

# Smart **Environmental** Monitoring for **Sustainable** Future



# About Company



Oizom is an Environmental IoT company offering data-driven environmental solutions for better decision making. Using our sensor-based hardware, we monitor various environmental parameters related to air quality, noise, odour, weather, radiation etc. Our data analytics platform derives various actionable insights for authorities, communities and industries. Through smart environmental solutions and data-science, Oizom is striving to play an important role in future cities. Since its inception in 2015, Oizom is primarily focused on environmental monitoring technology and solutions. In a short span of 3 years, Oizom solutions are live at 200+ locations monitoring environmental health of more than 10Mn people everyday. Oizom solutions are actively monitoring the environmental conditions of 6 Smart Cities in India. The solutions are live in 10 global cities like Mumbai, Delhi, London, Tokyo, Istanbul and a few more. Through an ecosystem of network-partners, Oizom has a strong presence in 10+ countries.



**VISION :** Keeping Environment at the core, we envision to empower various industries with highly scalable data-driven solutions for better decision making.



**MISSION :** Implement our Environmental IoT and Environmental Ai solutions in 50 Major cities of the world by 2020.



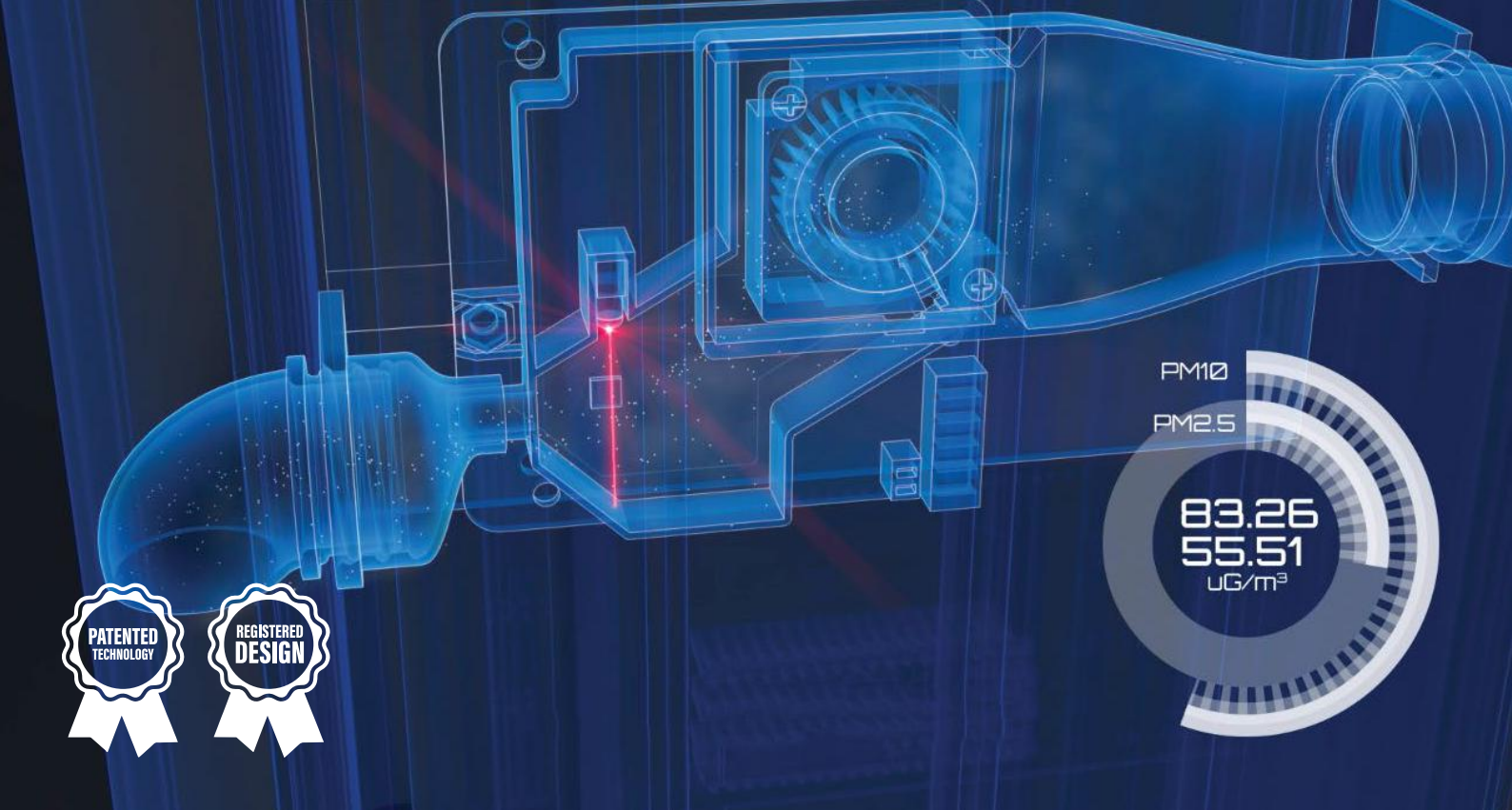
## Achievements



## Media Coverage

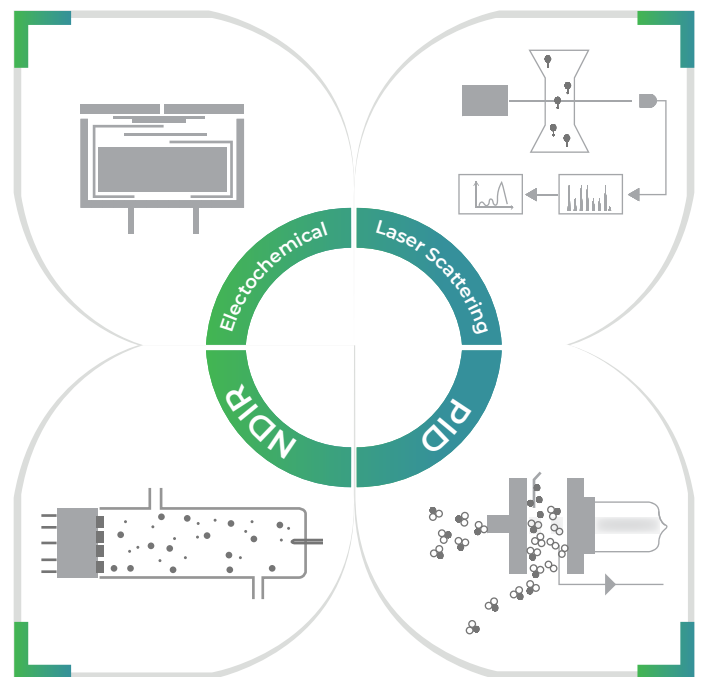






