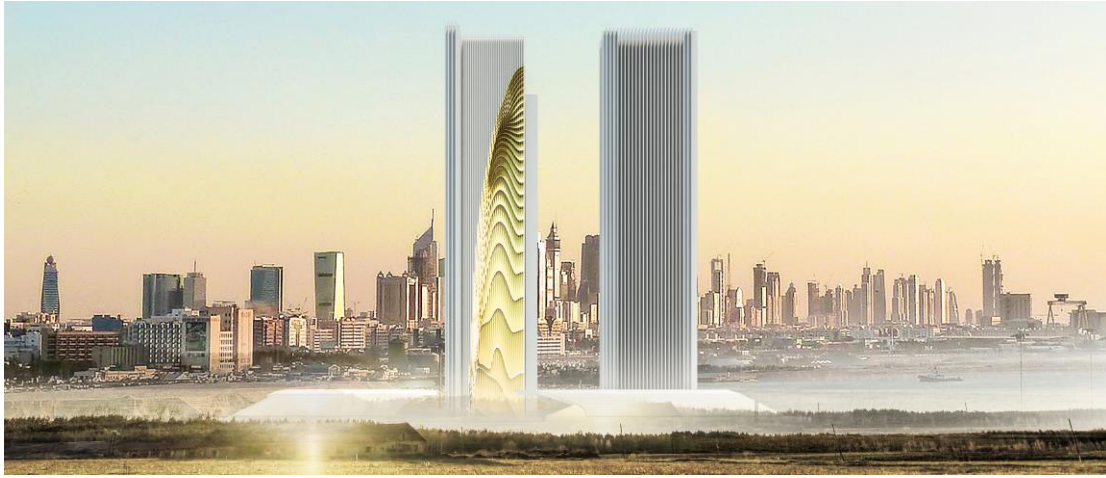


# MASDAR CITY

## IDENTITY & AUTHENTICITY



The United Arab Emirates is a country pioneer in the urban and modern technology development in the direction of global culturalization besides retaining the art, culture and authenticity thereof. Hence, the cities including Masdar City is trying this powerful idea through obeying such pattern and insight. Now four categories have been taken into consideration such as: Authenticity of The United Arab Emirates, the Arabian Architecture, Renewable Energies Technology, Attracting the Tourist throughout the World as a country which is longing for the peace and making the relationship with the world in designing such urban element and with regards to the pattern of the above-said city which is based on the Renewable Energies and the Clean City Pattern.

### **Authenticity of the United Arab Emirates**

With regards to the geographical situation of the foregoing country and the peace policy and making the relationship with the world and being pioneer among the Arab Countries, neighbors and enjoying a powerful global position and benefiting from the widespread fossil based energies and also the endeavors of this country to omit utilizing the fossil energies and then substituting the renewable energies and trying for helping the environment and also preventing the earth warming and upgrading such ideology in the world therefore we can say that in the real sense the flag of The United Arab Emirates can be known as a very powerful pattern for achieving to an appropriate and symbolic form and design of architecture for designing this urban element. Therefore and in compliance with the diagram of the sheet number one, the red color of the flag has been considered to signify a combination as a base for the project and in the form of a very huge fountain and pool in the ground floor and negative balance of this project and the flag's black color which is a symbol for the oil wealth has been taken into consideration as the high vertical volume of the first part and the green color of the flag of the said country means the idea improvement of the second part of the high vertical volume of this urban symbol which has an appropriate integration with the Arabian Architecture and ultimately the white color of the flag of the United Arab Emirates

# MASDAR CITY

will signify and mean the peace that the space between these two high vertical volume parts has been considered in the form of empty and open which it undertakes the responsibility of creating the storm in this project and ultimately a symbol of Masdar City, a very huge museum and gallery have been designed in the negative floor and in relation with the mentioned subject matters.

