



**SOLAR  
DECATHLON** MIDDLE EAST  
DUBAI, UAE

ORGANISED BY

هيئة كهرباء ومياه دبي  
Dubai Electricity & Water Authority



# QUESTIONS & ANSWERS





# SOLAR DECATHLON

MIDDLE EAST  
DUBAI, UAE



# 1. What is the Solar Decathlon?

The Solar Decathlon is the largest and most challenging competition among international universities to design, build, and operate sustainable, cost-and-energy efficient solar-powered homes. These homes should focus on protecting the environment, and take into consideration the climatic conditions of the region. During the final phase of the competition, teams assemble their houses in a main expo area, open to the general public, while undergoing the 10 contests of the competition, which is why the event is called Decathlon ('Deca' derives from Greek and means ten).

# 2. What is the Solar Decathlon Middle East?

The Solar Decathlon is being organised for the first time in the Middle East and Africa after its success in the USA, Europe, China, Latin America, and the Caribbean. SDME is organized under the patronage of His Highness Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of Dubai Executive Council. The first round of the Solar Decathlon Middle East (SDME) took place in Dubai, UAE in 2018 and the second will take place in 2021 to coincide with Dubai Expo 2020. SDME was established through an agreement between the Dubai Supreme Council of Energy, Dubai Electricity and Water Authority (DEWA), and the US Department of Energy (DOE).

# 3. Who is the steering / higher committee of the competition?

The steering committee of the SDME includes DEWA, the Dubai Supreme Council of Energy, the Ministry of Cabinet Affairs & The Future, UAE Ministry of Energy & Industry, Ministry of Education, Dubai Municipality, Dubai Police, Dubai Roads and Transport Authority (RTA), Expo 2020, and Museum of the Future.



## 4. What is the role of DEWA as an organiser of the competition?

DEWA will continue its journey to transform Dubai into a global hub for green economy and renewable energy. Hosting the SDME in Dubai underlines DEWA's commitment to consolidating Dubai's position as a place that encourages innovation, incubates creativity and promotes environmental sustainability, to ensure a clean, healthy and safe environment for generations to come.

## 5. What are the objectives of the competition?

The objectives of the SDME are aligned with the goals of the World Expo 2020, the National Innovation Strategy of the UAE and DEWA's Strategic Plan. These objectives are:

- ◆ To achieve the vision of HH Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, to establish Dubai as a global hub for sustainability, innovation, youth, and education
- ◆ To accelerate the future of sustainable buildings, exploring the possibilities of using breakthrough solutions and cutting-edge technologies to increase the energy efficiency, people's happiness and the sustainability level of the buildings and cities
- ◆ To educate the participant students on the benefits and opportunities offered when using renewable energy technologies, energy management, smart solutions, and advanced materials, challenging them to think creatively and develop innovative approaches that contribute to the dissemination of sustainable buildings
- ◆ To promote research in the buildings, cities and clean energy as well as the collaboration between industry and academia
- ◆ To encourage professionals from different industries to select materials and systems that reduce the environmental impact of buildings, optimizing the economic viability and providing comfort and safety of occupants
- ◆ To raise awareness about the responsible energy use, renewable energy, energy efficiency, and the technologies available that support in reducing/optimizing energy consumption
- ◆ To foster sustainable transportation
- ◆ To promote architecturally attractive solar systems integration, through replacing conventional construction materials in the building envelope such as the roof, skylights or facades with solar technologies
- ◆ To bring high efficiency architectural and engineering solutions for the Middle East climate
- ◆ To demonstrate that high-performance solar homes can be comfortable, attractive and affordable
- ◆ To demonstrate that an attractive and well-designed house can generate enough electricity to meet the needs of a household including transportation

## 6. What are the criteria on which teams are evaluated?

The teams will be evaluated over 10 contests (hence the name Decathlon), teams may earn points in three ways:

