ECOGREEN ENERGY Challenge 2027

May 12 and 13, 2027

Fay de Bretagne Circuit



OFFICIAL RULES

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The text in red corresponds to articles you have to pay particular attention to, following numerous non-conformities noted during the previous challenge.

ECOGREEN ENERGY Challenge 2027

INTRODUCTION

Objectives of the ECOGREEN ENERGY Challenge in partnership with the Pays de la Loire Region:

- The first objective of this competition is to **build, within an educational framework, a 3-wheeled or 4-wheeled vehicle to travel a distance of approximately 20 km at a minimum average speed of 25 km/h on a motor racing circuit with the lowest possible energy consumption, in complete safety**.

- The second objective is to **prioritize the strong potential in the fight against climate change in the service of decarbonized mobility**, gaseous biofuels, bioCNG or green hydrogen and electrical energy.

- The third objective is to **promote meetings between stakeholders from different sectors, the public and institutional decision-makers**.

- The fourth objective is to **train a generation of technicians and engineers in the mastery and development of these energies and their associated technologies**.

The competition includes 8 categories:

- Cat 1: Bio-CNG ICE Proto
- Cat 2: Green Hydrogen ICE Proto
- Cat 3: Green hydrogen powered fuel cell Proto
- Cat 4: Electric Proto
- Cat 5: Bio-CNG ICE Urban
- Cat 6: Green hydrogen ICE Urban
- Cat 7: Green hydrogen powered fuel cell Urban
- Cat 8: Electric Urban

The regulations reflect the spirit and principles of energy races that began in England in 1976 and in France in 1985.

All suggestions and proposals for the storage and use of alternative energies will be considered with interest for integration into this challenge.

RACE CHARACTERISTICS

- Circuit distance: 1942 m
- Track width: 8 m
- Minimum average speed: 25 kph
- Number of laps: 9
- Total distance: 17.478 km
- Maximum time allowed: 42 minutes

1. GENERAL ORGANIZATION

a) "Organizer" - The **"Challenge ECOGREEN ENERGY" association** organizes the **ECOGREEN ENERGY – C2E Challenge.**

b) "Team" – a group of individuals with a team name and a vehicle name that has been accepted for Participating in the challenge. .

c) "Participant" - member of a team.

d) "Team Leader" - a participant who has been named on the registration document of the team and who acts as liaison between the team and the organizers.

e) "Educational Manager" - a member of the professional staff of the educational institution who represents the team.

f) "Race Director" - a person appointed by the organizers who is responsible for managing the event, controlling activities in the pits, campsite, and on the track, and penalizing any illegal or dangerous activities or behavior.

g) "Track Director" - a person appointed by the Race Director to act on their behalf and to ensure safety and compliance with on-track rules.

h) "Fuel managers" – individuals who supervise refueling activities and measurements in accordance with the requirements of the regulations, either for bio-CNG or for green hydrogen.

i) "Technical Directors" - two people appointed by the organizers, who are responsible for ensuring the technical compliance of the vehicles, the integrity of the measurements and the results during the **ECOGREEN ENERGY Challenge** for all energy sources.

Article 1: ADMISSION

a) Applications for registration must be made by email to the following address challenge.ecogreen.energy@gmail.com using the form sent by the organizer by email when the invitation is sent.

b) The organizers will review all applications and select the teams.
All decisions made by the organizers and the technical director to any part of these rules will be definitive and enforceable.
The organizers reserve the right to add, modify decisions in cases not provided in the Official Rules. It includes force majeure due to, including but not limited to, adverse or extreme weather conditions, the occurrence of a natural disaster, acts of terrorism or safety concerns.

b) No claims for compensation will be accepted.

c) Participants agree that photo, audio, and video recordings may be made during the event and used by partner companies.

Article 2: REGISTRATION

a) Educational establishments eligible for participation in the **ECOGREEN ENERGY Challenge** are secondary schools, high schools, training centers, universities, and engineering schools.

b) Their participation must be approved by one of the establishment's officials with their signature and the establishment's stamp on the registration form.

c) The team leader and drivers (minimum age 14 on the date of the competition) must be enrolled at the institution on the date of the competition as pupils or students. Each team leader is responsible for one vehicle. Drivers will be required to provide a medical certificate stating they have no contraindications to driving. For minors, parental authorization will be required during team registration on the day of the competition.

Article 3: CONDITIONS OF ACCESS TO THE TRACK

During testing and competition, all vehicles must comply with the technical and safety rules of the event.

Article 4: IDENTIFICATION

a) Race numbers and sponsor stickers must be positioned on the vehicle in accordance with the diagram provided (annex 1) so that they are clearly visible during the competition.

b) The organizers will provide these numbers and logos.
They must be clearly visible during all public presentations, in promotional films and on all photos.

c) Under no circumstances will the **Challenge ECOGREEN ENERGY logos**, official sponsor stickers, or race numbers be altered.

d) A mandatory 10 cm space must be left free on all four sides of the **Challenge ECOGREEN ENERGY number**.

e) All other sponsor names/logos must be smaller than the **ECOGREEN ENERGY Challenge number**.

f) The trademarks or logos of tobacco and alcoholic beverages companies are prohibited. For the trademarks and logos of other energy companies, direct competitors of the partners of the event, it will be necessary to request prior written authorization from the organizers.

g) In the event of a violation of this rule, the organizers reserve the right to request the removal of the logos of the sponsors concerned. In case of refusal, the vehicle will not be able to participate in the competition.

h) All vehicles are subject to the organizers' approval regarding these arrangements.

Article 5: CONFORMITY

a) Only vehicles that comply with these official regulations are allowed to participate in the race. No vehicles will be allowed on the track for testing or competition until the organizers have approved the vehicle during the technical inspection.

b) The organizers must be informed of any significant modifications to the vehicle after validation of the technical inspection.

c) Vehicles must comply with all safety rules.

Article 6: COMPLAINTS

The claim must be addressed to the technical director, in writing, by the team leader.

a) Vehicles: before the runway closure on the current day.

b) Team and/or driver behavior: within 30 minutes following the end of the attempt.

c) Results: 1 hour after the result of an attempt was published.

Article 7: SANCTIONS

a) An attempt may be cancelled, or a team may be disqualified, depending on the severity of the breach.

b) The Race Director and/or the Technical Director may exclude, disqualify, or penalize a participant who, in the has gained an unfair advantage as a result of any breach of the Official Regulations, has hindered a participant's attempt, or any act misrepresenting performance, especially with regard to fuel consumption or the propulsion method .

c) The organizers will apply the following sanctions depending on the severity of the offense:
- Formal warning.
- Best performance invalidated at the end of the race.
- Immediate team disqualification.

2. SAFETY AND DRIVING RULES

Article 8: Safety Rules

a) As with any motorsport activity, one must be aware that certain risks are inherent to this activity.
Recognizing and controlling these risks are essential for the well-being of people, premises and equipment and are in no way intended to limit the spirit of competition. In case of drift, appropriate measures will be taken by the event organizers. The Track Director must notify organizers about anomalies or incidents to help crews comply with safe practices. The use of the track is at the full and sole discretion of the race director, particularly depending on weather conditions.

b) The average speed will depend on the choice of track to ensure maximum safety for all vehicles. This minimum average speed on the Fay de Bretagne circuit is 25 kph.

c) In the event of exceptional weather conditions (e.g. a heatwave), the Chief Race Director (FFSA) and the Sports Commissioner (FFSA), in consultation with the Organising Committee's Race Director, may amend the details of the attempts (number of laps, distance, duration). In such cases, the teams will be informed promptly.

