

## E-Highway:- A Future Transportation

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**Abstract** - Increasing demand in electric vehicle will play a major role in future of road While commercial electric vehicle exist their uptake has been limited due to high purchase cost, limited battery range and lack of charging convenience. Furthermore, while developments are on the way, hybrid and electric manual trains also to be efficiently integrated with heavy good vehicle, (HGVS). A novel to overcome such challenges are electric road system ; a branch of technologies that allow vehicle to charge while in motion.

As it isn't doable to transfer a lot of freight traffic to the rail, this traffic can have to be carried by trucks that mix reliable service with minimum environmental impact. The thrilling main road is double as economical as combustion engines. The innovation provides trucks with power from associate overhead contact line. this implies that not solely is

Energy consumption cut in however coinjointly native pollution reduced.

The E- transit is double as economical as typical combustion engines. This innovation provides trucks with power from associate overhead contact line. This reduces native air pollution and contributes considerably to the decarbonisation of the transport sector.

Zero-emission long-haul truckage technologies are being developed which will play a critical role in achieving global climate change goals and just about eliminate pollution from these vehicles. chemical element fuel-cell electrical, curve electrical and dynamic inductive charging technologies are being incontestable in tiny scale comes worldwide. In this study, these 3 zero-emission truck technologies were reviewed well and vehicle and infrastructure challenges and prices for every of the technologies assessed. In the near-to mid-term, thrilling the whole CA freeway system or deploying large chemical element stations at several wide truck stops would need terribly giant capital costs, on the order of billions of greenbacks, even although, a minimum of ab initio, there'll doubtless be relatively few zero-emission long-haul trucks in use. Considering technology readiness, energy potency, and opportunity cost, the foremost possible approach for the zero-emission technologies for long-haul trucks could also be to deploy native or regional curve systems. Dynamic inductive charge systems might be introduced, although with maybe additional disruption as roadways are ready for this service. chemical element electric cell trucks can benefit from some quantity of filling however would require big chemical element supplying stations on highways. The starting "up-front" investment in infrastructure for chemical element trucks looks like somewhat below for the opposite two choices however the value of providing chemical element to vehicles are high, particularly if provided mistreatment electrolysis. within the longer-term, all three of the technologies may become economically competitive with diesel truckage, though this relies on several factors and uncertainties. disruption as roadways are prepared for this service. Hydrogen fuel cell trucks will benefit from some but will require large hydrogen refueling stations on the highways. The starting "up-front" investment in infrastructure of hydrogen trucks appears somethings lower than for the other 2 options but the cost of providing hydrogen for vehicles become high, especially if provided using electrolysis. In the longer-term, all 3 of the technologies could create economically competition with diesel trucking, though this depends on many factors and uncertainties.

**Keywords** - Reduce GHG tail pipe emissions, Reduce inefficient driving patterns, Reduce travel time.

### Introduction

E-Highway system combines the potency of electrified railroads with the flexibility of trucks into associate innovative freight traffic answer that's economical, economical, and environmentally friendly. (Electric-Highway) associate electrically-augmented road. Hybrid diesel-electric locomotive trucks area unit fitted with rods that area unit raised once coming into the roads with overhead electrical lines at speeds up to sixty mph. Shifting suspensisse transport to rail has its limitations. Therefore, a share of this transport can ought to be disbursed by trucks that mix reliable service with minimum environmental impact. The e transportation is double as economical as conventional combustion engines. This

innovation provides trucks with power from associate overhead contact line. This reduces native pollution and contributes importantly for the decarbonization of the transport sector. costs, on the order of billions of greenbacks ,even although, a minimum of ab initio, there'll doubtless be relatively few zero-emission long-haul trucks in use. Considering technology readiness, energy potency, and cost of capital, the foremost possible approach for the zero- emission technologies for long-haul trucks is also to deploy native or regional curved shape systems. Dynamic inductive charge systems may well be introduced, although with maybe additional disruption as roadways area unit ready for this service. chemical element electric cell trucks can benefit from some measurability however would force giant chemical element supply stations on highways. The initial "up-front" investment in infrastructure for chemical element trucks seems somewhat under for the opposite 2 choices however the price of providing chemical element to vehicles are going to be high, particularly if provided exploitation electrolysis. within the longer-term, all three of the technologies might become economically competitive with diesel transport, though this relies on several factors and uncertainties.

