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*Shell Eco-marathon Americas®*

*Chapter II - 2010*

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# Foreword

The full Shell Eco-marathon Americas® 2010 rules are comprised of “Shell Eco-marathon® Official Rules 2010 Chapter I” and “Shell Eco-marathon Americas 2010 Chapter II.”

**Link to “Shell Eco-marathon Official Rules 2010 Chapter I”:**  
<http://www.shell.com/home/content/ecomarathon/about/rules.html>

**Shell Eco-marathon: Challenging young people to design build and drive energy-efficient vehicles.**

This educational project also acts as a springboard for energy optimization and encourages the use of renewable fuels (LPG, hydrogen, biofuels, etc.).

Each year Shell organizes an energy-economy competition known as the Shell Eco-marathon. This competition is governed by the rules presented herein.

Participating teams can enter:

- The following groups:
  - **Prototypes:** Three- or four-wheel vehicles.
  - **Urban Concept:** Four-wheel vehicles that is similar in appearance to regular cars and which are fit for on-road use.
- The following engine types and energy classes:

Engine Types	Energy Classes
Internal Combustion	Unleaded gasoline, diesel fuel, liquefied petroleum gas (LPG), Shell Gas-to-Liquid (GTL), fatty acid methyl ester (FAME), ethanol E100
Fuel cell	Hydrogen
Solar	

## 1 – GENERAL

In 2010, the Shell Eco-marathon Americas will be held from March 26 - 28 at Discovery Green Park downtown Houston, Texas. Teams are allowed to be on site from March 26 – 28 and the rules shall apply during team’s presence on site.

By participating in the Shell Eco-marathon project, entrants recognize that the Event Organizer, Shell Oil Company (“Shell”), and more generally all Shell Group companies have the right to use names, likenesses and images for publicity or materials promoting this Event without compensation, except where prohibited by law.

Event Organizers reserve the rights to modify any article of the present Rules.

## **Article 01: Participants**

Participating Teams must be from one of the following educational establishments ("Schools"):

- High Schools, but these Participants need to provide additional documentation if they are minors.
- Technical Schools preparing students for vocational training certificates, and professional certificates or equivalent.
- Establishments of higher education awarding university-level diplomas, or student associations.

Teams will consist of no more than 8 official student Team Members, one of whom is the Team Manager, although additional students may support the team as required. Only the designated Team Members will receive credentials when they check-in for the competition. Individuals who do not carry credentials will not be allowed into the competition area. One professor, teacher or adult leader should be designated by the team to receive credentials for admittance to the garage area.

For each entry, a Team Manager, a Driver and a Reserve Driver shall be designated. The Team Manager shall be responsible for only one vehicle. He/She may be the Driver for that vehicle, but only for that vehicle.

The Team Manager shall be the team's sole official liaison with Event Organizers. All information shall be addressed to him/her. For the purposes of the project, he/she shall be responsible for team and shall speak on behalf of the team and must be able to understand and speak English.

Drivers and Reserve Drivers shall be at least 16 years of age or older on the first day of the Event and must be a licensed driver in their home country. The main Driver for one vehicle shall not be the Reserve Driver for another. One Reserve Driver may be assigned to two vehicles. However, once he/she has driven one of those vehicles (practice or competition), he/she may no longer drive the other vehicle.

Each school is entitled to have more than one vehicle participate in the Event. The vehicle shall be described in a separate, fully completed registration. Registration is available on the Shell Eco-marathon enrolment website.

### ***Article 02: Enrolment***

Enrolment for the event is available on the Shell Eco-marathon Americas website.

Enrolment will be considered only if submitted per the instructions on the Shell Eco-marathon website. The Event Committee will examine all completed registrations. All Committee decisions shall be final. Event Organizers reserve the right to accept or refuse any applicant.

Entry confirmation and vehicle number will be sent by mail to each Team. The final list of entries will be posted on the website.

### ***Article 03: Compliance***

Only those vehicles that comply with these official rules shall be allowed to participate. No vehicle shall be allowed on the track for practice or competition until the Inspectors have approved it. The decisions of Inspectors shall be final in all matters concerning the compliance of vehicle design and construction with the present rules. Their decision shall be final.