Article 9: KNOWLEDGE OF THE RULES OF GOOD CONDUCT

a) Only the registered driver and the reserve driver will be allowed to drive the vehicle.

b) Drivers may be questioned on their knowledge of driving rules during the technical inspection. **Drivers must know the meaning of the different flags used by the track marshals (Appendix 2).**
The organizers reserve the right to refuse access to the track for drivers with insufficient knowledge of these rules.

Article 10: Driving Under the Influence of Alcohol/Illegal Substances

a) All drivers must have a blood alcohol level of zero.

b) Any infraction will be sanctioned in accordance with Article 7 by the immediate exclusion of the entire team.

Article 11: BRIEFING

Attendance at the daily briefing is mandatory for the team leader and all registered drivers. Absence from these briefings disqualifies the team for the entire day unless there is a special reason.

Article 12: ACCESS TO THE TRACK

a) For practice and the race, only vehicles with the following stickers will be allowed to compete:
- Chassis conformity (Green sticker)
- Propulsion compliance (Blue sticker)
- Fuel system or electrical supply conformity (Red sticker)

b) A maximum of one minute is allowed once the vehicle is positioned on the starting line to cross it. After this time, the vehicle must leave the starting line.
At no time on the track are drivers allowed to push their vehicle.

Article 13: DIRECTION OF THE RACE

It is forbidden to drive in reverse or to drive in the opposite direction of the circuit.

Article 14: DRIVER AND TRANSPONDER COMMUNICATIONS

a) A headset is allowed as long as both hands of the driver remain on the steering wheel and this does not prevent hearing the horn of other competitors.

b) All validated vehicles will receive a transponder before taking to the track for the first start during the practice or race session.

Article 15: OVERTAKES

a) Drivers are required to facilitate the pathway of vehicles wishing to overtake by maintaining their trajectory. Driver of the overtaking vehicle is responsible for the safety of the maneuver.

b) At each overtaking maneuver, the driver must honk the horn repeatedly for at least 3 seconds to warn of their presence and maneuver.

Article 16: BREAKDOWNS AND OTHER INCIDENTS

a) Intentional stop on the track is forbidden.

b) The driver is allowed to attempt to restart his vehicle within his driving position for 60 seconds. In the event of a breakdown, the driver must clear the path and wait in his vehicle for the track marshals.

c) In case of emergency, the driver must get out of the car and wait in a safe place off the track.

d) It is forbidden to carry out repairs on the track.

Article 17: OFF-TRACK VEHICLE MOVEMENT

a) All vehicles must be parked inside the designated paddock or directly in front of it.

b) Out of the track, vehicles must be moved without using the engine. They must be pushed or pulled. Any engine testing with the vehicle running in the paddock is prohibited.

Article 18: DRIVER WEIGHT

a) The minimum driver weight is 50 kg for the prototype category and 70 kg for the Urban Concept category.

b) The driver weight is defined as the weight of the person driving the vehicle, in full gear including helmet, gloves, goggles and their communication device.
If the driver's weight does not meet the minimum requirement, ballast must be fitted to the vehicle. This ballast must be provided by the team, in the form of diving weights, dumbbells weights or metal plates. It must be located outside the driver's compartment to ensure the driver's safety in the event of a collision or rollover and must be fixed to the chassis. It must be permanently installed for the entire duration of the competition. For ballast weighing less than 1 kg, the driver may place it in one of the pockets of their racing suit.

c) If the driver weight is less than the minimum required, the pilot in full gear will be weighted before each attempt.

Article 19: HELMETS

a) For testing and racing, drivers must wear a helmet suitable for motorsport activities. Bicycle, riding, skating, or sledding helmets are not permitted.

b) The helmet label (CE) must be clearly legible. Helmets worn by all riders will be inspected and must comply with automotive or motorcycle regulations. The helmet must have a visor; otherwise, the rider must wear goggles.

Article 20: DRIVER EQUIPMENT

a) All drivers must wear a racing suit as an outer layer of clothing (fire-resistant). Street clothes are not allowed. The wearing of synthetic clothing or synthetic underwear is strictly prohibited for drivers when they are in their vehicle.

b) Gloves (completely covering all fingers), socks covering the ankles and shoes are mandatory and must be provided by the team with non-synthetic materials.

Article 21: GENERAL SAFETY

Teams are required to provide and use the following while working on and off the vehicle, depending on the tasks and equipment used (Appendix 3):

a) General work gloves: leather or canvas.

b) Safety glasses for all team members (disposable type allowed).

c) Hearing protection for all team members when handling bottles and tires (approved earplugs or sleeves).

d) Adhesive tape to secure cords or cables located on the floor of the booth.

e) Safety shoes are mandatory when setting up stands and handling heavy loads.

f) Each team must provide a fire extinguisher for its stand with a minimum extinguishing capacity of 5 kg and a fire class "ABC". The extinguisher must be readily accessible within the team's designated stand area. The extinguisher must be full (i.e., never used) and have either a manufacturing date or an expiration date. If the extinguisher does not have an expiration date, it will be accepted (i.e., valid) if it was manufactured within the last three years. Any beyond its expiration date that has been re-inspected and marked with a dated certificate will also be permitted.

g) Specific equipment is mandatory to control the risk of fire from lithium-based batteries and must be used when charging the battery, whether it is being charged inside or outside the vehicle. It must prevent or contain the spread of any fire during battery charging. The equipment that must be used includes:
- A battery charging bag that is designed to contain a lithium battery fire.
- A fireproof cover that can be placed above and below the battery while it is being charged. This cover must be large enough to completely cover the battery and contain a fire.

3. VEHICLE DESIGN

3A – PROTOTYPE AND URBAN CONCEPT GROUP

Article 22: VEHICLE DESIGN

a) During the design, construction, and planning of the vehicle, participating teams must pay particular attention to all aspects of safety, namely the safety of the driver, the safety of other team members, and the safety of spectators.
Prototype vehicles must have three wheels that, under all conditions, must be in permanent contact with the road.
Urban Concept vehicles must have four wheels that, under all conditions, must be in permanent contact with the road.

b) Aerodynamic appendages, which adjust or are subject to change shape due to wind while the vehicle is in motion, are prohibited.

c) Vehicle bodies must not have external appendages that could be dangerous to other competitors.

d) The vehicle's body panels must have adequate rigidity so as not to be prone to changing shape due to wind.

e) The interior of the vehicle must not contain dangerous objects or unsecured objects that could injure the driver in an accident.

f) The windows must not be made of a material that can shatter into sharp shards.
For acrylic windows, a protective film is mandatory and must be certified by the manufacturer. We recommend using "Bodysence" film from the Hexis brand. This film must be applied to the exterior surface of the window.

g) All parts of the propulsion chain (energy storage / engine / transmission / battery, etc.) must be inside the engine compartment.

h) The engine compartment hood must be easy to open for quick access during inspection.

i) All objects in the engine compartment must be securely fastened.

j) All vehicles must have a solid floor and a frame that prevents any part of the driver's body from coming into contact with the ground.

k) All vehicles (including prototypes) must be fully covered. Open vehicles are not permitted.

l) **For vehicles using gas:**

- The bodywork must be equipped with a gas vent at the highest point of the engine compartment by means of an opening (or openings) having a minimum passage area of 5 cm^2. The shape and number of openings are unrestricted.

