HTL Zero Emission Challenge

powered by MAGNA

Static- Design Score Sheet 2025

C	A	P	Category	Areas Covered	Score
■	■	■	**1. Presentation**	Presentation skills, slides, on time,	___/70
▭			**2. Chassis**	Tires, wheels, hubs, uprights, control arms, steering linkage, springs, dampers, anti-roll bars, geometry, kinematics, vehicle dynamics	___/100
▭			**3. Car Body**	Primary structure/tub/tubing- frame, car body design, crash element, Load analyses, Fasteners.	___/80
▭			**4. Drive Train**	Energy source to Wheel, electrical and mechanical safety concept, internal communication and measurement technology, telemetry, Accumulator(s), Power conversion, Motor/Controller selection/design, Wiring considerations, Transmission. Torque vectoring. Gearing. Regenerative braking.	___/100
▭			**5. Human Machine Interface**	Driver interfaces, seat, belts, steering wheel, steering column, control panel/dash, cockpit sizing & protection, driver comfort/ease of control, pedals, braking system.	___/50
■	■	■	**6. General knowledge on electromobility**	- Answering questions from a given catalogue of topics - Multiple choice with a maximum of 2 team members (5 minutes during the jury session) - 20-page basic script on electromobility will be sent in advance	___/100
				DESIGN SCORE:	____/500

Judge Name: _____

C... Close to Series A... Advanced P... Professional

■ ... mandatory ▭ ... will not be assessed

Team:_____

ZeroEmission Static- Design Event Scoring Comments

This Design Score Sheet is based on the scoring sheets used by Formula Student Austria and Formula SAE Electric.

The design and development process of a ZeroEmission car is a complex process. So is judging! Although many metrics and details are reviewed during judging, it is easy to overlook various features which are critical to a given team's efforts. As such, it is critical for team members to pro-actively highlight these special details, how they support the team's overall goals, and how they distinguish them from the competition. Do not rely on the judges to hunt for the cool bits!

Judges **and** teams should be familiar with the scoring categories. A detailed break-down of each category follows, along with relevant examples. These examples exhibit just ***some*** of the key attributes that teams should be prepared to discuss, both in theory and as applied to their vehicle, with the judges. Note: While some categories may list components not in your design, if you present a data driven argument for omission, along with a demonstrated knowledge on the topic, your team may still receive points in that category.

Judges: Please provide as many detailed comments as time permits, for the benefit of students! Judge observations and comments shall be provided on the attached sheets for future review.

Remember: Judges are not just scoring your vehicle, they are also scoring ***your knowledge and understanding*** of vehicle development and performance. Reflective of this, for each major design score category, judges shall evaluate the teams and assess points per the following breakdown:

Design approach (~25%)

Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?

Execution/Build (~25%)

Is the presented car consistent with the design decisions? How is the fit & finish? Were appropriate manufacturing techniques used? How is the manufacture- and serviceability? Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?

Creativity/Innovation (~25%)

How "clever" was the engineering involved? Are any components or systems unique or unusual due to special analytical findings? Are unusual or specialized machining operations, materials or production processes, test procedures used? Will the car cause a rule change?

Knowledge/Understanding (~25%)

Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit? Were assumptions correct? Are carry-over parts understood? Does the team know if/how/why(not) parts work?

About your score…

The Design Event Score Sheet totals 500pts. At the end of competition, you will most likely find that your final score does not match the score listed on page 1. **Do not panic!** This scoresheet is a working tool.

Score sheets and written judges' comments shall be distributed to the teams but are not shared with other teams. Do not attempt to compare your scores on this sheet to that of another team as the comparison may not be valid.

In this scoring system, any score of the category that is 0.5 or higher is rounded up, whereas values less than 0.4 are rounded down. This rounding approach provides a clear, consistent method for evaluating scores or ratings that fall between standard whole numbers.

Basically, it is planned to conduct the presentation and evaluate the results in English. If this is held in German, only **80%** of the points are scored.

Vehicle Classes and Evaluation Criteria
There are three vehicle classes with different evaluation criteria:

- **Close to Series Class**: Only the presentation and the e-mobility test will be evaluated, since all other components are fully sourced and not self-developed.
- **Advanced Class** and **Professional Class**: Depending on the components installed in each kart, the respective categories may also be evaluated. If a category is self-developed and built by the team, it can be assessed accordingly.

Design Scoring Assessment Areas & Judging Comments

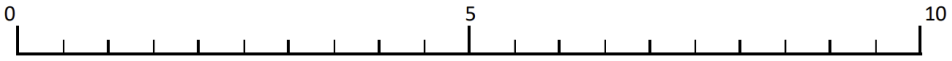
The Design score sheet is designed for both judges and students. The following topical area breakdowns offer some suggested attributes to discuss. It is not a check-off list, as each vehicle may have unique properties which should be covered. If you have further design questions (as a judge) or offerings (as a team) not included here, be sure to ask during your evaluation.

