# Medan, Indonesia

Partner city

Status of the project: Completed Sustainable Urban Mobility Plan


## Basic Information

Urban area: 3,151 km$^2$

Population: 4,795,186 | Growth rate: +1.1%

Regional capital city

GDP per capita: USD 12,400

Modal Share:

- Public transport: 6% of which
  - Minibus: 94%
  - Bus: 5%
  - Train: 1%
- On-demand transport services: 7% of which
  - Tuk-tuk: 40%
  - Ojek: 50%
  - Taxi: 10%
- Private transport: 72% of which
  - Car: 23%
  - Motorcycle: 77%
- Non-motorised transport: 15% of which
  - Walking: 94%
  - Cycling: 6%

National GHG emissions per capita: 3.45 ($tCO_2eq$)

Exposure to climate change: High

## Context

Medan, located on the northern part of Sumatra Island, is the capital and largest city of North Sumatra Province and ranks as the fourth largest city in Indonesia. The city itself has a population of 2.3 million, while the greater metropolitan area (Mebidangro) encompasses 4.8 million inhabitants and continues to expand. This metropolitan area consists of four Kota (cities) and two Kabupaten (regencies): Kota Medan, Kota Binjai, Kabupaten Deli Serdang, and part of Kabupaten Karo. Medan is a significant economic hub, home to Belawan, Indonesia's third-largest container port, and Kualanamu International Airport, the country's fifth-busiest airport. With an economic growth rate of 6.4%, which exceeds the national average, the Medan metropolitan area plays a crucial role in Indonesia's industrial and economic landscape.

Medan's transportation system has been grappling with the rapid increase in private motorised vehicle usage, particularly motorcycles, while road infrastructure grows at a modest 0.8% annually. This disparity has resulted in considerable congestion issues. Public transport services in Medan are provided through fixed routes that include public passenger

cars and buses of various sizes alongside a rail network that offers alternative transport options. However, Medan lacks a designated Public Transport Authority, which impacts a mass transit system overall organisation and development. The development of a comprehensive Sustainable Urban Mobility Plan (SUMP) for Mebidangro in 2022 introduced a strategic transport master plan with a strong focus on enhancing public transit options.

Local authorities in the Medan Metropolitan Area do not currently hold full responsibility or the mandate to finance mass public transport infrastructure, nor do they have direct authority to borrow from international finance sources. This limits their capacity to drive large-scale transport infrastructure projects independently. Institutional systems and procedures for monitoring, evaluating, and reporting on urban mobility in the area are only partially established, creating challenges for systematic transport management and policy enforcement.

# Support from the Partnership - Mobility Planning

## Project description

**Technical Assistance:** Sustainable Urban Mobility Plan (SUMP) Development

**Funded by:** AFD

**Funding amount:** EUR 510,155

**Implemented by:** AFD through MobiliseYourCity Asia

**Local counterpart:** North Sumatra Province (and the representatives of the Medan Metropolitan Area authorities from Kota Medan, Kota Binjai, Kabupaten Deli Serdang and Kabupaten Karo).

# Supported activities:

- Supporting a SUMP process for the Medan Metropolitan Area
- Conducting capacity development activities (subject to inception phase approval)
- Developing a citizen participation process and a communication plan
- Establishing an observatory on urban mobility data and GHG emissions

# Status of the SUMP development process

**Project start:** 2020 Q3

**Project completion:** 2022 Q2

**SUMP approval:** *de facto approved* (no formal approval expected)

**Completed outputs:**

- Inception Phase
- Diagnosis
- Construction of scenarios and formulation of priority measures
- Action plan which includes indicators, budget, and financing measures
- Final SUMP document

# SUMP measures and cost estimates

The following table highlights the most significant measures identified in the SUMP.

| Measure packages | Cost Estimate (CapEx) up to 2040 | Cost Estimate (OpEx) up to 2040 |
|---|---|---|
| Urban planning and non-motorized transport<br>• Periodical closure of roads<br>• Mixed-use zones<br>• Comfortable and safe sidewalks<br>• Development of safe bicycle lanes<br>• Laws to restrict urban sprawl<br>• Transit-Oriented Development framework | USD 64,100,000 | Operating expenses (OpEx) were assessed for all quantifiable and operational actions, including public transport and digital systems, and excluding governance measures that require further specification through additional studies. |
| Public transport<br>• Expansion of BRT network<br>• Expansion of urban rail wider network<br>• Increased rail service levels<br>• Bus lines for schools<br>• Optimiszation and rejuvenation of minibus routes<br>• Waterbus lines<br>• Promotional campaign for public transport | USD 3,274,000,000 | |
| Road network and private vehicles<br>• Road link Medan – Berastagi<br>• Circular roads in Medan<br>• Quality road network across Mebidangro<br>• Standardized road signage<br>• Traffic calming measures and blackspots<br>• Limitation on freight vehicles operating hours<br>• Dedicated Park and Ride at transit hubs<br>• Multimodal hubs | USD 222,300,000 | |
| Governance<br>• Creation of Metropolitan Transport Authority<br>• Corporate taxes on mobility<br>• Capacity building through technical assistance<br>• Separation of train and track operators<br>• Reorganisation and reform of the minibus industry | USD 8,100,000 | |
| Environment<br>• Incentives to reduce fuel consumption<br>• Tax on motoriszed vehicles using urban roads<br>• Cleaner energy sources for all road vehicles<br>• Renewable energy for rail<br>• Air quality stations<br>• Awareness-raising campaign | USD 2,900,000 | |
| Digitalization<br>• Mobility as a service<br>• Fare integration<br>• Passenger information systems<br>• Traffic monitoring systems | USD 600,000 | |
| **Total** | **USD 3,572,000,000** | **USD 1,400,000,000** |