- The driver's compartment must be equipped with a gas exhaust vent; an opening (or openings) totaling 5 cm^2 must also be provided at the highest point of the vehicle within the driver's compartment. The shape and number of openings are unrestricted.

Article 23: CHASSIS STRENGTH

a) Teams must ensure that the vehicle's chassis is designed to effectively protect the driver's body in the event of a collision or rollover. Organizers may exclude any vehicle whose construction is deemed unsafe.

b) The vehicle chassis must be equipped with an effective roll bar that extends 5 cm around the driver's helmet when seated in the normal driving position with seat belts fastened.
If this position impairs the driver's visibility, the roll cage will be considered inadequate. The effectiveness of the roll cage and the driver's visibility will be assessed simultaneously. Specifically, the driver must not be in a position where they have to raise their head above the roll cage to pass the visibility test.

c) This safety roll bar must extend beyond the width of the pilot's shoulders when he is seated in his normal driving position with the seat belts fastened.
It is permissible to use either a tubular roll bar or a roll bar made of rigid panels. If a tubular roll bar is used, it must be made of metal. A rigid partition must separate the driver's compartment from the engine compartment. Such a panel roll bar must be an integral part of the chassis or integrated into the vehicle's monocoque.

d) Every hoop must be able to withstand a static load of 700 N applied in a vertical direction, without deformation exceeding 10 mm (deflection under load).

e) To protect the driver's feet in the event of a frontal impact, a 10 cm crumple zone is mandatory between the front of the vehicle and the heels of the driver's feet.

Article 24: DRIVER AND PROPULSION ISOLATION

a) A permanent and rigid bulkhead must completely separate the engine compartment and the driver compartment.
This means that the engines, fuel cells, fuel tanks, battery, super capacitors, etc., must be located outside the driver compartment. The purpose of this bulkhead is that, in the event of a leak or fire, it prevents liquids and/or flames and/or smoke from reaching the driver compartment.

b) The bulkhead must also prevent manual access by the driver to the engine compartment.

c) If holes are made in the bulkhead for wires, cables, etc., it is mandatory that the wires/cables are protected by an eyelet or similar covering to prevent chafing or damage. All holes must also be filled.

Article 25: VISIBILITY

a) The driver must have access to a direct line of sight ahead and 90° to each side of the vehicle's longitudinal axis. This field of vision must be achieved without the aid of optics. The driver may move their head to achieve a full field of vision.
The pilot's helmet must be 5 cm below the roll bar at all times.

b) The vehicle must be equipped with a rearview mirror on each side, each with a minimum surface area of 25 cm^2. The visibility provided by these mirrors, and their mounting, will be subject to inspection. An electronic device may not replace a rearview mirror.

c) During the technical inspection, the visibility test will consist of evaluating the visibility of 60 cm high cones positioned every 30° on a semicircle with a radius of 4 m located in front of the vehicle, with the driver's head representing the center.

Article 26: SEAT BELTS

a) The driver's seat must be equipped with an effective safety harness having at least five attachment points, preferably bolted, to securely restrain the driver. The five or six independent belts must be firmly attached to the vehicle's main structure and mounted in a single loop specifically designed for the attachment points. Mounting points must be installed so that the belts self-align with the direction of the load. A test will be carried out during the vehicle inspection by applying a vertical force of 700 N to the loop with the driver harnessed.

b) The safety harness must prevent any upward or forward movement of the driver's torso. The harness must be adjusted using the lengths of the adjustment straps. The crotch strap attachment point must be above the hip line, and the highest straps must be at an angle of at least 10° below the shoulder line.

c) The safety harness must be worn and fastened at all times to prevent the driver from having any free movement when the vehicle is in motion.

d) The suitability for using and fitting the harness will be assessed during the technical inspection.

Article 27: ACCESS TO VEHICLES

a) It is imperative for the fully harnessed drivers to be able to leave their vehicles at any time without any assistance in less than 10 seconds.

b) Prototype vehicles must be equipped with an opening large enough for the driver's compartment. The opening of the driver's compartment must be designed in such a way that emergency services can easily extract the driver from their vehicle, if necessary.

c) For prototype vehicles, the opening may be joined in whole or in part by means of hinges, removable doors and/or folding, provided that a release mechanism is easily usable from the inside and that the method of opening from the outside does not require tools and is clearly marked by a red arrow at least 10 cm long.

d) For Urban Concept vehicles, the release mechanism must be easy to use and can be operated from both inside and outside the vehicle. The external opening procedure must be clearly marked with a red arrow at least 10 cm long and must not require any tools.

e) It is forbidden to use adhesive tape to close the driver opening from the outside.

Article 28: HORN

a) Each vehicle must be equipped with a commercially available electric horn. Bicycle horns are prohibited. The horn must be mounted towards the front of the vehicle so that the sound is clearly audible to other vehicles and track marshals. With a properly charged battery, the horn must emit a sound exceeding 85 dB measured horizontally from 4 meters away from the vehicle. This horn must be connected to the battery before the joule meter.

b) The horn will be tested at the start of each attempt on the starting line. If the horn is not working properly, the race cannot start.

Article 29: DRIVER'S POSITION

a) For safety reasons, the head-forward driving position is prohibited.

Article 30: CLUTCH AND TRANSMISSION

a) The propulsion of all vehicles must be achieved solely through contact between the wheels and the road.

b) All vehicles equipped with internal combustion engines must be equipped with a clutch system.

c) For automatic centrifugal clutches, the starting engine speed must always be lower than the clutch engagement speed.

d) For Urban Concept vehicles with ICE only, the vehicle must have "idle running capabilities", meaning the vehicle must remain stationary with the engine running.

e) For manual clutches, the engine starter must not be usable with the clutch engaged. A locking mechanism is necessary to facilitate this function.

Article 31: EXHAUST SYSTEM

a) Exhaust gases must be vented outside the vehicle body.

b) The exhaust pipe must not protrude from the rear or side of the vehicle body.

Article 32: VEHICLE NOISE LEVEL

a) The noise level of the vehicle (excluding the horn) must not exceed 85 dB measured at 4 meters from the vehicle.

Article 33: EMERGENCY STOP

a) The purpose of the emergency stop system is to disable the vehicle's propulsion system.

b) The vehicle must be equipped with an external emergency stop and an internal emergency stop.

c) The external emergency stop mechanism must be activated by a red locking button that can only be reactivated by turning it. The external emergency stop mechanism is permanently installed on a non-removable part of the vehicle's body. A standard sticker (blue triangle with a red arc) supplied by the organizer with the sticker kit must be affixed to the vehicle's body to clearly indicate the external location of this actuator.

d) The internal emergency stop mechanism must be implemented by means of a red locking button which can only be reactivated by turning it and must be easily accessible to the pilot.

e) Each emergency stop must allow for the simultaneous shutdown of:
- for ICE vehicles, the power supply for the gas cylinder solenoid valve and the ignition system.
- for fuel cell vehicles, the power supply for the gas cylinder solenoid valve and the electric propulsion motors.