## •Architectural Authenticity and Arabian Architecture:

Arabian and Islamic Architecture have historically benefited from authenticity and indicator style and with regards to the climate in the United Arab Emirates we can remember that climate as a different architecture and the identity of a nation will practically owe to the architecture of that country but in the last years a very modern landscape has been created due to the increase in the mass construction process of the miscellaneous projects and of course with the different applications and we tried to perform a very special emphasis on the Modern and Arabian Integrated Architecture besides the technology and in this project and designing the urban symbol of Masdar City and therefore some Arabian Architecture Forms and Arabian Architecture Patterns have been symbolically applied for retaining such authenticity and such Arabian Architecture is now changing to the modern style from the high altitude of this project to the low level of this texture which this associates the retention of architecture besides the technology and with regards to the mass construction the urban design changes and accordingly the height of this urban symbol has been considered about 150 meters and for the future of Masdar City so that the such element could be observable from the entire parts of the city but would not be influenced by the height of neighbors if there were some high towers in the years to come and in addition to this matter a very different architecture and high-rise building have been created in most cities of the United Arab Emirates hence, the low height plans and merely the statues and convoluted forms and structures and far from such authenticities all have been avoided in this urban symbol.

## •Technology and Renewable Energies:

The renewable energies in this project have been taken into consideration in several ways. With regards to the climate and weather in the United Arab Emirates which is in the form of desert climate and flat land therefore many people travel to the coasts of this beautiful country from different parts of the world and due to the same characteristic and also for using the sun. All year round the raining happens scarcely and the most important source of energy is the sun during the year and the wind blowing can be used but sometimes many sand storms occur hence, three elements such as the sun, wind and visitors have been used for producing the energy in this urban symbol. We can benefit from the sun and wind energies both at the same time in this project and with regards to the high altitude which has been taken into consideration and such a thing can be possible even in the cloudy days of year. This symbol acts like those wind catchers that exist in the historical and old regions of this country and at the higher altitude and then these wind catchers direct the warm weather and wind blowing through the entrance gates towards the project and a large number of turbines which are very sensitive to the wind that

# MASDAR CITY

every one of them has been separately installed in the stair form in this element with the different levels and surface plates and at the same height and according to the presented diagram so that these turbines start acting after the wind blowing in to the project and the wind enters there and then it is directed downwards after passing through such turbines and the wind plays the role of a cooler like the wind catchers for the visitors and the technical parts of the project which are in need for being cooled and this can be a new distribution for producing the energy through the wind in such turbines which are applied in the project while the colossal turbines are usually in need for an open and vast space and utilizing them requires more costs especially in such project which will be probably surrounded by many constructions and also there have already been installed a large number of sun panels on the roof and landscape of the whole project for producing the sun's energy which can produce an useful amount of energy appropriate to the under operation patterns in Masdar City and these panels have been installed in such a way that in those levels and surface plates that the visitors and surveyors are there they can prevent them from facing with the industrial perspectives and the transplant glass layer which has holes for letting the wind into the project which has been installed at the higher altitudes and it can provide an appropriate energy production by passing the sun light from itself and in the view of the entire project and under the presented diagram and such symbolic idea is because of the glassy entity of the most of sky scrapers of the afore-said country and the technology of such glasses has been formerly tested and they are very useful and finally some mosaics of the electricity producing ability have been applied on the floor, the entire landscape, the gallery part and the museum under the ground floor which allow the visitors and tourists to frequent there and such mosaics can be also used under the decorative floorings and the plants appropriate to ventilate the weather have been applied for ventilating this space other than the wind catchers' technique in compliance with the recommendations made by The National Aeronautics and Space Administration (NASA) in America.

## •The Project Materials:

The dominant material with the white background has been used due to the high exposure of sunlight and the golden color has been used for highlighting, inviting and attracting the visitors and surveyors in the integration part of the Arabian Architectural Pattern.

# MASDAR CITY



Electrical Characteristics	
Model	PS - 100 M
Maximum power(Pmax)	100 W
Current at Pmax (Imp)	5.17 A
Voltage at Pmax (Vmp)	18.06 V
Short circuit Current (Isc)	5.08 A
Open circuit Voltage (Voc)	18.90 V
Temperature coefficient Voltage	0.16V/°C / -(160 +10)mV/oC
Temperature coefficient of power	-(0.5+0.05)%/oC
Temperature coefficient Current	0.06%/°C / (0.065 +0.015)%/ oC
Maximum voltage	1000 V DC
Mechanical Characteristics	
Dimensions	985 × 650 × 30 mm
Weight	10.4 Kg
Cell	mono crystal 156x156 mm2
Operating temperature	-45 to 80 °C
Front glass	2.8 mm
Hail diameter @ 80 Km/h	Up to 25 mm

