A Review Paper on CO_2 Generation through Automobile and Conceptual Design of CFS and ECC

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Abstract— Accelerating growth in the transport sector is responsible for worsening air pollution in urban areas. While estimates of health impact are effective in raising overall concern about air Research paper introduce new conceptual design of two devices "exhaust CO2 collector [ECC] and CO2 filtration and another one is lower the concentration of CO2 in passenger area. This study try to draw researcher affection towards automobiles air condition system and exhaust system and scopes in new Euro and B S standardssystem [CFS] for the automobile which do not allow any CO2 molecule outside the exhaust system.

Key words: Automobile, Exhaust CO_2 Collector [ECS], CO_2 filtration System [CFS]

I. INTRODUCTION

An emission is something that's been released or emitted into the world. Car exhaust, burps, and radio broadcasts are all examples of emissions. Technically, an emission is anything that's been released out into the open. But more often it refers to gases being released into the air, like greenhouse gasses or emissions from power plants and factories. Anytime your body emits something (sweat, drool, gas), it's also considered an emission

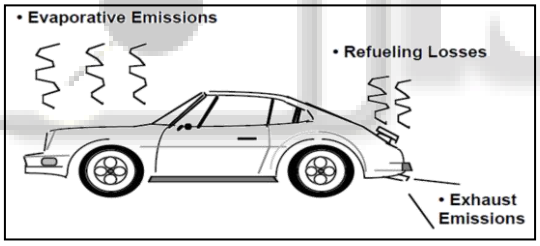

Fig. 1: Emission from Automobile

Main three types of emission 1.Evaporative emission, refilling emission,3 exhaust emission .In recent years, the U.S. Environmental Protection Agency (EPA) has started to view carbon dioxide, a product of "perfect" combustion, as a pollution concern. Carbon dioxide does not directly impair human health, but it is a "greenhouse gas" that traps the earth's heat and contributes to the potential for global warming

A. *Physical Properties of CO_2*

Carbon dioxide is colourless. At low concentrations, the gas is odourless. At higher concentrations it has a sharp, acidic odor. At standard temperature and pressure, the density of carbon dioxide is around 1.98 kg/m3, about 1.67 times that of air. Carbon dioxide has no liquid state at pressures below 5.1 standard atmospheres (520 kPa). At 1 atmosphere (near mean sea level pressure), the gas deposits directly to a solid at temperatures below −78.5 °C (−109.3 °F; 194.7 K) and the solid sublimes directly to a gas above −78.5 °C. In its solid state, carbon dioxide is commonly called dry ice.Liquid carbon dioxide forms only at pressures above 5.1 atm; the triple point of carbon dioxide is about 518 kPa at −56.6 °C (see phase diagram, above). The critical point is 7.38 MPa at 31.1 °C. Another form of solid carbon dioxide observed at high pressure is an amorphous glass-like solid. This form of glass, called carbonia, is produced by super cooling heated CO_2 at extreme pressure (40–48 GPa or about 400,000 atm) in a diamond anvil.

B. *Allowable CO_2 According EURO Norms:*

In ealier period of euro standards there is no provision for CO_2 regulating standard ,but due to increasing pollution and green house effect and better human comfort zone in vehicle there is a need of CO_2 regulating norms. Regulation 443/2009 sets a pan-European sales weighted average new car CO_2 emissions target of 130g/km by 2015 and 95g/km by 2020. Improved mpg = lower CO_2 emissions. Fuel economy has improved by 42% since 2000. New Car CO_2 Regulation and other legislation encourage lower CO_2 emitting cars.

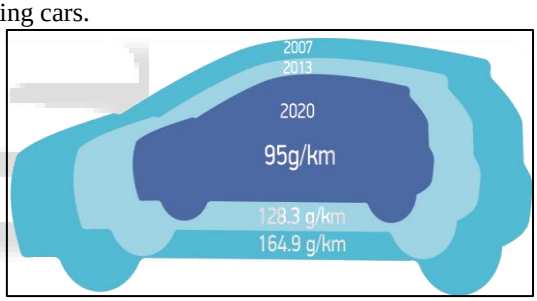

Fig. 2: Allowable CO_2 According Norm

CO_2 transport distribution The mode wise distribution of CO_2 emissions amongst transport section, reveals that road transport contributes major share of around 73% towards total CO_2 emissions from transport sector. Aviation, International shipping & Railways sector emissions of carbon dioxide from transport sector are about 11%, 9% & 2% respectively