- for electric vehicles, the power supply of the safety relay to cut off both the power supply to the control boards and the power supply to the electric motors.

f) In addition to the devices mentioned above, all vehicles must be equipped with a "dead man's switch" or sometimes called an "operator presence control" device. The purpose of this device is to ensure that if the driver becomes incapacitated, the vehicle's propulsion power is automatically disengaged (i.e., returns to a standby state). A push-button that requires holding by hand is mandatory and must be located on the steering wheel to perform this function. This device is a separate switch from the necessary "emergency stop" mechanisms.

g) If an ICE prototype vehicle is designed with a WOT (wide open throttle), the push button must cut off the ignition system.

Article 34: ADDITIONAL CONTROLS

a) After any significant incident involving the vehicle, it will be inspected again.

b) At any time, the organizers may conduct unannounced inspections of the vehicles.

c) A self-assessment form will be provided to the competitor.

3B – PROTOTYPE GROUP

Article 35: DIMENSIONS

a) The maximum height of the vehicle must be less than 100 cm (without driver).

b) The vehicle's track width must be at least 50 cm, measured between the midpoints where the tires of the outer wheels touch the ground.

c) The ratio of height divided by width of the road must be less than 1.25.

d) The vehicle's wheelbase must be at least 100 cm.

e) The maximum total width of the vehicle must not exceed 130 cm, excluding the mirrors.

f) The maximum total length must not exceed 350 cm.

g) The maximum weight of the vehicle, without a driver, is 100 kg.

Article 36: TIRES, WHEELS

a) All types of tires and wheels are permitted.

b) Any type of rim can be used. The rims must be compatible with the dimensions of the selected tire in order to meet safety standards.

c) All installations must be carried out in such a way that there is no risk of wheels coming into contact with other parts of the vehicle (e.g., cables, wires, hoses, and engine compartment components such as batteries, etc.). These must be mounted/secured safely so that they cannot interfere with the rotating wheel while driving and cause accidents.

Article 37: FRONT AXLE AND STEERING

a) Only front-wheel steering is permitted. If the organizers are not satisfied with the effectiveness and/or control of a vehicle's steering system, that vehicle will be withdrawn from the competition.

b) The turning radius is the distance between the center of the circle generated by the trajectory of the center of the vehicle's outer wheel. The outer wheel of the vehicle must be able to follow a 180° arc with a radius of 12 m for prototypes in both directions. The steering system must be designed in such a way as to prevent any contact between the tire and the vehicle body.

c) Indirect electric steering systems are permitted provided they are operated by a steering wheel or similar device (rotary potentiometer); joystick operation is not allowed. If the electronic steering system is used, in the event of the driver releasing the steering wheel or in the event of an electrical failure, the vehicle must return to a straight-ahead position.

d) The steering must be precise and without play.

Article 38: BRAKING

a) One system must act on the front wheel(s) axle, the other on the rear wheel(s) axle. When braking on both front steering wheels, two actuators (calipers) must be used (one on each wheel), controlled by a single system. In addition, the right and left brakes must be properly balanced.

b) The rear braking system must work on each wheel, unless the two wheels are connected by a common shaft, in which case only one system is required.

c) It should be possible to activate both systems simultaneously without removing your hands from the steering system. A control pedal is recommended.

d) The effectiveness of the braking systems will be tested during the vehicle inspection. The enclosed vehicle will be placed on an inclined plane with a 20% incline, with the driver inside. The brakes will be applied and must keep the vehicle stationary.

e) During testing or the race, the brakes must be protected against any adjustment by the driver. The effectiveness of the protection in ensuring compliance will be assessed during technical inspection.
Furthermore, vehicles may be checked at the start and finish of each attempt (practice and race). If the test is negative before the start, the start will be refused. If the test is negative at the end of the attempt, the attempt will be invalidated.

f) The use of a hydraulically controlled braking system is strongly recommended.

3C – URBAN CONCEPT GROUP

Article 39: NUMBER OF URBAN CONCEPT SEATS

The Urban Concept vehicle can have one or two seats. During all testing and the race, only one person (the driver) is seated inside the vehicle, regardless of the number of seats in the driver's compartment.

Article 40: DIMENSIONS

a) The total height of the vehicle must be between 100 cm and 130 cm.

b) The total width of the vehicle, excluding the mirrors, must be between 120 cm and 130 cm.

c) The total length of the vehicle must be between 220 cm and 350 cm.

d) The track width must be at least 100 cm for the front axle and 80 cm for the rear axle, measured between the midpoints of tire contact with the .

e) The wheelbase must be at least 120 cm.

f) The driver's door(s), left and/or right, must have a minimum height of 88 cm and a minimum width of 70 cm at the driver's shoulders. A board measuring 88 cm by 70 cm must be able to fit inside the passenger compartment. The board may be tilted up to a maximum of 30° during this inspection to verify these dimensions.

g) The ground clearance must be at least 10 cm with the pilot and his ballast.

h) The maximum weight of the vehicle (excluding the driver) is 200 kg.

Article 41: BODYWORK

a) The bodywork must cover all mechanical parts, whether the vehicle is viewed from the front, rear, sides, or top. However, the wheels and suspension must be fully covered by the bodywork when viewed from above and up to the axle centerline when viewed from the front or rear. The covering for the wheels and suspension must be a rigid, integral part of the vehicle's bodywork.

b) Access to the vehicle by the driver must be just as simple and convenient.

c) All mechanisms (e.g., doors) must be securely attached to the vehicle body (e.g., using hinges, slides, etc.). Adhesive tapes, Velcro, etc., are not permitted for this purpose.

d) The vehicle must have a fixed roof covering the driver's compartment.

e) A windshield equipped with an effective windshield wiper is mandatory.

f) A rectangular suitcase measuring 500 x 400 x 200 mm must be transported. A dedicated space for this suitcase must be easily accessible from the outside and must include a floor and side panels to secure the suitcase in place while the vehicle is moving. This suitcase must be provided by the participant and must be placed in its designated space during inspection and throughout the competition.

g) The bodywork of the vehicles must not have any external appendages that could be dangerous to other teams.

h) A tow hook or tow ring is mandatory at the front of the vehicle. It can be fixed (rigid or flexible (cable or strap)) or removable, like a car tow ring. If it is rigid, it must be fully recessed into the vehicle body for safety reasons. It can be retractable or removable, but must be easily accessible. It must be used to tow the vehicle in case of a breakdown on the track. It must have a tensile strength equivalent to the vehicle's weight and an opening diameter of at least 3 cm.

Article 42: FRONT AXLE AND STEERING

a) Only front-wheel steering is permitted. If the organizers are not satisfied with the effectiveness and/or control of a vehicle's steering system, that vehicle will be withdrawn from the competition. The vehicle must be steered using a two-handed, rotating motion.

b) The turning radius is the distance between the center of the circle and the outermost wheel of the vehicle. The outermost wheel of the vehicle must be able to follow a 180° arc with a radius of 8 meters in both directions. The steering system must be designed to prevent any contact between the tire and the vehicle body.

c) Indirect electric steering systems are permitted provided they are operated by a steering wheel or similar device (rotary potentiometer); joystick operation is not allowed. If the electronic steering system is used, in the event of the driver releasing the steering wheel or in the event of an electrical failure, the vehicle must return to a straight-ahead position.
On the other hand, a steering system that controls the wheels by means of one or more cables is prohibited.

d) The steering must be precise and without play.