1. Task Completion (Measured)
2. Monitored Performance (Measured)
3. Jury Evaluation (Juried)

### Task Completion

- ◆ Teams complete tasks that simulate modern living and deliverables of the competition
- ◆ Teams perform household chores, such as cooking, laundry, and hosting dinner gatherings for fellow competitors and invited visitors
- ◆ Teams required to log miles driving an electric vehicle charged by the house's solar power system

### Monitored Performance

- ◆ An advance and comprehend monitoring system to evaluate in real time their energy performance and their capacity to maintain a healthy and comfortable interior environment, including temperature, humidity, air quality, lighting levels, and acoustical performance

### Jury Evaluation

- ◆ Judges who are experts in subjects like architecture, engineering & construction, sustainability, marketing and communications, and energy efficiency will award points for features that cannot be measured with meters or sensors

### CONTEST 1: ARCHITECTURE (Juried Contests)

To evaluate the coherence of the design, the flexibility of space, the innovation, the seamless integration of technologies in the house's architecture and how the house's design responds to the conditioning factors of the Middle East.

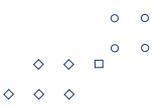
### CONTEST 2: ENGINEERING AND CONSTRUCTION (Juried Contests)

To evaluate the construction and engineering systems design merits, innovation, integration and implementation. Teams must demonstrate the higher level of functionality of the house structure, electricity, plumbing and solar systems design and construction.



## Evaluation Concepts / Sub-contests

- ◆ Construction system and assembly of the house
- ◆ House Structure
- ◆ Plumbing System
- ◆ Electrical System
- ◆ Solar Systems
- ◆ Energy Strategy and Simulations



### CONTEST 3: ENERGY MANAGEMENT (Measured Contests)

To evaluate the house' electrical energy self-sufficiency, their energy consumption, and their electrical management system.

## Evaluation Concepts / Sub-contests

- ◆ Load consumption per surface area.
- ◆ Net electrical balance
- ◆ Temporary generation - consumption profile patterns correlation
- ◆ Demand response

### CONTEST 4: ENERGY EFFICIENCY (Juried Contests)

To evaluate the functionality and efficiency of the houses design, systems and components, in addition to their contribution in reducing energy consumption.

## Evaluation Concepts / Sub-contests

- ◆ Efficiency of the House Envelope
- ◆ Efficiency of passive and semi-passive solutions
- ◆ Efficiency of the active systems
- ◆ Efficiency of the appliances
- ◆ Efficiency increase due to the smart management
- ◆ Building performance simulations



### CONTEST 5: COMFORT CONDITIONS (Measured Contests)

To evaluate the capacity for providing interior comfort through the control of temperature, humidity, daylighting, indoor air quality and acoustic performance.

## Evaluation Concepts / Sub-contests

- ◆ Temperature
- ◆ Lighting
- ◆ Humidity
- ◆ Façade airborne sound insulation
- ◆ Air quality – CO2
- ◆ HVAC systems noise



## CONTEST 6: HOUSE FUNCTIONING (Task Completion Contests)

To evaluate the performance of the house and the efficiency of the selected appliances. The contest replicates normal activities and tasks of a contemporary home.

### Evaluation Concepts / Sub-contests

#### Monitored Performance Scoring:

- ◆ Refrigeration
- ◆ Freezing
- ◆ Water Balance

#### Tasks Completion Scoring:

- ◆ Clothes Washing
- ◆ Clothes Drying
- ◆ Dishwashing
- ◆ Oven
- ◆ Hot Water Draws
- ◆ Cooking
- ◆ Home Electronics

#### Guests Scoring:

- ◆ Dinner



## CONTEST 7: SUSTAINABLE TRANSPORTATION (Task Completion Contests)

To evaluate the simulation of a typical household driving patterns. In this contest, teams should drive an electric vehicle charged from the house' electric system several times during the competition.

### Evaluation Concepts / Sub-contests

- ◆ Driving task completion
- ◆ Energy-efficient driving

## CONTEST 8: SUSTAINABILITY (Juried Contests)

To evaluate the sustainability of the house, including the reduction of its environmental impact during its whole life-cycle, through its design, systems, and components. The water conservation initiatives and the vegetation are part of this evaluation.