## About Technology

Oizom has years of experience in stimulating innovation by creating groundbreaking technology for environmental monitoring. With the platform-based development approach, Oizom has been able to successfully unlock multiple solutions catering to various industries. Our sensing technology is built on proven working principles like NDIR, Electrochemical, Semiconductor, Optical, Laser-Scattering, etc. As a part of our proprietary 'Micro Active Sampling' (e-breathing technology), we have a sophisticated suction and exhaust system to take a sample of air and monitor inside a controlled environment. This leads to zero effect of the external environment on measurement responsible for up to 13% higher accuracy than the industry standards.



## Data Communication



**Data Accuracy:** Oizom is preferred for the sensor-based environmental monitoring system because of its patented micro-sampling technology which gives 13% higher accuracy than industry standards. All the competitors can commit upto 75% accuracy where Oizom can achieve upto 88% data accuracy.



**Custom End-to-end Solution:** Using modular technology stack, Oizom provides a customized end-to-end solution based on the application and use-case. Using our hardware, cloud, software, data-science and secured-APIs, we come up with an appropriate solution targeting the application.

# Hardware Solutions

## Polludrone®

Polludrone is an Ambient Air Quality Monitoring System (AAQMS). It is capable to monitor all the required urban pollutants like Air-Pollution, Radiation, Noise etc. Using external probes/attachments, it can monitor other peripheral parameters like weather, traffic, disaster etc.

