Challenge Regulations

for the

2016 Albi Solar Challenge
Part of the Albi Eco Race
https://www.facebook.com/albiecorace/

16.01.2016. Release version 2.1

This document should be read in conjunction with the Technical Regulations

Date	Release	Author
24/10/2015	Create	JLF
29/10/2015	Add Challenge and scrutineering chapters	JLF
16/12/2015	Finalize the first public version	JLF
16/01/2016	Reading by Léna, Bastien, Alexandre	JLF

1 Introduction

The “Albi Solar Challenge” is a part of the mayor race called **Albi Eco Race**. This part only concerns solar vehicles. It will take **place in Albi from the 5th of May to the 8th of May 2016.**

The aim of that French Challenge is to improve efficiency of electrical cars (EV). The challenge for the Teams during this event is focused on strategy, efficiency, sharing experience.

This document provides the details of the challenge regulations in order to ensure a smooth and fair procedure of the different challenges. If you have any questions or concerns about these regulations, please do not hesitate to contact Jean-Luc FLEUREAU (information.ecosolar@gmail.com).

This Event is supported by AVERE MIDI-PYRENNEES and ISF (International Solarcar Federation). So this Event is a part of the Global Championship and it is a chance to get points for the final table!

We are looking forward to welcoming you at the event and we are hoping for an exciting, fair and entertaining event.

The Event Organizers

2 General Information

2.1 Track of Albi

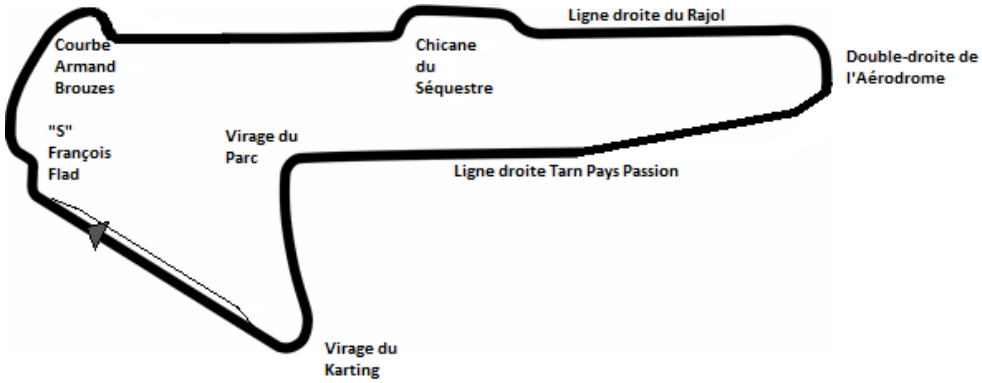
Lieu	Le Séquestre France
GPS	43° 54′ 53″ Nord 2° 06′ 48″ Est

Géolocalisation sur la carte : France

Track:

Length 3,565 km (2,215 mi)

Turns: 15



Circuit d'Albi - Le Séquestre

2.2 Flag Signals

Flag	FIA-sanctioned championships	Location	Use
	Start of race / Restart / End of hazard / Safe racing conditions / Pit lane open	Whole course	Waving flag
	Local caution / Full-course caution (if displayed with "SC" sign Safety Car on course)	Whole course	Waving flag / if necessary shown with „SC“ sign
	Debris, Fluid, or Oil on track	Whole course	Hold still
	Session stopped	Whole course	Waving flag
	Slow vehicle on track	Whole course	Waving flag
	Faster car approaching — during races / Lapped cars should give way to faster cars	Whole course	Waving flag
	Session finished / Winner	Race organizers only	Waving flag

Only for the Challenge relevant flag signals are listed
Non-compliance of the flag signals will lead to time-penalties which will be assigned by the race control.

