Digitalization of the Plastic Value Chain in Southeast Asia - Plastic Management Open Data Platform

PROMOTING ACTION ON PLASTICS POLLUTION FROM SOURCE TO SEA IN SOUTHEAST ASIA AND PACIFIC
SUBPROJECT 2: PRIORITIZING AND IMPLEMENTING ACTIONS TO REDUCE MARINE PLASTIC POLLUTION

TA-6669 REG

18th of June 2025

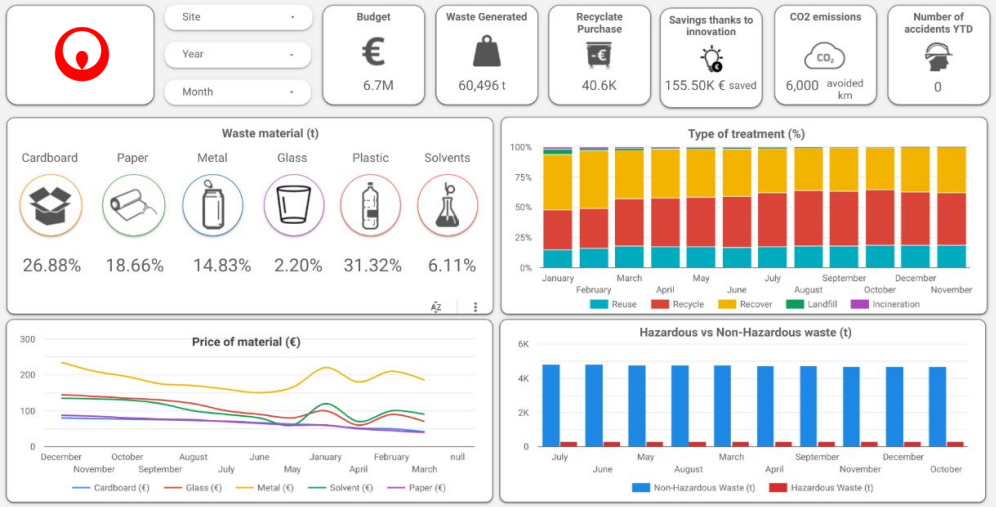
In Consortium with

CONSULTING ENGINEERS

Plastic Management Open Data Platform
Proof of Concept

Open Data Platform Proof of Concept (PoC) to collect, store, and analyse the data generated in activity 3 and validate the data governance framework.

- **Technical approach**: use cloud solutions offered in the region as a basis for the data storage, data processes;
- **Principle:** The data from the *Activity 3* will be managed using the Business Information Models and stored on the platform. Business Intelligence Tool will be used to generate dashboards and demonstrate the added value of Data sharing and analysis;
- The Open Data Platform PoC will involve the stakeholders of the *Activity 3* and will test the data management framework on a concrete example.