**Inspectors reserve the right to rescind vehicle approval upon further or more detailed checks. Inspectors must be notified of any modifications to the vehicle after Inspection. Non-compliance with this rule is grounds for vehicle disqualification.**

## **2 - SAFETY**

The vision for Shell that applies to all of its business activities including the Shell Eco-marathon Americas is Goal Zero. Simply put, Goal Zero means no harm to people and protect the environment. Consequently, Shell is requiring all of the participants share this vision while participating at the Shell Eco-marathon.

### **GOAL ZERO PRINCIPLES**

#### ***Article 04: Waste management***

Each team is responsible for the upkeep of its immediate environment, including waste management. As such, the Organizers will put in place a sorted waste collection system at the race circuit. To save both energy and natural resources, participants are required to sort waste and to put it in the appropriate containers and bins.

#### ***Article 05: Smoking***

In addition, considering the event type (similar to a car-racing competition), which requires the handling and the storage of dangerous components and fluids such as gasoline, hydrogen, and other fuel materials, **smoking will be strictly forbidden in all areas where a “non smoking” sign is displayed.**

#### ***Article 06: Narcotics***

US law strictly forbids the distribution and the consumption of narcotics.

Law enforcement officers (Police) may intervene anywhere on the premises for narcotic searches. In addition to legal prosecutions from the authorities, any drug and narcotics related breach of the regulations will be treated as a 3<sup>rd</sup> infraction of the team, even if no prior violation has occurred.

#### ***Article 07: Alcohol***

No alcoholic beverages are allowed at the Event or on the track premises, paddock or campsite.

### **TRACK AND PIT LANE SPECIFIC RULES**

#### **PROTOTYPES / URBAN CONCEPTS**

#### ***Article 08: Off track cycling***

All bicyclists are forbidden outside of the competition track area. Due to the nature of the venue at Discovery Green and the George R. Brown Convention Center all traffic will be designated as pedestrian only. The event surroundings are close enough so that walking will not require significant travel distance. The primary reason for this rule is Safety. These areas will be more congested, therefore the Organisers deem the addition of bicyclists a significant safety risk.

### **PADDOCK SPECIFIC RULES**

#### ***Article 09: Emergency exits***

Fire and emergency exits duly signaled must be kept clear from any obstructing equipment or vehicles.

#### ***Article 10: Whole Paddocks area housekeeping***

Participants should meet the following requirements:

- Stand cleanliness
  - Electrical connections (e.g. cabling on ground to be duct taped or appropriately secured)
    - Display of regulatory stickers and posters e.g. the "no-smoking" and the Safety posters that will be supplied by the Event Organizer to each team upon their arrival.
- NB: to develop best practice sharing in safety, all teams are encouraged to display specific safety pictures or posters in their stands.*
- Clear separation between food and toxically/noxious products
  - Proper tidying of fuels and other flammable products
  - Respect of "no work with hot sources" rule on hydrogen stand
  - Extreme caution with heat sources: A dedicated area will be made available for cooking and barbecues. Therefore, fires will be strictly forbidden in the whole paddock area.
  - Wear personal protection equipments
  - Proper use of portable electric equipment and its protection

Any infringement to the paddock area housekeeping rules will expose the team to a formal warning and infraction consequences.

**Article 11: Material Safety Data Sheets (MSDS)**

Except for approved race fuels or energy sources, upon request by the Event Organizers all teams should be able to provide the MSDS of any products they use in their stands e.g. solvents, cleaning agents, chemicals, etc.

**Article 12: Safety Walks**

Event Organizer will conduct safety walks during the Event period, day and night, to ensure compliance with safety rules.

### **3 – COMPETITION**

**Article 13: Fuel Consumption Checks  
Before Inspections**

**Before the inspection competitors shall proceed to the inspection area with the fuel system completely drained.**

Inspectors shall fill the fuel tank in the inspection area.

For the **hydrogen and LPG-powered vehicles**, a fuel canister will be provided during inspection.

**Before the start**

In the case of the top-ranked **gasoline-powered vehicles**, fuel consumption shall be measured with a precision balance. A Technical Inspector shall fill the fuel system, and then the system, the fuel tank and the injector shall be weighed on the precision balance.

The fuel system (tank, hose and injector) must be compact and easily dismantled in order to facilitate weighing. Before approving reinstallation of the duly weighed fuel system, Technical Inspectors shall verify that the engine is the one that was inspected and validated by the Head Inspector. They shall also ensure that gasoline is not present in the air intake.