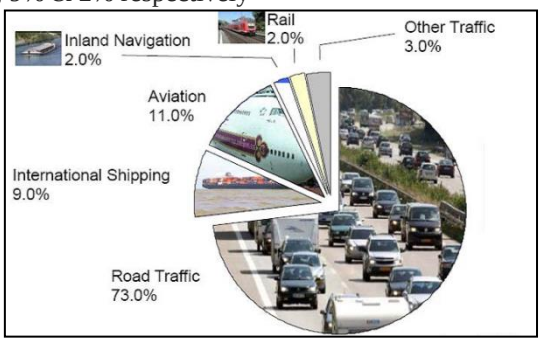

Fig. 3

The need to control the emissions from automobiles gave rise to the computerization of the automobile. Hydrocarbons, carbon monoxide and oxides of nitrogen are created during the combustion process and are emitted into the atmosphere from the tail pipe Some of the

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more popular control devices installed on the automobile are: EGR valve, Catalytic Converter, Air Pump, PCV Valve, Charcoal Canitiser emission etc**.** The emission can be reduced by using smoke suppressant additives, using particulate traps, SCR (Selective Catalytic Reduction) etc.various technology upgrade in recent are variable valve time engine, multi point fuel injection system, turbocharged engine, turbocharged after cooled engine, common rail direct injection. Its compulsory to get involved in future Euro standard, so technology up gradation in engine and exhaust parts, interior of vehicle is necessary

II. LITERATURE SURVEY

Jan Eide,Fernando [1] has done a study to CO2 emission standards and investment in carbon capture. he represent the rate of carbon capture and its costs as a decision over a continuous range. As opposed to the majority of system-level studies, which explore only one or two possible capture rates (e.g., 30% and 90%), the capture rate is chosen to meet each emission standard at minimum costs, assuming that capital would be sized and operations would be adjusted to achieve the mandated emission rate**.** Coal with CCS is more competitive at higher emission standards because the cost of capturing carbon can be minimized by designing the facility to capture the CO2 only up to the required emission rate, and these lower capture percentages can be achieved at lower costs.

Haikun Wang, Lixin Fu , Jun Bi[2] studied CO2 and pollutant emissions from passenger cars in China. Because of economic growth and accelerating urbanization in China, the vehicle population has increased rapidly and road vehicles are becoming one of the major sources of CO2 and pollutant emissions other than CO2 from PCs are estimated to decrease nearly 70% by 2020 compared to NI scenario mainly due to technological improvement linked to the vehicle emissions standards under a recent policy scenario. improvement and the penetration of advanced propulsion/fuel systems of the PC should be considered to reduce CO2 and pollutant emissions simultaneously for mid and long terms.

Gvidonas Labeckas,Stasys Slavinskas [3] had Studied of exhaust emissions of direct injection diesel engine operating on ethanol, petrol and rapeseed oil blends. Fuel consumption increases because of the growing number of diesel engine powered heavy-duty haulage trucks and city buses, agricultural tractors and self-propelled machines as well as personal light duty cars. Emissions of carbon dioxide, CO2, increase together with load,speed and fuel consumption in mass. In spite of a higher fuel consumption
A.C.McKinnon,,M.I.Piecyk [4] had studied Measurement of CO_2 emissions from road freight transport: A reviewof UK experience. The sestrategies is usually analysis of CO2 emissions from freight operations, disaggregated by transport mode .Attention has tended to focus on road transport, as this is the dominant mode of freight movement, accounting for the largest share of freight-related emissions with in countries The emergence of differing road freight-related CO_2 estimates from official sources Using UK data, examines the various methods of carbon auditing road freight transport at the national level and compares the results both for a single year (2006) and over a time period. carbon intensity of road freight transport in the UK now appears to have fallen by 6% over this period rather than risen by 11% as suggested by the previous set of official statistics

S.BaidyaJ.Borken-Kleefeld [5] studied Atmospheric emissions from road transportation in India. India has the second largest populations of the world .n the year 2000, India was among the ten countries with highest exhaust pollutants from the road transportation sector construct a consistent data base for the running vehicle fleet, their average annual mileage, fuel efficiencies and emission factors the data is differentiated by 7 vehicle categories, 3 fuel types and 4 age/technology levels for both the seven most populated cities as well as the whole nation transport volume growth had been much less (below 20%) or much higher (more than 55%) than the GDP growth

Sarath K. Guttikunda,Puja Jawahar [6] had Application of SIM-air modelling tools to assess air quality in Indian cities. Urban air pollution is a complex issue, fuelled by multiple source ranging from vehicle exhaust an application of the SIM-air modelling tool in six Indian cities e Pune, Chennai, Indore, Ahmadabad, Surat, and Rajkot. Using existing and publicly available data, we put together a baseline of pollutant emissions for each of the cities and then calculate concentrations, he impacts, and model alternative scenarios for 2020. Of the estimated 21,400 premature deaths in the six cities in 2020, he estimate that implementation of the six interventions in the transport ln sectors, can potentially save 5870 lives (27%) annual and result in an annual the six cities.