Polludrone is an ideal choice for urban monitoring applications such as smart-city infrastructure, roadside monitoring, campus monitoring, airport monitoring, etc.



Parameter	Lite	Smart	Pro
Particulate Matter - PM <sub>2.5</sub> , PM <sub>10</sub>	✓	✓	✓
Carbon Monoxide (CO) and Carbon Dioxide (CO <sub>2</sub> )	✓	✓	✓
Noise, UV Radiation, Temperature, Humidity	✓	✓	✓
Gaseous Pollutants (SO <sub>2</sub> , NO, NO <sub>2</sub> , O <sub>3</sub> )	X	✓	✓
Ultra Fine Particulate Matter (PM <sub>1</sub> ), Total Suspended Particulate Matter (PM <sub>100</sub> ), Hydrogen Sulfide (H <sub>2</sub> S)	X	X	✓
Equipment Size	360mm (H) x 328mm (W) x 200mm (D)		
External Modules (optional)	Wind Speed & Direction, Rainfall, Flood		



## Odosense®

Odosense is the Real-time Odour Emission Tracking Solution. Odosense detects, measures and monitors the odourful gases and gaseous contaminants on a continuous basis. Odosense is engineered for accuracy to measure odourful gases such as Ammonia (NH<sub>3</sub>), Hydrogen Sulfide (H<sub>2</sub>S), Volatile Organic Compounds (TVOCs), and Methyl Mercaptan(CH<sub>3</sub>SH), Meteorological Parameters and many more.

Parameter	Lite	Smart	Pro
Hydrogen Sulfide (H <sub>2</sub> S), Sulfur Dioxide (SO <sub>2</sub> ), Ammonia (NH <sub>3</sub> )	✓	✓	✓
Temperature, Humidity	✓	✓	✓
Methyl Mercaptan (CH <sub>3</sub> SH), Total Volatile Organic Compounds (TVOCs)	X	✓	✓
Chlorine (Cl <sub>2</sub> ), Nitrogen Dioxide (NO <sub>2</sub> ), Formaldehyde (CH <sub>2</sub> O)	X	X	✓
Equipment Size	360mm (H) x 328mm (W) x 200mm (D)		
External Modules (optional)	Wind Speed & Direction, Noise		



# Weathercom<sup>®</sup>

Weathercom is an automatic weather station which measures real-time Wind Speed, Wind Direction, Rainfall, Flood, Temperature, and Humidity. The data can be visualized on the Oizom Terminal which is a Data Platform (Web Application).

Parameter	Lite	Smart	Pro
Wind Speed, Wind Direction	✓	✓	✓
Rainfall Monitoring	✓	✓	✓
Light, UV Radiation	✓	✓	✓
Temperature, Humidity, Pressure	✓	✓	✓
Soil Humidity	X	✓	X
Visibility, Road Surface Condition	X	X	✓
Equipment Size (HxWxD)	360mm (H) x 328mm (W) x 200mm (D)		
External Modules (optional)	Flood Monitor, Noise		



# Dustroid<sup>®</sup>

Dustroid is an Online Particulate Monitoring system for Ambient applications. It is capable to monitor various particulate matter like Suspended Particulate Matters (SPM) and Respiratory Suspended Particulate Matters (RSPM). Dustroid is an ideal choice for applications like construction sites, mines, quarries, ports, research projects, etc.

Parameter	Smart	Pro
Ultra Fine Particulate Matters (PM <sub>1</sub> )	✓	✓
Suspended Particulate Matters - PM <sub>2.5</sub> , PM <sub>10</sub>	✓	✓
Total Suspended Particulate Matter (TSP-PM <sub>100</sub> )	✓	✓
Temperature, Humidity	✓	✓
Heated Inlet for Air-sample Dehumidification	X	✓
Equipment Size (HxWxD)	360mm (H) x 328mm (W) x 200mm (D)	
External Modules (optional)	Wind Speed & Direction, Rainfall, Noise	



