

## **Electronic Nose (E-Nose) - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029**

Market Report | 2024-02-17 | 113 pages | Mordor Intelligence

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### **Report description:**

The Electronic Nose Market size is estimated at USD 27.38 million in 2024, and is expected to reach USD 53.10 million by 2029, growing at a CAGR of 14.17% during the forecast period (2024-2029).

#### Key Highlights

- Technological advances, such as artificial intelligence (AI), the cloud, and the Internet of Things (IoT), have positively impacted the demand for electronic nose technology. These advancements have enhanced computing systems, which are one of the key components of products in the electronic nose industry.
- The electronic nose has significant application value in identifying odors of items like wine, vegetables, or cigarettes. It is widely employed in odor detection, raw material inspection, quality signing, and sprinkling process management. It is also one of the indispensable tools for quality assurance and quality control. It is primarily used for maturity detection and species identification in fruit and vegetable testing.
- The increasing prevalence of diseases like lung cancer, tuberculosis, and diabetes and the increasing necessity for early detection of these diseases play a significant role in the growth of the market studied. According to the American Cancer Society, in 2023, it was estimated that around 59,910 women in the United States would die of lung and bronchial cancer. 88,900 men are estimated to die of lung and bronchial cancer in the United States in 2023.
- The e-nose market is also witnessing demand from the crime and security sector. With the surge of international terrorism and the increased use of explosives in terrorist attacks, law enforcement agencies globally face the problem of detecting hidden bombs in luggage, mail, vehicles, and aircraft. In the military and defense sector, e-nose devices can be used to detect explosives, chemical agents, and other hazardous materials. They are also employed for surveillance, reconnaissance purposes, and environmental monitoring at military installations and training areas.
- The cost of an electronic nose is significantly high due to the high costs of sensors that are incorporated into it. This is a major

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factor hampering the market's growth as the initial cost of the electronic nose is high, making it unaffordable for small- and medium-sized enterprises. Lack of awareness and technical expertise among users, coupled with varying regulatory requirements across various regions, is another factor that is likely to hinder the growth of the market studied.

-Along with the COVID-19 pandemic, various macroeconomic trends, such as global economic conditions, government spending on defense, geopolitical tensions, and technological advancements, influence the defense sector. Critical macroeconomic trends currently shaping the defense sector include decarbonization, high-intensity warfare (HIW), environmental, social, and governance (ESG) considerations, and increasing investments in the defense sector globally. According to SIPRI, with USD 877 billion allocated to the military in 2022, the United States leads the ranking of countries with the largest military spending. That equated to approximately 40% of overall global military spending that year, which totaled USD 2.2 trillion. With an estimated USD 292 billion spent, China was the second-highest military spender, with Russia coming in third.

-According to the US Congressional Budget Office, defense spending in the United States is predicted to increase every year until 2033. Defense outlays in the United States amount to USD 746 billion in 2023. The forecast predicts an increase in defense outlays up to USD 1.1 trillion in 2033. Such developments are likely to boost the adoption of advanced technologies like electronic nose in the military and defense sector.

## Electronic Nose Market Trends

### Waste Management (Environmental Monitoring) to be the Largest End-user Vertical

- Methane gas and other odors produced at landfills not only contribute to global warming but also create an odor nuisance, which is considered one of the largest sources of nuisance in various regions. As a result, waste management or environmental impact monitoring applications provide significant scope for electronic nose technology.

- The opportunities for e-nose for odor exposure assessment purposes are critical, especially in cases where dispersion modeling is not applicable. For instance, in landfills, where a detailed characterization and quantification of odor emissions for every hour of the simulation time domain is difficult due to the nature of the source, among other reasons, e-nose technology that uses receptors can be of strong potential. As governments across regions are considering a circular economy (reuse by recycling) to manage their landfills better, the need for such technology that enables real-time monitoring is increasing.