## The total area intended for solar panels

AREA **130 square meter**

Panel Dimensions **985\*650 MM**

Number of required panels **205**

10 square meter solar panel **1KW → H 1**

**130 \* 1KW = 13KW → H 1**

Sunlight hours of the day **H12 → 12 \* 13KW = 156KW**

Estimated power in one year **156KW \* 365 = 56.94MW**

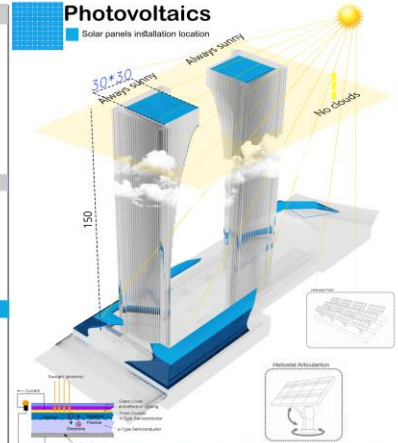
**Electricity offers from the following methods**

**Wind turbines**

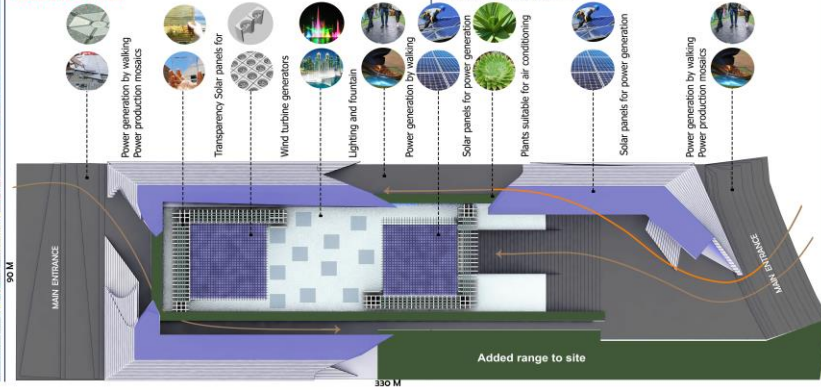
**Pedestrians**

**wind energy**

**Geothermal**



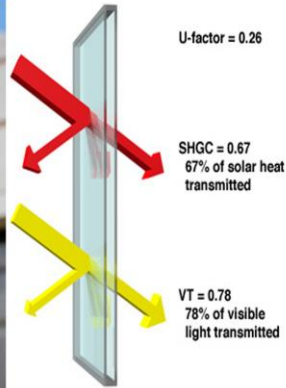
A photovoltaic system employs solar panels, each comprising a number of solar cells, which generate electrical power. PV installations may be ground-mounted, rooftop mounted or wall mounted. The mount may be fixed, or use a solar tracker to follow the sun across the sky. Solar PV has specific advantages as an energy source: once installed, its operation generates no pollution and no greenhouse gas emissions, it shows simple scalability in respect of power needs and silicon has large availability in the Earth's crust. Advances in technology and increased manufacturing scale have in any case reduced the cost increased the reliability, and increased the efficiency of photovoltaic installations. Net metering and financial incentives, such as preferential feed-in tariffs for solar-generated electricity, 100 have supported solar PV installations in many countries. More than countries now use solar PV.



