



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

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In Consortium with

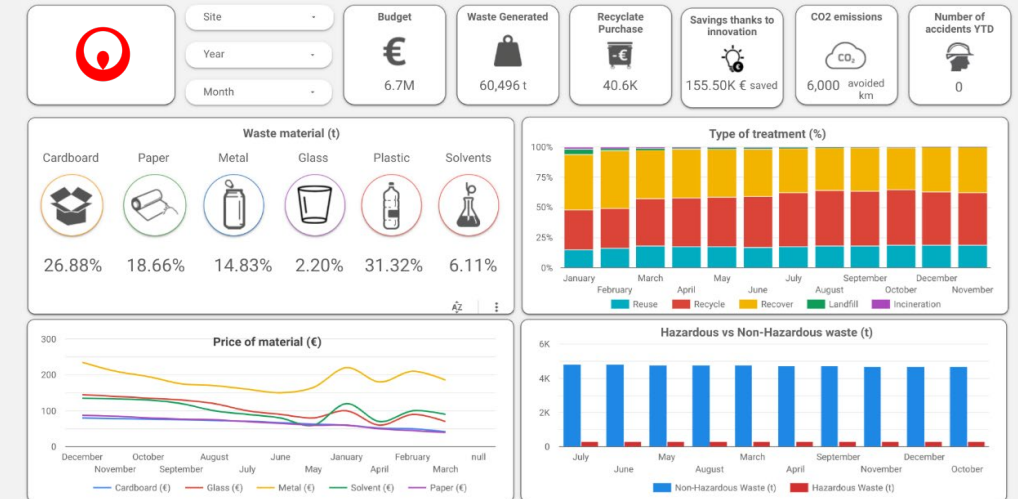


Plastic Management Open Data Platform

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.