1. Presentation	Score:____/70

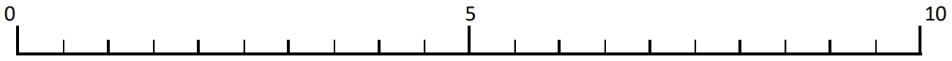
Presenter Name: _____ Start: _____ End: _____

Part 1: Content

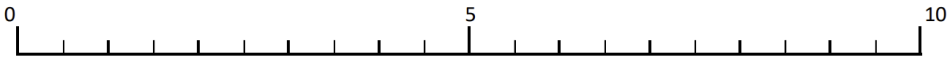
Clarity and Depth of Information



Organization and Structure of the Information

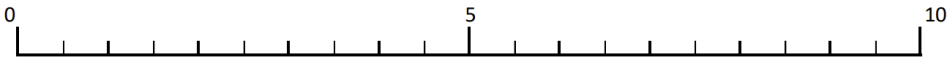


Quality and Use of Visual Aids

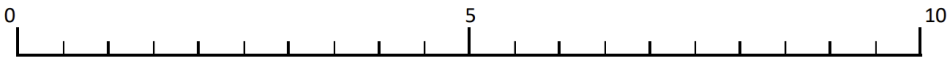


Part 2: Delivery

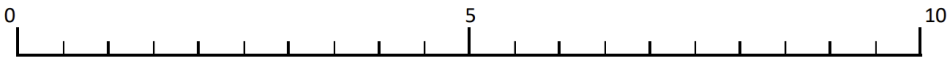
Clarity of Speech



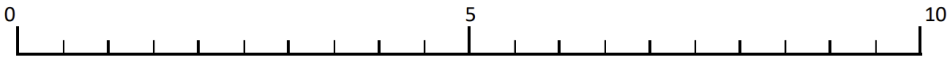
Engagement with Audience



Use of Time



Part 3: Overall Impression



Comments:_____

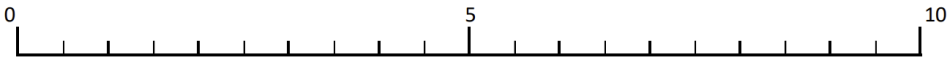
_____

2. Chassis	Score:____/100

Tires, wheels, hubs, uprights, control arms, steering linkage, springs, dampers, anti-roll bars, geometry, kinematics, vehicle dynamics,

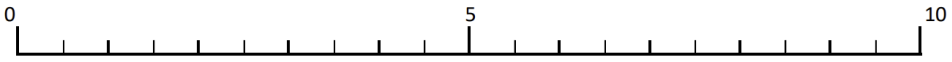
Design approach (~25%)

Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?



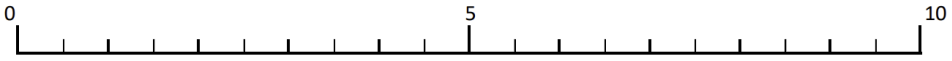
Execution/Build (~25%)

Is the presented car consistent with the design decisions? How is the fit & finish? Were appropriate manufacturing techniques used? How is the manufacture- and serviceability? Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?



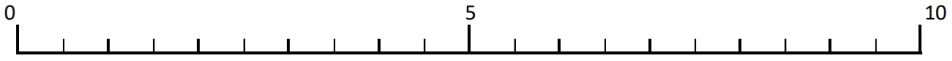
Creativity/Innovation (~25%)

How "clever" was the engineering involved? Are any components or systems unique or unusual due to special analytical findings? Are unusual or specialized machining operations, materials or production processes, test procedures used? Will the car cause a rule change?



Knowledge/Understanding (~25%)

Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit? Were assumptions correct? Are carry-over parts understood? Does the team know if/how/why(not) parts work?



Comments:_____

_____

_____

_____

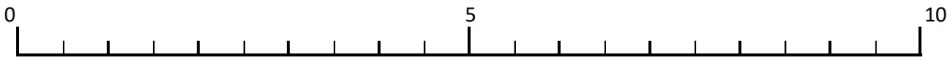
_____

3. Car Body	Score:____/80

Primary structure/tub/tubing- frame, car body design, crash element, Load analyses, Fasteners.

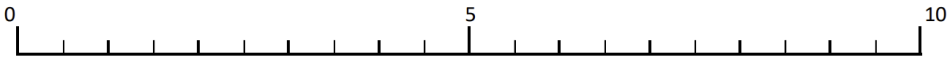
Design approach (~25%)

Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?