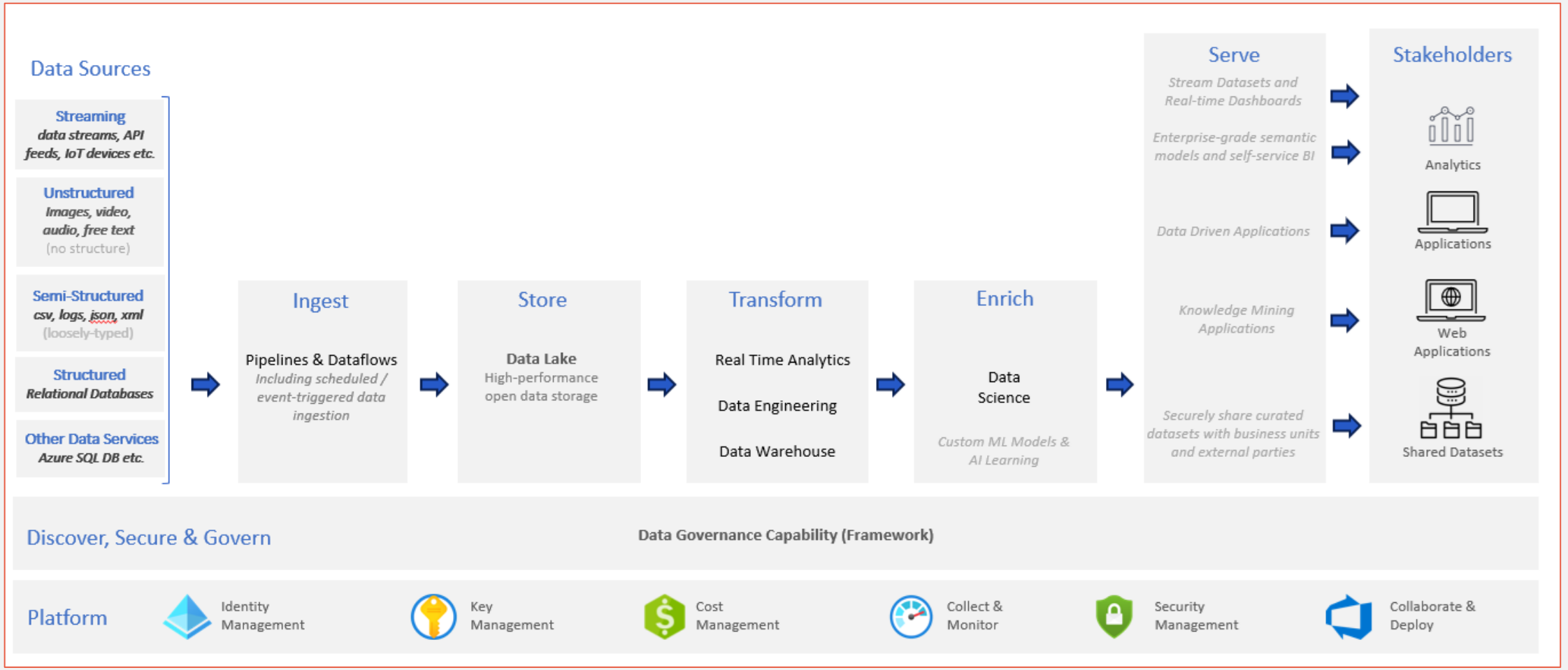


Example of Data platform dashboard

Open Data Platform

Architecture and Workflow

The flow of data from sources to stakeholders



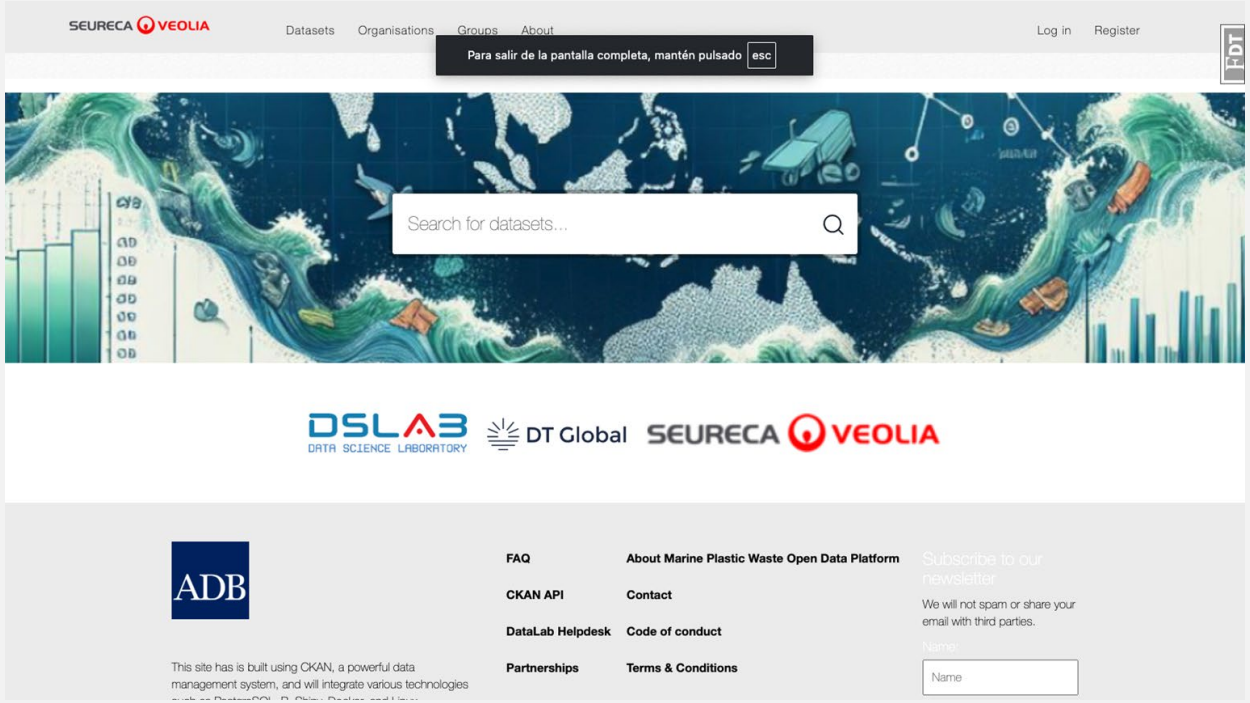
Open Data Platform
Overview and Objectives

Description & Objectives:

- **Description**: The PWM Open Data Platform is a CKAN-based system to manage marine plastic waste data, enabling data aggregation, analysis, and sharing across stakeholders.

Objectives :

- Aggregate Activity 3 pilot data from Jakarta, Surabaya, and Bali to validate the Data Governance Framework.
- Enable scalable, transparent data management for Indonesia.
- Support marine plastic reduction goals (350,000 tonnes/year leakage target).

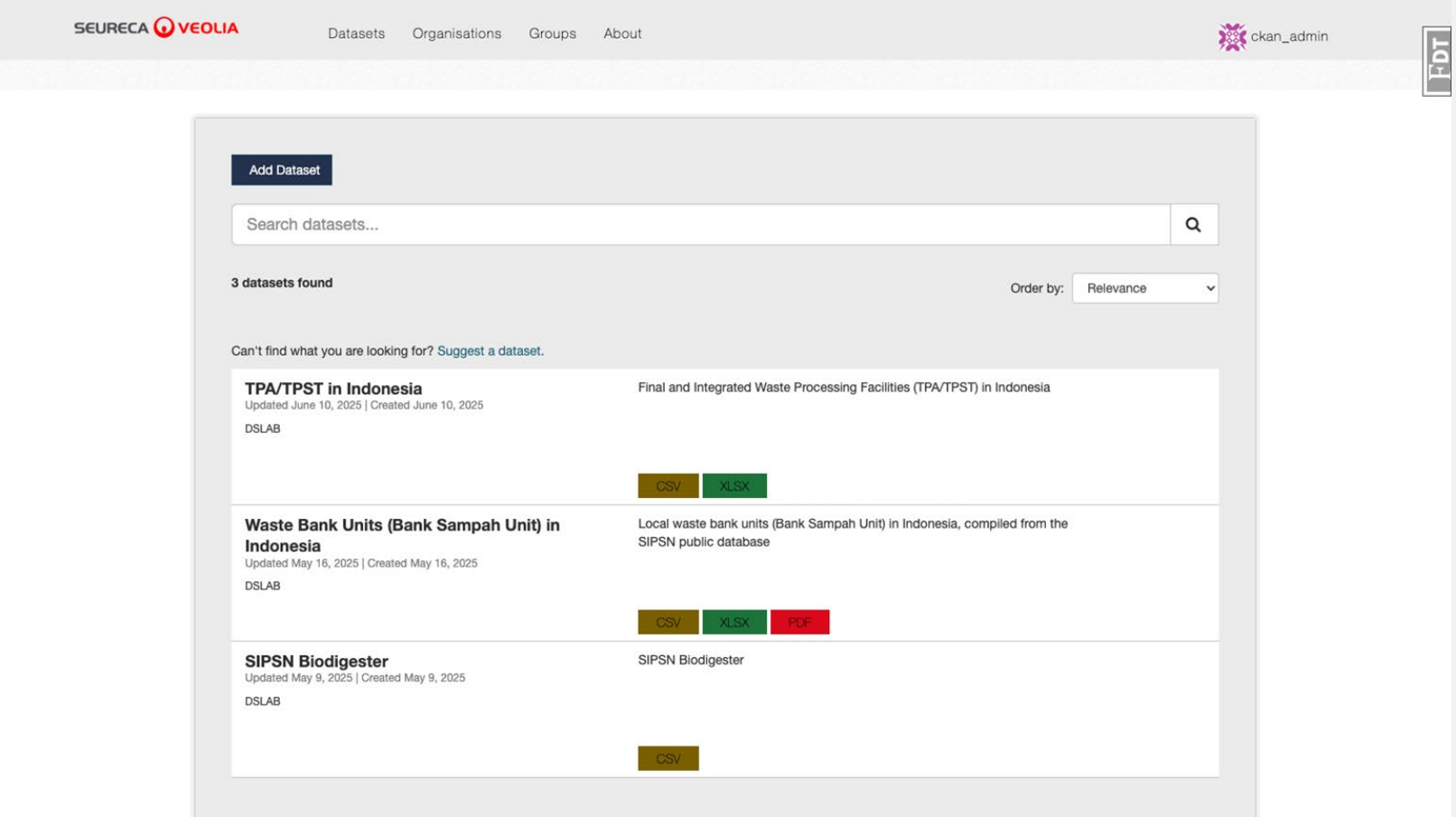


Open Data Platform
Overview

Key Features and Benefits:

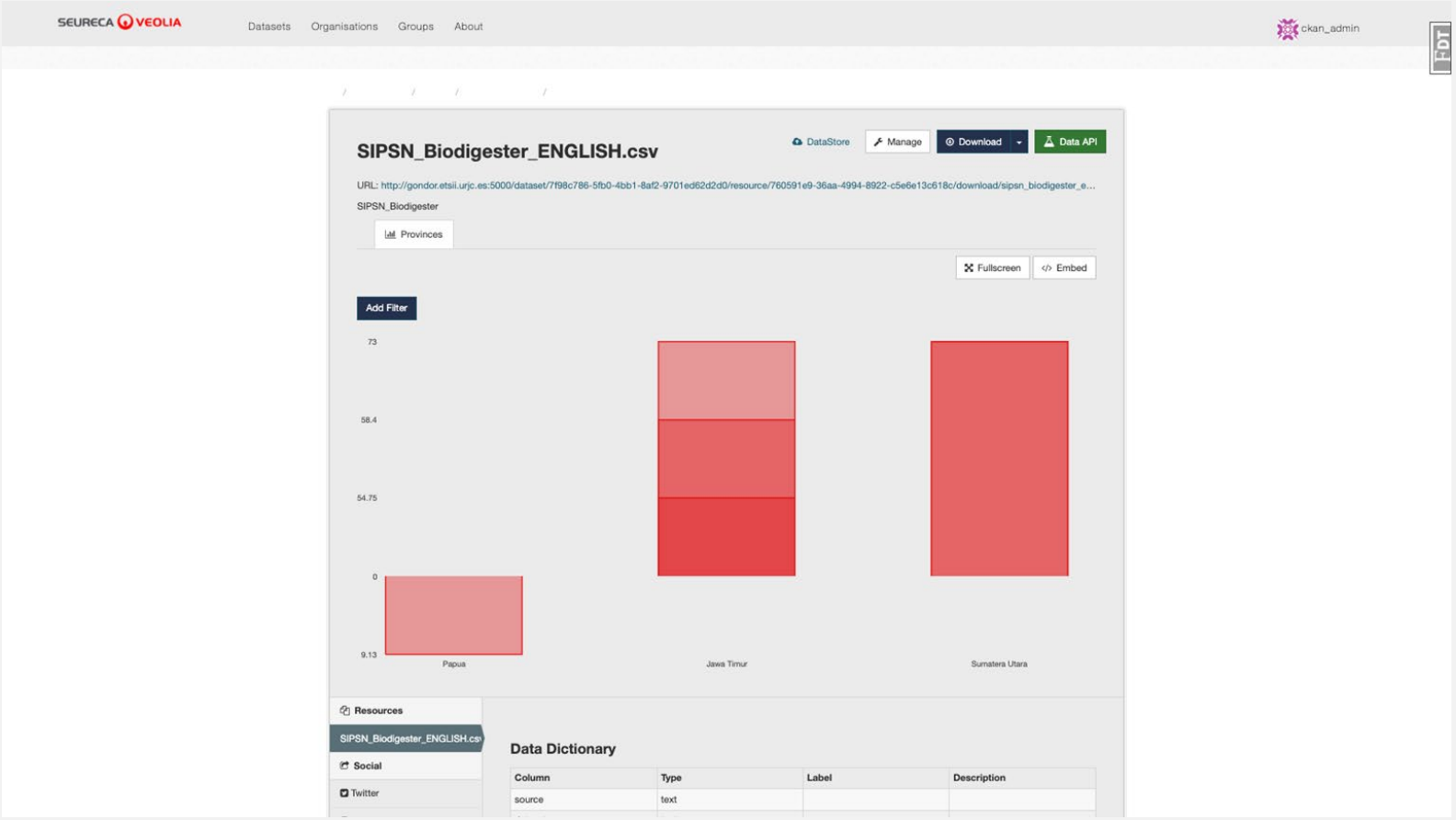
Features	Description	Stakeholder Benefit
CKAN Platform	Open-source system with web interface, supports structured/unstructured data	Government: Transparent data sharing via SIPSN, enabling MoE to monitor waste metrics; Communities: Public access to waste metrics
PostgreSQL Database	Stores structured pilot data (e.g., CSV, JSON) with **metadata** management	Private Sector: EPR compliance tracking; Informal Sector: Data integration via Duitin app, empowering waste pickers in Jakarta and Surabaya
Visualisation	1) Configured visualizations in the own platform; 2) API for reuse of data; 3) R/Shiny and PowerBI dashboards for generic exploration, configurable for future use	Government: Real-time policy insights (e.g., 20% recycling increase); Communities: Awareness
Scalability	Docker/Linux deployment, supports 1M+ data points, versioning for updates	All: Scalable solution for national rollout, future-proof for IoT/AI integration

Open Data Platform
Dataset upload



Admin login: Organizations allowed to upload data. Upload data and fill METADATA

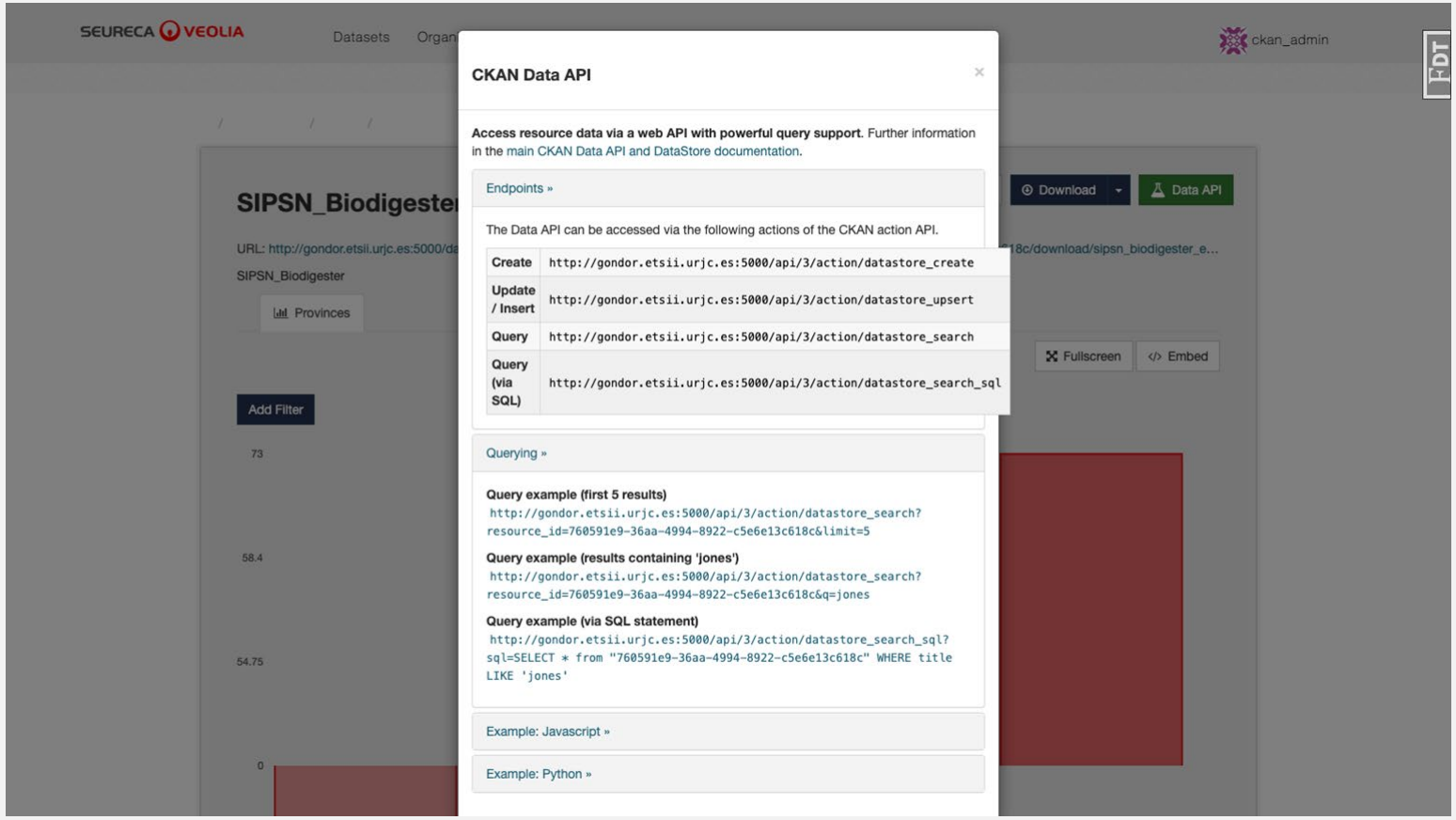
Open Data Platform
Configured visualizations