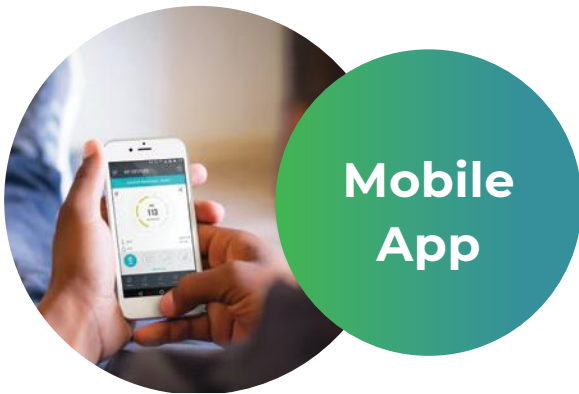
# Data Accessibility

Oizom Terminal is a cloud-based data visualization and analytics platform. It offers an overview as well as detailed analysis of environmental data from all the locations. The Terminal has essential features like smart notifications, print-ready reports, historical data analytics and many more.



## Terminal

The mobile app allows users to analyze the air quality of their city, compare the AQI of hundreds of cities around the world on the go. This user-friendly app also generates alerts every time there is a pollution threshold breach. Increased public awareness through this app simulates the precautionary actions by the citizens for their day-to-day activities and to achieve better health.



## Mobile App

Using sensor data as a primary source and secondary sources like Satellite Data, Traffic Condition, Meteorological Condition, Heat Island Effect and Source Inventory; Oizom creates a high-resolution environmental model in the form of hyperlocal pollution map at a city scale. Using this map, multiple geospatial applications can be addressed.



## Pollution Heatmap

Oizom Data Platform can provide automated/on-demand print-ready reports as per industry standards. These reports can be activated on a daily, weekly, and monthly basis for multiple email recipients. This offers a better overview of the environmental condition and documentation capability.



## Automated Reports

Using custom thresholds for every parameter, Oizom can trigger actionable alerts in the form of push notifications, email notifications, and SMS notifications for the action team. This feature drastically reduces the problem-to-solution time using data-driven actions.



## Smart Alerts



For better environmental awareness, Oizom environmental data can be published on a Visual Messaging Display (VMD). Along with data, the display can also showcase actionable insights for the citizens. This allows citizens to take precautionary actions for better environmental health safety.



Secured and encrypted (OAuth 2.0) APIs enables the data transfer to a third party application. The MQTT/HTTPS API empowers developers and solution providers to build custom applications using Oizom Environmental Data.

Using smart TV box, any TV Display can be used for Environmental Awareness by showcasing Environmental Data and actionable insights. This Intuitive Environmental data interface can be used in any indoor key location (hot spots) for public engagement.



An easily integrateable i-frame based widget can be embedded in any third party web platform (website/apps) to showcase real-time environmental data and analytics. Such widget based approach can be a powerful medium environmental awareness digitally.

By enabling environmental data access through voice activation people can interact with Oizom platform using their Digital Assistants (Google Home, Alexa). This enables hands-free requests, alerts and other environmental insights.



# Solution Applications

## Smart City

Oizom provides a comprehensive solution for complete environmental monitoring for smart-city. The solution is designed to be compatible with the available network and communication infrastructure of the city. Through this real-time data can be provided to the city's Command and Control Center (CCC). The solution is designed to be integrated with a smart/intelligent pole.



## Real Estate / Campus

Oizom sensors along with Outdoor LED Display is a Smart Solution to empower the residents of the society.

The Oizom sensors can monitor the dust and noise levels in the residence periphery. The data is then transmitted to the cloud which reflects the data on the Outdoor LED and the respective building's mobile app.

The Oizom intelligent algorithms disperse the data in the form of suggestive actions for the citizens to take data-driven actions. The Maintenance and the Real Estate Management can also have a holistic view of the environmental health of the buildings.



## Road Safety

By monitoring critical weather parameters from strategic locations, the problem can be well addressed by dynamically changing the top-speed-limit. Weather monitoring solution comprising Road Visibility, Road Surface Temperature, Ice/Snow on Road, Tyre grip level, Rainfall; can be installed at specific intervals to gather data in the command and control centre. Using this data, vehicle top-speed-limit can be dynamically derived by applying parametric algorithms. The same can be enforced using a speed-control system.