- Odor annoyance due to industrial gas emissions from wastewater treatment plants (WWTPs) is a recurring problem that is difficult to manage properly, partly due to the lack of appropriate instrumentation to accurately quantify odor concentrations in situ and in real-time. Such measurements are key to regularly verifying the efficiency of odor abatement systems, identifying the main odor sources within the plant, and predicting off-site impacts based on atmospheric dispersion models.

- When odors are exclusively measured by olfactometry (human panels), the high cost and discontinuous nature of this technique inevitably lead to an insufficient number of measurements to provide a representative characterization of the odor emissions. Electronic noses are currently considered one of the most promising tools for environmental odor monitoring.

- Waste generation rates are rising around the world. As per the World Bank, in 2020, the world generated 2.24 billion tons of solid waste, which amounted to a footprint of 0.79 kg per person per day. With rapid population growth along with urbanization, annual waste generation is estimated to increase by 73% from 2020 levels to reach 3.88 billion tons in 2050. With the growing amount of waste, the investment and adoption of new technologies in managing waste are expected to positively boost and influence e-nose's adoption during the forecast period.

### North America to Dominate the E-Nose Market

- North America holds a significant share of the market studied due to factors such as developed infrastructure and the availability

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of resources, which have enabled the adoption of e-nose technology in sectors such as defense, healthcare, and food and beverages, among others.

- The region is also home to a major food and beverage industry, which is highly regulated. This is where e-nose technology finds a prime opportunity for growth. For instance, according to the US Census Bureau, in December 2022, the monthly retail sales of food and beverage stores in the United States were USD 88.43 billion, compared to USD 82.14 billion in November 2022.

- According to StatCan, retail sales of food and beverage stores in Canada amounted to CAD 12.06 billion (USD 8.91 billion) in June 2022, compared to CAD 11.81 billion (USD 8.73 billion) in June 2021. Such an increase in food and beverage sales may facilitate the demand for electronic nose devices during the forecast period.

- The demand for e-nose technology is high in the food and beverage industry, as it can detect the freshness of food items, such as meat and poultry products, more effectively than a human nose. This helps in accurately determining the longevity of food items and reducing the amount of food waste.

- Similarly, healthcare agencies in the United States are trying to diagnose asthma in children using e-nose technology. In the United States alone, about 6.2 million children are diagnosed with asthma, comprising 8.4% of the population younger than 18 years. According to the report published by Pediatric Pulmonology, the country achieved an 80-100% success rate in asthma diagnosis using the e-nose technology. The study stated that this technology has fewer drawbacks, which are expected to be combated in the coming years, paving the way for the widespread adoption of this technology.

- Also, cities and states in the region regulate citizens and enterprises for odor pollution, which allows e-nose solutions to grow. For example, Buda, Texas, is fining residents for offensive odors. This includes an ordinance declaring offensive odors, including smoke, chemicals, and dead animals. Similar ongoing innovations and research across various end-user industries are expected to act as a catalyst for the market's growth in the region.

## Electronic Nose Industry Overview

The Electronic Nose Market is semi-consolidated with the presence of several players like Alpha MOS, Plasmion GmbH, The eNose Company, Aisense Analytics GmbH, EnviroSuite, etc. The companies in the market aim to develop advanced products and processes and strengthen their supply chains to cater to consumers' complex and evolving needs.

- In May 2023, Alpha MOS declared the formal validation of its milk quality control solution by the Chinese conglomerate Mengniu, which is the seventh-largest dairy group globally and the foremost in China. This validation was granted six months after the execution of a two-year framework agreement with the distribution enterprise Lan Chou Instruments, which aimed at equipping Mengniu with Heracles NEO electronic noses. The manufacturer has become the first to be equipped with three Heracles NEO instruments to monitor, under operational conditions, the alterations in the aroma of its products over time.

- In April 2023, The eNose Company demonstrated the use of the aeoNose to treat lung cancer at the HIMSS Global Health Conference and Exhibition in Chicago. The aeoNose communicates with the EHR using the company's platform, IRIS4health Intersystems.

## Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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