Dashboards: Configure several views, then build a dashboard

Open Data Platform

Data reuse: consistent API



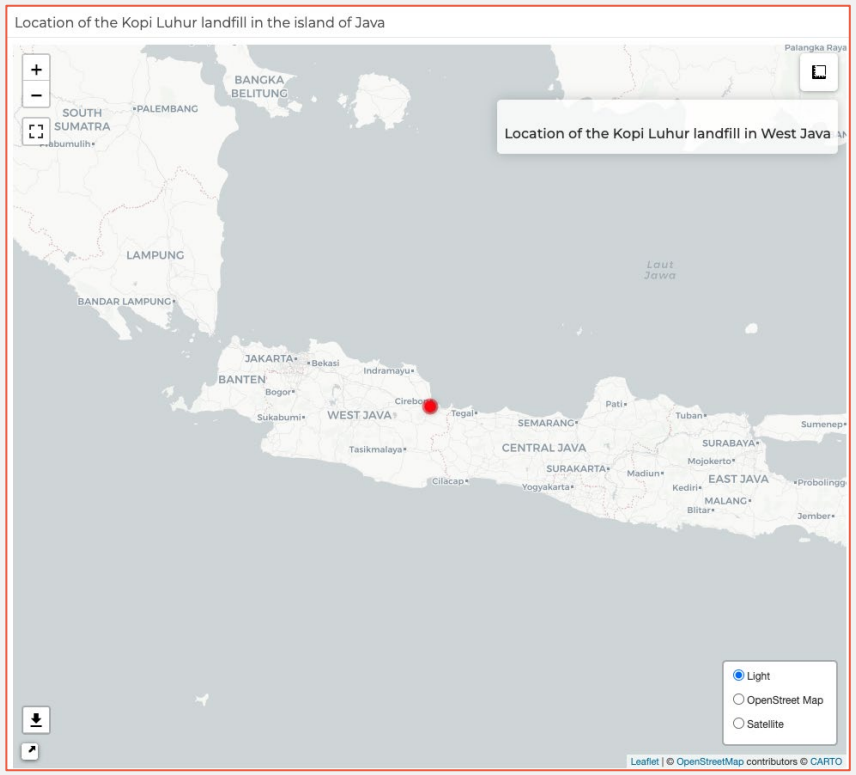
Standard access: To be consumed by other systems (R, PowerBI, …)

Open Data Platform
Architecture and Workflow (R & PowerBI Dashboards)

- **Thanks to the API, data can be reused and integrated in specific dashboards**

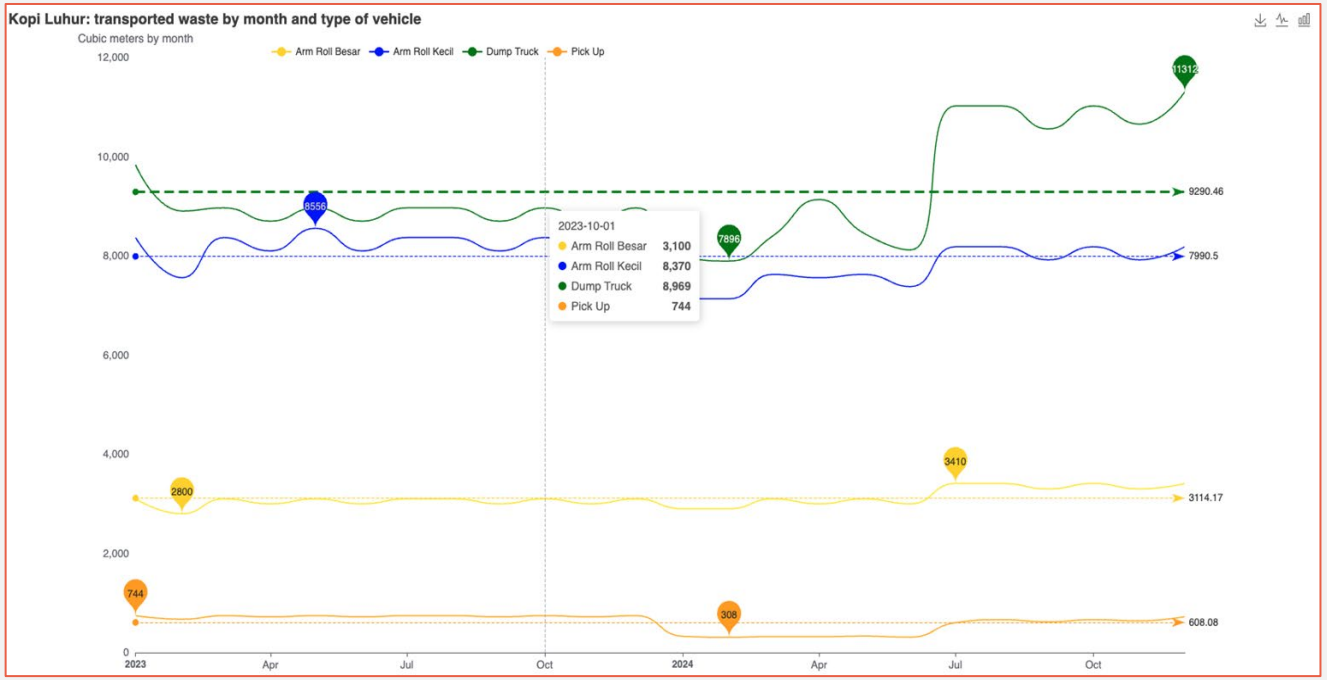
- **Why R?**
  - R is a free and open-source environment ideal for statistical modeling, data analysis and visualization.
  - It supports a wide range of interactive dashboard frameworks (e.g., shiny, flexdashboard, quarto) that integrate smoothly with databases and geospatial tools.
- **Typical Data Analytics and Visualization Workflow**
  - **Data Collection and Storage:** survey responses, local government databases, monitoring systems (e.g., waste volumes, collection frequency, recycling rates).
  - **Data Cleaning and Transformation:** Standardization, reshaping, validation.
  - **Data Analysis and Aggregation:** Summary statistics, indicators, trends, comparisons by region or type of waste, etc.
  - **Dashboard Development:** Interactive and dynamic interfaces for stakeholders and decision-makers.
  - **Visualization:** static and interactive charts, plots, tables and maps.
  - **Deployment:** Locally or online.
- PowerBI is an alternative for quick visualizations