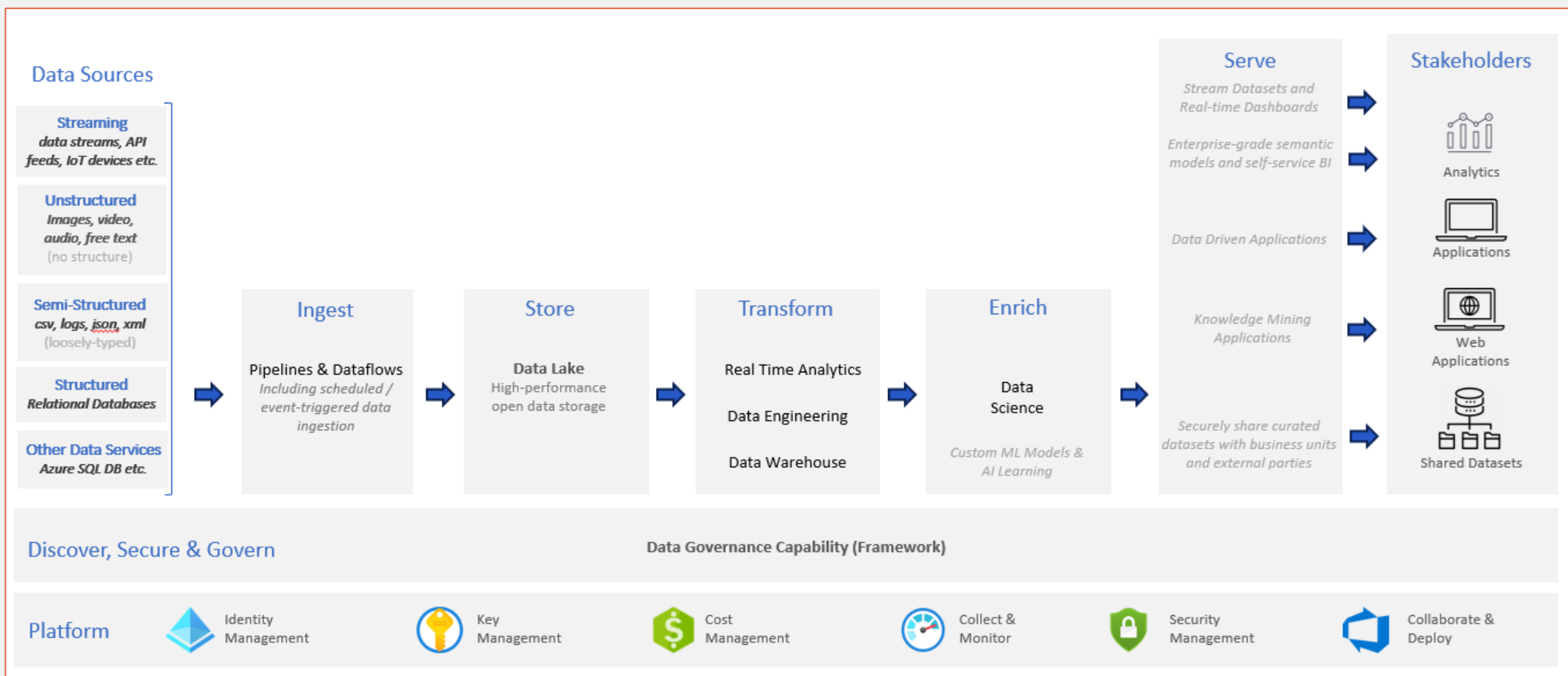


Example of Data platform dashboard

Open Data Platform

Architecture and Workflow

The flow of data from sources to stakeholders



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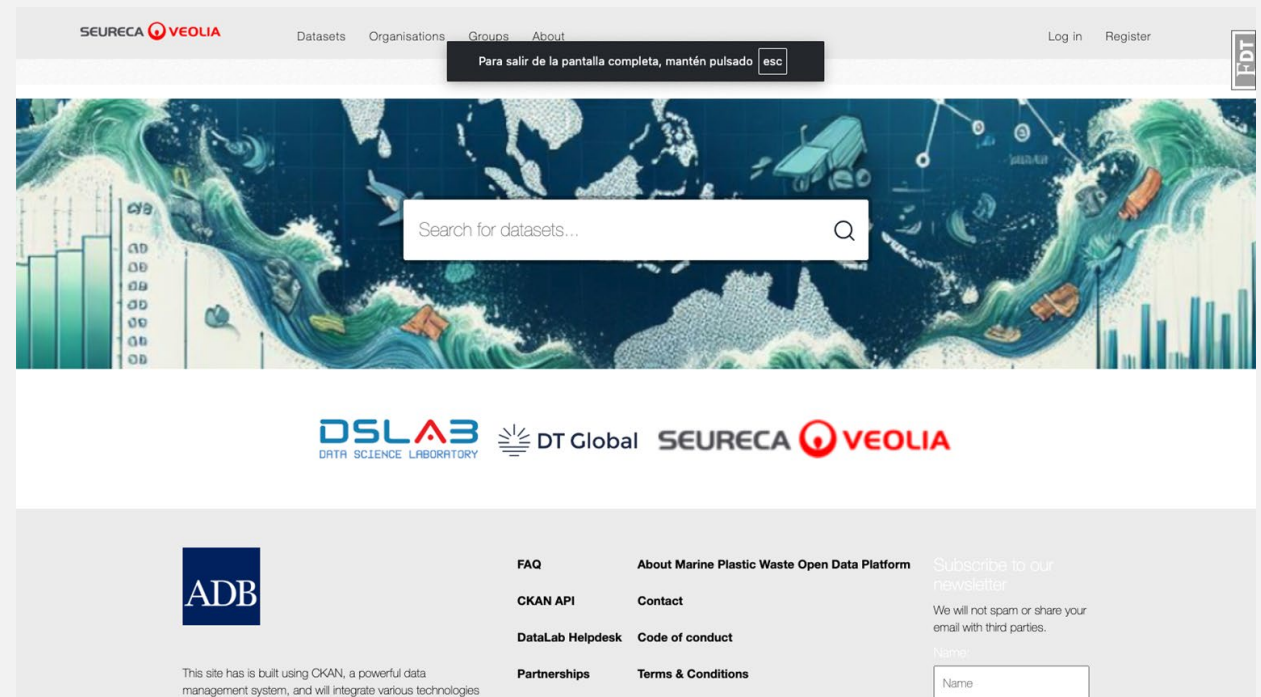
Overview and Objectives

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

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Dataset upload

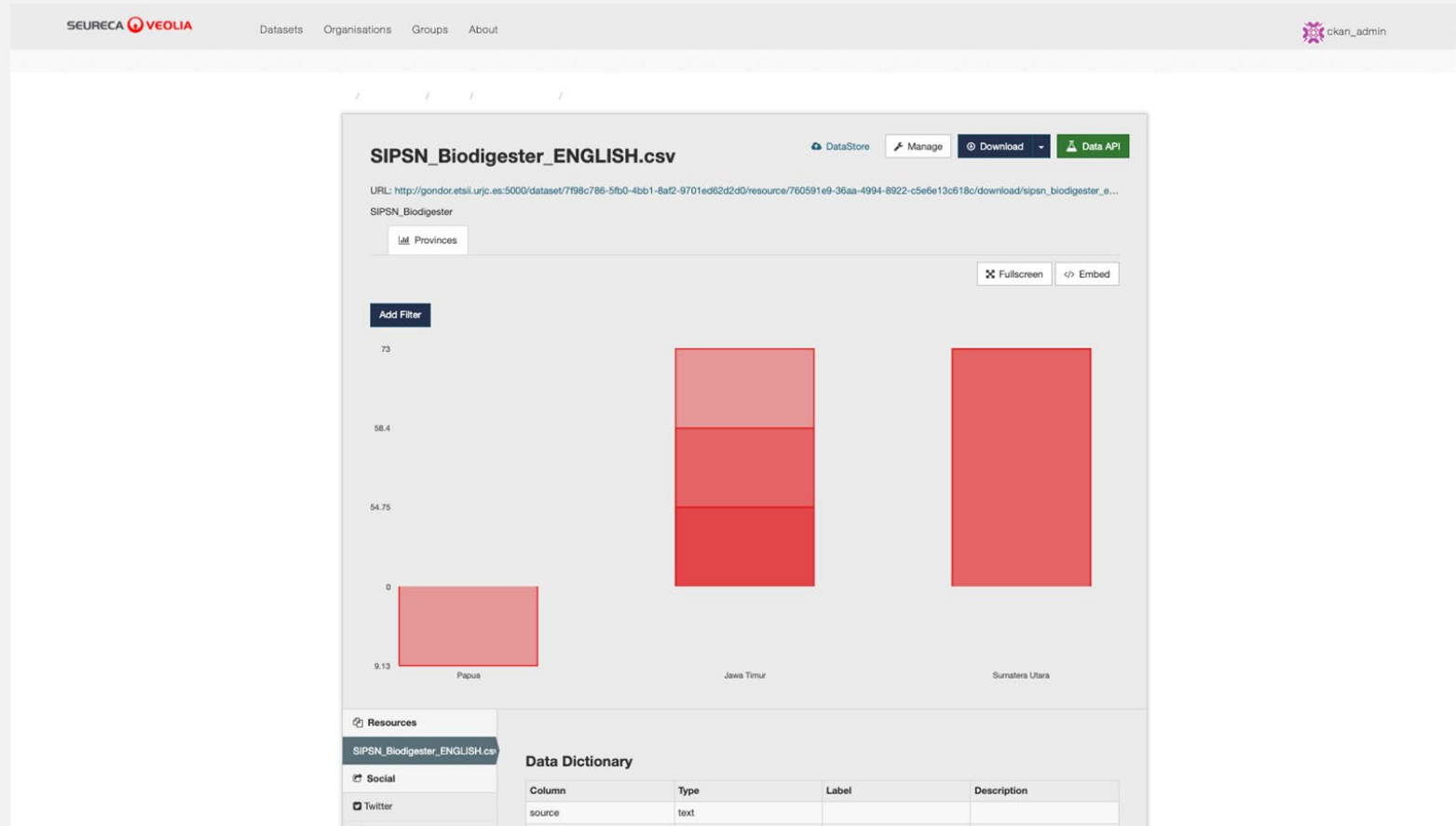
The screenshot displays the Open Data Platform interface. At the top, the header includes the SEURECA and VEOLIA logos, navigation links for Datasets, Organisations, Groups, and About, a user profile for ckan_admin, and an FDI logo. The main content area features an 'Add Dataset' button and a search bar with the placeholder text 'Search datasets...'. Below the search bar, it indicates '3 datasets found' and an 'Order by: Relevance' dropdown menu. A message states 'Can't find what you are looking for? [Suggest a dataset.](#)'. The search results are listed as follows:

Dataset Title	Description	Update/Creation Date	Source	Formats
TPA/TPST in Indonesia	Final and Integrated Waste Processing Facilities (TPA/TPST) in Indonesia	Updated June 10, 2025 Created June 10, 2025	DSLAB	CSV, XLSX
Waste Bank Units (Bank Sampah Unit) in Indonesia	Local waste bank units (Bank Sampah Unit) in Indonesia, compiled from the SIPSN public database	Updated May 16, 2025 Created May 16, 2025	DSLAB	CSV, XLSX, PDF
SIPSN Biodigester	SIPSN Biodigester	Updated May 9, 2025 Created May 9, 2025	DSLAB	CSV

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

The screenshot displays the CKAN Data API interface. At the top, it says "Access resource data via a web API with powerful query support. Further information in the main CKAN Data API and DataStore documentation." Below this, there's a section titled "Endpoints »" which lists the following actions and their corresponding URLs:

Action	URL
Create	<code>http://gondor.etsii.urjc.es:5000/api/3/action/datastore_create</code>
Update / Insert	<code>http://gondor.etsii.urjc.es:5000/api/3/action/datastore_upsert</code>
Query	<code>http://gondor.etsii.urjc.es:5000/api/3/action/datastore_search</code>
Query (via SQL)	<code>http://gondor.etsii.urjc.es:5000/api/3/action/datastore_search_sql</code>

Below the endpoints, there's a section titled "Querying »" which provides three query examples:

- Query example (first 5 results)**
`http://gondor.etsii.urjc.es:5000/api/3/action/datastore_search?resource_id=760591e9-36aa-4994-8922-c5e6e13c618c&limit=5`
- Query example (results containing 'Jones')**
`http://gondor.etsii.urjc.es:5000/api/3/action/datastore_search?resource_id=760591e9-36aa-4994-8922-c5e6e13c618c&q=jones`
- Query example (via SQL statement)**
`http://gondor.etsii.urjc.es:5000/api/3/action/datastore_search_sql?sql=SELECT * from "760591e9-36aa-4994-8922-c5e6e13c618c" WHERE title LIKE 'jones'`

At the bottom, there are links for "Example: Javascript »" and "Example: Python »".

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

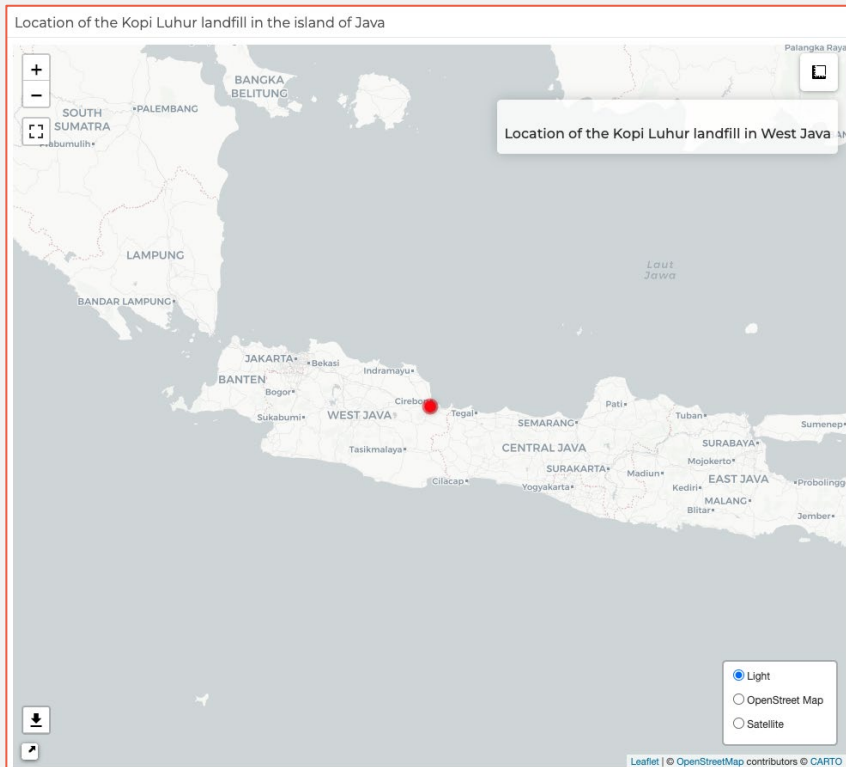
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Architecture and Workflow (R & PowerBI Dashboards)