### Evaluation Concepts / Sub-contests

- ◆ Sustainability in the project
- ◆ Construction systems
- ◆ Materials
- ◆ Bioclimatic strategies



- ◆ Active systems and equipment
- ◆ Solar systems
- ◆ Water
- ◆ Vegetation
- ◆ Waste



### CONTEST 9: COMMUNICATION (Juried Contests)

To evaluate the teams' communication and social awareness capacity, considering their creativity, effectiveness, and efficiency of sharing the SDME relevant topics (sustainability, energy efficiency and the use of renewables), as well as the team's goals and objectives.

#### Evaluation Concepts / Sub-contests

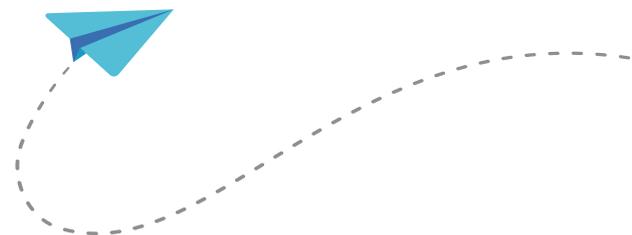
- ◆ Communication strategy
- ◆ Communication throughout the project duration
- ◆ Education and social awareness
- ◆ Communication at the Solar Hai
- ◆ Creativity
- ◆ Effectiveness
- ◆ Efficiency

### CONTEST 10: INNOVATION (Juried Contests)

To evaluate the innovation degree of the house, its systems and components, focusing on emergent, radical and revolutionary changes, in addition to the contribution of the innovation to improving the comfort, performance, level of sustainability or energy efficiency of the house.

#### Evaluation Concepts / Sub-contests

- ◆ Innovation in Architecture
- ◆ Innovation in Engineering & Construction
- ◆ Innovation in Energy Efficiency
- ◆ Innovation in Communication & Social Awareness
- ◆ Innovation in Sustainability



### SPECIAL CONTESTS

1. The Special Creative Solution contest will be dedicated to innovative solutions, ideas, and proposals from participants that can be developed commercially
2. People's Choice contest, visitors will be able to vote for the best house Juried sub-contest
3. Interior Design
4. Juried Building-Integrated Photovoltaics

## 7. Solar Decathlon Middle East - 2nd edition 2021 in Conjunction with Expo 2020

The Expo 2020 themes, Opportunity, Mobility, and Sustainability as well as its main messages “Connecting Minds; Creating the Future,” “Sustainable Solutions,” and “Youth for a Brighter Future” are closely related with the SDME. Thus, it is not a surprise that both organizations agreed in linking these projects, and their events. The SDME 2021 is part of the Memorandum of Understanding (MOU) signed between Expo 2020 and DEWA, in which DEWA is recognized as an Official Sustainable Energy Partner. Both organizations have formed a national partnership to maximize the use of clean energy and deliver the most sustainable World Expo. The competition will raise the prestige and visibility of the selected participating universities. They will be part of the small group of top institutions that will compete in the world’s most important green construction competition, internationally known as the “Olympics of Sustainable Building”, which will be for the first time in its history linked to a World Expo.

The SDME 2021 organization has decided to focus on seven interrelated pillars for this edition, teams must consider them when they plan and work on their houses: Sustainability, Future, Innovation, Clean Energy, Mobility, Smart Solutions, and Happiness. These pillars coincide with the goals of DEWA and the World Expo 2020, and shall be present in all the SDME 2021 houses.



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## 8. What are the awards?

The total prize fund is worth AED 10,000,000. The prize structure for the 22 teams is shown in the table below.



PLACE	AWARD AED
1st	1,000,000
2nd	800,000
3rd	650,000
4th	500,000
5th	450,000
6th - 22nd	400,000

**Special prize:** Creative Solutions Awards will be dedicated to rewarding innovative solutions, ideas, and proposals from the participants that can be further developed into a business proposal. A total fund of AED 200,000 will be distributed among to the most innovative solutions, according to the assessment of the jury.