In the case of **fuel cell-powered vehicles** using a flow meter to measure consumption, a Technical Inspector shall reset said flow meter to zero.

### **At the finish line**

Competitors shall refrain from any work on their vehicles prior to inspection of the vehicle by Inspectors. Inspectors/marshals are the only persons authorised to fill or top up the tank.

A maximum of two persons per team (with ID badges) may be present at the finish line for the measurements.

For vehicles using a fuel that is in the liquid state at atmospheric pressure (petrol, diesel fuel, fatty acid methyl ester-type biofuel, ethanol, etc.), the quantity of fuel needed to refill the fuel tank shall be the basis for calculating fuel consumption. This volume shall be corrected for temperature variations. The volume consumed shall be measured at the reference temperature of 15°C.

For top-ranked gasoline vehicles, a Technical Inspector shall be present during disassembly of the fuel system and during its transport to the weighing room, where he/she shall perform the weighing. After reinstallation of the duly weighed fuel system, the starter shall be verified by the Technical Inspector to ensure that the clutch setting has not been tampered with since the technical inspection. The Technical Inspector may also request that the vehicle be brought to an enclosed area so that further inspection can be conducted prior to posting of the results.

For LPG-powered vehicles, the cartridge shall be removed and weighed by an Inspector.

### **Article 14: Results**

A list showing the valid performance of each team will be posted throughout the day. The best result for the two days will be retained for the final ranking. The Official Results will be expressed in kilometres per litre i.e. theoretical distance covered) corrected to a temperature of 15°C.

### **Article 15: Timing**

Timing for the event will be managed by an electronic timing system. As such, all vehicles will be required to carry a transponder. The transponder will be checked out to each Team prior to its first entrance on the track and will be fastened to the vehicle by a track official. At the conclusion of the competition, it will be the responsibility of each team to return the transponder to the Timing & Scoring Tent. Failure to return the transponder will result in a \$75 fee charged to the team.

### **Article 16: Cars on Track**

The number of cars allowed on the track may be limited in regards to safety at the discretion of the event organizers.

## **PROTOTYPE GROUP**

Participants shall complete ten (10) laps of the track in the normal racing direction.

**Average speed:** For their attempt to be validated, teams shall complete the ten laps at an average speed of 15 mph. The average speed may be lowered at the discretion of the event organizers.

### **Article 17: Start of Race for Prototypes**

Drivers shall wait until the starting line is clear before starting their attempt. They shall wait for a signal from the Track Marshal (green flag) before starting and will enter carefully the track at the merging point track/the pit lane.

Vehicles shall be at a full stop and shall receive no outside assistance during starting.

Any pushing of the vehicle is prohibited.

The vehicle may be accompanied by a maximum of two persons with ID badges (not including the driver). Once the vehicle has left the starting line, all team members shall leave the starting area with their equipment.

### ***URBAN CONCEPT GROUP***

Participants shall complete ten (10) laps of the track in the normal racing direction.

**Average speed:** For their attempt to be validated, teams shall complete the ten laps at an average speed of 15 mph. The average speed may be lowered at the discretion of the event organizers.

#### ***Article 18: Principle***

The vehicles in each Urban Concept Event will compete as follows:

- Each run will be started with the vehicles in a starting grid.
- Each run will consist of 10 laps around the track.
- During each run, vehicles shall make three pit stops for duration of 10 seconds each. Event Organizers shall indicate the locations for these pit stops on the track. During the pit stops, drivers shall use their stoplights and their turn signals. Any teams failing to comply with this regulation shall be subject to penalties.
- After each run, fuel consumption shall be measured using the same method as the Prototype group.
- The final ranking for the Urban Concept group shall be determined using each team's best performance.

#### ***Article 19: Starting Grid for the First Run (for each group)***

The track will be cleared 1 minute prior to the start.

Drivers will be instructed to start their engines prior to the start.

The waving of the start flag will start each run. Each car has 30 seconds to leave the finish line otherwise they will be towed off the track.

No handicaps for distance or time shall be granted on the basis of starting order.