3 Race Organization

3.1 Scope

3.1.1 These regulations apply to the 2016 Albi Eco Race (the Event), which comprise participants' eligibility, pre-event preparation, scrutineering, testing, on-road components and associated activities. These regulations supersede regulations for any previous event.
3.1.2 The Event will be conducted under the regulations described in the document “Technical regulations”.
3.1.3 Teams and individuals requesting entry into the Event are assumed to know the Regulations of the Event. The participation of teams and individuals in the Event will constitute an acceptance of the Regulations of the Event.
3.1.4 The Event is recognized by the International Solarcar Federation (ISF).

3.2 The Event

3.2.1 The purpose of the Event is to stimulate research into and development of sustainable transport.
3.2.2 The Challenge’s aim is to design and build a Solar EV as described in the Regulations of the Event, and drive it on the Albi Track.
3.2.3 The Correct Title of the Event is the `Albi Eco Race '.
3.2.4 Entrants shall use the Correct Title in all references to the Event.
3.2.5 The Official Language of the Event are French and English.

3.3 Entrants and eligibility

3.3.1 The Entrant is the legal entity completing the Participation Agreement. The Participation Agreement forms part of the entry documentation which can be download from the Albi Eco Race web site.
3.3.2 Eligible Solar EVs will be those described in the Technical Regulations of the Event.
3.3.3 The Organizer is:

AVERE MIDI PYRENEES
Bureau SEM EVEERHY POLE
Circuit d’Albi,
81990 LE SEQUESTRE

Phone: +61 8 8212 8500
E-mail: contact@albiecorace.com

3.3.4 Technical Committee:

Jean-Luc FLEUREAU, coordinator for the Albi Eco Race staff
Nabih BEDEWI, Director of ISF (International Solarcars Federation)
André MEVEL, Mechanical supervisor
Lionel SERRA, Battery supervisor
Frédéric MAURIES, Solar Panels supervisor
Sophie FLEUREAU, Safety and Drivers supervisor

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3.4 Date and Venue of the Event

3.4.1 The Event will start with the opening of the Registration Desk in Albi (see Agenda document)

3.5 Entries

3.5.1 Application for participation must be made on the approved form and, together with the Participation Agreement, be signed by the Entrant.
3.5.2 Applications will be opened on publication of these regulations and will close at noon 15 days before the event, when the maximum number of entries is reached, or when otherwise determined by the Organizer. Late entries may be accepted at the discretion of the Organizer. Late entry fees will apply.
3.5.3 The number of Solar EVs will be limited to 20, or such number as the Organizer determines.
3.5.4 A team is composed of a maximum of 15 persons
3.5.5 Entries received after capacity has been reached may be put on a reserve list.
3.5.6 The Organizer reserves the right to accept or reject any entry at their absolute discretion. No correspondence will be entertained.
3.5.7 All entries are subject to qualifying.

3.6 Change of entry details

3.6.1 Once the specification of the Solar EV has been lodged with the Organizer, technical changes (defined as those items required by this form and by other compulsory documentation) may be made only with the agreement of the Chief Scrutineer.
3.6.2 Changes may be made to team members up to the time of Team Registration. Changes to drivers may be made up to the time of Scrutineering.
3.6.3 No guarantee is given that any changes will appear in Event publicity.
3.6.4 Once a Solar EV and its drivers have passed scrutineering, no technical changes or changes to drivers will be permitted.

3.7 Financial

3.7.1 The entry fee for the Event for each team is defined by Organizers
3.7.2 The Organizer will issue invoices on behalf of the race
3.7.3 All invoices are payable by the date shown thereon.
3.7.4 Places on the entry list will be confirmed only upon receipt of entry fees.
3.7.5 Entries will become void if payment or documentation deadlines are not met.
3.7.6 Bank and currency transaction charges are the responsibility of the Entrant.
3.7.7 All outstanding financial matters must be finalized before the start of the Event.
3.7.8 Withdrawing from the Event:

3.7.8.1 Entrants withdrawing on or before one month before the Event will be entitled to a full refund of monies paid.
3.7.8.2 Entrants withdrawing after one month before the Event will forfeit all monies paid.