## Dust Suppression

Oizom offers a smart, cost-effective, and low powered real-time Suspended Particle Monitoring Solution. It is capable of monitoring the Total Suspended Particulate Matters i.e. PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, PM<sub>100</sub>.

Peripheral monitoring at strategic locations in the vicinity of the Construction site / Earthworks (Mines & Quarries) / Civil Works is beneficial to ensure the activities are not violating the Air-Quality Regulations. Alerts feature can trigger notifications to the concerned person automatically whenever the Dust accumulation is rising than the threshold and helps in effective mitigation planning.



## Solid Waste

By installing Oizom Odosense around a Municipal Solid Waste (MSW) Dumpsite/Landfill and near Waste-to-energy (WtE) plants; odour intensity can be monitored in real-time. Through analysis of the odour composition by monitoring levels of Hydrogen Sulfide (H<sub>2</sub>S), Ammonia (NH<sub>3</sub>), TVOC, Methane (CH<sub>4</sub>) etc.; sources of odour are predictable. Using real-time Odour data and Meteorological data (wind speed and direction), our platform measures odour nuisance on the neighborhood on real-time. Using reverse modeling capabilities, Oizom can predict odour emission hot-spots.



## Waste Water Treatment

By installing Oizom Odosense near key process tanks of a Sewage Treatment Plant (STP) or an Effluent Treatment Plant (ETP), odourful gases emission can be monitored on a real-time basis. Using this solution, the source of odour can be identified and corrective measures can be taken. This solution leads to data-driven odour control for waste-water treatment. In addition, by installing Odosense on the periphery of the WWTP, its impact on the surrounding neighbourhood can be measured.

# Case Studies



## Smart City Project

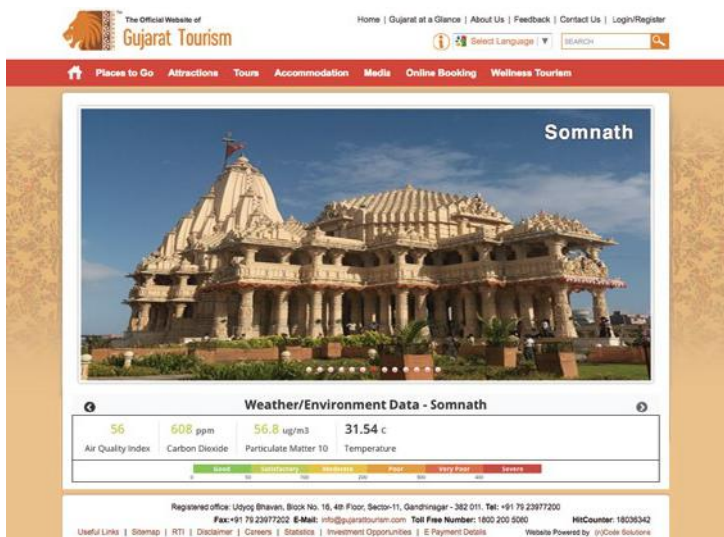
Oizom executed the Kakinada Smart City Project having installed 12 Polludrone all around Kakinada to provide real time environmental data. Solution included Air Quality parameters, Rainfall and Flood Monitoring. The data is integrated with CCC. LoRaWAN based Low Power Long Range solution specially designed for smart city air quality monitoring. Automated Reports, Alerts, Analysis available to authorities for better decision making.

- Kakinada
- July 2017
- 36 Km<sup>2</sup>
- Polludrone
- API Integration to ICCC
- Smart City

## Odour Monitoring

Second largest Landfill site of Asia needed a scientifically proven measure for odour abatement and fire hazard safety for nearby residents. Oizom with ESS Enviro designed a Solar Powered and Robust Odour Monitoring Solution 'Odosense' for real-time odour emission tracking. Peripheral odour monitoring using data analytics and triangulation for source location spotting.

