has developed products that reduce the VOC content in the products. Jotun recognizes sustainability as a long-term competitive advantage.
Therefore, we will use Jotun paint product with price 250 EGP/ gallon instead of the used paint with price 160 EGP/ gallon:

- 1 gallon = 400 m2
- Total quantity of paint = 139,644 m2
- Needed paint = 139,644/400 = 350 gallons
- Difference in price= 350 × (250-160) = 31,500 EGP

Acquired Points = 2 Point

L) Total Points Gained:

Categories	Credit	Points
Location and Transportation (LT)	LEED for Neighborhood Development Location	1
	Sensitive Land Protection	1
	Surrounding Density and Diverse Uses	5
	Access to Quality Transit	5
	Reduced Parking Footprint	1
	Green Vehicles	1
Sustainable Sites (SS)	Site Assessment	1
	Open Space	1
	Heat Island Reduction	6
Water Efficiency (WE)	Outdoor water-use reduction	6
	Indoor Water Use Reduction	6
	Cooling Tower Water Use	1
Energy and Atmosphere (EA)	Renewable Energy	3
Materials and Resources (MR)	Building Life-Cycle Impact Reduction	5
	Construction and Demolition Waste Management	2
Indoor Environmental Quality (EQ)	Low-emitting materials	1
	Indoor Air Quality Assessment	2
	Thermal Comfort	1
	Interior Lighting	2
	Daylight	1
Total		52

Therefore, total acquired points are **52 Points** which is sufficient to award the building a **Silver Certificate** as the range of it is (50-59) points.

M) Conclusions and Recommendations:

Most of the recommendations draw attention to the importance of adapting the needs and regional considerations including climate, social, cultural, environmental and economic aspects in any emerging local rating system. Moreover, developing local codes and standards should be based on scientific research, technical knowledge, and stakeholder's participation. Similarly, an assessment for building performance local situation shall be performed to specify local sustainability strategies and major aims.

N) Limitation in Egypt:

Regarding to a research paper developed in Egypt at 2013, about the Green Building Council "*Applicability and Implementation of U.S. Green Building Council Rating System (LEED) in Egypt (A Longitudinal study for Egyptian LEED Certified Buildings)*".

There are the credits that the project team did not target, or were rejected in the projects and it is by the circumstances in the County to be decided as credit Green Power due to not targeted in any project in Egypt, this credit is very difficult to achieve, as it requires buying electricity from certified renewable resources in the form of certificates.

Also, the high initial cost credits, these credits need high initial cost in any project and their achievement depends on the project team decisions as credit Certified Wood Not targeted in any project. This credit is very hard to be achieved because certified wood is not yet recognized in the local construction market, and it cost too much if purchased from outside.