# SUMP Finance leverage

## Leveraged financing (resulting or enabled by the SUMP preparation process)

| Description | Source of financing | Secured | Amount |
|---|---|---|---|
| Loan to build the 1st BRT line | World Bank[1], AFD[2] | Secured | USD 132,000,000 |
| Technical Assistance for establishing BRT Management Institution of Medan | UK-PACT Grant | Secured | Unknown |

# Projected impacts

| Indicator | Impact 2035 (SUMP vs BAU) | Baseline - 2020 | Projected 2035 BAU | Projected 2035 SUMP scenario |
|---|---|---|---|---|
| **Total annual GHG emissions** (Mt $CO_2eq$) | -0618 t $CO_2eq$ or 15% reduction | 2225 t $CO_2eq$ | 3196 t $CO_2eq$ | 2578 t $CO_2eq$ |
| **Annual transport related GHG emissions per capita** (kg $CO_2eq$) | -124 kg $CO_2eq$ / capita | 549 kg $CO_2eq$ / capita | 641 kg $CO_2eq$ / capita | 517 kg $CO_2eq$ / capita |
| **Access**<br>Increase in the proportion of the population living within 750m or less of a mass transit stop | +7,3% | 3,8% | 3,8%1 | 11,1% |
| **Air pollution**<br>Decrease in the mean urban air pollution of particulate matter (in µg $PM_{2.5}$) at road-based monitoring stations | N/A | N/A | N/A | N/A |
| **Modal share**<br>Increase in the modal shares of trips by public transport, walking, and cycling | Public Transport: 13.7%<br>NMT: 0% of total trips<br>**TOTAL: 13.7%** | Public Transport: 9.6%<br>NMT: 15% of total trips<br>**TOTAL: 24.6%** | Public Transport: 9.6%<br>NMT: 15% of total trips<br>**TOTAL: 24.6%** | Public Transport: 23.3%<br>NMT: 15% of total trips<br>**TOTAL: 38.3%** |
| **Road safety**<br>A decrease in traffic fatalities within the urban area, per 100.000 inhabitants | -9.0 fatalities/100 000 hab | 10.4 fatalities/100 000 hab | 13.9 fatalities/100 000 hab | 4.9 fatalities/100 000 hab<br>(Target) |
| **Affordability of public transport**<br>Percentage of disposable household income spent on public transport for the second quintile household income group | -15,5% | 13,0% | 20,5% | 5,0%<br>(Target) |

[1] More about the Indonesia Mass Transit (MASTRAN project) available here https://www.worldbank.org/en/news/press-release/2022/06/01/new-project-will-support-improved-mobility-and-accessibility-in-indonesia-bandung-and-medan-metropolitan-areas

[2] AFD cofinance the project for 40 M EUR. More information available here https://www.afd.fr/en/actualites/communique-de-presse/40-million-euros-loan-afd-enhance-urban-mobility-and-accessibility-indonesia-mass-transit-program-support-project-mastran

## Insights from practice: lessons learned from the SUMP development process

Leveraging innovative data collection tools and inclusive stakeholder processes has proven critical in developing a strategic, data-driven, and widely accepted mobility framework for Medan.

The **use of telecom data** for diagnostics allowed for precise and reliable analysis of home-to-work commute surveys, significantly improving the understanding of mobility patterns and travel demand in the Medan Metropolitan Area.

**Stakeholder engagement** was prioritized at every phase of the process, ensuring broad participation in the development of scenarios and the action plan. This inclusive approach fostered consensus, enriched decision-making, and built local ownership of the SUMP measures.

**Mebidangro's SUMP leading the way of sustainable mobility planning in Indonesia:**

Mebidangro's SUMP is being used as a model by the Ministry of Transport to show other cities what such plan should cover.

## Perspectives for SUMP implementation

**The SUMP as a requirement for Bappenas to approve the financing of the MASTRAN project:**

The SUMP is de facto approved, as Bappenas approved the completion of the grant, and the SUMP was necessary for the approval of the Mass Transit Program Support (MASTRAN) Project as national priority project (Green Book). This project covers the implementation of BRT projects in Medan and Bandung and the designs of two future BRTs in Semarang and Surabaya. The total amount of the loan co financed by AFD and the World Bank, is USD 264 M.

## Next Steps

As next steps, the implementation of the SUMP is expected to include the creation of a task force that will be in charge of setting up a Metropolitan Transport Authority and establishing an observatory on urban mobility data and GHG emissions.

*Updated in December 2024*