- Kanjurmarg Landfill Site
- June 2016
- 15 Km<sup>2</sup>
- Polludrone
- Oizom Terminal, Reports
- Odour Monitoring



## Promoting Ecotourism

With an annual footfall of 19.81 Mn tourists, Gujarat Tourism Board decided to monitor Air Quality of heavy tourist attraction spots for Citizen health and safety. By installing Environmental Monitoring Systems at key tourist destinations ( i.e. Somnath, Porbandar, Saputara, Dwarka, and Rann of Kutch) the real-time Pollution data was centrally collected and published on the Gujarat Tourism website to promote Eco-Tourism.

- Tourist Destinations
- Jan 2017
- 15 Km<sup>2</sup>
- Polludrone
- Web Widget, Oizom Terminal
- Eco-Tourism





## Air-Quality Noise Study

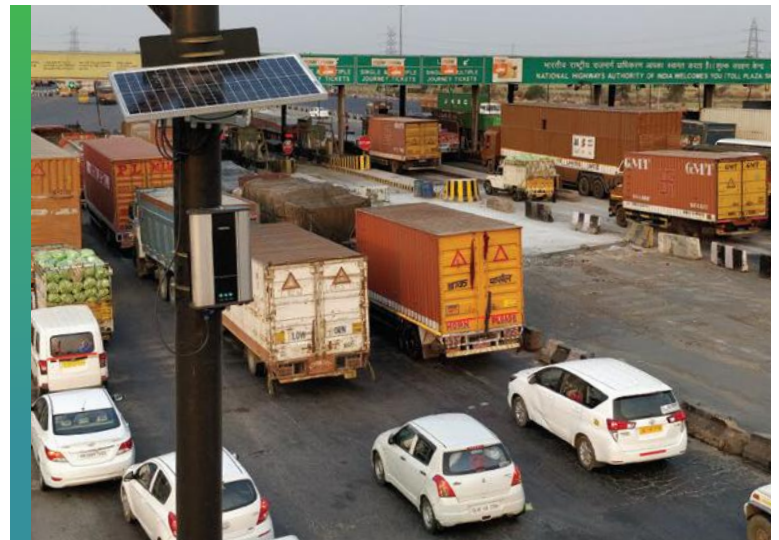
World's most polluted city and capital of India, Delhi has been a Gas Chamber and it's imperative to monitor Continuous Air Quality. With the top pollutants Total SPM and Vehicular Emissions, ESS Enviro with Oizom deployed 10 Polludrones for real-time air quality data. The data from congested traffic spots to residential areas was put into action using Automated Reports and Alerts.

- 📍 Delhi
- 📅 Feb 2017
- 📏 30 Km<sup>2</sup>
- 🏠 Polludrone
- 🖥️ Oizom Terminal, Reports
- ⚙️ Air Quality Noise Study

## Highway Monitoring

Oizom deployed a comprehensive solution to monitor Air Quality and Weather Conditions on Alwar Highway for vehicular emission monitoring and preventive maintenance of the roads. The solution installed near Electronic Toll Collection booth also indicates a significant reduction in amount of vehicular emissions simply by keeping the traffic moving smoothly and avoiding heavy traffic congestion, deceleration and acceleration effects.

- 📍 Alwar Highway
- 📅 March 2018
- 📏 1 Km<sup>2</sup>
- 🏠 Polludrone
- 🖥️ API Integration to ICC
- ⚙️ Smart Highway



## Real Estate Monitoring

Palava Smart City by Lodha Developers is ranked Most Livable City in India. Palava is equipped with 21000 trees and 28000+ families. To provide a quality environment to the residents, PCMA and Oizom deployed Air Quality Monitors and Odour Monitoring Stations in 3 different sites. One aesthetically pleasing display board shows color-coded real time air quality data for Citizen awareness.