3.8 Structure

3.8.1 Regulations of the Event may be amended or supplemented by the issue of Further Regulations.
3.8.2 The Stewards of the Event are the only authority empowered to make a decision on the interpretation of the Regulations of the Event.
3.8.3 Exclusion will occur if the Stewards deem an Entrant to have departed from the spirit of the Event by deliberately acting to gain unfair advantage over other Entrants.
3.8.4 Non-compliance penalties will be imposed at the absolute discretion of the Chief Scrutineer, and may include Failure to Qualify.
3.8.5 The Chief Scrutineer's decision is final and no correspondence will be entertained.

3.9 Compulsory documentation

3.9.1 The Entrant must also submit, one month before the Event:
3.9.1.1 Solar EV Draft Structural Integrity Certificate
3.9.1.2 Electrical System Specification
3.9.1.3 Solar Collector Specification
3.9.1.4 Energy Storage System Specification
3.9.1.5 Publication-quality information and photographs of the team and Solar EV.

3.10 Driver's and Entrant's qualifications

3.10.1 All Solar EV drivers must present a current and valid motor vehicle driver's licence,
3.10.2 All Solar EV drivers shall have a minimum experience of 2 hours driving the Solar EV
3.10.3 The minimum number of Solar EV drivers is two and the maximum number is four.
3.10.4 Any participant under the age of 18 shall be duly vouched for through the submission of a Parental Consent Form and written acceptance of responsibility by the Team Manager. Supervision and responsibility for persons under the age of 18 is vested in the relevant Team Manager.
3.10.5 The official mass of each solar car driver, as weighed at scrutineering with helmet and driving clothes, shall be 80 kg.
3.10.6 If the mass of a driver is less than 80 kg, ballast will be added to make up the difference.
3.10.7 No credit will be given if a driver or passenger weighs more than 80 kg.
3.10.8 Ballast will be provided by the teams.

3.11 Entrant numbers

3.11.1 Solar EVs will be allocated Entrant numbers on acceptance of entry.
3.11.2 Special requests for the use of a particular Entrant number may be submitted. Requested numbers should contain two digits. Allocation is at the sole discretion of the Organizer

3.12 Insurance

3.12.1 All Entrants will be covered by the Organizer’s Public Liability policy.
3.12.2 Insurance covering the cost of damage to Third Party Property caused by the operation of the Solar EV whilst participating in the Event will be arranged by the Organizer on behalf of the Entrant.

3.12.3 Insurance covering emergency medical evacuation, air-ambulance and emergency hospital treatment will be arranged by the Organiser on behalf of the Entrant.

3.13 Race Control

3.13.1 Each team will have a "Control Observer" decided upon by the event organizers.
3.13.2 The "Control Observer" will verify that team respects regulations and fair of the race.

3.14 Line-up and Raffle

3.14.1 After the scrutineering the raffle will follow. The start-numbers of the teams that have passed the scrutineering will be placed in the draw pot and will be drawn by the Fairy of Fortune.
3.14.2 The order of the start-numbers corresponds with those of the line-up for the "Qualification Challenge".

3.15 Safety equipment

3.15.1 The teams have to dispose of the following equipment:
- 3.15.1.1 First-aid-box
- 3.15.1.2 ABC fire extinguisher (10 kg or more),
- 3.15.1.3 Reflective vests for all team members,
- 3.15.1.4 Battery datasheet,
- 3.15.1.5 Battery safety container,
- 3.15.1.6 A safety method to extinguish a battery fire.

The battery safety container and first-aid box have to be ready to use in the pit lane. Each team member, who is on the pit lane or the race track has to be wearing a reflective vest.

3.16 Support vehicles

3.16.1 Without an allowance, no supportive vehicles are allowed on the race track.

3.17 Safety vehicles

3.17.1 Safety vehicles will be driven by the official event organizers of the Challenge or by employees of the race track themselves (ambulance).
3.17.2 If a safety car is required it will drive on the „slow side" of the race track. No driver may overtake another solar car on the track, including the safety car, until the safety car re-opens the track and car returns to the pit lane. As well as when the yellow flag is up, overtaking is not allowed.

