

# *Project Garuda*

## **ABOUT US**

Project Garuda is a multidisciplinary team from R.V. College of Engineering, Bengaluru, with members from Mechanical, Electrical, Aerospace, Electronics and Instrumentation Engineering backgrounds. We at Project Garuda, aim to design, fabricate and test urban concept super-mileage cars with an objective to develop Sustainable, Green and Efficient technology for mobility by incorporating new technologies to accommodate alternative energy sources to make a car for the future.

Started in 2006, the team built its first prototype in 2008 and participated in the 'Shell Eco Marathon, UK-2009', a unique competition that challenges students around the world to design, build and drive the most energy-efficient car. We were the first Indian team to compete at Shell Eco Marathon and were the only Indian team to successfully pass all the static and dynamic tests and also pass an international endurance test in the Urban Concept category in our first attempt. Since its inception in 2008 the cars (prototypes) developed by team has received many laurels and appreciation at International level.

We have designed 7 prototype and 3 urban concept vehicles in the period of 10 years.

This year, we are venturing into the urban concept Battery Electric category in Shell Eco Marathon, Singapore. Electric cars are the future and there is a huge opportunity for innovation in their design.

## **COMPETITION WE PARTICIPATE**

### **Shell Eco Marathon**

Shell Eco Marathon is a unique competition that challenges students around the world to design, build and drive the most energy-efficient car. It is held in Asia, America and Europe.

The competition dates back to 1939, when Shell Oil company employees in the USA made a friendly wager over who could travel furthest on the same amount of fuel. Since then it has expanded to two more continents, includes many energy types and sparks passionate debate around the future of energy and mobility.

The competition is split into two classes or Categories-Prototype and Urban Concept Vehicles. The Prototype class focuses on maximum efficiency, while passenger comfort takes a back seat. The urban Concept encourages more practical designs.

Cars are also divided by energy Type-Internal combustion engines and electric mobility category. The IC Engines fuels include petrol, diesel, liquid fuel made from natural gas and ethanol. In electric mobility category vehicles are powered by hydrogen fuel-cells and lithium-based batteries.

## Our Designs so far

### PROTOTYPES

7 different designs from 2008 to 2014

#### 2008 Prototype

The First prototype designed by the team, named BLACK COFFIN which gave a mileage of 180 kmpl and it participated in the event Shell Eco Marathon held at Rockingham Raceway, Corby, UK.

The event was a successful start for the team.



#### 2009 Prototype

The vehicle stood unique in its design and gave a mileage of 250 kmpl in the SEM- UK event.



#### 2010 Prototype

There was a lot of appreciation on the improved design which gave a mileage of 330 kmpl and it participated in SEM-UK event.



### 2011 PROTOTYP E

The prototype gave a mileage of 380 kmpl. The team participated in Shell Eco Marathon- Asia held at Malaysia.



### 2012 PROTOTYP E

First Asian team to participate with 2 vehicles in different categories. Only Indian team to finish the Shell Eco Marathon-Asia, at Sepang International Circuit, Malaysia. We were placed 14<sup>th</sup> in the shell eco-marathon 2012, electric prototype category.  
(First Indian team to clock a mileage at an International event)



### 2013 PROTOTYP E

The improved gasoline prototype team passed the virtual assessment for SEM Asia 2013 which was to be held from the 4<sup>th</sup> to 7<sup>th</sup> of July 2013. The team was geared up for the event and confident of securing a competent rank. However due to unforeseen circumstances and health hazards, Shell had to cancel the SEM-A event.





## URBAN CONCEPT VEHICLES

### 3 different Urban Concept designs since 2015

#### 2015 URBAN CONCEPT

Participated in the Urban concept gasoline category in SEM Asia 2015 held from 26<sup>th</sup> to 1<sup>st</sup> March, 2015 at Philippines. The team completed all the technical inspections and was the only Indian team to complete the Endurance test. Team Phoenix was placed 7th in the overall competition and was given special recommendation from the organizers of the event.



#### 2016 URBAN CONCEPT

Agni showed major improvements in both mileage and weight. The car was presented in SEM-2016 held at Philippines from 1<sup>st</sup> to 5<sup>th</sup> March, 2016. The weight was reduced to 147kg and clocked a mileage of 66kmpl.



#### 2017 URBAN CONCEPT (Electric Vehicle)

Electric vehicles are gaining importance because of their higher energy conversion efficiency and low emission rates. This led to shift in the energy category we participate. We are the only Indian Team to participate in Battery Electric Urban concept Category in SEMA-2017 to be held at Singapore from 15<sup>th</sup> to March 19<sup>th</sup>, 2017. This is our 3<sup>rd</sup> car in urban concept category.

We also have installed Standalone solar unit in our workshop to facilitate battery charging, thereby generating cleaner energy. We have designed and developed the motor controller for running the car, which was the challenging task for this year.



## Our Achievements

**India's first Super-mileage team (In the year 2006)**



**Won the Rotary Young Achievers Award in 2008.**





**The 'Perseverance in the face of adversity' learning award in Shell Eco Marathon UK, 2009.**



**First team in Asia to participate in the SEM-A with 2 cars in different categories in the 2012 event.  
Placed 14th in the electric prototype category at SEM-A 2012.**



**Invited by Shell India to showcase our battery electric prototype at the inauguration of their research center.**



**Only Indian team to be invited to take part in SEM-A 2012 Opening Parade.**

**One among the six Indian teams selected to compete at SEM-A 2013.**

**First Indian team to compete in Urban Concept category at SEM-A 2015.**





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