Mohammed Mustafa Abunowara Elgarni [7] Carbon Dioxide Capture from Flue Gases by Solid Sorbents. Advanced concepts for capturing CO_2 is an absorption process with dry regenerable sorbents. Calcium Carbonate would be a suitable absorbent material, The flue gas typically contains about 12 % CO_2, 73 % nitrogen, 10 % vapour water, 4 % oxygen and less than 1 % various pollutants by volume.CO_2 separation does not need to cool the flue gas to the ambient temperature or even lower temperature prior to separation, thus reduce the cost caused by heat exchange. The investigated materials were selected among minerals, such as calcium carbonate, lithium orthosilicate for high temperature ranges , and caustic soda for low temperature ranges Caustic soda sorbent was tested at low temperature ranges. (75 ^oC ~ 225 ^oC) and found that its ability for absorbing pure carbon dioxide increase with increasing temperature ranges**.**

D.W.F.Brilman,R.Veneman [8] studied Capturing atmospheric CO2 using supported amine sorbents. Regeneration was done at elevated temperatures up to 150°C and CO_2 pressures up to 10 bar. Two potentially attractive fields of application were identified: (1) production of CO_2 enriched air using low regeneration temperatures and (2) the production of pure CO_2 at elevated pressure**.** Amine sorbents can be attractive for CO_2 air capture considering the high CO_2 capacity, the adsorption selectivity over water and, depending on the purity of the CO_2 product, moderate regeneration temperatures. For large scale deployment, more work is needed on both sorbent (support) development to reduce cost, have quantitative information on sorbent stability.

Yu Wang and M. Douglas LeVan[9]had studied Adsorption Equilibrium of Carbon Dioxide and Water

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Vapour on Zeolites 5A and 13X and Silica Gel: Pure Component. Normally, two adsorption beds or beds with a layer of silica gel followed by one with zeolite are used to remove water and carbon dioxide. Water adsorption on zeolites is strong. Adsorption isotherms are reported for pure carbon dioxide and water vapor on 5A and 13X zeolite beads and silica gel granules. These data were obtained using a volumetric method . For carbon dioxide adsorption, zeolites 5A and 13X have similar loadings and show a much higher capacity than silica gel. However, for water vapor, zeolite 13X has a slightly higher capacity than zeolite 5A. Both zeolites have very good adsorption capacities for water vapor at low pressures but lose their advantages to silica gel when water pressure

Dennis Y.C. Leung, Giorgio Caramanna, M. Mercedes Maroto - Valer [10] overviewd of current status of carbon dioxide capture and storage technologies. Global emission of CO2 was33.4billion tones in 2011,which is 48% more than that of two decades ago. Over the past century atmospheric CO2 level has increased more than 39%, from 280ppm during pre-industrial time to the record high level of 400ppm in May 2013 with a corresponding increase in global surface. The best option for CO2 transport will depend on a variety of parameters including:1.Volumes of CO2 to be transported2.Planned life time of the CO2 source 3.Distance between CO2 source and storage area; 4. On shore vs. off shore transport and storage; 5. Typology of transporting infrastructure available.Four main types of geological formations are considered for CO2 storage:1. Depleted oil and gas reservoirs; 2.Unmineable coal beds; 3.Saline aquifers; 4.Basalts

III. Conclusion

From the review of literature, different authors have conduct the experiment and study on co2 emission and absorption process ,in different countries

1) Automobile vehicles are increases so rapidly. Pollution also increases with the numb of vehicles which . so there is a need of technology which decreases the emission level of CO_2.
2) Earlier CO_2 emission is not considered in norms but due to global greenhouse effect and increasing CO_2 also effect on human health.
3) There is a need of device in automobile exhaust which reduces CO_2 level by 0 gram/km to device which regulate the CO_2 level in passenger cabin of vehicle like ambulance
4) For differ fuels{petrol,diesel,cng,etc} engine emits different level CO_2 emission in which Cng,Lng has light emission than petrol and diesel zeolite is best absorbent among others like lime soda ,ammonia.
5) The research aims to optimize the design of the system for CO_2 minimization and carbon capture material and as a result of the research to develop a new type of system for the carbon capture from automobile .continues air monitoring needs tobe done to show co2 relation with respect to temperature

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