# MASDAR CITY

## This fully transparent solar cell could make every window and screen a power source

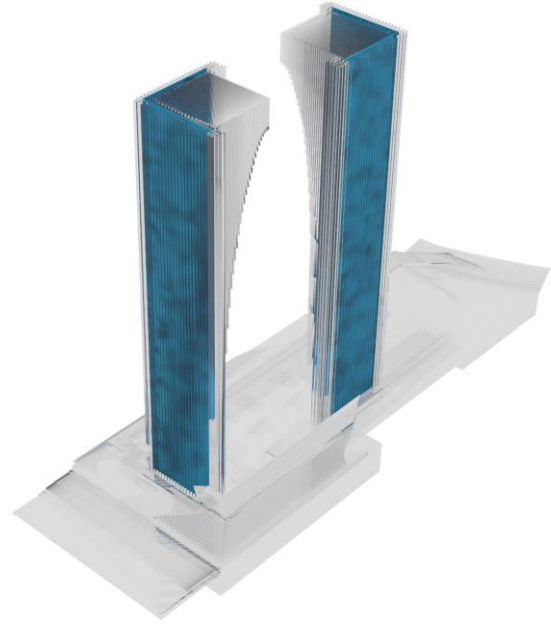
Scientifically, a transparent solar panel is something of an oxymoron. Solar cells, specifically the photovoltaic kind, make energy by absorbing photons (sunlight) and converting them into electrons (electricity). If a material is transparent, however, by definition it means that all of the light passes through the medium to strike the back