- 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

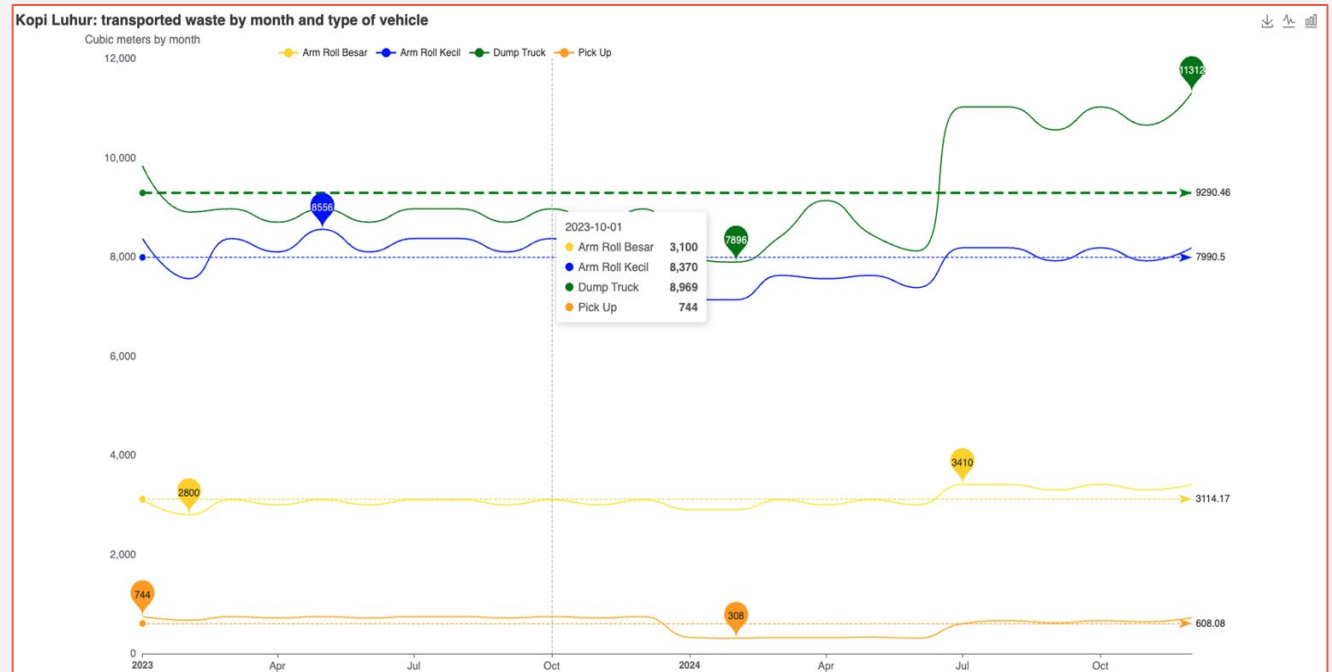
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R Dashboards



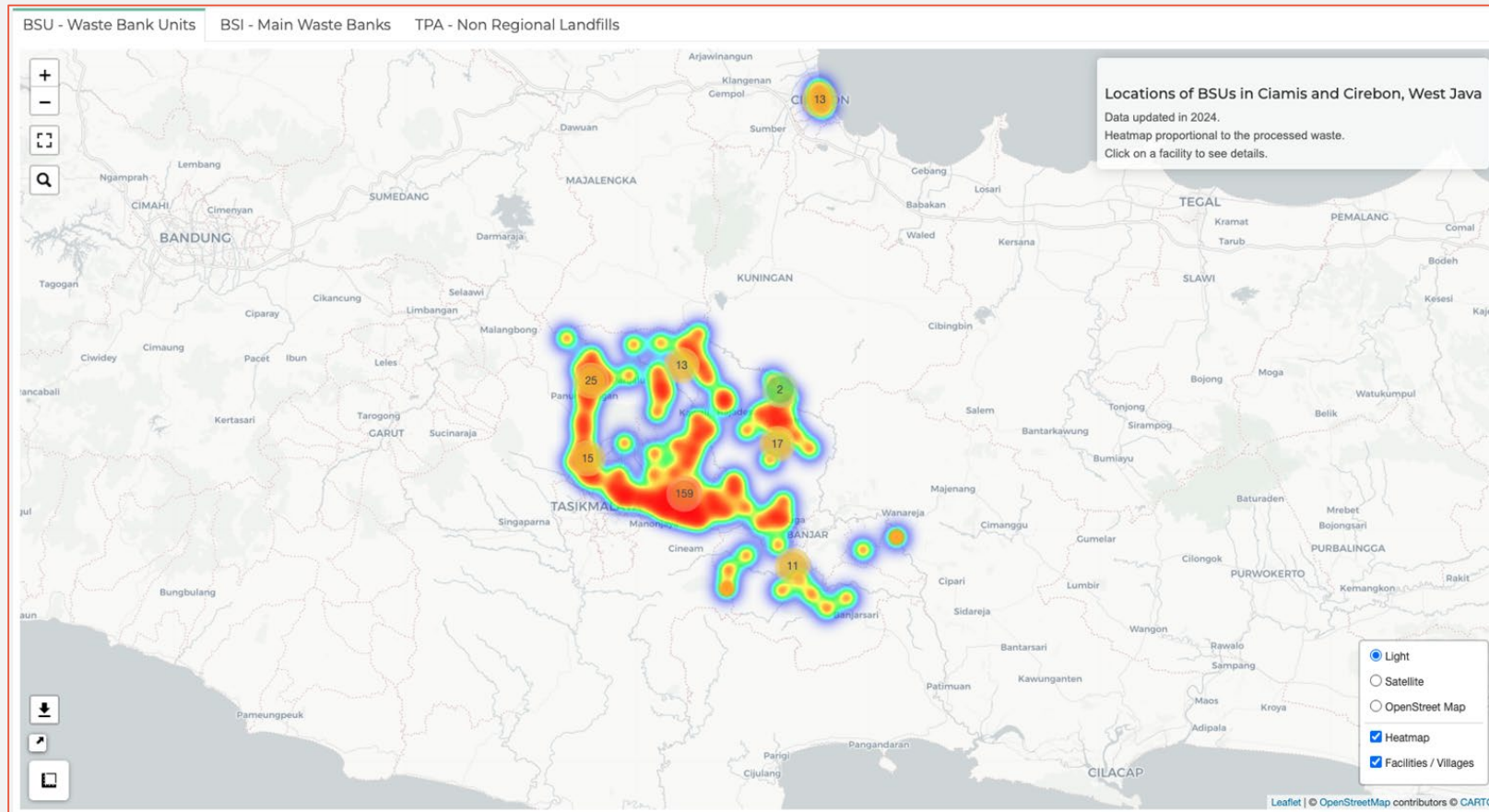
Location of the Kopi Luhur landfill in the island of Java