3.18 Radio Communication

3.18.1 The teams have to have a two-way channeled radio, which allows the communication between the pit lane and the solar car.

3.19 Pushing

3.19.1 It is not allowed to move the solar car manually (by pushing or pulling) as soon as they have been placed on the starting position. This is only allowed in the pit lane.
3.19.2 Emergency: In an emergency situation, technical failure or vehicle damage, the vehicle has to be removed from the race track immediately by the Safety car of the track.

3.20Damage and vehicle failure

3.20.1 Each solar car which breaks down on the track or encounters any mechanical problems or battery shortage has to be removed from the race track as soon as possible before a repair can take place (for details look into the safety concept).
3.20.2 Each solar car has to carry a towrope within the vehicle at all times in order for the safety car to be able to tow off the vehicle from the track into the pit lane. It is prohibited for team members to enter the track until they get the OK from the marshals. All people have to follow the rule of wearing a reflective west when on the race track at all times! Every vehicle which is towed off the race track has to be inspected again before re-entering the race track.
3.20.3 Stopping on the Race track for any reason will cause time penalties.

3.21 Energy Sources

3.21.1 With exception of the Challenge, "Long Run" any kind of charging the batteries is allowed.
3.21.2 For Battery specification see Technical regulations.

4 The race

4.1 Quick Overview

The race is composed of four parts:

4.1.1 **"Qualification"**: After the scrutineering the raffle will follow. The start-numbers of the teams that have passed the scrutineering will be placed in the draw pot and will be drawn by the Fairy of Fortune. The order of the start-numbers corresponds to those of the line-up for each Challenge. This start will be given as Le Mans. The team will have to run 20 laps of the circuit at the maximum speed. The winner is the team who run the 20 laps in the best time.

4.1.2 **"Long Run"**: 8 hours of run between 9am and 5pm. The winner is the team who does the maximum number of laps.

4.1.3 **"Best lap without battery pack"** during the Long Run. Teams will have to use only the solar panels to power the car. This race will be organized one hour before and one hour after noon. As it is not possible easily to switch off the battery pack, we will measure in real time the current from the battery pack. So Teams have to do their best time on the track taking care that no energy from the battery pack is used.

4.1.4 **"Fast and furious solar challenge"** or "High speed challenge", as the circuit is close to the airport, the landing strip of 2575 yards (1600m) will be used to do a standing start. The speed at 1609 yards (1000m) will be

checked by the police radar. The winner is the team who does the best time to run 1000m.

If the Organizers are not allowed to use the landing strip, this challenge will use a part of the track near the paddocks.

4.2 First Challenge (Qualification)

The aim of that challenge is to do 20 laps at the maximum speed. The winner is the team who run the 20 laps in the best time. The ranking of arrivals will determinate the order of the start for the next Challenge the next day.

4.2.1 The start-numbers of the teams that have passed the scrutineering will be placed in the draw pot and will be drawn by the Fairy of Fortune. This start will be given as Le Mans.

4.2.2 The Challenge's agenda is defined in the schedule table.

4.2.3 The batteries pack could be full

4.2.4 The solar car must be on the track 30mn before the start

4.3 Second Challenge (Long Run)

The aim of that challenge is to prove efficiency of solar cars. That is why during a long day they will run at their best speed. The winner is the team who run the maximum laps during the day.