Open Data Platform
R Dashboards



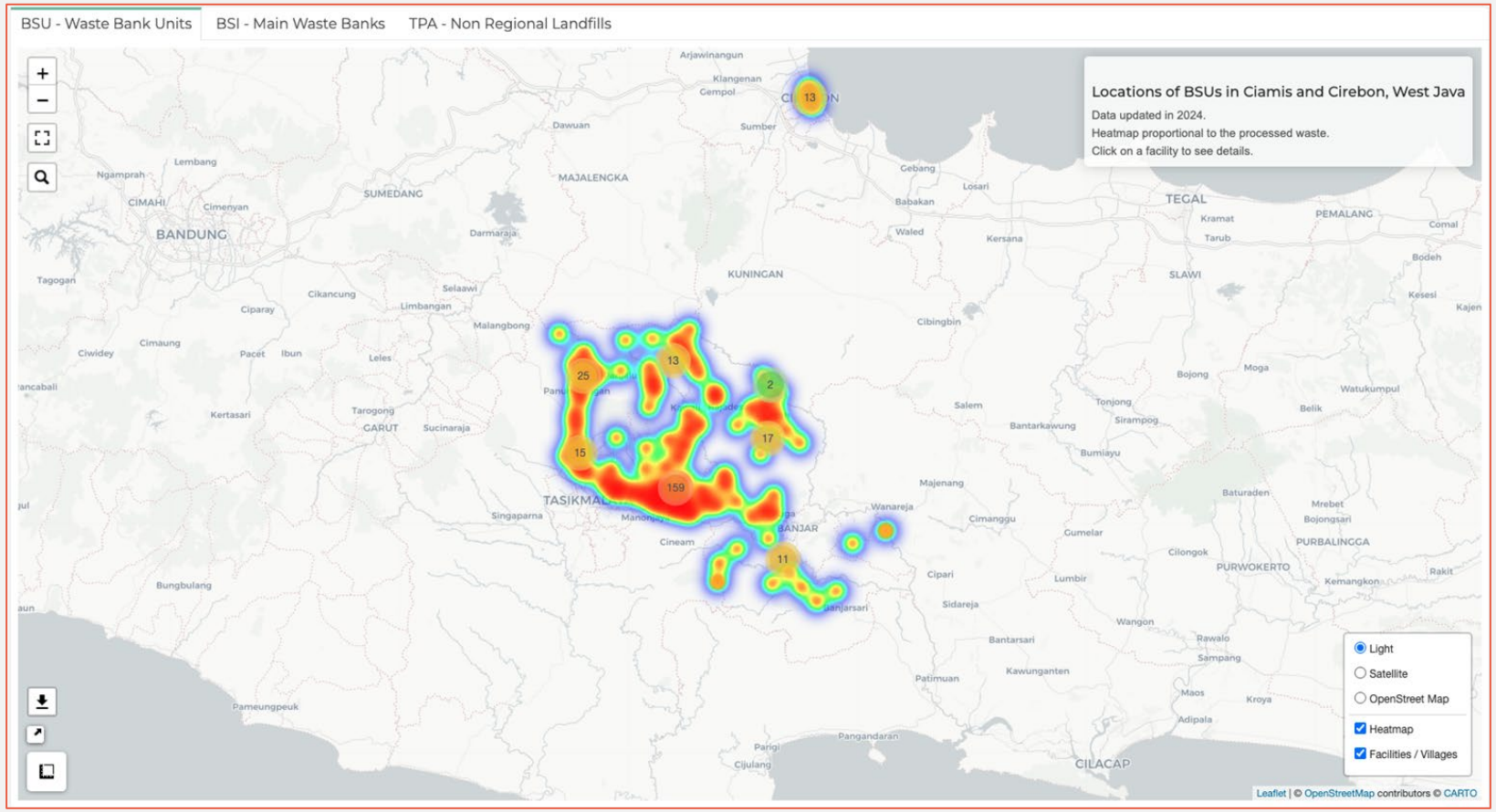
Location of the Kopi Luhur landfill in the island of Java

Kopi Luhur landfill: operational details (transported waste by month and type of vehicle)