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



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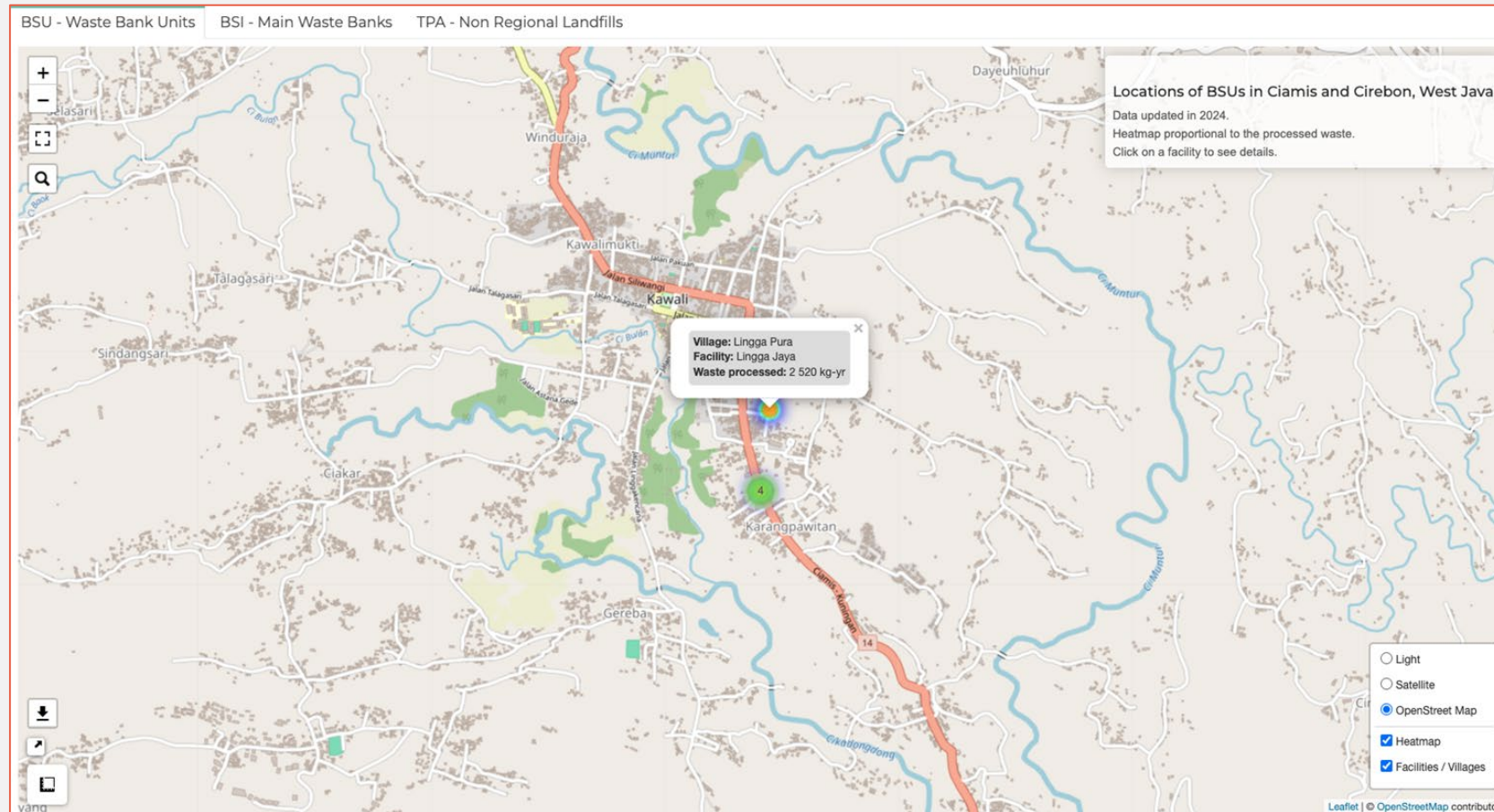
R Dashboards: Sample screenshots



