

Energy Efficient MotorSport

Eco Record Breaking A New Concept

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The EEMS Project

- Motorsport needs to develop a new working relationship with OEM's
- Motorsport needs to recognise real world issues
- In the UK the EEMS Project is seeking to address these issues



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Energy Efficient Motorsport

Recent racing projects



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The EEMS Project

- EEMS seeks to place fuel efficiency at the heart of professional motorsport
- Engine regulations based on energy equivalent flow
- Different fuels and engine technologies racing in the same championship
- EEMS seeks to engage all the relevant partners to make this happen



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Basic Record Philosophy

- Land Speed Record:
 - Travel as fast as possible over a set distance, with no limit on the available energy.
- Fuel Economy Record:
 - Cover a set distance at a minimum average speed, using as little energy as possible.
- Eco Record:
 - Travel as far as possible, on a set amount of energy, in a set period of time



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An Important Point

- Eco Record breaking does not seek to replace either Fuel Economy or Land Speed records.
- Eco record breaking seeks to complement them, providing scope for all types of motorsport records.



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Record Holders....



>300 kph
6.0l V12
Hydrogen
Cd 0.21



180 kph
1l lean burn VTEC
Integrated Motor Assist
103 mpg



250 kph (>30 mpg)
113 mpg combined cycle
1.3 l
Diesel
Cd 0.2



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Energy Equivalence (1)

- How do we compare different records?
- Not all fuels are alike - it can be reasonably argued that some fuels are more advantageous than others from an energy content point of view.
- Eco Record breaking will be based on Energy Equivalence theory, where the amount of fuel allowed is not based on weight or volume, but energy



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Energy Equivalence (2)

Fuel	Density (Kg/m ³)	Higher Heating Value (MJ/kg)	Mass/1000 MJ (kg)
Petrol	730-760	48	20.8
Bio-diesel	880	40	25.0
Diesel	820-860	46.1	21.7
Hydrogen	80	142	7.0
Methanol	790	22.7	44.0
LPG (Propane)	500-510	50	20



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Eco Record Classes

- All competitors supplied with same quantity of energy, regardless of fuel type, engine type or class.
 - Open Class
 - Common Chassis Class



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Open Class

■ Constraints: -

- Min Frontal area, 1.7m²
- Min mass 650 kg
- Min ride height – GT rules
- 1000 MJ
- 2 seats
- 4 wheels
- Common data logger

■ FREE: -

- Wheel type
- Tyres
- Transmission
- Adaptive bodywork
- Engine type
- Engine size
- Fuel type



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Common Chassis Class

■ Constraints: -

- Chassis
- Transmission
- Min mass, 750 kg
- Aero *
- Min ride height – GT rules
- 1000 MJ
- Wheels, tyres, brakes
- Common data logger

■ FREE: -

- Engine type
- Engine size
- Fuel



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Considerations

- Safety
- Monitoring of Energy Consumption
- Qualifying
- Competition Format
- Spectators
- Venue



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Fundamental Tenet

- The most efficient use of a given amount of energy in a limited time will result in the greatest distance travelled...
- The greatest distance in a given time implies a greater speed.



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Further Information...

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