4.3.1 The solar car must be on the track 30mn before the start. Starting grid corresponds to the ranking of the previous challenge.
4.3.2 This start will be given such as Le Mans.
4.3.3 Each team has the possibility to assign one team member to help the driver enter the solar car during the start.
4.3.4 The Challenge's agenda is defined in the schedule table.
4.3.5 The batteries pack could be full at the start, then only the solar energy is allowed
4.3.6 The driver must be changed at least all the 20 laps
4.3.7 After a driver exchange and before that the solar car leaves the pit, Observers must check horn and lights
4.3.8 The teams are only allowed to charge their batteries with solar energy during the challenge only on the predefined area. The orientation of the panels is only allowed on the declared charging area (the charging area will be announced during the event)

4.4 Third Challenge (Only the sun)

4.2.1 The aim of that challenge is to determine the efficiency of solar cars using only solar energy. This challenge will be done during the Second challenge. It means that the car must not use energy from the battery pack, teams have to use only the solar panel to power their car. This race will be organized one hour before and one hour after noon. As it is not possible easily to switch off the battery pack, we will measure in real time the current from the battery pack. So Teams have to do their best time on the track taking care that no energy from the battery pack is used.

4.5 Fourth Challenge (Fast and Furious)

The aim of that challenge is to demonstrate that solar cars are also cars that can have high velocity. The Albi track is close to the airport, the landing strip of 2575 yards (1600m) will be used to do a standing start. The speed at 1609 yards (1000m) will be checked by the police radar. The winner is the team who does the best time to run 1000m.

If the Organizers are not allowed to use the landing strip, the same challenge will use a part of the track near the paddocks.

4.5.1 The solar car must be on the landing strip 30mn before the start. The order is not determined previously. When a competitor is ready, he can start
4.5.2 A team is allowed to do 3 attempts
4.5.3 The Challenge's agenda is defined in the schedule table
4.5.4 The batteries pack could be full at the start,

5 Scrutineering

5.1 Static Scrutineering

5.1.1 Qualification must be achieved in road ready configuration. Vehicles unable to present at the designated time, or that are not ready to start, may fail to qualify.
5.1.2 Each team must provide appropriate tools and personnel to facilitate the inspection of structural components.
5.1.3 One group of checks will be made with the solar panel in place, and another group of checks will be made with the solar panel removed.
5.1.4 Checks with the panel in place include:

5.1.4.1 Signage
5.1.4.2 Solar EV size
5.1.4.3 Solar collector type and size
5.1.4.4 Vision (all Solar EV drivers required)
5.1.4.5 Lights, indicators, horn.

5.1.5 Checks without solar panel:

5.1.5.1 Mechanical systems (seats, tires, brakes, steering)
5.1.5.2 Electrical systems

5.1.5.3 Energy storage system
5.1.5.4 Roadworthiness.

5.2 Dynamic Scrutineering

5.2.1 After the static scrutineering, all the team must do a dynamic scrutineering. Solar cars will be tested for dynamic stability and handling performance. A combination of the following tests may be conducted:

5.2.2 **Figure-8:** Solar cars must be able to negotiate a figure-8 course in less than 12 seconds per side. The figure-8 course shall have a 5 m wide lane around two 8 m radius center circles, as illustrated in Figure 6-1. The vehicle shall not knock over any of the cones or exhibit signs of structural instability. No body work shall contact moving structural members.

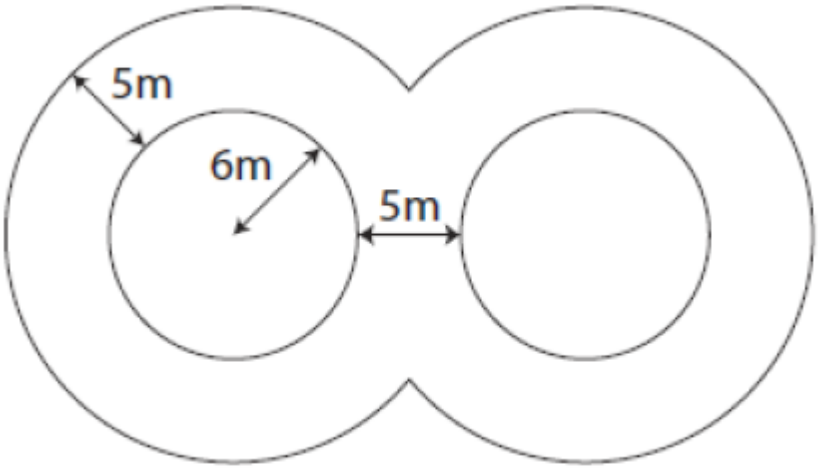


Figure 6-1 Figure-8 Course Layout

5.1.3 **Stability at Speed:** Solar cars must be able to stay within a 3.5 m lane for at least 250m at its maximum speed. Cars must be able to achieve this regardless of crosswinds or gusting conditions.