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

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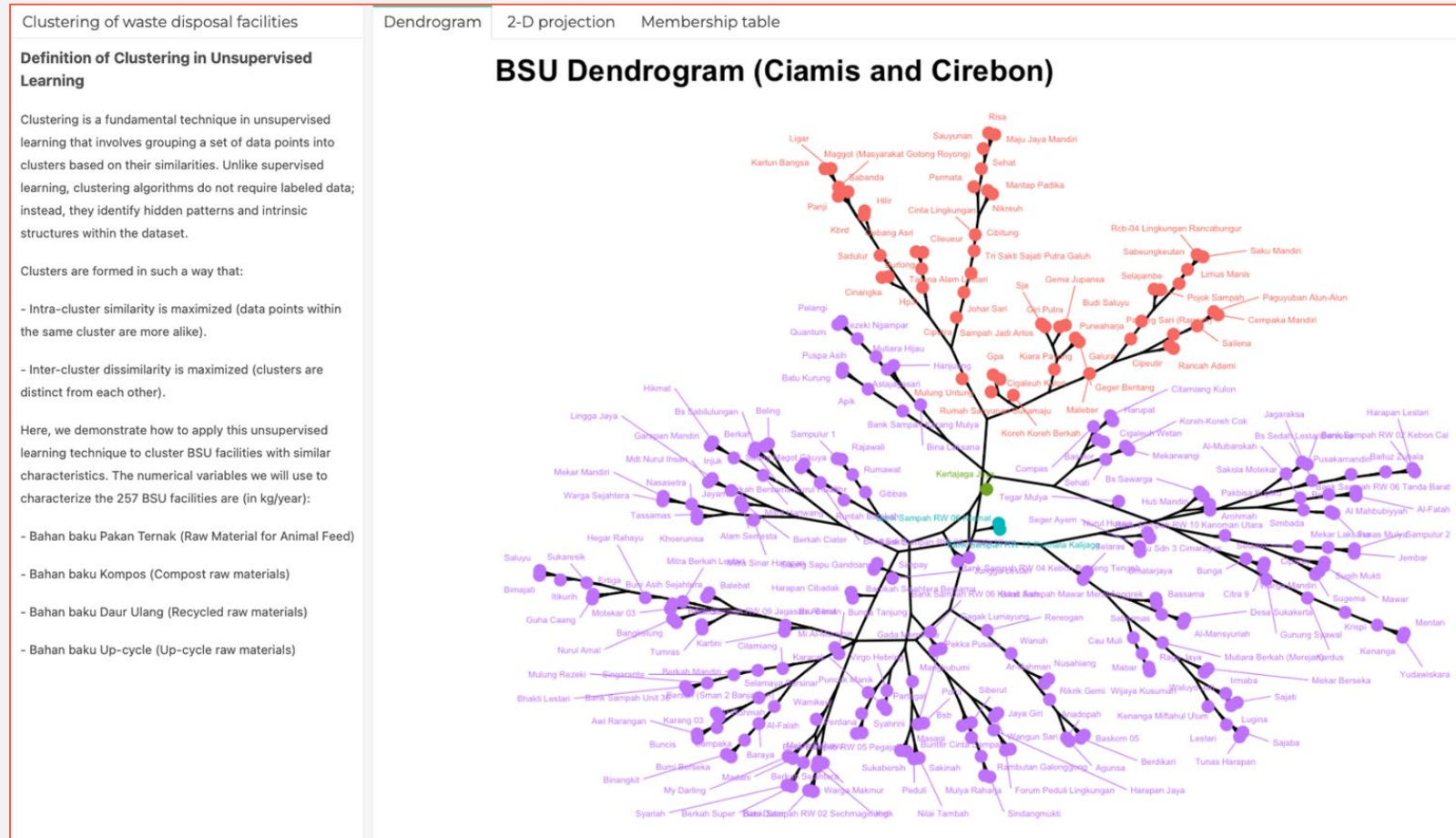
R Dashboards: Sample screenshots



Spatial Databases: Details of individual BSUs

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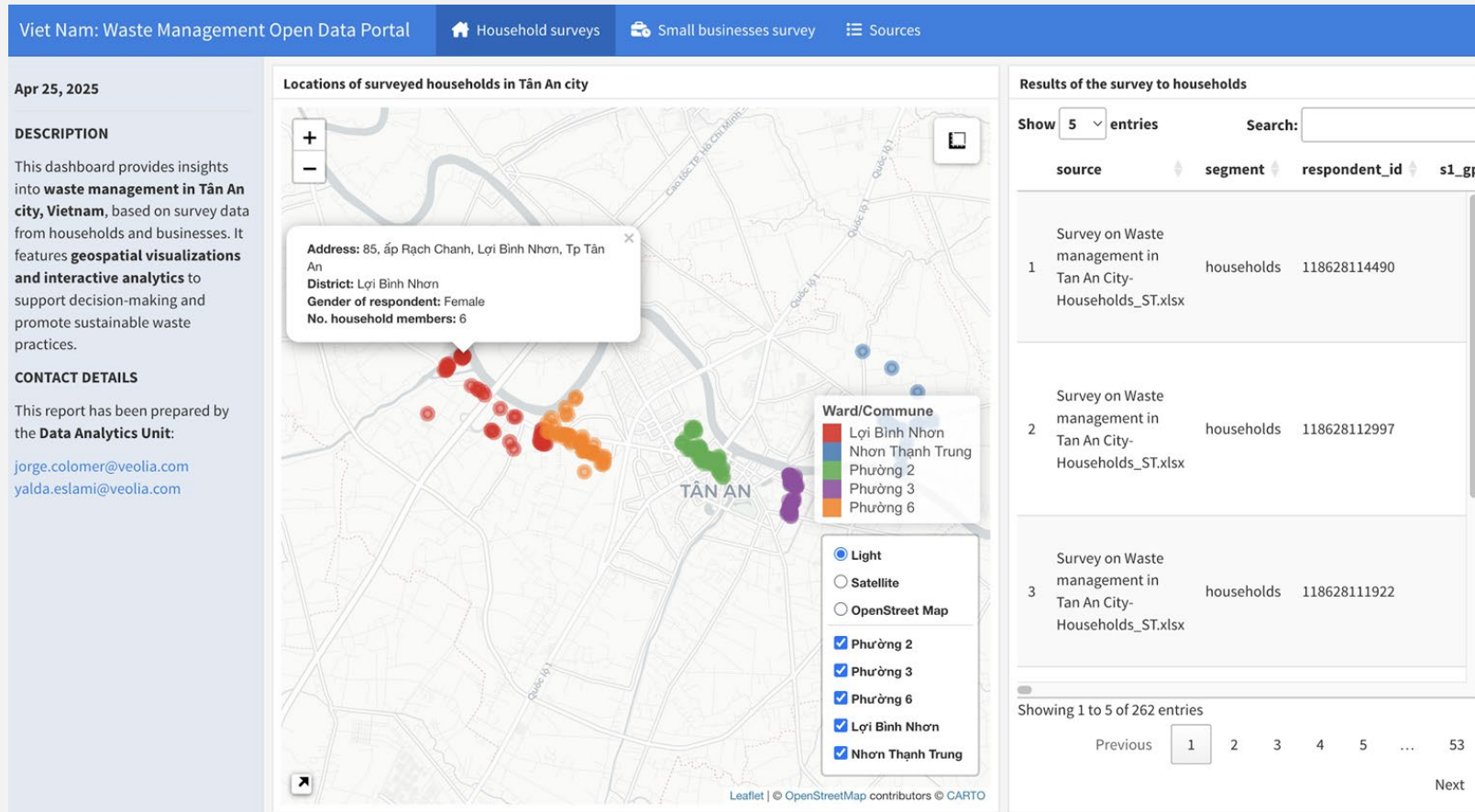
R Dashboards: Sample screenshots