of your eye. This is why previous transparent solar cells have actually only been partially transparent — and, to add insult to injury, they usually they cast a colorful shadow too



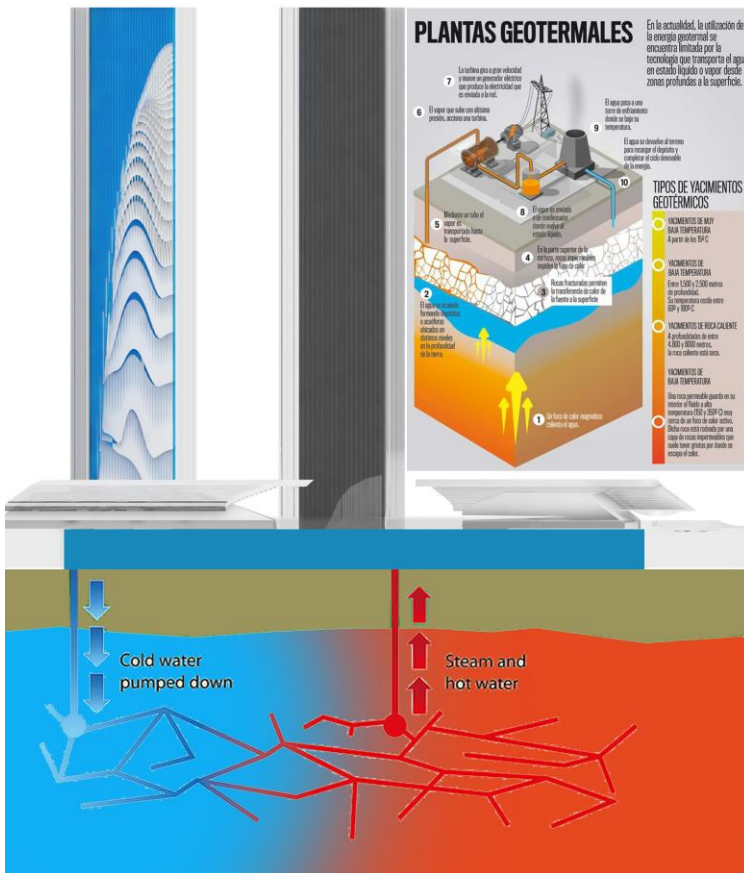
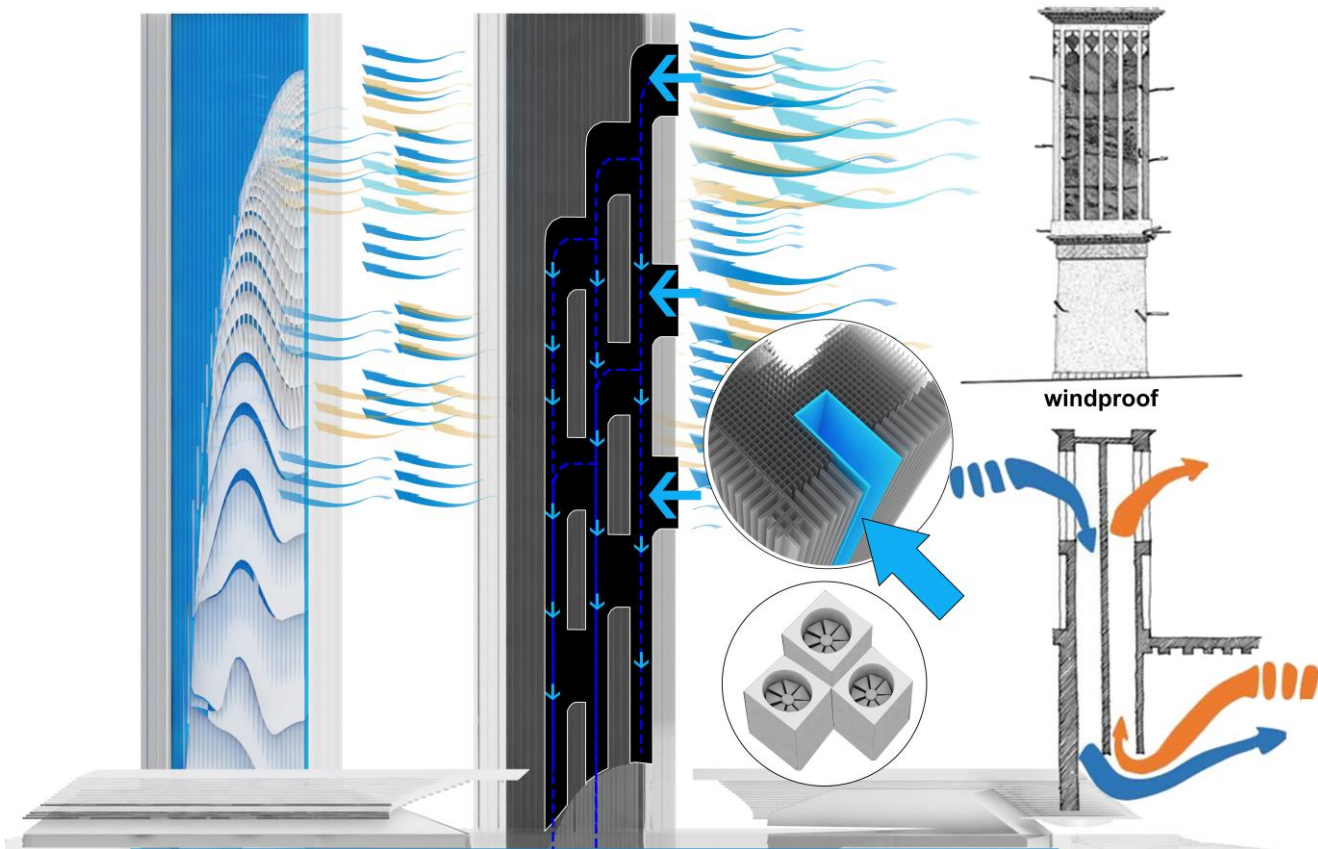
researchers at Michigan State University ,2014 Back in August created a fully transparent solar concentrator, which could turn any window or sheet of glass (like your smartphone's screen) into a photovoltaic solar cell

