



FORMULA

**ELECTRIC
AND HYBRID
ITALY**

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Internal track

ENEA "Casaccia" Centre

Via Anguillarese 301

Santa Maria di Galeria (Roma)

7-9 October



ASSOCIAZIONE TECNICA DELL'AUTOMOBILE

Introduction

The progress in the field of sustainable technology for ecological vehicles with low or zero environmental impact, which should constitute a mandatory commitment for all actors involved, can get substantial benefits by the coordinated actions from academy and industrial world.

The technologies, which are object of the present research activities, are mainly related to hybrid, battery electric and fuel cell systems.

It is important that the achievements and the results of the research actions are brought to the public attention and demonstrated, in order to create and diffuse the culture of vehicles addressing environment conservation, energy saving, effective performance and to stimulate the market acceptance and further technology development.

The merge of academy institution and industry is an opportunity to promote the transfer of research, to put in evidence further needs of developments and to stimulate an interaction of initiatives among student teams and between university and industry.

Formula Electric and Hybrid Italy (EHI) is addressing these objectives and involves university students operating in team, sponsor industries and research institutions.

Students and young engineers are encouraged and stimulated, in this competitive event, to produce their best performance in technology innovation for the future sustainable mobility.

The annual sequence of the events allows a progressive updating of the state of the art for the various types of vehicles and ecological systems and contributes to identify the opportunity of future developments.

These types of event constitute milestones for technology benchmarking and identification of evolution trends.



Formula ELECTRIC and HYBRID Italy

The fifth edition of the event for battery electric, hybrid and fuel cell vehicles, to be developed by university students and extended to technical institutions, will take place from October 7 to 9 at the test track of ENEA Center "Casaccia" – via Anguillarese 301 – S. Maria di Galeria (Roma).

Three classes of vehicles and research products are welcome, as in 2008:

Classe 1 – Four wheel cars, formula style body, equipped with the following systems:

- hybrid electric, including externally rechargeable hybrids
- battery electric, including cars with solar cells
- fuel cell cars, fuelled by hydrogen.

Cars are admitted with chassis previously used for formula SAE and vehicles, which have already participated to previous editions, provided they present substantial innovations.

Classe 2 – Two or three or four wheel vehicles, without formula constraints, ready for competition, with the same systems as for Class 1.

Vehicles are admitted, which have participated in previous editions, as long as they integrate substantial innovation elements.

Classe 3 – Demonstration systems, components, vehicle concept, for static presentation and projects on electric and hybrid technologies.

The competition will consist of:

- presentation, including description of the project, cost estimation for possible industrial production of system, utilization aspects (with mission analysis), infrastructure requirements and evaluation of operational costs;
- dynamic tests, to demonstrate the practical behaviour of the vehicle:
 - acceleration, autocross, climbing
 - energy consumption
 - performance
 - pursuit.

The evaluations of the participant vehicles will be performed by an expert jury on the basis of performance, of energy consumption and of innovation level.

More detailed information and periodic updating of the event can be obtained from the website www.ata.it.

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Formula TECH

2005 The beginning

Formula EHI starts in 2005 as Formula TECH.

It is introduced by ATA with the scope of promoting the innovation developed in Academic Institutions worldwide, to be applied to vehicles for ecological sustainable mobility.

The first event takes place in the Fiat Proving Ground facilities of Balocco (Vercelli) in September, at the same time as Formula SAE Italy; it is open to all ecological propulsion systems.

The evaluation, performed by an expert jury, has awarded:

- 1) **Big Scooter** – Advanced technology electric scooter – Politecnico di Torino
- 2) **LEMA** – Advanced electric drive – Università di Bologna
- 3) **Gruppo Hyscooter** – Hybrid dual mode scooter – Università di Pisa

Special Awards from WEVA - AVERE - CIVES

Best Innovation
Transportation Technology
Vrije Universiteit Brussel

Best Performance
PED Team – Università di Roma Tre

Best System Efficiency
MAGICA – Università di Roma La Sapienza



2006

The event, which is held like in the previous year in the Fiat Proving Ground facilities of Balocco, is provided with new rules, to better appreciate and measure the operational and energy performance.

