



Volatile Organic Molecules & EVs

For Prelims: Volatile organic molecules, National Electric Mobility Mission Plan (NEMMP) and Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India), National ambient air-quality standards.

For Mains: Environmental Pollution & Degradation, Conservation, Prospects and Challenges associated with electric vehicles.

Why in News?

Recently, a study conducted by **Indian Institute of Science Education and Research** revealed that India can slash emissions of **Volatile Organic Molecules (VOC)** by 76% in the next eight years by swapping all two- and three-wheelers with [electric vehicles](#) and all diesel-fuelled ones with **Compressed Natural Gas (CNG)**.

- Gases escaping out of a vehicle's exhaust account for **65-80% of an automobile's emissions**.
- India is home to **14 out of the top 20 most polluted cities globally**. Around 1.67 million deaths were linked to air pollution in 2019. The country lost **1.36% of its gross domestic product the same year**.
- Therefore, adopting electric vehicles can help India achieve a cleaner future.

What are Volatile Organic Molecules?

- VOCs are **carbon-containing chemicals** released by petrol and diesel vehicles. They impact air quality and human health.
 - However, VOCs can have a **natural origin, too**.
 - **Plants emit** these chemicals **to attract pollinators, defend themselves from pests and predators** and adapt to environmental stress.
- **Effect of VOCs on Health:** VOCs can irritate the eyes, nose and throat, damage body organs and cause [cancer](#).
 - Long-term exposure to VOCs is not good because the majority of the VOCs are **carcinogenic (cancer-causing)**.
 - It is also linked to medical conditions such as **asthma and heart disease**.
 - **Black carbon** is linked to health problems such as respiratory and cardiovascular disease, cancer and congenital disabilities. It also contributes to [climate change](#).
- **Positive Feedback Loop:** VOCs can drive the **formation of other dangerous pollutants**.
 - For instance, they react with sunlight and nitrogen dioxide to form **ground-level ozone**.
 - VOCs also trigger the **formation of [Particulate Matter \(PM2.5\)](#)**, a pollutant that reaches deep into the lungs, affecting their normal functioning.
 - They react in the air to **produce secondary organic aerosols, minute particles suspended in the air**.
- **Issues Related to VOCs:** Human-made VOCs are a cause for concern, yet they don't draw enough attention.
 - Benzene, a chemical that induces cancer, is the only VOC included in the [National](#)

ambient air-quality standards.

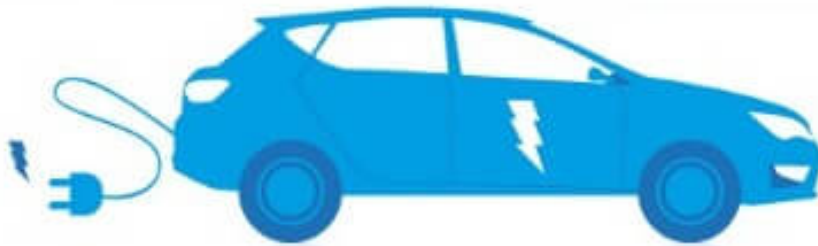
- The other pollutants under ambient air-quality standards considered are PM10, PM2.5, nitrogen dioxide, sulphur dioxide, carbon monoxide, ozone, ammonia, lead, nickel and benzo(a)pyrene.

What are Electric Vehicles?

- An EV **operates on an electric motor instead of an internal combustion engine** and has a battery instead of a fuel tank.
- In general, EVs have **low running costs** as they have fewer moving parts and are also environmentally friendly.
- In India, the **fuel cost for an EV is approximately 80 paise per kilometre**. Contrast this with the cost of petrol which is today more than Rs 100 per litre in Indian cities, or Rs 7-8 per kilometre to operate a petrol-based vehicle.

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Advantages & Disadvantages of Electric Vehicles



ADVANTAGES



Doesn't depend on fossil fuels for your commutation



Electric vehicles are known for their **always-on power delivery**



Electric vehicles are **silent operators**



Running on electricity means **good bye to exhaust gases**. Say hello to clean air!

DISADVANTAGES



Priced 30-40% higher than their regular counterparts



Charging infrastructure not adequate



Driving range offered by battery technology is **not adequate**



Battery packs that power them are **highly susceptible to wear & tear and expensive**

What are Associated Challenges with EVs?

- **Lack of a Stable Policy For EV Production:** EV production is a **capital intensive sector**

requiring long term planning to break even and profit realisation, uncertainty in government policies related to EV production discourages investment in the industry.

- **Technological Challenges:** India is technologically deficient in the production of electronics that form the backbone of the EV industry, such as batteries, semiconductors, controllers, etc.
 - India does not have any known reserves of lithium and cobalt which are required for battery production.
- **Lack of Associated Infrastructural Support:** The lack of clarity over AC versus DC charging stations, grid stability and range anxiety (fear that batteries will soon run out of power) are other factors that hinder the growth of the EV industry.
- **Lack of skilled workers:** EVs have **higher servicing costs and higher levels of skills** is needed for servicing. India lacks dedicated training courses for such skill development.

What are Central Government Initiatives on EVs?

- Government has set a target of EV making up **30% of new sales of cars and two-wheelers by 2030**.
- To build a sustainable EV ecosystem, initiatives like [National Electric Mobility Mission Plan \(NEMMP\)](#) and [Faster Adoption and Manufacturing of \(Hybrid &\) Electric Vehicles in India \(FAME India\)](#) have been launched.
 - **NEMMP was launched in 2013** with an aim to achieve national fuel security by promoting hybrid and EVs in the country. There is an ambitious target to achieve 6-7 million sales of hybrid and EVs year on year from 2020 onwards.
 - **FAME India was launched in 2015** with the objective to support hybrid/EV market development and manufacturing ecosystem. The scheme has 4 focus areas viz. technology development, demand creation, pilot projects and charging infrastructure.
- Organisations like [Bureau of Indian Standards \(BIS\)](#), Department of Heavy Industry, Automotive Research Association of India are devising design and manufacturing standards of EVs, Electric Vehicle Supply Equipment (EVSEs) and charging infrastructure to smoothen the advent of in-house production of EVs.

What Should be the Way Forward for EVs Adoption in India?

- **Increasing R&D in EVs:** The Indian market **needs encouragement for indigenous technologies** that are suited for India from both strategic and economic standpoint.
 - Since investment in local research and development is necessary to bring prices down, it makes sense to leverage local universities and existing industrial hubs.
 - India should work with countries like the UK and synergise EV development.
- **Sensitising Public: Breaking away the old norms and establishing a new consumer behaviour is always a challenge.** Thus, a lot of sensitisation and education is needed, in order to bust several myths and promote EVs within the Indian market.
- **Viable Electricity Pricing:** Given current electricity prices, home charging may also be an issue if the generation is from thermal power plants run on coal.
 - Thus, a **shift in the electricity generation landscape as a whole** is what is required to facilitate the growth of electric cars.
 - In this context, India is on track to become one of the largest solar and energy storage markets by 2025.
 - A combination of **solar-powered grid solutions** that are organised with a general improvement in grid resilience will ensure adequate charging infrastructure for EV's being a green option.
- **Creating the Closed-Loop Mobility Ecosystem:** Subsidising manufacturing for an electric supplychain will certainly improve EV development in India.
 - Along with charging infrastructure, the establishment of a **robust supply chain will also be needed**.
 - Further, **recycling stations for batteries** will need to recover the metals from batteries used in electrification to create the closed-loop required for the shift to electric cars to be an environmentally-sound decision.

PDF Reference URL: <https://www.drishtias.com/printpdf/volatile-organic-molecules-evs>