### **7.1 Electric Roads -**

Catenary wire systems presently power several train and bus systems, such as the Northeast and Keystone Amtrak train corridors and parts of Pune, MA's MBTA transportation system. This technology is currently being custom-made for the commercial sector: within the urban center, CA area, a curve system is being tested to replace diesel trucks on a main shipping artery. the best profit lies in shifting emissions to cleaner root generation. rather than drawing power from an indoor combustion motor, curve cables draw from gridconnected power plants, doubtless employing a combination of renewable energy and carbon sequestration for fuel combustion, transportation cleaner power directly to the client. Shifting emissions from tail-pipe to root conjointly reduces the mobile Night and PM pollution that cause dangerous air quality problems in heavily engorged cities. moreover, providing on- road power supply reduces the requirement for extra supply or charging stations.

Currently, combustion vehicles operate severally of a centralized power network. Providing comparable independence in an electrical system would require either a curved shape network on all roadways or a way of energy storage inside the vehicle such as current hybrid or battery vehicles. We address this issue within the following section.

### **7.2 Wireless Charging -**

Installing the large above-ground infrastructure of a curve system is associate impractical method of thrilling roadways employed by lightweight duty vehicles. Wirelessly transmitting electricity is associate equally effective however less cumbersome various. Nikola Tesla initial incontestable the power to transmit power wirelessly within the 1890's, though this technology is barely currently being realised through wireless charging of cell phones and electrical vehicles. during this method, associate electrified coil transmits energy through associate magnetic attraction field to a receiving coil hooked up to A battery. Receiving coils area unit cheap adapters which will be fitted to most existing EVs, despite battery sort. many firms area unit already commerce stationary wireless vehicle charging pads and adapters that alter recharging and scale back the chance of forgetting to charge a vehicle whereas reducing charging efficiency by no quite 100 percent .

Dynamic wireless charging (DWC) is that the a lot of advanced application of Tesla's hundred year previous technology. rather than inactivity over one transmission coil, the battery is frequently charged by passing over a series of optimally spaced coils embedded within the road. this permits the heat unit to instantaneously fill up the energy used for propulsion and avoid depleting keep battery power, alleviating vary issues.