## transparent solar cell

Place of installation of transparent solar glass



# MASDAR CITY



## Generating Electricity from Geothermal Energy

Remember how your basic steam turbine works in a power plant that uses fossil fuels: Fuel is burned to heat water in a boiler, to create steam. The steam is used to drive a turbine, which generates electricity. What if you could get all that steam without burning a single ounce of coal, oil or natural gas? That is the appeal of geothermal electricity production. In certain locations (primarily near geologic fault lines) there are reservoirs of very hot water or steam deep under the earth's surface. These reservoirs, also called "hydrothermal resources," are typically a few miles down (or more) and under high pressure. Using those geothermal resources instead of fossil fuels to drive a steam turbine is not much more than drilling wells into the hydrothermal resource and channeling that hot water or steam into a turbine unit for generating electricity. (Of course, the engineering is (a bit more complicated, but that's the basic idea

There are three basic types of geothermal power plants, depending on the type of hydrothermal reservoir

Dry steam plants, which draw steam directly from deep underground (a la Old Faithful)

Flash steam plants, which draw hot water under high pressure up towards the surface. As the pressure decreases, the water boils, which generates steam to power the turbine

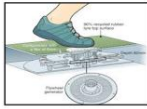
degrees 150 Binary steam plants, which utilize hot water (perhaps around Celsius) to vaporize another fluid (one with a lower boiling point). This hot vapor then drives the turbine, generating electricity

Dry steam is the oldest geothermal power generation technology but is limited to a few specific areas. The Geysers, in California, is the largest geothermal installation in the world and the only accessible dry-steam area in the United States (other than Old Faithful and the rest of Yellowstone, which is off-limits). Flash steam and binary steam plants are called "closed loop" systems, which means that the water brought up from the surface is re-injected back into the earth

# MASDAR CITY

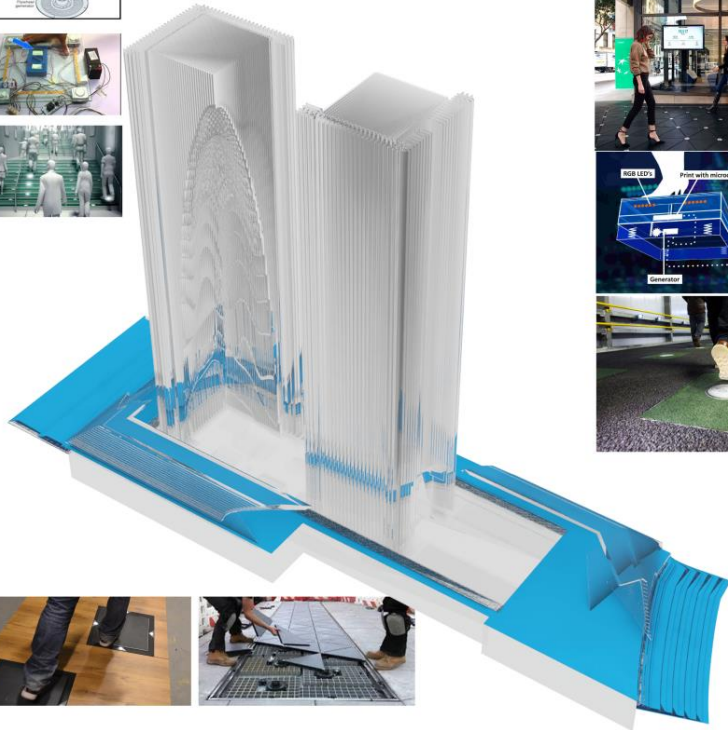
Due to the rapid depletion of the main fossil source of energy (oil), it is vital to search for other sources of energy. Also, the global pollution due to traditional sources of energy moves scientists to search for other sources of green energy. One sustainable and green source of energy is the power generation from the human footsteps. This research work aims to design and test a simple device that converts the kinetic energy of the human footsteps to electrical energy. This device may be used in all crowded spots with a big number of pedestrians such as mosques, churches, underground stations, theaters, stadiums, etc. This technique of energy harvesting is suitable for such applications as street lighting, advertising billboards, and information displays. The device was efficiently designed, fabricated and tested

Idea The basic idea of this work is to design and implement a device that generates energy from the human footsteps. This goal is achieved by converting the resulting force of the weight of the human body that is transferred to the ground by footsteps to a useful mechanical torque. Thus, electricity can be generated when coupling this device to an electric generator. This idea is much suitable for crowded places such as airports, train and underground stations, theaters, stadiums, universities, churches, and mosques. As for Makkah, due to its holy places, a huge number of people, that may reach millions, gather in particular times of the year. Usually, people have to march for long distances when performing The total amount of .') .their worshiping activities, Fig energy resulting from their footsteps is enormous. Good utilization of the footsteps energy may save a big sum of money that goes for electricity generation from traditional fossil fuel



## LANDSCAPE AND ELECTRICITY FROM WALKING

Green space and air conditioning by certain plants



NASA Approved Plants to Improve Your Air Quality 16  
Improve the air quality of your landscape by having one or .plants shown to improve air quality 16 some of these  
Houseplants are beautiful decorative elements, but some people find them a chore to keep alive, and don't bother to .keep them around

However, indoor plants do much more than just look or smell pretty—many can actually improve the air quality of .your home

While all plants take in carbon dioxide and emit oxygen, they also act as natural humidifiers and can remove some .harmful chemicals from the air around us

