

Hybrid technology platform for 2 & 3 wheel vehicles (L-category)



ARAI - xEV Program

Technology

Fully integrated hybrid powertrain in a compact vehicle

Technology Readiness Level: 6 (System model/demonstrator tested in relevant environment)

Features

- Innovative integration solution
- Uses an instant response high torque electric motor complementing existing IC engine
- Replaces starting system of existing vehicles
- Packaged within existing vehicles space in an innovative manner
- Simultaneous jerk free shifting between the two drives (engine and motor)
- Operating features include
 - Start-Stop,
 - EV only crawl
 - Assisted engine braking
 - Regeneration
 - E-ride
 - Boost
 - Launch Control
 - Hill start
- Higher low end torque for enhanced low speed performance
- Higher fuel efficiency
- Lower emissions and reduced after-treatment hardware requirement
- Part of the existing system cost is offset

Application

- 2-3 wheeler vehicles, especially with single cylinder engines

Scale of Validation Achieved

A working prototype has been developed and is tested. Further validation and optimization of the hardware is also ongoing to further optimize the packaging.

Intellectual Property

Patent filed (Application number 201821048259)

The Automotive Research Association of India

(Research Institute of the Automotive Industry with the Ministry of Heavy Industries & Public Enterprises, Govt. of India)
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Abstract

With over 72% of registered vehicles in India being 2 wheelers, the environmental impact of this transportation segment is significant due to the sheer number of vehicles plying on the roads coupled with the congested urban environment prevalent.

‘DVI’ (द्वि), Sanskrit for 2, is a fully integrated mild hybrid powertrain in a compact vehicle that efficiently utilizes space and P1 parallel coupling to provide a spirited driving experience, while still being as effective, if not more in bustling urban roads.

All functions listed are inherently possible thanks to its small, compact, integrated drive configuration. Additionally, the driver’s interaction with the vehicle doesn’t feel as alienating or complicated due to the seamless integration of the control strategies of both systems, giving the driver uncompromising performance and efficiency. To an average driver, it feels but like a higher capacity vehicle without the disadvantages that come with a larger, less efficient & heavier engine.

Beneficiary Industry

- OEMs
- Tier 1 industries supplying the smart controls for hybrid vehicles
- Service Industries
- Research Institutes/Academies/Universities working on Hybrid Vehicle programs
- Motorsports

ARAI also offers the following development services in areas of Hybrid vehicles.

- Electrical system design
- Structural analysis on effect of hybridization
- MIL & SIL simulation with feasibility studies
- System and component sizing and identification
- Subjective and objective analysis