Article 43: WHEELS

a) The rims must be between 13 and 17 inches in diameter.

b) The wheels located inside the vehicle's bodywork must be made inaccessible to the driver in the driving position.

Article 44: TIRES

The choice of tires is free as long as they are mounted on the type and size of rims recommended by their manufacturers. The tread depth must be at least 1 mm at the center point of the tread.

Article 45: LIGHTINGS

The vehicle must have a functional external lighting system, including:

a) Two front headlights.

b) Two front turn signals.

c) Two rear turn signals.

d) Two red brake lights at the rear.

e) Two red rear position lights (can be combined with brake lights).

f) The center of each headlight unit must be located at an equal distance and at least 30 cm from the vehicle's centerline.

(g) The mandatory red indicator light (ICE vehicles) for the self-start operation must be separate from one of the lights above.

Article 46: BRAKING

a) The vehicle must be equipped with a four-disc hydraulic braking system and a single brake pedal with a minimum surface area of 25 cm^2. The brake pedal must actuate the master cylinders either directly or via a rigid mechanical linkage. Wires/cables are not permitted. The minimum thickness of the brake discs must be at least 1.5 mm, and the mounting direction specified by the manufacturer must be observed.

b) The brakes must operate independently either on the front and rear axles or in an X-arrangement (front right wheel with rear left wheel and front left wheel with rear right wheel).

c) A single master cylinder can be used, provided that it has a dual circuit (two pistons).

d) The effectiveness of the braking system will be tested during the vehicle inspection. The vehicle must remain stationary with the driver inside when placed on a 20% incline with the main brake applied.

e) A parking brake function is required to hold the car stationary during technical inspections, handling gas cylinders, or to allow the driver to safely exit the vehicle during practice and racing. It must provide a braking force of at least 50 N.

Article 47: RACE CONDITIONS

In rainy or drizzly weather conditions, Urban Concept vehicles (only) may be permitted to drive on the track during the race with the approval of the race director.
Urban Concept vehicles must be adapted to drive in such conditions.

a) The vehicle must be equipped with an efficient electric windshield wiper, usually found on a production car.

b) The windshield wiper operation must be activated by a separate switch easily accessible to the driver.

c) The proper functioning and effectiveness of the windshield wiper can be checked.

d) The vehicle must be properly ventilated to prevent fogging in the driver's compartment.

e) The vehicle's electrical system must be adapted to humid climatic conditions with protection of electrical circuits to prevent any short circuits.

f) The vehicle's braking efficiency can be re-inspected before and/or after any attempt.

4. ENERGY SOURCES

4A - GENERAL

Article 48: TYPES OF ENERGY

a) Vehicles must use one of the following energy sources provided by the organization:
- Internal combustion engine: bio-CNG or green hydrogen
- Fuel cell: green hydrogen
- Electric vehicle: electricity stored in a battery

Article 49: CALCULATION OF RESULTS

a) **Bio-CNG ICE**

Based on the mass consumed during a validated attempt, performance will be calculated using the lower heating value (LHV) of bio-CNG. The LHV of bio-CNG depends on its composition, particularly its methane content. This information will be provided on the first day of the event.

The results for the Bio-CNG ICE category will be expressed in **km/kWh**, in **km/m³** of methane and in **km/litre of Unleaded 95 gasoline**(theoretical distance travelled using the energy contained in 1 litre of gasoline at a temperature of 15° C).

For this calculation, the usual constant is 8.99 kWh per litre of unleaded 95 gasoline.

b) Hydrogen ICE

Based on the mass consumed during a validated attempt, the performance calculation will be carried out using a LHV of hydrogen at 120,000 J/g with a density of 0.0898 g/Ndm^3 or 2.99 kWh/Nm^3.

The results for the hydrogen ICE category will be expressed in **km/kWh,** in **km/m³** of hydrogen and in **km/litre of Unleaded 95 gasoline**(theoretical distance travelled using the energy contained in 1 litre of gasoline at a temperature of 15° C).

For this calculation, the usual constant is 8.99 kWh per litre of unleaded 95 gasoline.

c) **Fuel cell**

Based on the volume of hydrogen consumed during a validated attempt, the performance calculation will be carried out using a LHV of hydrogen at 120,000 J/g with a density of 0.0898 g/Ndm^3 or 2.99 kWh/ Nm^3 .

Fuel cell vehicles must use a VOEGHIN COMPACT (20 l/min H_2) flow meter from Alto Instrument to measure the volume of H_2 consumed in normal m^3. The use of any other flow meter is only permitted with the organization's approval and presentation of a calibration certificate for that meter, dated within the last month. The organization will verify the calibration.

The results will be expressed in **km/kWh,** in **km/m³** of hydrogen and in **km/litre of Unleaded 95 gasoline**(theoretical distance travelled using the energy contained in 1 litre of gasoline at a temperature of 15° C).

For this calculation, the usual constant is 8.99 kWh per litre of unleaded 95 gasoline.

d) **Battery**

The results will be calculated from the amount of energy measured in Joules during a validated attempt using a calibrated joule meter, provided by the organization.

The results for the battery electric vehicle category will be expressed in km/kWh and in km/litre of Unleaded 95 gasoline(theoretical distance travelled using the energy contained in 1 litre of gasoline at a temperature of 15 °C).
For this calculation, the usual constant is 8.99 kWh per litre of unleaded 95 gasoline.

e) **Hybrid vehicle**
As with other vehicles, the results for hybrid vehicles will be expressed as a function of the primary energy used. To this consumption will be added the electrical consumption converted to the equivalent of unleaded 95 gasoline. This electrical consumption must not exceed 50% of the fuel energy.
The results for this category will be expressed in **km/kWh** , in **km/m ^{3}** and in **km/litre of Unleaded 95 gasoline**(theoretical distance travelled using the energy contained in 1 litre of gasoline at a temperature of 15 ° C).
For this calculation, the usual constant is 8.99 kWh per litre of unleaded 95 gasoline.

Article 50: HANDLING OF GAS CYLINDERS
Participants handling the cylinders must wear safety glasses, earplugs or helmets, and chemical-resistant gloves.

Article 51: ELECTRICAL SYSTEM SAFETY

a) For safety reasons, the maximum voltage on board a vehicle at any point must not exceed 48 Volts nominal and 60 Volts peak (which includes on-board batteries, external batteries, super capacitors, fuel cell stacks, etc.).
Definition of a battery: A "battery" is defined as a source of electrical energy that has exactly two connections (one positive and one negative) and comes as a single unit. This single unit may contain more than one subunit.

b) For all vehicles, only one battery is permitted. This battery will power both accessories and propulsion. Only batteries integrated into speedometers are allowed.

c) If a lithium-based battery is used, a battery management system (BMS) suitable for this chemistry must be used to control and protect the battery against fire.
The BMS must provide cell balancing and surge protection during off-road charging.
If a lithium battery contains more than one subunit or cell, the basic subunit must be connected in series before being connected in parallel. Otherwise, the BMS would be unable to control the current of each individual cell.
For lithium-based batteries, the BMS balancing cell and overvoltage protection can be contained within the external charger frame.

d) If the battery is lithium-based, it must be enclosed in a metal container or a suitable charging bag and securely fastened. When charging, the battery must be placed in a suitable charging bag.

