Success story

NEOM

The Line, sustainable from its foundations with Libelium's AI solution

Intro

Libelium plays a crucial role in the building of The Line in NEOM, a linear city conceived to be sustainable from its inception.

This project is an architectural marvel and aims to be a benchmark in urban sustainability. The Line is envisioned as a linear metropolis, 200 meters wide and 170 kilometres long, connecting the Red Sea to the mountains of the Arabian Peninsula. It promises a lifestyle in harmony with nature and a new way of designing cities. The plan estimates that the city will be completed by 2030.

The challenge

BUILDING AN ENTIRE CITY IN A SUSTAINABLE WAY

The Line, by NEOM, is a cognitive city stretching across 170 kilometres, from the epic mountains of NEOM across inspirational desert valleys to the beautiful Red Sea.
The Line wants to be a 0 emissions city since their construction.

PROJECT DETAILS

Client
NEOM

Location
KSA

Sector
Urbanism

The solution

ENVIRONMENT POLLUTION ORIGINS AND PROPAGATION

Libelium is at the forefront, of monitoring and controlling air quality. The challenge was to address air pollution stemming from construction, as well as other nearby sources such as the Red Sea port or desert sand.

libelium

SOLUTION DETAILS

Vertical
Air Quality, Sustainability

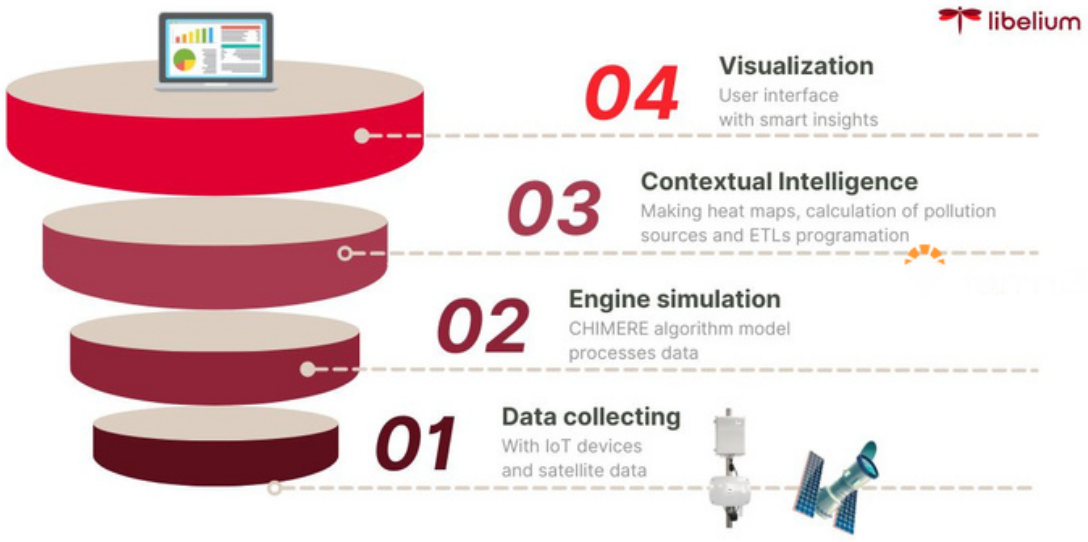
Solution
Smart Spot, IA for Air Quality

Parameters
Particle Matter, air pollutants, noise, weather

Behind the change

Libelium uses the CHIMERE chemical transport model, a multi-scale, open-source system that ranges from hemispheric to urban scales. This model integrates:

- CHIMERE: Calculates chemical concentrations based on emission models and meteorological data.
- IoT sensors and satellite observations: Calibrate the model and provide real-time data on air quality.
- Pollution source algorithm: Uses a semi-automatic clustering approach in two stages, identifying pollution patterns and associating them with specific sectors.



Libelium's solution is organized into several layers:

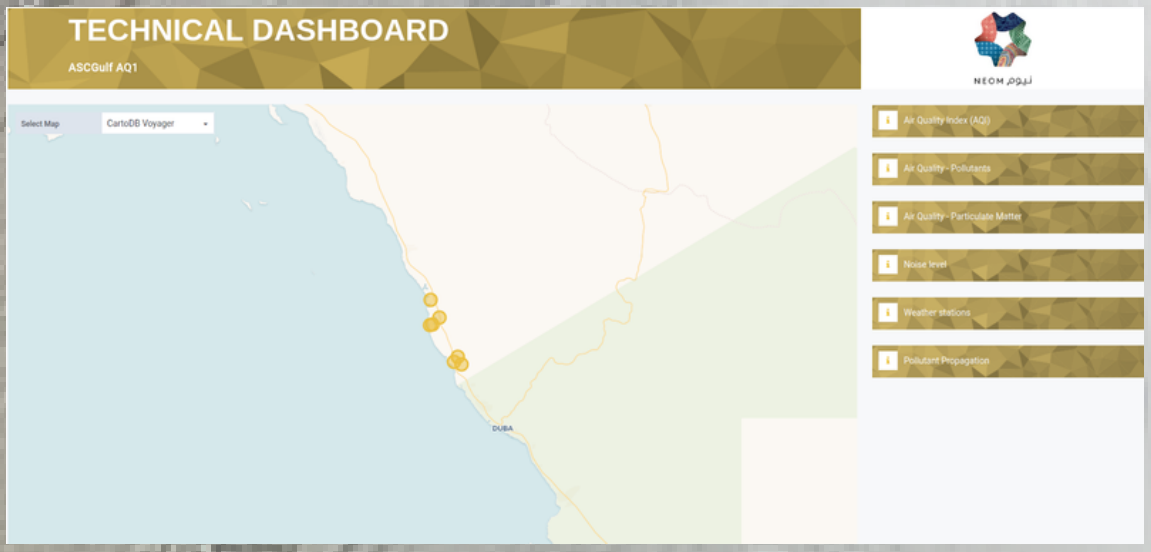
1. Data collection layer: With IoT devices and satellite data.
2. CHIMERE simulation engine: Feeds contextual intelligence.
3. Contextual intelligence layer: Generates heat maps and pollution source calculations.
4. Insights visualization in the user interface.