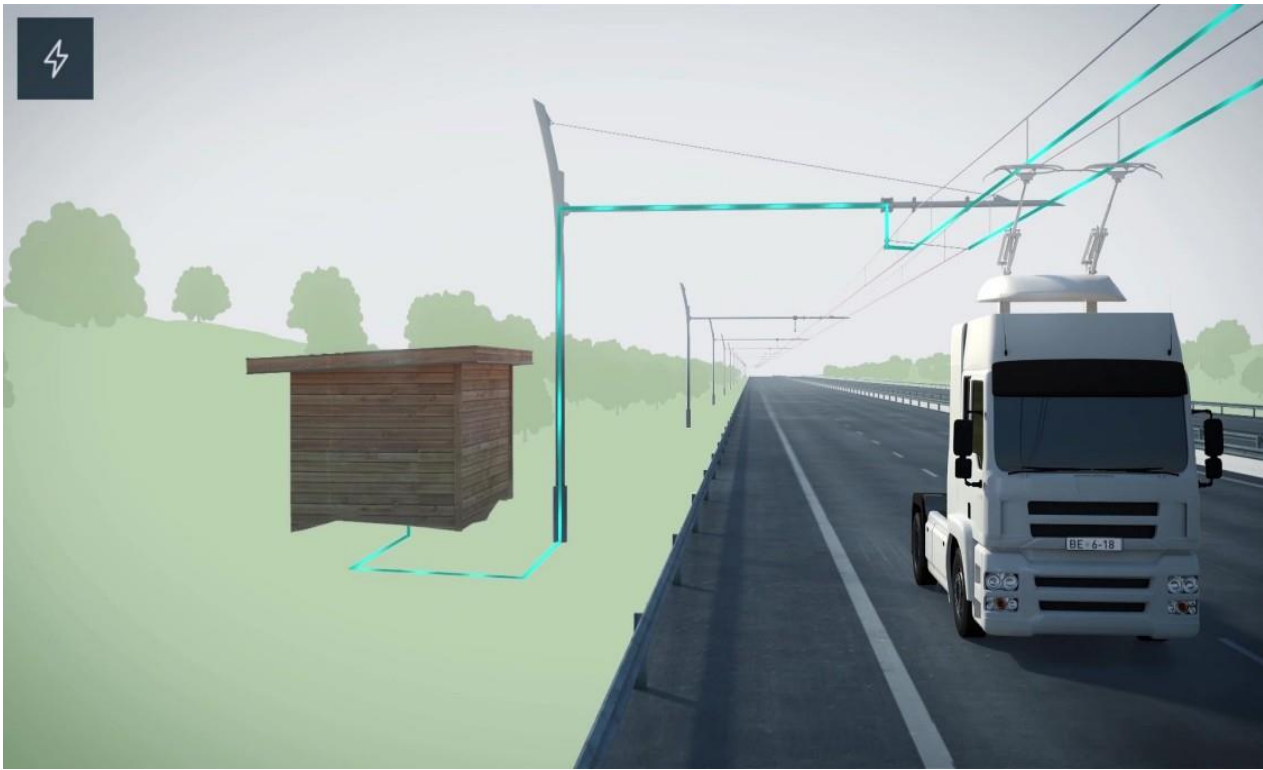
#### **E-Highway working**

##### **Energy Supply**

The energy provide system is predicated on tried technology from the planet of railroad electrification. The two-pole curved shape system ensures a reliable energy provide for the eHighway truck. The curved shape system ends up in level contact wire that permits stable current transmission, even at high speeds. The overhead contact lines area unit furnished energy from substations equipped with:

- Medium voltage switchgear
- Power transformers
- Rectifiers

Controlled inverters (for feedback of the electrical energy generated by the vehicles' regenerative braking).