e) All batteries and super capacitors must be protected by a circuit breaker. This protection can be in the form of a fuse or a circuit breaker. Short-circuit protection devices must be located on the positive conductor and as close as possible (maximum 30 cm from the positive terminal) to the battery or super capacitor. The rating of the protection device must be appropriate.

f) For safety reasons, both the positive and negative connections of the Super Capacitors must be electrically isolated from the vehicle chassis.

g) All electrical circuits in the vehicle must be protected against electrical overloads by fuses or circuit breakers.

h) The battery supplies all authorized electrical needs such as safety devices (windshield wipers, horn, meter, data acquisition, telemetry, pilot ventilation, lights, hydrogen sensors, hydrogen relay and hydrogen stop, bio-CNG solenoid valve...) or systems essential to the proper functioning of the internal combustion engine (ignition, fuel injection computer, injector, gas pressure sensor, starter, oil pump, water pump, electromagnetic distribution...).

i) The battery must be installed in the engine compartment and securely fastened.

j) Wiring must be in good condition, clean, clearly identified, secure, and away from all moving parts (e.g., wheels, chains). "Spaghetti" wiring is prohibited, and the organizers may require the team to rewire part of the electrical system.

k) Connections must be secured to prevent them from coming loose.

Article 52: TECHNICAL DOCUMENTATION

a) Participants must provide technical documentation during the technical inspection.

b) Teams must print their documentation before the event. During the technical inspection, the documentation will be compared to the vehicle. Any discrepancies between the technical documentation and the vehicle must be corrected before the technical inspection is fully validated.
The printed documentation must be bound and divided into the following sections:

For gas ICE:
- Energy supply diagram: cylinder, regulator, pressure gauge, pressure limiter, safety solenoid valve, gas line, pressure sensor (optional), injector, motor, safety board for detection and shutting off the safety solenoid valve in case of leakage.
- Propulsion system diagram
- Electrical
- Hybrid system with super capacitor diagram
- Battery / BMS

For bio hydrogen fuel cells:
- Energy supply diagram: cylinder, solenoid valve, pressure regulators, flow meter, fuel cell, control and command boards, super capacitors, motor, safety board for detection and shut-off of safety solenoid valve in case of leakage.
- Diagram of the propulsion system
- Electrical diagram
- Super capacity
- Battery / BMS

- Electrical Diagram: Provide a schematic vehicle diagram showing all vehicle wiring and components, and their associated connections. The diagram must include component values such as voltage levels and fuse ratings. Diagrams of components such as the engine, fuel cell management system, or control system are required in this section.
- Hybrid system: Include diagrams describing the energy flow in and out of the hybrid system. Include documentation of the super capacitors.
Battery/BMS: (For lithium-based batteries only) Provide at a minimum the battery documentation (specifications) and the BMS documentation.

4B – ICE PROPULSION WITH BIOMETHANE OR GREEN HYDROGEN
Article 53: PROPULSION

a) The type and design of internal combustion engines are not limited, but they must operate only on gas supplied by the organizers.

b) Only the use of electronic injection is permitted.

c) If the engine temperature is regulated, only the use of pure water at atmospheric pressure is permitted. The regulated temperature for engines equipped in this way is therefore limited to 100°C.

d) The use of super capacitors for energy storage is permitted for Urban Concept vehicles only.

e) This capacitor must be the sole source of energy storage for the vehicle's electric propulsion motor.

f) Two connectors must be securely installed outside the vehicle to allow voltage measurement on the starting line. These must be labeled "super capacitors" with a red terminal for + and a black terminal for -.

g) The super capacitors charge level will be checked before and after each attempt by measuring the voltage. The voltage recorded after the run must be at least equal to the voltage recorded before the run. Upon crossing the finish line, if the voltage is lower than the starting voltage, only the driver in the driving position will be allowed to recharge the super capacitors to reach the starting voltage. The time allotted for this operation is 5 minutes beyond the end of the hour corresponding to the maximum run time for validating an attempt (final maximum time for official measurement = start time + maximum run time + 5 minutes) . No team member is authorized to work on the vehicle during this period.

h) An electric starter may be used during competition, provided that it can only operate when the ignition and fuel systems are activated.

i) It must be clearly established that the starter is never capable of providing forward propulsion to the vehicle.

j) A clearly visible red indicator light, equivalent in luminescence to a conventional 21W bulb, must be installed at the rear of the vehicle and must be clearly visible from both sides of the bodywork to signal any use of the starter.

k) At the start of an attempt, the starter and therefore the start light must be switched off at the moment the rear wheel of the vehicle crosses the starting line.
Otherwise, the attempt will be invalidated.

Article 53: GAS FUEL CIRCUIT

a) With the exception of the injector, a possible pressure sensor, the gas leak detection board and the hoses, it is recommended that all the components should come from the company AD Venta which has developed a set adapted to the engines and vehicles.
Annex 4 specifies the characteristics of the items supplied by AD VENTA. If another brand is used, the equipment's characteristics must be included in the technical documentation presented during the technical inspection.

b) The following are the authorized gas storage cylinders:
- ULLIT brand carbon cylinder, 1 liter, 70 bar (78 mm x 360 mm),
0.75 kg only for bio-CNG
- AD Venta brand aluminum cylinder, 2 liters, 70 bar (102 mm x 355 mm), 1.5 kg
- B04 and B2 steel cylinders

c) For safety reasons, the bottle must not exceed a temperature of 50°C at any time. Prevent the bottle from overheating, it must not be installed above a battery, directly exposed to sunlight, or near the exhaust system.

d) The bottles must be installed on the vehicle under the supervision of a fuel manager and securely fastened.
The filling of the bottles will be managed by the fuel manager, who will organize all the logistics.
Safety advice: Bottles must be handled with care.

e) Technical inspection / Measurement
The fuel system must be easily accessible for inspection and measurement. Gas consumption will be measured by weighing. Before the start of the attempt, a technical commissioner will weigh the complete system and take photographs of the entire circuit (tank, pressure regulator, shut-off solenoid, limiter, hose, and injector). The entire circuit must be compact and easily disassembled for weighing. After the attempt is completed, the fuel system will be completely disassembled and weighed again on the same scale. This handling of the fuel system, including assembly and disassembly from the vehicle and transport to the weighing room, must be carried out by the team leader accompanied by two people of their choosing.

The entire fuel system management process will be overseen by a fuel manager.

f) Gas leak detector.
A gas leak sensor must be installed in the engine compartment, at the highest point on the engine bulkhead. This gas sensor must directly close the gas solenoid valve located on the regulator.
The gas sensor trigger level must be set to 25% LEL (Low Explosive Limit).
The gas detector reset must be performed manually via a switch located in the engine compartment.
This switch must not be accessible to the pilot from the cockpit.

g) The complete system includes one or two pressure regulator(s), a shut-off solenoid valve, a pressure gauge for the pressure after the regulator and a pressure relief valve set at 5 bars relative.

h) The maximum operating injection pressure is limited to 3 bars relative. A pressure sensor is permitted between the pressure regulator and the injector for injection management.

i) The line connecting the regulator output to the fuel injector must have an outside diameter of 6 mm.

j) The discharge pipe which is connected to the relief valve to the outside must have a minimum outside diameter of 10 mm.
The gas must be vented to the outside of the vehicle, through the upper part of the bodywork of the engine compartment or into the 5 cm^2 section.

k) The shut-off valve is normally closed when there is no voltage.

l) The ignition/injection power supply unit must be automatically switched off at the same time as the shut-off valve. This must be achieved by a suitable safety relay.

m) This valve and the relay must be activated by one of the following three elements:
1. By detecting a gas leak using the gas sensor;
2. By the emergency stop located outside the vehicle;
3. Via the interior emergency stop, accessible by the driver in the driving position.
If one of these elements is activated, the valve and the relay must act simultaneously. These three scenarios will be tested during the technical inspection.

n) In all cases, the gas circuit piping must be designed for gas use.

o) The pipes and fittings must withstand a pressure of 9 bars, 3 times the maximum working pressure of 3 bars relative.

