

Project Name – “H-CATv” (Hybrid commercial all-terrain vehicle)

Problem Statement- Currently all small-scale commercial vehicles are either purely electric or purely IC engine based. The market has yet to see an affordable hybrid powertrain which gets the job done.

Project Budget- INR 1,00,000

Description-

I started this project with an idea to build a hybrid powertrain on a tight budget. This frame is a modified chassis of an existing ATV design. I designed the powertrain roughly in CAD and started fabrication. The idea is to use a brushless motor on one sprocket and a motorcycle engine on another on the same shaft and a dyno attached to the same driveshaft. The idea is to use IC engine till the point that the batteries are sufficiently charged then a computer electrically cuts of the IC engine and engages the brushless motor. The motor can be electronically disengaged but the engine needs to be shifted into neutral manually for now. An Arduino based computer will monitor battery voltages and switch the power between the IC engine and the BLDC motor controller. The motor has its own control unit responsible for powering it. So, by controlling the power to the circuit I can toggle the use of the same using a relay module. In future once this has successfully completed trials, I plan on conducting efficiency tests (IC engine only vs with hybrid mode on) and compare the differences.

Before mounting the BLDC motor, I will independently collect data on efficiency on the distance covered by the setup with a limited amount of fuel. Later when the motor is mounted and functional, I will collect data with the same amount of fuel but this time both systems will work in tandem with each other. The only problem I'm currently facing is the unification of the pedal. The accelerator for the BLDC motor is electrical while the IC engine utilizes a brake wire to open the throttle body for acceleration. This is the main problem in my setup so for now I'm planning on having two accelerator pedals and based on whichever system is active for now the driver will have to switch pedals, I am currently working on the unification of both to one pedal.

Materials Consumed-

1. 1"by 1" square mild steel pipes
2. Nut/Bolts
3. Weldments
4. Recycled Bajaj Pulsar Bike (For Engine , Suspension & Wiring Harness)
5. Stainless Steel Axle
6. Bearing Mounts
7. Rack & Pinion Steering
8. Steering wheel & Rods
9. Disk Brake (Master Cylinder , Brake line , Calliper , Disc , Disc Hub , Slotting Key
10. Recycled Car Seat
11. Switches
12. Wires
13. Necessary Tools (Hand Grinder , Drill , Arc Welding)