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

Open Data Platform

R Dashboards: Sample screenshots

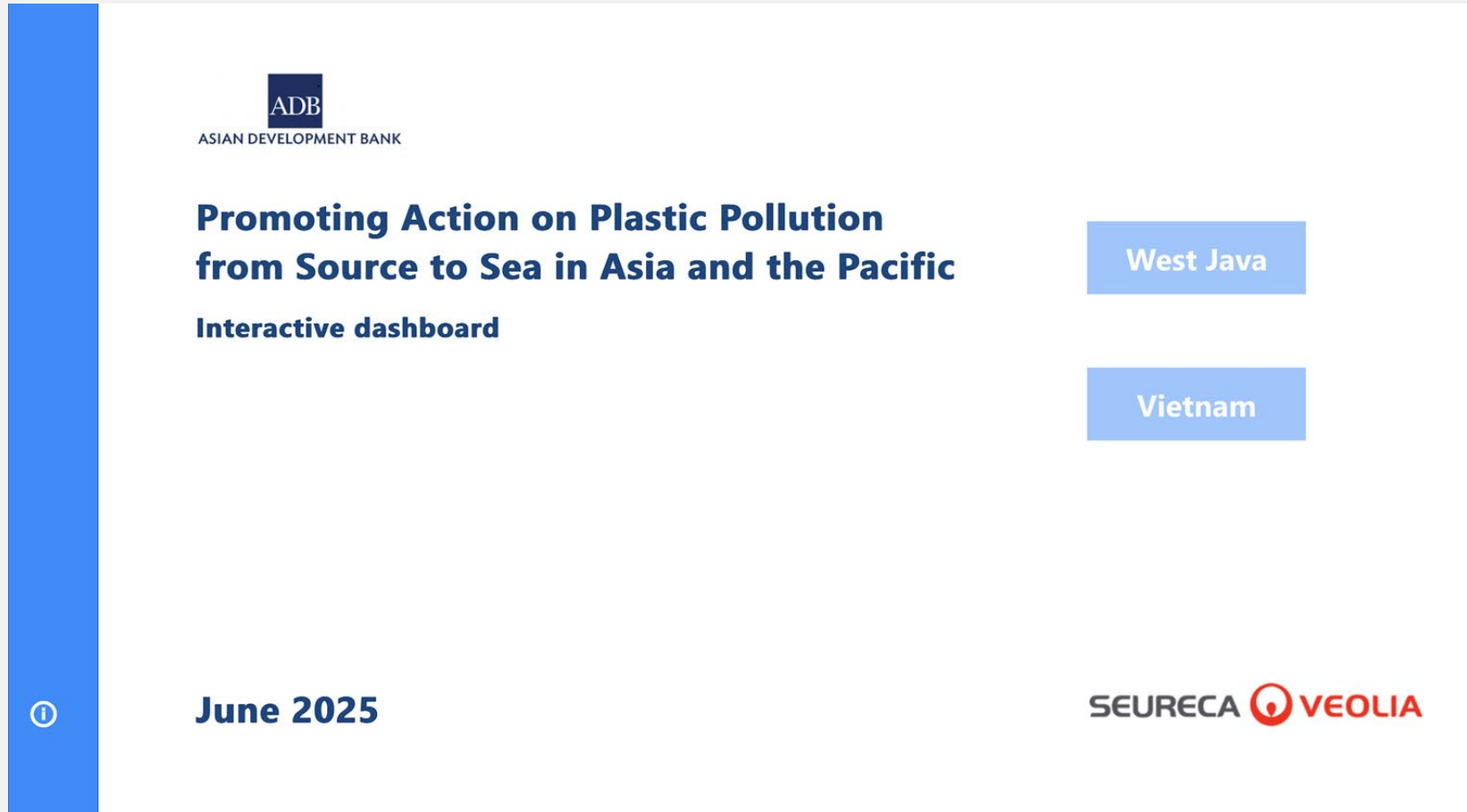


Access to dashboards

Viêt Nam Household surveys

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PowerBI Dashboards: Sample screenshots