Open Data Platform

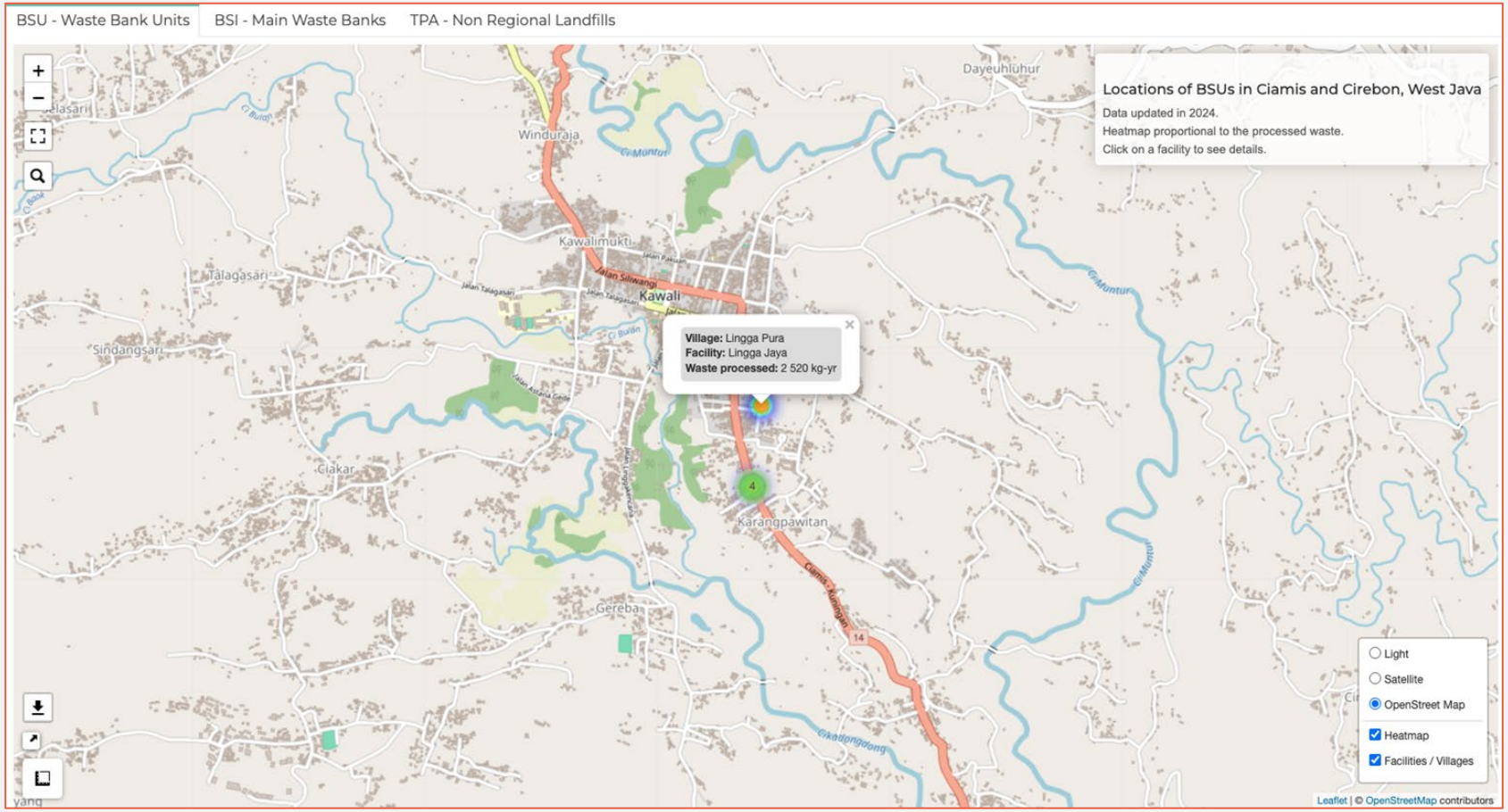
R Dashboards: Sample screenshots



Spatial heatmap: Location of BSUs in the municipalities of Ciamis and Ciberon, West Java

Open Data Platform

R Dashboards: Sample screenshots



Spatial Databases: Details of individual BSUs

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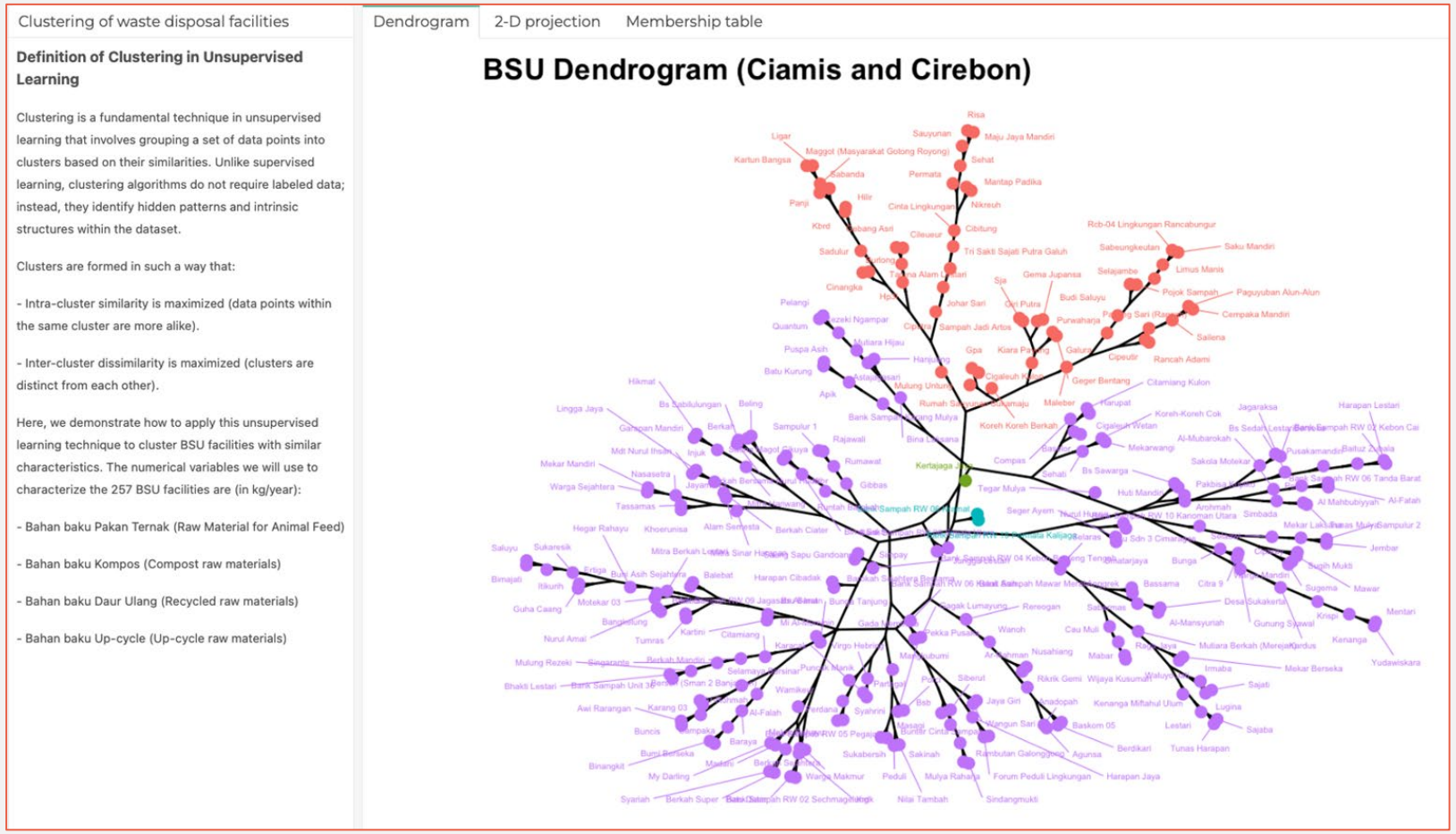
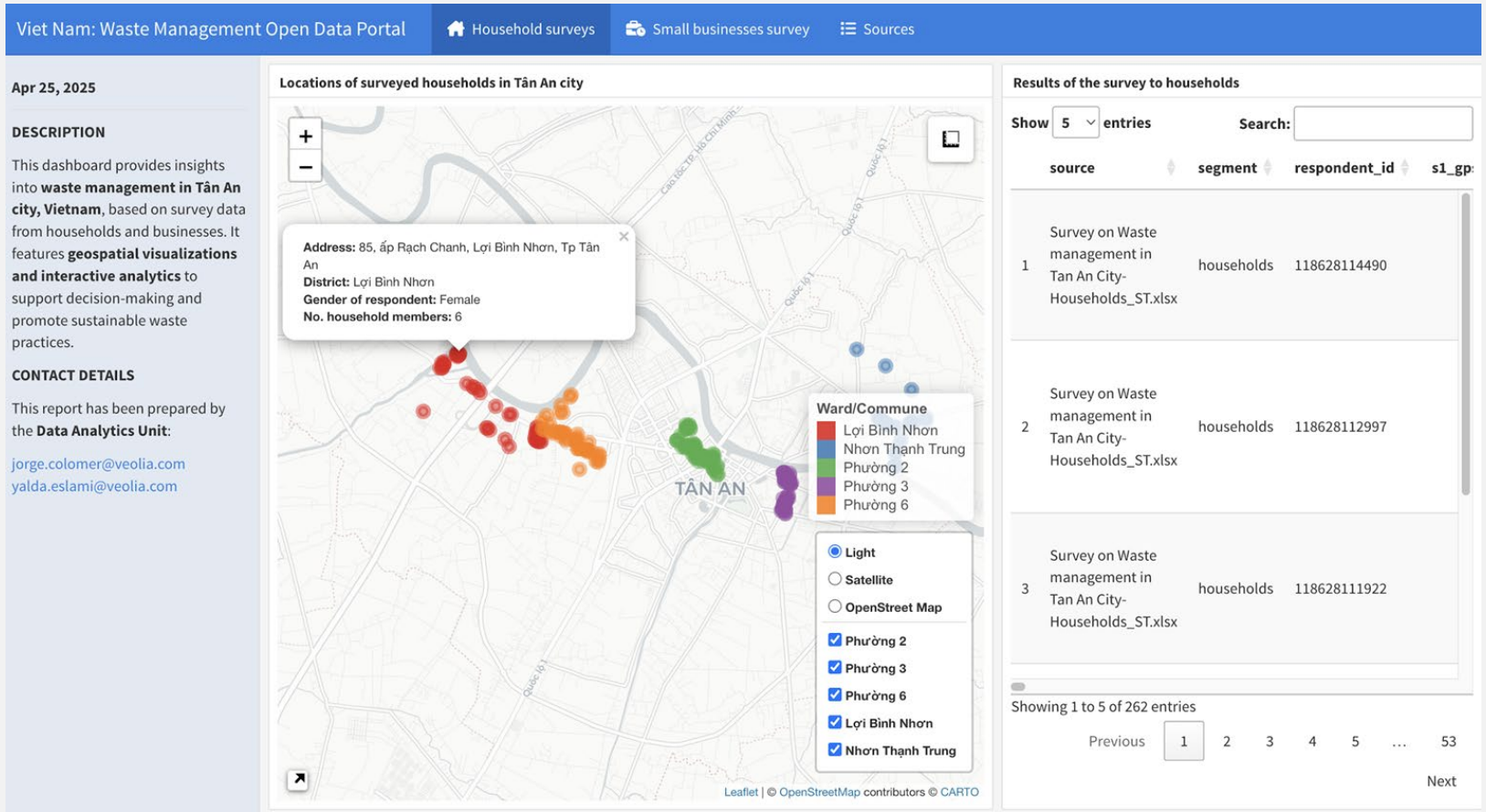
R Dashboards: Sample screenshots