5.1.4 **Slalom Test:** Solar cars must be able to negotiate a slalom course in 13 seconds. The slalom course shall be 126 m long, with cones equally spaced every 18 m as in Figure 6-2

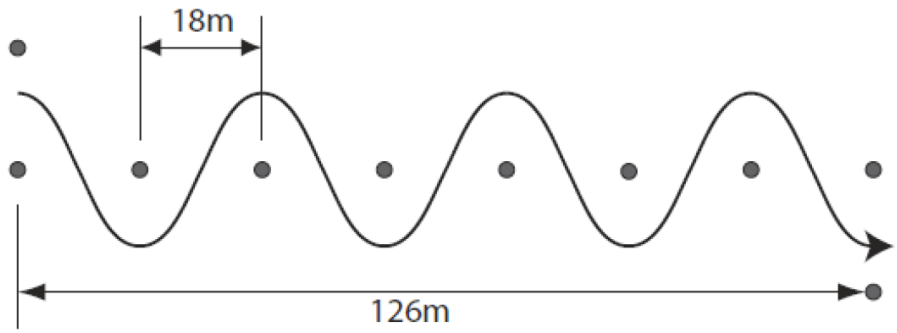


Figure 6-2 Slalom Course Layout

5.1.5 **Brake Test**: Solar cars will be tested to verify compliance with the Braking Performance. The time interval over which the deceleration is averaged shall be from the first indication that the driver should stop until the solar car comes to a complete halt. When braking, the solar car must not veer excessively to the left or right, or exhibit structural instability. The tire pressure and mechanical systems settings used in this test will be considered Event configuration. Solar cars may be required to demonstrate the brake performance a minimum of two out of three times.

5.1.6 Solar cars must be able to make a U-turn in either direction, without backing up, such that any portion of the solar car that is within 200 mm of the ground remain within a 16 m wide lane. Portions of the solar car above 200 mm above ground may exceed the 16 m distance.

6 Penalties

6.1 Any team failing to comply with these regulations during scrutineering, the qualifier, or the challenge will be penalized. Penalties range from official warnings to disqualification from the event.

6.2 Penalty Times : All penalty times listed are suggested minimums. Driving conduct may double with each subsequent infraction. Mathematical penalties will normally be the same for each infraction.

6.3 If the Inspectors believe the teams are deliberately violating traffic or driving regulations for strategic advantage, they may impose more penalties up to and including potential disqualification.

6.4 Conduct: Penalties, including disqualification from the event, may be imposed for improper conduct or the use of alcohol or illegal substances. Improper conduct may include, but is not limited to, improper language, unsportsmanlike conduct, unsafe behavior, or cheating. Teams are responsible for the conduct of all persons associated with the team, whether or not they are officially registered.

6.5 Speeding: Any solar car found to be speeding will be penalized. Speeding penalties may be assessed based on the following factors: (1) velocity over posted speed limits on the Pit Stop, (2) length of time of speeding infraction. The speed of either the solar car itself or the trailer vehicle may be used in determining a speeding infraction.

6.6 Pushing: A one lap penalty for every team who pushes a solar car along the Track. (Except in an emergency).

6.7 Improper Ballast: A five lap penalty may be given each time a team operates its solar car with ballast that does not match the solar car driver.

6.8 Unauthorized Drivers: Any solar car that drives with an unauthorized driver will be required to return to the pit lane and drive with an authorized driver. Unauthorized driving will not be counted.