## **4 - TROPHIES, PRIZES AND AWARDS**

#### ***Article 20: Award Presentation***

The trophies shall be presented to the winning teams after the competition. Prize money shall be paid by check and shall be sent by mail to the University representative designated on the team's entry form during the month following the competition. The following prizes shall be awarded:

#### ***Article 21: Grand Prizes and Other Awards***

	<b><i>Prototypes</i></b>	<b><i>Urban Concept (UC)</i></b>
<b><i>By engine type</i></b>		

<i>Combustion (1)</i>	<i>Shell Eco-marathon Americas Grand Prize</i>	1 <sup>st</sup> prize: \$5,000 2 <sup>nd</sup> prize: \$2,500 3 <sup>rd</sup> prize: \$1,000	<i>Shell Eco-marathon Americas Grand Prize</i>	1 <sup>st</sup> prize: \$5,000 2 <sup>nd</sup> prize: \$2,500 3 <sup>rd</sup> prize: \$1,000
<i>Fuel cells (2)</i>	<i>Shell Hydrogen Grand Prize</i>	1 <sup>st</sup> prize: \$2,500 2 <sup>nd</sup> prize: \$1,000	<i>Shell Hydrogen Grand Prize</i>	1 <sup>st</sup> prize: \$2,500 2 <sup>nd</sup> prize: \$1,000
<i>Solar</i>	<i>Solar Power Award</i>	\$2,500	<i>Solar Power Award</i>	\$2,500
<i>By energy class</i>				
	<i>Gasoline Prize</i>	\$1,000	<i>UC Gasoline Prize</i>	\$1,000
	<i>Diesel Prize</i>	\$1,000	<i>UC Diesel Prize</i>	\$1,000
	<i>Alternative Gasoline Prize</i>	\$1,000	<i>UC Alternative Gasoline Prize</i>	\$1,000
	<i>Alternative Diesel Prize</i>	\$1,000	<i>UC Alternative Diesel Prize</i>	\$1,000

**(1) Shell Eco-marathon Americas Grand Prize – Combustion Engines - Prototypes**

This Grand Prize will be awarded to the “Internal Combustion” vehicle that posts the best fuel economy figure, regardless of the energy source used.

**(2) Shell Eco-marathon Americas Hydrogen Grand Prize – Fuel Cells – Prototypes**

This Grand Prize will be awarded to the “Fuel Cell” vehicle that posts the best fuel economy figure.

**Article 22: SPECIAL AWARDS**

*Participating teams may also elect to compete for one or more special awards: Eco-Design (1), Safety (2), Technical Innovation (3), Design (4), and Communications.*

Teams may register for the special awards by completing and returning the corresponding questionnaires as well as a complete entry form for the Communications, Design, Eco-Design, Technical Innovation and Safety Awards.

**➤ Eco-Design Award**

A special Eco-Design Award will be presented to the team that creates a design that contributes to the fuel efficiency of the vehicle and incorporates recycled and/or eco-friendly materials into the vehicle and production process

\$500 and a trophy

The completed form must be submitted with Phase II of Registration.

**➤ Safety Award**

This prize recognises the three teams having made the most extensive efforts to comply with the safety rules set forth in the present document.

The completed form must be submitted with Phase II explaining how the team has integrated safety concerns into vehicle design and construction.

First Prize:	\$1,000 }	
Second Prize:	\$500 }	and a trophy
Third Prize:	\$500 }	

➤ **Technical Innovation Award**

This award is presented to the top team demonstrating outstanding initiative and technical ingenuity along with optimal use of new materials in the drive train, chassis, instrumentation and tyres.

First Prize:	\$500 and a trophy
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The completed form explaining the innovation concept, the team's approach, etc. must be completed during Phase II of Registration. The judges will meet before the Event in order to make a preliminary selection of teams. Only the selected teams will receive a visit from the judges in the pit area.

➤ **Design Award**

This category recognises innovative design research in terms of ergonomics, aesthetics, choice of materials and technical feasibility. The originality and overall coherence of the design are also taken into account. The term "design" includes: vehicle structure, driving position, the engine, steering, suspension, braking, etc.

First Prize:	\$500 and a trophy
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The completed form explaining the team's design approach, the basis for their research and photos of the vehicle (front, rear and side views) must be completed during Phase II of Registration. The judges will meet before the Event in order to make a preliminary selection of teams. Only the selected teams will receive a visit from the judges in the pit area.