Advanced Analytics Applications:
Unsupervised machine learning algorithms to cluster waste disposal facilities

Open Data Platform
R Dashboards: Sample screenshots



Access to dashboards

Viet Nam Household surveys

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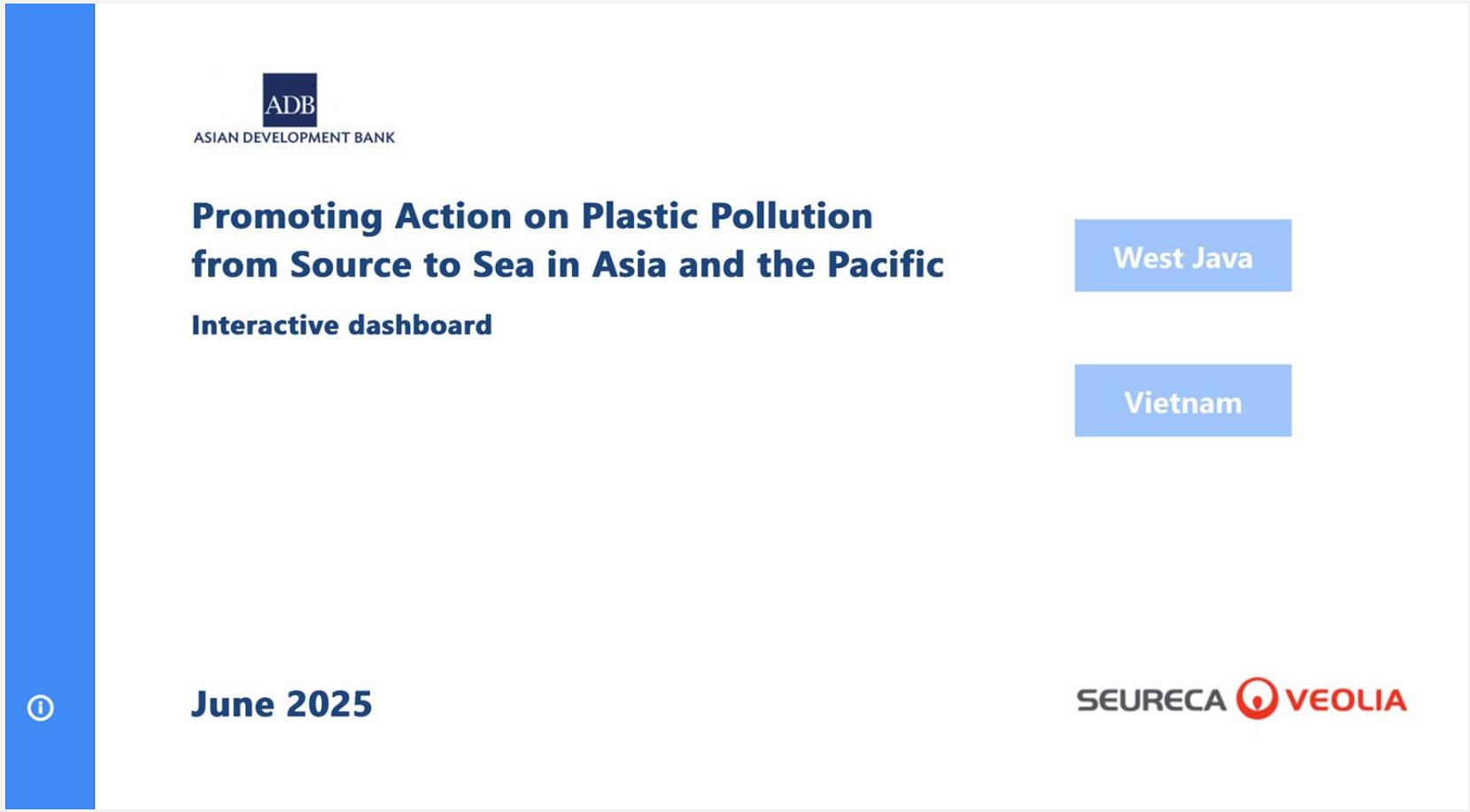
PowerBI Dashboards: Sample screenshots