6.9 Non-Solar Charging of Batteries: From the start of the Long Run challenge until the official finish, teams will be disqualified from the event for charging their solar cars' storage batteries from any other source.

6.10 Disturbing Official Battery Seals: Solar car batteries will be marked with an official seal.

6.11 Disturbing these seals in a manner that prevents proper identification by an observer may be penalized as though all of the battery modules affected had been replaced.

6.12 Replacement of Batteries: Decisions to exchange all or part of a battery must be communicated formally to the team's observer. ***The penalty will be computed as follows: One Lap penalty for each single physical cell***

6.13 Exceeding Size Specifications: Oversized solar arrays will be penalized one lap per excess centimeters in each dimension beyond the allowed size specification.

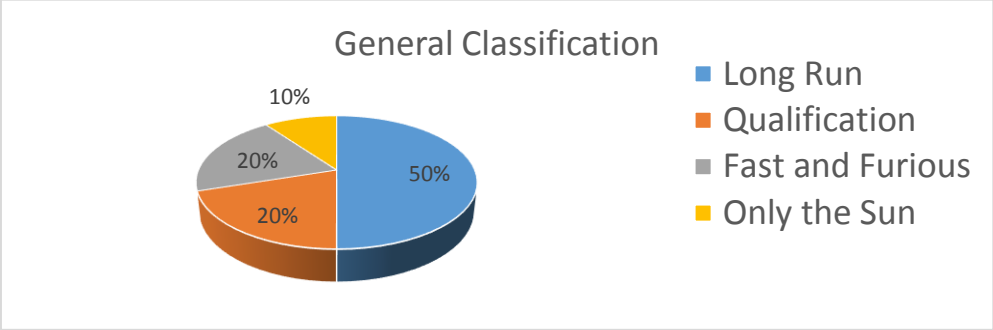
6.14 Restriction on Overtaking: On the track there are three dangerous curves where overtaking is not allowed. The restriction on overtaking will be marked with red tire stacks (will be published in the Team meeting), three laps penalty for overtaking in the marked zones will be given.

6.15 Shortcut curves on the green areas beside the track will be penalized with one lap penalty.

7 Rewards

7.1 The competition entails four different challenges which are distributed over two days. Through the participation in each of the four different challenges, the teams can get points. The general classification will be established from the total number of points obtained by each team. To be part of this classification, a team must participate to the four challenges.

7.2 If for any reasons, the challenge "Only the Sun" could not be done, points of these challenge would be integrated to the "Fast and Furious" one.



The scoring for the different challenges is divided as follow:

	Qualification	Long Run	Fast and Furious	Only the Sun
1st	35	50	15	10
2nd	25	36	11	8
3rd	21	30	9	7
4th	17	24	7	6
5th	14	20	6	5
6th	11	16	5	4
7th	8	12	4	3
8th	6	8	3	2
9th	3	4	2	1
10th	1	2	1	0
11th	0	0	0	0

7.3 The team with the highest score is the winner.

7.4 The prize money: There is no prize money for this first challenge, only cups and medals will be attributed. Also each team will have cash for their transportation's costs.

8 Global Championship supported by International Solarcars Federation

As the Albi Eco Race is included in that Global Championship, participants will receive points according to their position.

ISF has created a table of a Global Championship around the world. The criteria are:

1. Events must have international participation.

2. Teams must have participated in two or more events (which means that a team that has performed well in a single event does not outrank a team that has performed creditably in multiple events).

3. Points have been awarded for each event in which a team has successfully competed, based on the size of the field and their position in the event according to the rules below:

- First place will be awarded **n** points, where n is 10 or the number of entrants that successfully complete the event, whichever is smaller.
- Second place will receive n-1 points, third n-2 and so on.
- All teams that complete the event will receive at least 1 point i.e. competitors placed 10^{th} – 15^{th} in an event where 15 teams complete will receive 1 point.
- A bonus point will be awarded to the team that achieves Pole Position.