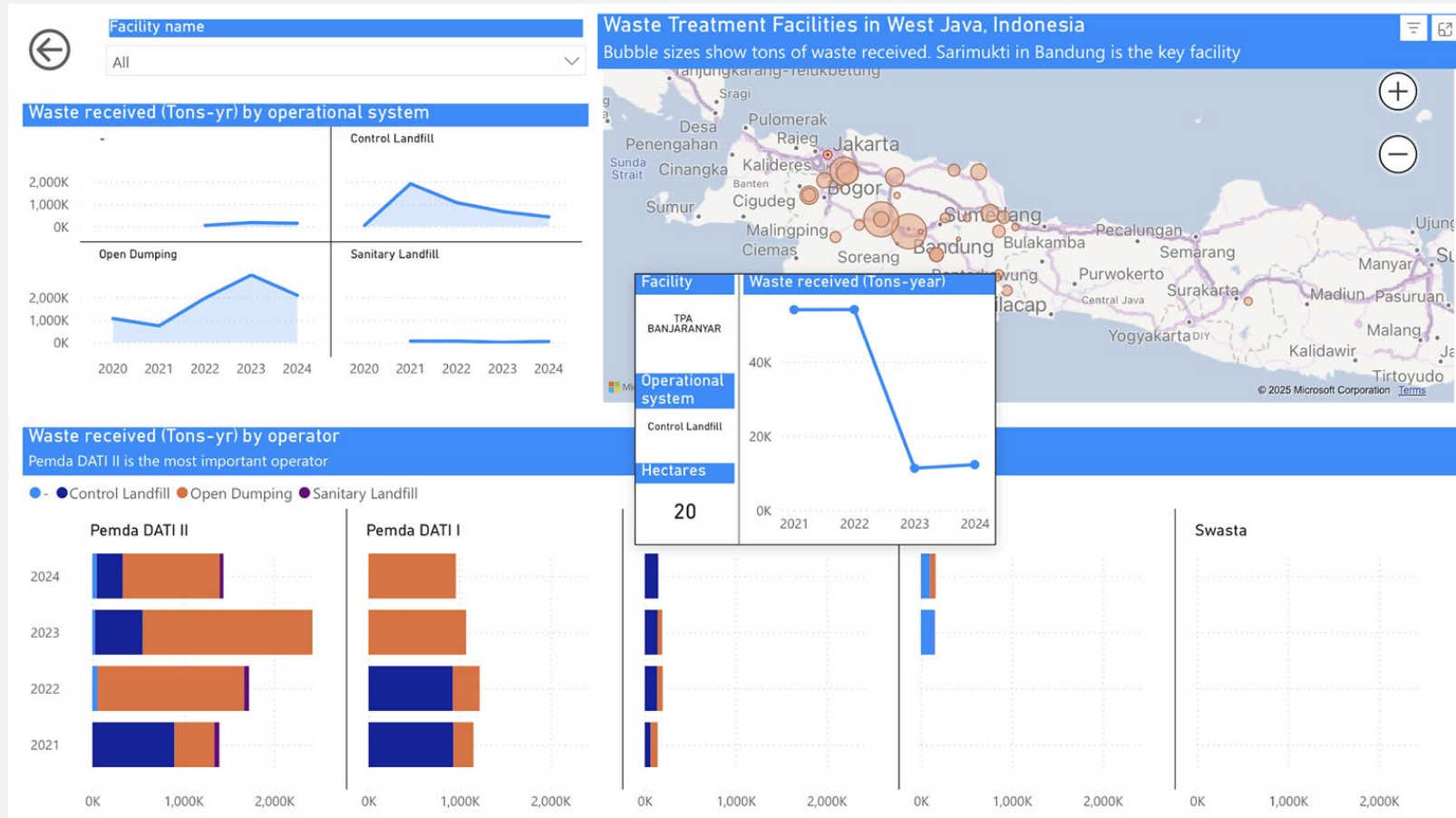


Access to dashboards

Menu Access to different visualizations

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PowerBI Dashboards: Sample screenshots



Access to
dashboards

West Java Facilities

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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.

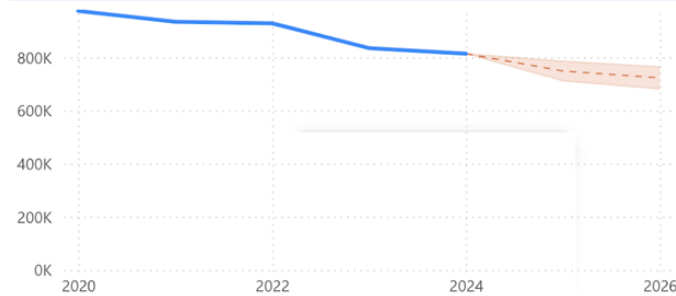
Municipalities Generating > 80% of Waste in 2024

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

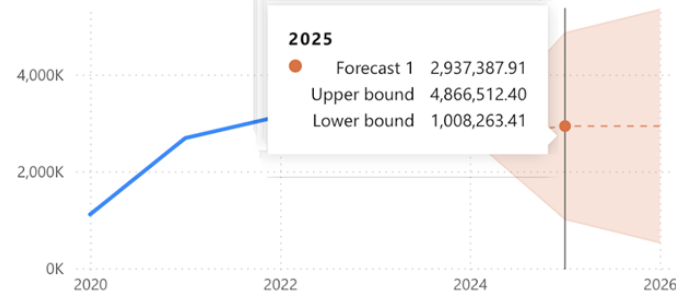
Source:
Sistem Informasi Pengelolaan Sampah Nasional (SIPSN)
<https://sipsn.menlhk.go.id>

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).

Waste Generation in Kota Bandung: Historical Series and Forecast



Waste Generation in Waste Java: Historical Series and Forecast



Access to
dashboards

West Java Rankings and predictions

Q&A Session

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Thank you!

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



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