- 📍 Palava, Mumbai
- 📅 June 2016
- 📏 18 Km<sup>2</sup>
- 🏠 Polludrone
- 🖥️ Oizom Terminal Outdoor LED
- ⚙️ Smart Campus



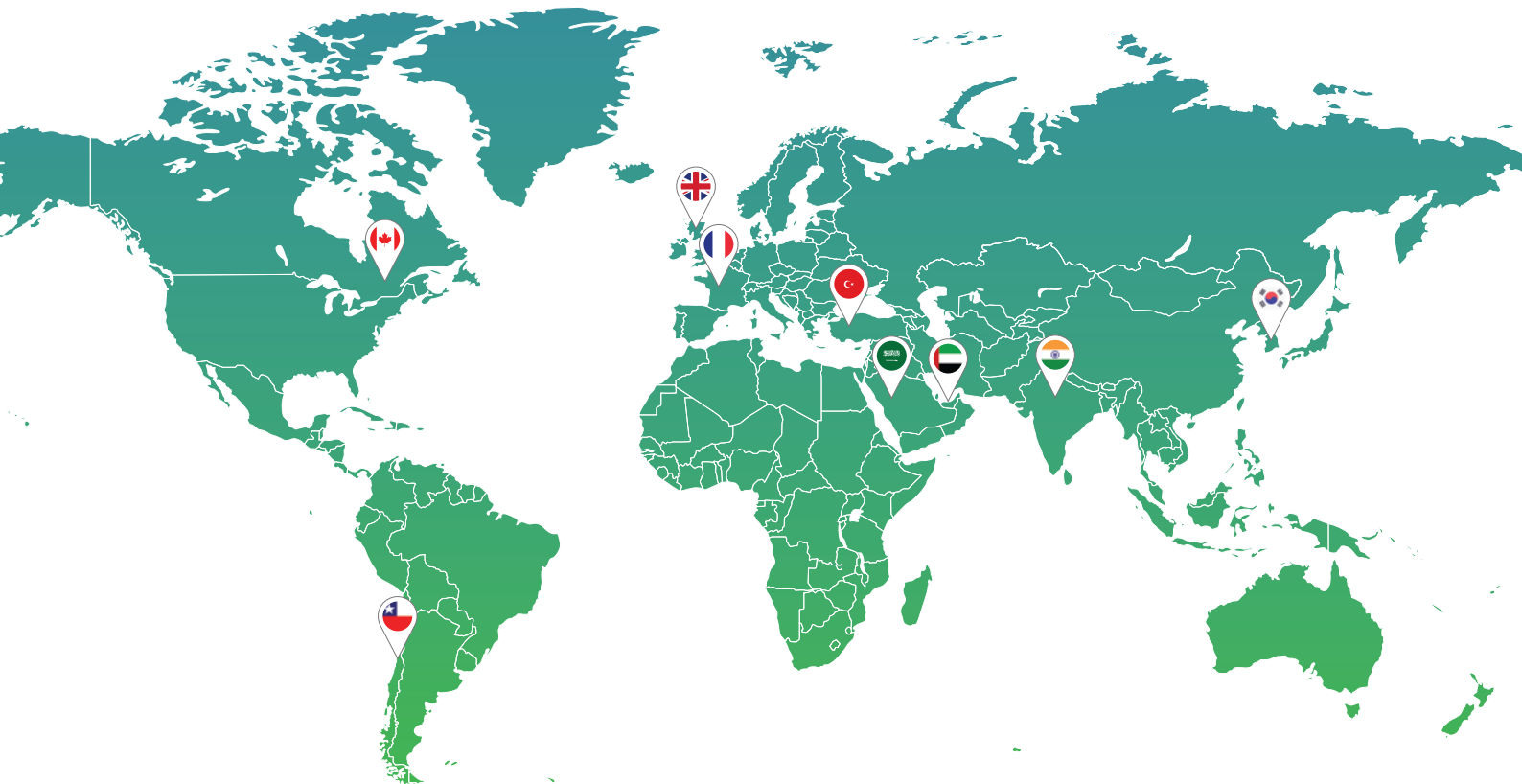
## Oizom Customers



## Oizom Ecosystem



## Global Presence



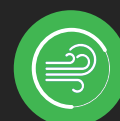
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306, Indraprasth Corporate, Prahladnagar,  
Ahmedabad - India  
✉ [contact@oizom.com](mailto:contact@oizom.com) / [connect@oizom.com](mailto:connect@oizom.com)  
☎ +91-8866660025 / 82



HB9, Savoie Technolac,  
Le Bourget du Lac - France  
✉ [hello@oizom.com](mailto:hello@oizom.com)  
☎ +33 783426695



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