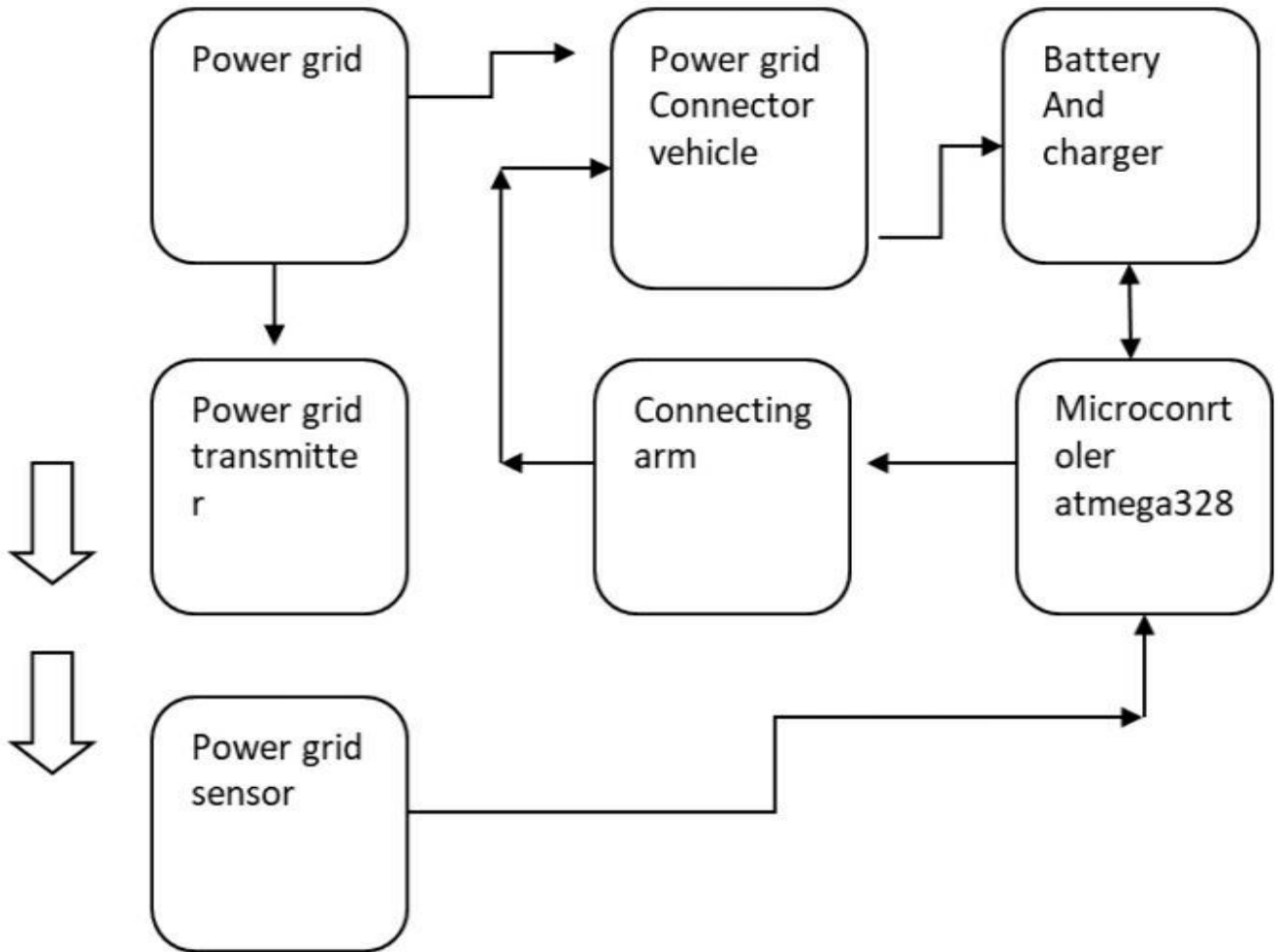
### Pantograph

The active mechanical device transmits the energy from the overhead contact lines to the electrical motor of the eHighway truck. The mechanical device is simply connected to and disconnected from the contact wire at speeds starting from zero to ninety km/h. This is often done either automatically or manually for push to a button. Steering associate degree eHighway truck connected to the overhead contact lines is not any totally different to driving a diesel truck, because the active pantograph compensates for any shifts in position among the lane. The mechanical device automatically disconnects within the event of evasive maneuvers or if the symptoms are used.

### Hybrid drive

On electrified routes, the electrical motors in eHighway trucks are unit power-driven via the overhead contact lines and therefore the active mechanical device. For remaining sections of road, the eHighway truck incorporates a hybrid drive. There aren't any restrictions on the sort of hybrid drive: depending on the applying and client needs, serial and parallel ideas with burning engines, battery solutions, fuel cells etc. can all be implemented. The electrical motors of the eHighway trucks conjointly alter recovery of the vehicle's braking energy.

**BLOCK DIAGRAM OF THE SYSTEM**



**Conclusions**

Considering the resource-intensive impacts of a growing international population, we have a tendency to establish a need to produce a safer, additional economical driving expertise. Our strategy aims to alleviate health considerations through reduction of non-point carbonic acid gas, Roman deity and stuff emissions, additionally as a dramatic reduction in traffic fatalities. we have a tendency to additional get to scale backor repurpose the roughly a hundred million hours each day Americans pay driving. a serious step in achieving these goals, the E-Highway leverage advances in battery storage and automotive electronics with rising techniques for wirelessly charging moving vehicles and cutting edge vehicle automation to form a cleaner, safer route for yankee drivers. Shifting away from a gas tax to associate amount-of- travel tax and travel-lane incentives for E-Highway users realizes price savings inside twenty years and cuts future emissions in 0.5. These potential edges will improve additional if the electrical grid powering the route aggressively switches to renewable energy generation. The initial pilot program on California road five can establish and overcome key issue areas, encourage adoption and build the availability chain for additional economical readying across the state’s road system. Eventually, sensible electrical highways can criss-cross the land, providing yankee drivers a quick, clean, safe thanks to travel.

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