## 9. Where was the 1st SDME held?

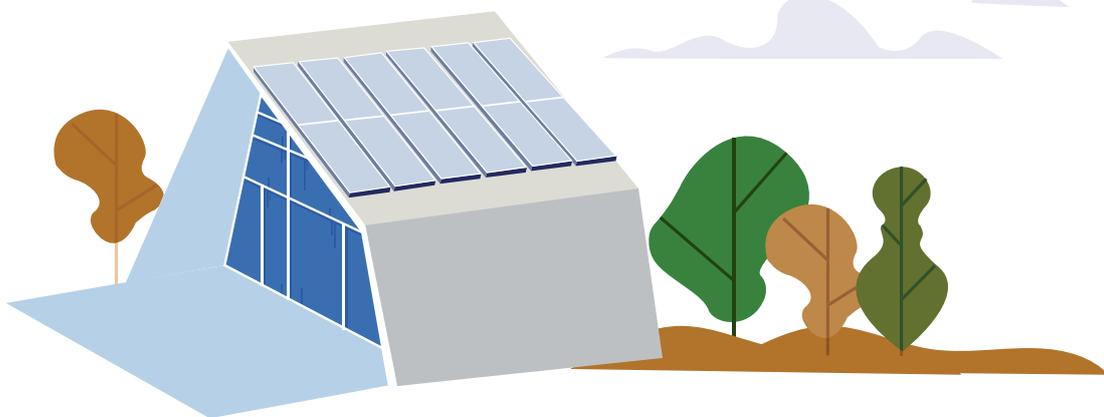
The competition was held at the Mohammed bin Rashid Al Maktoum Solar Park in November 2018 over an area of approximately 60,000 square metres. DEWA chose the Solar Park due to its strategic importance as a location that will benefit the economy through its environmental sustainability and clean energy. The solar park is the largest single-site solar energy project of its kind, based on the Independent Power Producer (IPP) model.

## 10. Who were the SDME 2018 Sponsors?

PLATINUM	OFFICIAL MOBILITY PARTNER	GOLD	SILVER
    	 <p>CHEVROLET</p> 	  	

## 11. How many teams participated in the 1st SDME?

15 teams from 4 continents, comprising 28 universities in 11 countries have participated in the 1st SDME. Over 1,000 university students participated in the competition.



## SDME 2018

TEAM	UNIVERSITY	COUNTRY
Team AquaGreen	Ajman University	UAE
Team AURAK	American University of Ras Al Khaimah	UAE
Team BaityKool	University of Bordeaux	France
	National School of Architecture and Landscaping of Bordeaux (ENSAPBx)	France
	Arts et Métiers Paris Tech Bordeaux (ENSAM)	France
	Nobatek/Inef4	France
	An-Najah University	Palestine
	AMITY University Dubai	UAE
Team EFdeN	Ion Mincu University of Architecture and Urbanism	Romania
	Technical University of Civil Engineering Bucharest	Romania
	University Politehnica of Bucharest	Romania
	Birla Institute of Technology and Science Pilani Dubai Campus	UAE
Team Jeel	American University in Dubai	UAE
Team KNOW HOWse	University of Sharjah	UAE
	Università degli Studi di Ferrara	Italy

## SDME 2018

TEAM	UNIVERSITY	COUNTRY
Team KSU	King Saud University	Kingdom of Saudi Arabia
Team MizanHome	Universiti Sains Islam Malaysia	Malaysia
	Universiti Teknologi Malaysia	Malaysia
Team NYUAD	NYU Abu Dhabi	UAE
Team ORA	Heriot Watt University	UAE
Team Sapienza	Sapienza University of Rome	Italy
Team TDIS	National Chiao Tung University	Taiwan
Team UOW	University of Wollongong-Australia	Australia
	TAFE NSW	Australia
	University of Wollongong-Dubai	UAE
Team Virginia Tech	Virginia Tech	USA
Team VIRTUe	Eindhoven University of Technology	Netherlands
	Fontys University of Applied Sciences Eindhoven	Netherlands