➤ **Communications Award**

This category recognises the team who has made outstanding communications efforts concerning the Shell Eco-Marathon Americas. All actions throughout the year are taken into account: participation at trade shows, creation of a Web site and all other activities that successfully promote the competition, its name, its founding principle, its educational aspects, etc. in the team's country of origin.

First Prize:	\$500 and a trophy
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The completed form presenting all of the team's communications actions and their results must be completed during Phase II of Registration. The judges will meet before the Event in order to make a preliminary selection of teams. Only the selected teams will receive a visit from the judges in the pit area.

➤ **Best Team Spirit**

This prize is awarded to the team who fostered cooperation and collaboration among their team and others at the competition, demonstrated initiative to learn more about other teams and their vehicle and contributed to the morale of team members and/or other teams at the competition

First Prize:	\$ 500 and a trophy
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No self-nomination required. All teams are eligible.

➤ ***Perseverance in the Face of Adversity***

Awarded to the team who overcomes the greatest obstacles/challenges in order to make it to the Shell Eco-marathon Americas or while participating at the Shell Eco-marathon.

First Prize: \$500 and a trophy

No self-nomination required. All teams are eligible.

➤ ***Other Awards***

Shell reserves the right to create new awards that are either open to all competitors or restricted to those from a certain country. Participating teams shall be notified accordingly.

## ***5. Miscellaneous Terms and Conditions***

### ***Article 23: Eligibility***

Contest open to full time students of recognized schools, who are 16 years of age or older as of the first date of the Event except employees, officers and directors (and their immediate families and those living in their same households) of Shell or its parent company, subsidiaries, affiliates, retailers or wholesalers (including the retailers and wholesalers themselves), public relations, advertising or promotion agencies.

### **Article 24: Judging**

The Track Marshals shall conduct all judging and decisions of the Track Marshals are final and binding.

### **Article 25: Taxes**

Prizes will be awarded in the name of the School for the Team registered for the Event. Winning Schools are responsible for all federal and state taxes related to the prize, if any.

### **Article 26: Expenses**

Each Team shall be granted a stipend to assist with travel cost to/from the Event. The amount of this stipend is specified in Article 38 of Chapter II. Each Team is responsible for all other costs and expenses associated with participating in the Event.

### **Article 27: Third Party Rights**

By entering, each Team warrants and represents that its vehicle is original and does not infringe, defame or otherwise violate the rights of any third party; does not violate any federal, state or local laws or ordinances; and does not utilize the property of others without express permission to do so.

### **Article 28: Transfer of Prizes**

No substitution or transfer of prizes. Shell reserves the right to award alternate prizes in the Event a prize becomes unavailable. Shell reserves the right to not award any prize.

### **Article 29: Disqualification**

Shell shall have the right, at its discretion, to disqualify any entries that they deem to be obscene, defamatory or otherwise not in good taste.

### **Article 30: Release of Liability**

**Shell Oil Company and its parent, affiliate and subsidiary companies and all of their respective officers, directors, employees, shareholders, representatives and agents shall have no liability and will be held harmless by Team Members and Schools for any claim, action, liability, loss, injury or damage to any Team Member, Schools and/or**

any other person or entity, including personal injury or death to any person or damage to personal or real property, due in whole or in part, directly or indirectly by reason of participation in this contest, or the acceptance, possession, use or misuse of a stipend and/or a prize (including any travel or related activity).

Team Members and Schools acknowledge that they will be required to sign an Assumption of Risk Waiver and Release from Liability Agreement provided by Shell in order to participate in the Event. Team Members and Schools acknowledge that the track venue may require Team Members to sign an additional release in order to access the facility. Team Members who are under 16 years of age may have to have additional documents signed by their parents and/or guardian and may need to be accompanied to the Event by a parent and/or guardian.

**Article 31: Travel Allowance**

For the Event in 2010 only, the travel allowance set forth below shall be given by Shell to each registered team travelling from either North or South America upon their arrival at the competition. For all non-Americas teams special permission will need to be given by the Event Organizer. The distances are measured from the central administration building or main campus address of the registered School to the address event location. If there are any uncertainties about distance measures, the final decision will be made by the Event Organizer.

<u>From</u>	<u>To</u>	<u>Allowance</u>
0	250 miles	\$150
251	500 miles	\$250
501	750 miles	\$500
751	1000 miles	\$750
1001	1500 miles	\$1,000
1501	2000 miles	\$1,250
2001	or more miles	\$1,500