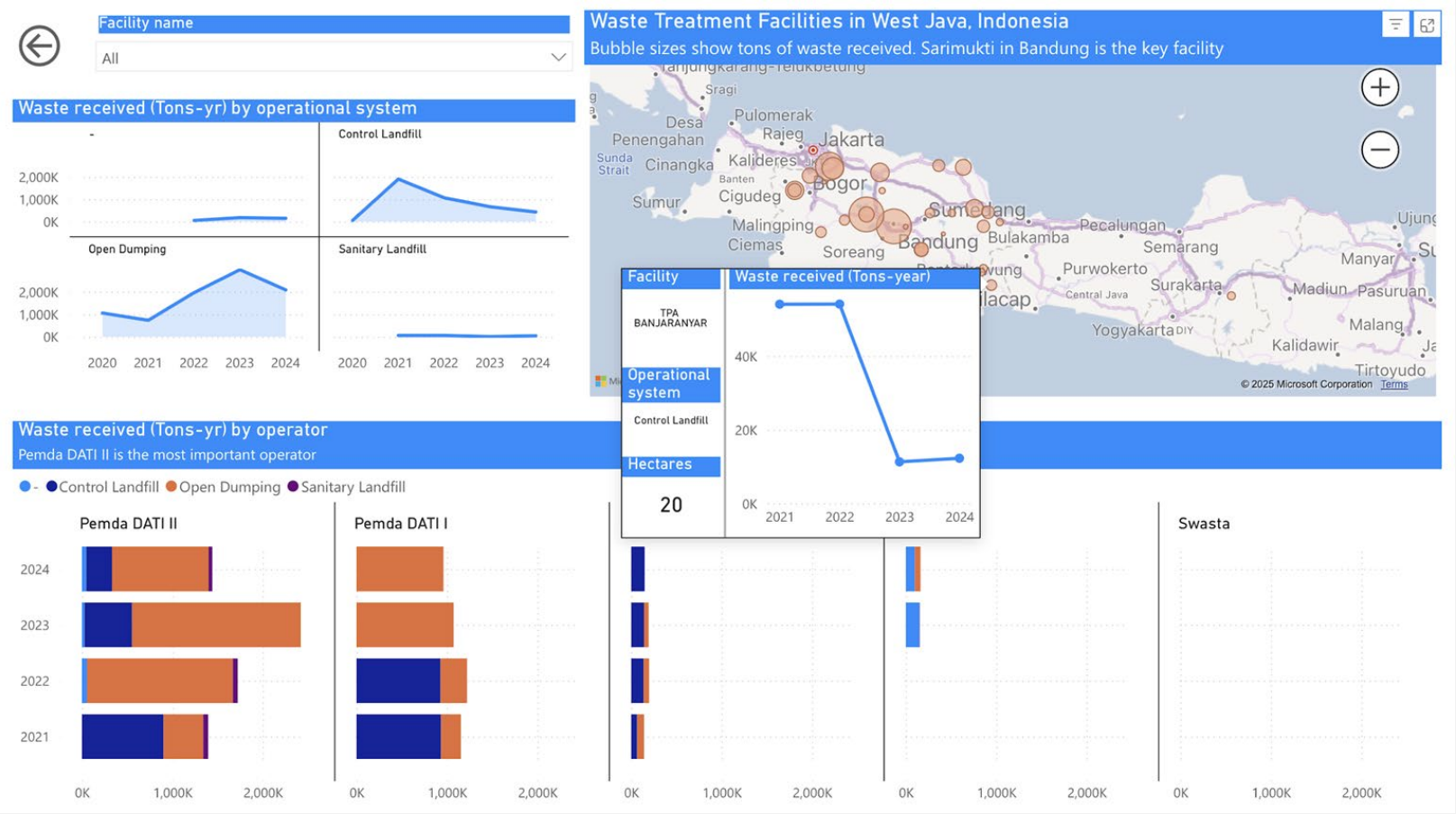


Access to dashboards

Menu Access to different visualizations

Open Data Platform

PowerBI Dashboards: Sample screenshots



Access to dashboards

West Java Facilities

Open Data Platform
PowerBI Dashboards: Sample screenshots

Analysis of Top Municipalities by Annual Waste Processing Volume

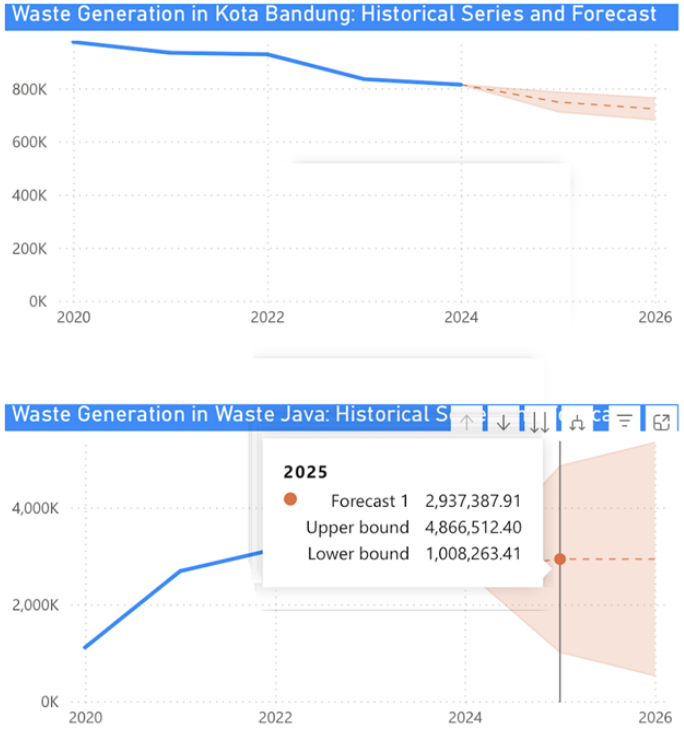
In 2024, **7** municipalities in West Java generated approximately **80%** of the waste in this province.

Municipalities Generating > 80% of Waste in 2024

Regency / City	2020	2021	2022	2023	2024
Kota Bandung	975K	934K	928K	835K	814K
Kota Bekasi		438K	365K	410K	422K
Kab. Bandung		219K	293K	188K	197K
Kab. Bekasi			225K	352K	307K
Kab. Cirebon	55K	66K	138K	159K	169K
Kota Bogor			196K	200K	188K
Kab. Karawang			127K	138K	138K
Total	**1,029K**	**1,657K**	**2,273K**	**2,282K**	**2,235K**

Source:
Sistem Informasi Pengelolaan Sampah Nasional (SIPSN)
https://sipsn.menlhk.go.id

Time series prediction models have been fitted to forecast waste volume for the next **2** years in West Java and in the most important municipality (Bandung).



Access to dashboards

West Java Rankings and predictions

Q&A Session
Plastic Management Open Data Platform

Thank you!

Please scan the QR if you want to ask any questions.

OR join at menti.com

Code: 1792 4101