While we already know that just having a plant around can boost our mood and productivity, and many people experience fewer headaches, mood swings, and even reduced al- .lergies when they bring plants into their homes

To figure out exactly why these plants are so beneficial, NASA performed a controlled experiment to see which plants were most effective at removing several common indoor air pollutants, including ammonia and VOCs like formaldehyde, trichloroethylene, benzene, toluene, and .xylene

High levels of these chemicals can result in health problems that collectively make up the phenomenon known as "sick ".building syndrome

Benzene, a known carcinogen, can enter our environment through plastics, synthetic fibers, and resins. Formaldehyde .is emitted by paints and varnishes

## LANDSCAPE AND PLANTS

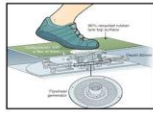
Green space and air conditioning by certain plants



# MASDAR CITY

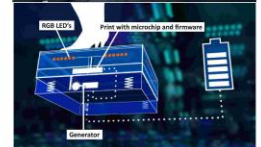
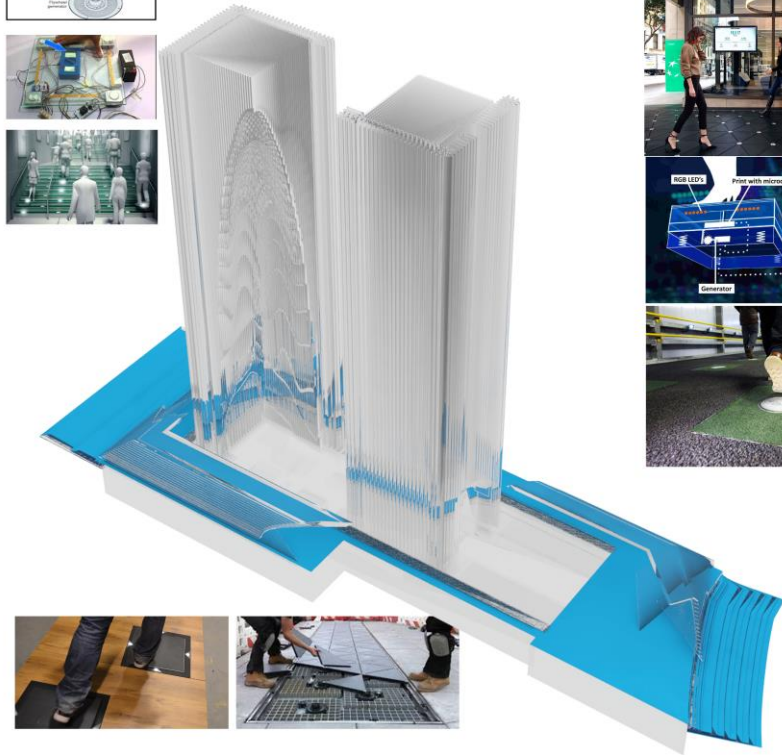
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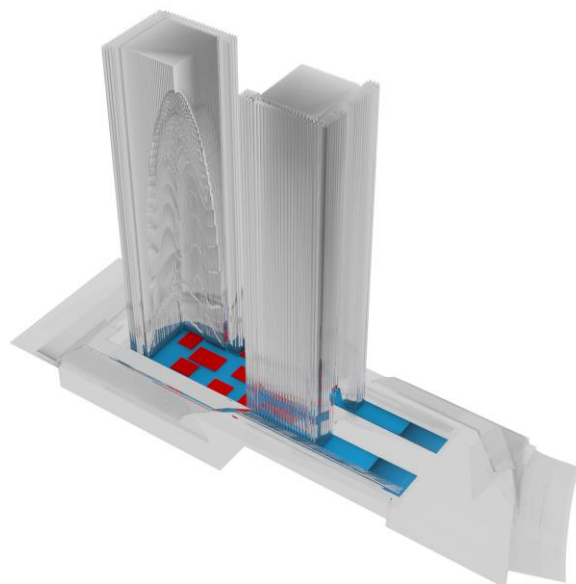
## LANDSCAPE AND ELECTRICITY FROM WALKING

Green space and air conditioning by certain plants



## Musical fountain

Location of fashion clothing



# MASDAR CITY