Two classes are defined:

- **Classe 1** – Two or three or four wheel vehicles, ready for competition, with battery, hybrid and fuel cell systems
- **Classe 3** – Demonstration systems, components and projects.

The competition has produced the following results:

Classe 1

- 1) **ESCOOTER** – Electric scooter – Politecnico di Torino
- 2) **MAGICA** – Hybrid electric vehicle – Università di Roma La Sapienza
- 3) **ITAN 500** – Series hybrid vehicle – Università di Lecce

Classe 3

- 1) **LEMAD** – Double inverter – Università di Catania
- 2) **HYSKO2** – Hydrogen system for fuel cell scooter – Università di Pisa
- 3) **VUB-ETEC & EHB-IWT** – Studies for electrical hybrid vehicles – Vrije Universiteit Brussel



Formula EHI

2007



The event takes place from October 4 to 6 in Pollein (Aosta) and is denominated **Formula EHI**, to better express the involvement of ecological vehicles with low/zero environmental impact. In this edition emphasis is given to competitive tests on track, with rules established consistently with **Formula Hybrid USA**, which is also at its first edition.

The following classes are considered:

- **Classe 1** – Two or three or four wheel vehicles, ready for competition, with battery, hybrid and fuel cell systems
- **Classe 3** – Demonstration systems, components and projects.

Four types of dynamic tests are established:

- acceleration
- autocross, to evaluate the handling and drive-ability
- endurance, to evaluate the overall performance, the reliability and the energy efficiency
- pursuit, for a direct competition between teams.

The awards have been assigned as follows:

Classe 1

- 1) **Big Electric Scooter** – High technology electric scooter – Politecnico di Torino
- 2) **E-SNAKE** – Three wheeler electric scooter, with front tilting body – Università di Padova
- 3) **MICROCAR** – Series hybrid electric car – Università di Roma La Sapienza

Classe 3

- 1) **NEPH** – Vehicles for postal distribution; **ECONOCAP** – Test bench for supercapacitors – University Association Brussel
- 2) **MICROCAR** – Control system for hybrids – Università di Roma Tre
- 3) **Fuel Cell Pickup** – Battery electric vehicle, supercapacitor and fuel cell – Università Politecnica delle Marche

2008

Formula EHI takes place from October 1 to 3 in Fiat Safety Testing Center in Orbassano (Torino).

As an integration of the existing classes, Class 2 is introduced, which encompasses all types of ecological vehicles with 2, 3 and 4 wheels, with battery, hybrid and fuel cell electric systems.

Class 1 involves only 4 wheel vehicles (cars) with formula style body. The reference rules are still those of **Formula Hybrid USA**.

The competition has produced the following results:

Classe 1

- 1) **Hyb-alpha** – Hybrid car – ETH Zurich

Classe 2

- 1) **E-SNAKE** – Three wheeler electric scooter, with front tilting body – Università di Padova
- 2) **ENEAI2** – Battery electric car – ENEA/Università di Roma La Sapienza
- 3) **IDRA08** – Low drag three wheel fuel cell vehicle – Politecnico di Torino

Classe 3

- 1) *ex equo* • **SEG MADI HYBRID** – Hybrid car – MADI (STU) di Mosca
- **ENEAI1** – Hybrid car – ENEA/Università di Roma La Sapienza e di Roma Tre
- 3) *ex equo* • **BRUSSEL HYBRID RACING TEAM** – Hybrid car – Erasmushogescool Brussel & Vrije Universiteit Brussel;
- **UPC ecoRACING** – Hybrid car – ETSEIAT UPC di Terrassa (Spagna)

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JUDGES

2008

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