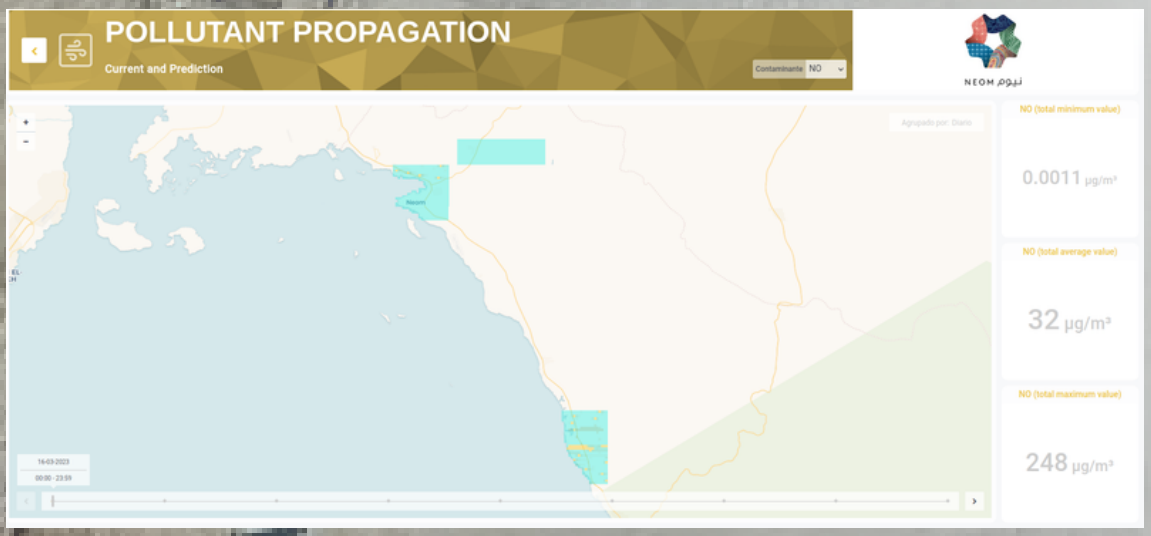
The CHIMERE model, enhanced with AI, allows detailed pollution analysis with a multi-scale approach, ranging from satellite panoramas to urban areas with a detailed 1 km resolution.

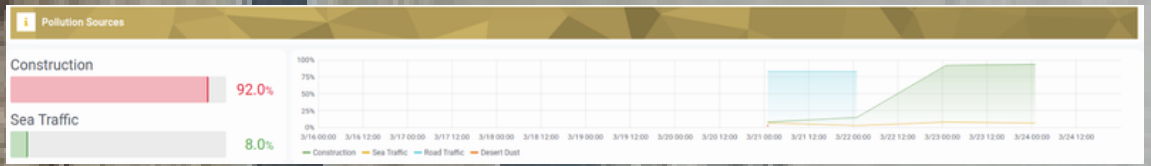
IoT sensors and satellite data are crucial for fine-tuning this model.

Libelium's innovation

Air quality pollution sources technology, an exclusive Libelium innovation, represents a significant milestone in the field of environmental monitoring. Developed by the Libelium's R&D team for several years in the mining field.
The ability of this technology to accurately identify the sources of air pollutants allows mining companies and other industrial sectors, such as construction, to take more effective measures to control and reduce their environmental impact.
Its application in real cases like in NEOM has proven to be a success, providing crucial data that helps improve air quality and, therefore, public health and the environment.







Beyond the challenge

Additionally, the AI solution incorporates further innovation in the pollution source algorithm, as it can semi-automatically cluster pollution sources. Using the advanced CHIMERE model, combined with the latest IoT sensor technology and satellite analysis, Libelium measures air quality and identifies the exact pollution sources. This holistic approach is key to effective environmental management.

Libelium's solution in NEOM has exceeded initial expectations, leading the city towards greater sustainability. The ability to monitor and manage air quality in real-time not only certifies NEOM's sustainability from its construction but also underpins informed decision-making and continuous improvement.

Furthermore, the Libelium platform has opened up new opportunities in resource management, public safety, and urban planning. With access to precise and up-to-date data on air quality, NEOM can optimize its operations and ensure a healthy and sustainable environment for its residents.

libelium

NEOM نيوم

libelium.com