4C – FUEL CELL PROPULSION WITH GREEN HYDROGEN

Article 55: POWER SUPPLY SYSTEM

a) Competitors must provide a detailed description and technical diagram of the power system. The fuel cell must operate autonomously. The electricity required to operate the following components must come from the fuel cell itself and not from the auxiliary battery: temperature control, fan, compressor, electronic control system, and electric motor.

b) The hydrogen supply system must be designed as follows: H_2 cylinder, first-stage pressure regulator mounted directly on the cylinder, emergency shut-off solenoid valve mounted directly at the pressure regulator outlet, option to add a second-stage pressure regulator, flow meter, and fuel cell. The flow meter must be installed at the fuel cell inlet. Both the flow meter and the fuel cell must be at the same pressure.

Article 56: CYLINDER

a) During the competition, competitors must use their own cylinders or those provided by the organization.

b) Each vehicle must be equipped with only one cylinder.

c) The organizer takes care of filling the cylinders.

d) Hydrogen cylinders ranging from sizes B04 to B2 are permitted.

Article 57: VENTILATION

See article 22.

Article 58: HYDROGEN DETECTOR

a) A hydrogen sensor must be installed in the fuel cell compartment, near the 5 cm^2 ventilation opening. This hydrogen sensor must control the solenoid valve and the emergency stop relay. The hydrogen sensor's activation threshold must be set at 25% of the Lower Explosive Limit (LEL) of hydrogen in air. A test will be performed during the technical inspection.

b) The hydrogen detector, including the sensor and its electronic components, must be reset manually using a switch located in the fuel cell compartment. This switch must not be accessible to the pilot from inside the cockpit.

Article 59: EMERGENCY SHUTOFF VALVE AND RELAY

a) The hydrogen supply circuit must be equipped with an emergency shut-off solenoid valve.

b) This solenoid valve should normally close in the event of a power outage. It must be installed immediately after the pressure regulator. The power supplying the motor must be automatically cut off at the same time as the solenoid valve is activated. This operation must be performed by a reliable and specially designed relay.

c) The solenoid valve and the relay must be controlled by one of the following three devices:
- Hydrogen detection, as explained above;
- The external emergency safety stop is located outside;
- The internal safety emergency stop is activated by the driver in the driving position.

If one of these three devices is used, the solenoid valve and the relay must operate simultaneously.
These three processes will be checked during the technical inspection.

Article 60: HYDROGEN PIPES AND FITTINGS

a) These pipes and fittings must be designed for hydrogen. The team leader must be able to produce, during technical inspections, the manufacturer's technical documentation for these pipes and fittings to prove their suitability for use with hydrogen.

b) The use of PTFE tubing is recommended for pressures less than or equal to 1.5 bar absolute. Rigid, threaded fittings are mandatory if the hydrogen pressure exceeds 1.5 bar absolute.

Article 61: BLEEDING PIPE

If a drain pipe is required, it must open outside the vehicle.

Article 62: MEASUREMENTS AND EQUIVALENCES

a) Hydrogen consumption must be measured using an on-board flow meter. The volume of hydrogen consumed is displayed in liters under normal temperature and pressure conditions.

b) It is forbidden to pulse the hydrogen flow rate.

c) The mass airflow sensor display must be readable from outside the vehicle, with the body closed. It must be located in the engine compartment.

Article 63: OXYGEN AND RESERVES

The use of non-replaced reserves of oxygen or compressed air is prohibited.

Article 64: SUPER CAPACITORS

a) The state of charge of the super capacitors will be checked before and after each attempt by measuring their voltage.

b) The voltage recorded after the race must be at least equal to the voltage recorded before the race.

Article 65: EXTERNAL STARTING BATTERY

a) An external battery is permitted on the starting line for starting the fuel cell. As soon as the vehicle is on the line ready to go, the battery must be disconnected.

b) If an external battery is used, two connectors must be provided on the bodywork to allow for easy connection and ensure the fuel cell system starts at the starting line. Only a self-contained external battery is permitted to start the fuel cell system.

c) It is mandatory to operate the hydrogen detector and warning system using the auxiliary battery. This battery can also supply power to the emergency stop solenoid valve and its relay, as well as the lighting system for Urban Concept Group vehicles.

Article 66: Electrical and Electronic Circuits

a) All electrical/electronic boards and enclosures made by competitors must be protected at a minimum by at least one transparent plate.

b) A fuse must be fitted to the positive terminal of the fuel cell.
Its melting current (expressed in amperes) must not exceed 0.5 times the active area (expressed in cm^2) of a cell in this fuel cell.

c) When using super capacitors, a fuse must be fitted to the positive terminal. Its fusing current must be less than the electrical current corresponding to a 1000 W power supply for the Urban Concept group, assuming the super capacitors are charged to their maximum voltage.

4D – ELECTRIC PROPULSION

Article 67: BATTERY

a) A single battery is used to power both accessories (safety components) and propulsion. The joulemeter used to measure power consumption must be placed directly after the battery. Only the following may be connected between the battery and the joulemeter:
For the prototypes: the horn, the safety relay control
For the Urban Concept: the horn, the safety relay control and the specific accessories (windshield wipers, ventilation, lightings).

b) Compliance will be verified during the technical inspection using the updated electrical diagrams provided by the team.

c) The battery must be located in the engine compartment and securely fastened to the vehicle's chassis or body. The use of auxiliary solar cells is not permitted.

Article 68: JOULEMETER

a) The organizers will make these joulemeters available to competitors for each measured attempt.

b) The characteristics of the joulemeter used are indicated in Annex 5. The impossibility of mounting the joulemeter, due to non-compliance with one of the constraints expressed in Annex 5, will prevent the vehicle from taking to the track.

c) At the starting line, the marshals in charge of refueling will provide the joulemeter, reset to zero, and verify its placement and connection. At the finish line, the refueling marshals will collect the joulemeter to process the data.

Article 69: CONTROLLER

a) The motor control unit can be industrial, assembled from a kit, or prototype-built. This unit (complete circuit board) will be protected by a transparent plate.