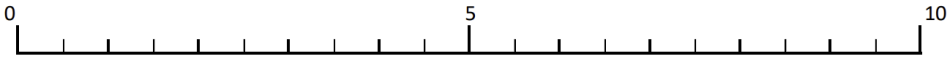
Execution/Build (~25%)

Is the presented car consistent with the design decisions? How is the fit & finish? Were appropriate manufacturing techniques used? How is the manufacture- and serviceability? Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?



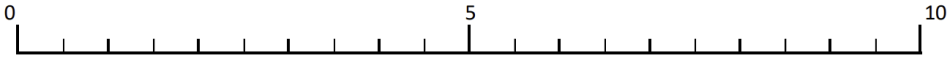
Creativity/Innovation (~25%)

How "clever" was the engineering involved? Are any components or systems unique or unusual due to special analytical findings? Are unusual or specialized machining operations, materials or production processes, test procedures used? Will the car cause a rule change?



Knowledge/Understanding (~25%)

Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit? Were assumptions correct? Are carry-over parts understood? Does the team know if/how/why(not) parts work?



Comments:_____

_____

_____

_____

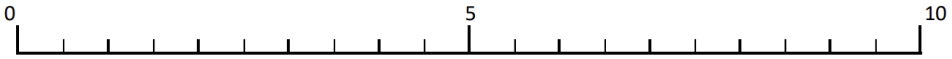
_____

4. Drive Train	Score:____/100

Energy source to Wheel, electrical and mechanical safety concept, internal communication and measurement technology, telemetry, Accumulator(s), Power conversion, Motor/Controller selection/design, Wiring considerations, Transmission. Torque vectoring. Gearing. Regenerative braking.

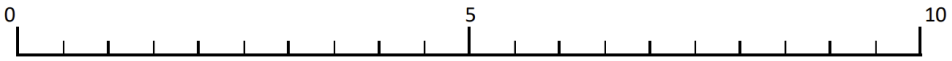
Design approach (~25%)

Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?



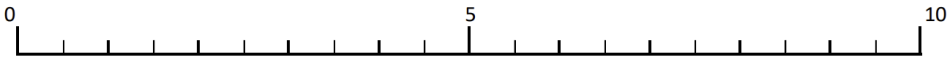
Execution/Build (~25%)

Is the presented car consistent with the design decisions? How is the fit & finish? Were appropriate manufacturing techniques used? How is the manufacture- and serviceability? Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?



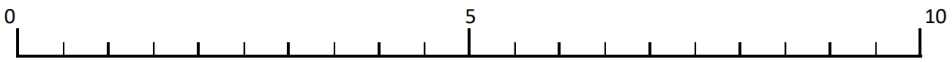
Creativity/Innovation (~25%)

How "clever" was the engineering involved? Are any components or systems unique or unusual due to special analytical findings? Are unusual or specialized machining operations, materials or production processes, test procedures used? Will the car cause a rule change?



Knowledge/Understanding (~25%)

Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit? Were assumptions correct? Are carry-over parts understood? Does the team know if/how/why(not) parts work?



Comments:_____

_____

_____

_____

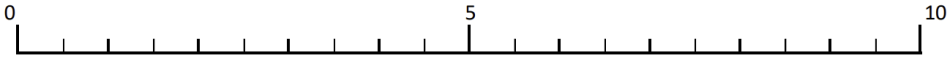
_____

5. Human Machine Interface HMI	Score:____/50

Driver interfaces, seat, belts, steering wheel, steering column, control panel/dash, cockpit sizing & protection, driver comfort/ease of control, pedals, braking system.

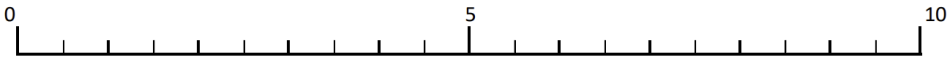
Design approach (~25%)

Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?



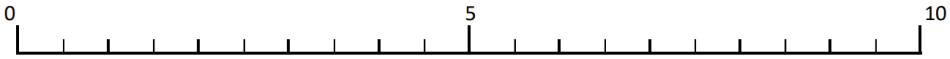
Execution/Build (~25%)

Is the presented car consistent with the design decisions? How is the fit & finish? Were appropriate manufacturing techniques used? How is the manufacture- and serviceability? Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?



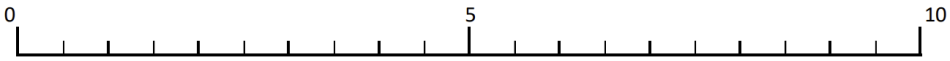
Creativity/Innovation (~25%)

How "clever" was the engineering involved? Are any components or systems unique or unusual due to special analytical findings? Are unusual or specialized machining operations, materials or production processes, test procedures used? Will the car cause a rule change?



Knowledge/Understanding (~25%)

Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit? Were assumptions correct? Are carry-over parts understood? Does the team know if/how/why(not) parts work?



Comments:_____

_____

_____

_____

_____