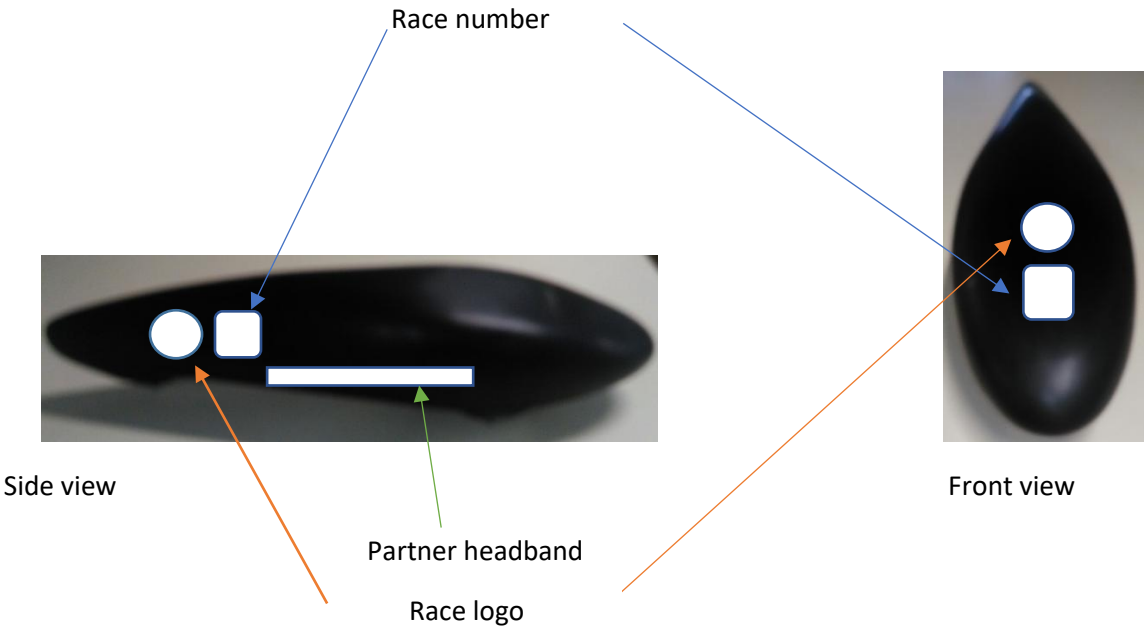
b) It is recommended, for educational and efficiency purposes, to create the controller.

Article 70: ELECTRIC MOTOR

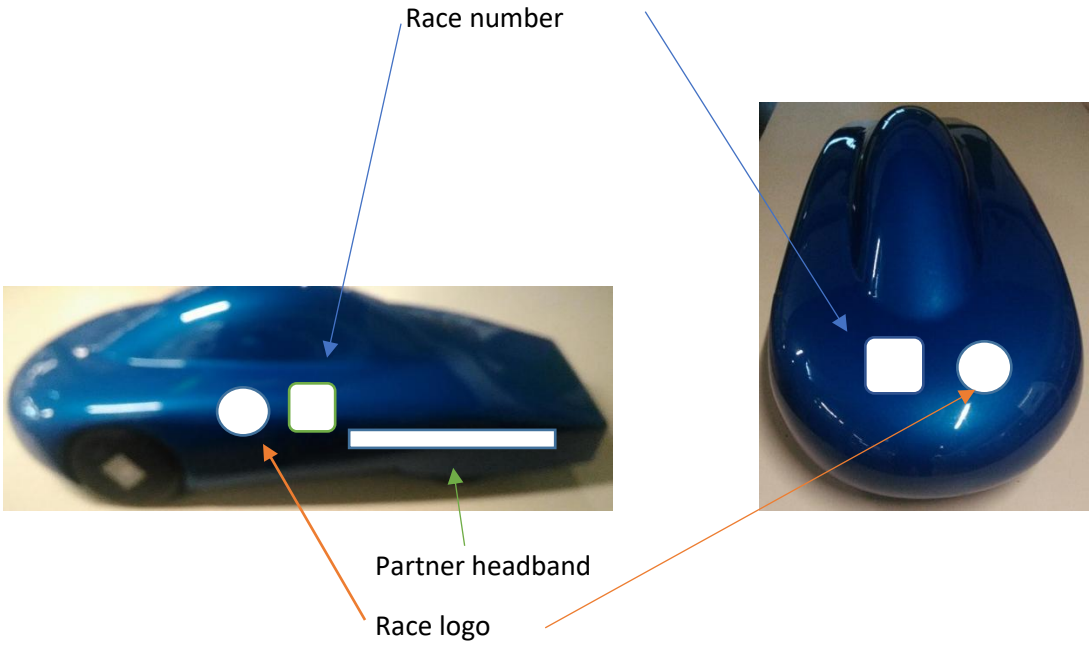
a) There is no limit to the number of electric motors. They can be commercially available or prototype-made.

Appendix 1: VEHICLE IDENTIFICATION

PROTOTYPE



URBAN CONCEPT



The logos, race numbers and partner banners should be positioned on each side of the car.

Identification	Position	Format	Quantity	Remarks
Race logo	Left side Right side . Front of vehicle	200 mm * 215 mm	3	Mandatory
Race number	Left side Right side . Front of vehicle	200 mm*260 mm	3	Mandatory
Partner banner	Left side Right side	770 mm * 80 mm	2	Mandatory
Emergency stop sticker 	Next to the external emergency stop	120 mm * 105 mm	2	Mandatory

Appendix 2: RACE FLAGS

USE OF FLAGS

- **National flag**: USED BY RUNWAY MANAGEMENT

for opening and closing the track aboard the DP vehicle

- **Red flag**: PRESENTED BY **ALL MARSHALS** on the exclusive instruction of the track management.

Presented agitated, it signals the interruption of the event **TO ALL VEHICLES** which must return to the pits at reduced speed and not overtake each other.

- **White flag** : USED BY MARSHALS

The WHITE flag is always displayed WAVED. It indicates to the pilot that a recovery vehicle has returned to the track.

- **Yellow flag** : USED BY MARSHALS

The yellow flag signals a hazard on the track; it is always waved, if possible, 30 to 40 meters before the hazard. Overtaking is prohibited in this area. The driver must be prepared to slow down if necessary.

- **Red and yellow striped flag** : USED BY MARSHALS

This flag signifies a change in grip; it is waved by all the marshals.
The prototypes must immediately stop their attempt and return at reduced speed to their stand. Urban drivers must be extra vigilant when overtaking.

- **Green flag** : USED BY EACH STATION

It is fixed and indicates a clear track.

Note : There is no overtaking flag, but the overtaking driver is required to honk their horn at the start of their maneuver. Failure to comply with this rule will be reported to the race director.

<u>BREAKDOWN VEHICLES</u>

- They return to the track with permission from the track director, and with the track clear
- They turn on their flashing lights at the rear of the trailer
- They are driving outside the circuit (left side)
- They park on the track and never on the grass
- They do not overtake the competitors
- The repairmen must be ready to leave without delay as soon as a request for intervention is received.

Annex 3: PROTECTIVE EQUIPMENT



Appendix 4: BIOCNG AD VENTA CIRCUIT





Appendix 5: JOULEMETER

♦Maximum dimensions (including USB plug, excluding cables): 140 ×80 ×80 mm;
♦Maximum admissible current 100 A;
♦Maximum admissible voltage 72 V;
♦Use of EC5 type connectors (Ø5 mm) for soldering:
•Connector equipped with male plugs on the upstream electrical connection;
•Connector equipped with female sockets on the downstream electrical connection.
♦Presence of a CENELEC PRO - OMEGA DIN rail segment, 15 mm deep and 130 mm long, at the location intended for the joulemeter.

