

Medan, Indonesia

Partner city

Status of the project: Completed Sustainable Urban Mobility Plan



Basic Information

Urban area: 3,151 km²

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 (tCO₂eq)

Context

Located in the northern part of Sumatra Island, Medan is the capital and largest city of the North Sumatra Province and the fourth largest city in Indonesia. Its population is 2.3 million inhabitants, while its metropolitan area has 4.8 million inhabitants, and is expected to continue to grow. Medan Metropolitan Area (Mebidangro) is composed of four Kota (cities) and two Kabupaten (regencies): Kota Medan, Kota Binjai, Kabupaten Deli Serdang and (part of) Kabupaten Karo.

Belawan, the third biggest container port in Indonesia, and Kualanamu International Airport, the fifth busiest airport of the country, are both located in Medan. The city's economic growth rate of 6.4% is higher than the national average, making the Medan metropolitan area an important industrial and economic hub in Indonesia.

The Medan Metropolitan Area is facing a rapid increase in the use of private motorised vehicles use, predominantly motorcycles. In the meantime, road lengths are increasing by only 0.8% a year, leading to the increased number of vehicles causing congestion issues.

Public transport operates on fixed routes in Medan and consists of public passenger cars and small, medium, and large buses. The area also benefits from a rail network as an alternative transport mode. It is to be noted that there is no Public Transport Authority in the City of Medan and the Metropolitan Area.

The completion of the Sustainable Urban Mobility Plan (SUMP) for Mebidangro in 2022 marked the conclusion of a two-year participatory process of studies and the development of a vision, future scenarios, and an action plan. While focusing mainly on developing public transport, the SUMP, supported by AFD, also provided significant methodological contributions by testing digital solutions for a mobility diagnosis to overcome obstacles such as the COVID-19 pandemic.

A rapidly growing and multi-centric metropolitan area dominated by private motorised mobility

With more than 4.8 million inhabitants, Mebidangro is the largest metropolitan area outside Java, and its urban population keeps growing. The increased dependency on private motorised vehicles leads to congestion along main road axes, time loss, and increased environmental and social externalities, including GHG emissions, traffic fatalities, and air pollution.

The mobility diagnosis evidenced a deficient use of public transport even though a massive bus fleet is available. Only 6% of the trips are collective and are almost exclusively made by Angkot, the local informal minibuses. Private vehicles, particularly motorcycles, prevail in the city, making up 72% of the trips. In total, individual motorised mobility reaches nearly 80%, and only 15% of trips are made by walking or cycling.

The lack of effective urban planning, leads to unmanaged urban sprawl, governance issues regarding procurement, while articulation issues between local and provincial levels constitute other vital issues.

While the COVID-19 pandemic limited data acquisition, the mobility planning process benefited from innovative tools, a mobile application for safe surveys, an online communication platform and live translation for stakeholder engagement activities and workshops.

A vision made possible through an ambitious action plan

As an essential part of the SUMP elaboration, the participative process developed a common vision to provide a sustainable, integrated, and equitable mobility system. The SUMP action plan aims to achieve this vision through six measure packages:

1. The most significant measure package aims at developing a **better public transport system**. It includes six BRT corridors, new rapid rail lines, improvements to the existing bus and rail network, optimisation of the minibus service (called Angkot), fleet renewal, and multimodal hubs. This 3.2 billion USD investment package will help shift 15% of trips from individual motorised modes to public transport. Over 550,000 additional people will have access to the public transport network.
2. **Urban planning**, transit-oriented development, and public space optimisation will reduce urban sprawl and provide better conditions for walking and cycling.
3. **Road infrastructure investments** will focus on enabling public transport and addressing traffic black spots.
4. **Digitalisation** will improve fare intermodality, passenger information and traffic monitoring.
5. Reforms will ensure sustained, comprehensive **governance of mobility**, including the set-up of a metropolitan transit authority, a reform of the informal minibus system, and the separation of tracks management and train operation between distinct entities.
6. **Environment-specific policies** will incentivise the reduction of fuel consumption and foster the use of cleaner and renewable energy. The outcome will be measured through an air quality monitoring and GHG-emissions MRV system.

Support from the Partnership

Technical assistance: Sustainable Urban Mobility Plan (SUMP)

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

Finance leverage: USD 132 million

Status of the SUMP process

Project start: 2020 Q3

Project completion: 2022 Q2

Expected SUMP approval (by provincial and national authorities): shall be approved at the national level in 2024 Q1

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

Next expected outputs:

- SUMP adoption by provincial and national authorities
- Establishment of an observatory on urban mobility data and GHG emissions

SUMP key 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-motorised transport <ul style="list-style-type: none"> • Periodical closure of roads • Mixed-use zones • Comfortable and safe sidewalks • Development of safe bicycle lanes • Laws to restrict urban sprawl • Transit- Oriented Development framework 	USD 64,100,000	
Public transport <ul style="list-style-type: none"> • Expansion of BRT network • Expansion of urban rail wider network • Increased rail service levels • Bus lines for schools • Optimization and rejuvenation of minibus routes • Waterbus lines • Promotional campaign for public transport 	USD 3,274,000,000	
Road network and private vehicles <ul style="list-style-type: none"> • Road link Medan – Berastagi • Circular roads in Medan • Quality road network across Mebidangro • Standardised road signage • Traffic calming measures and blackspots • Limitation on freight vehicles operating hours • Dedicated Park and Ride at transit hubs • Multimodal hubs 	USD 222,300,000	Operating expenses (OpEx) were assessed for all quantifiable and operational actions, including public transport and digital systems, and exclude governance measures that require further specification through additional studies.
Governance <ul style="list-style-type: none"> • Creation of Metropolitan Transport Authority • Corporate taxes on mobility • Capacity building through technical assistance • Separation of train and track operators • Reorganisation and reform of the minibus industry 	USD 8,100,000	
Environment <ul style="list-style-type: none"> • Incentives to reduce fuel consumption • Tax on motorised vehicles using urban roads • Cleaner energy sources for all road vehicles • Renewable energy for rail • Air quality stations • Awareness-raising campaign 	USD 2,900,000	
Digitalisation <ul style="list-style-type: none"> • Mobility as a service • Fare integration • Passenger information systems • Traffic monitoring systems 	USD 600,000	
Total	USD 3,572,000,000	USD 1,400,000,000

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, AFD	Secured	USD 132,000,000

Projected impacts

Indicator	Impact 2035 (SUMP vs BAU)	Baseline - 2020	Projected 2035 BAU	Projected 2035 SUMP scenario
Total annual GHG emissions (Mt CO₂eq)	-0618 t CO ₂ eq or 15% reduction	2225 t CO ₂ eq	3196 t CO ₂ eq	2578 t CO ₂ eq
Annual transport related GHG emissions per capita (kg CO₂eq)	-124 kg CO ₂ eq / capita	549 kg CO ₂ eq / capita	641 kg CO ₂ eq / capita	517 kg CO ₂ eq / capita
Access Increase in the proportion of the population living within 750 meters or less of a mass transit stop	+7,3%	3,8%	3,8% ¹	11,1%
Air pollution Decrease in 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 Increase in the modal shares of trips by public transport, walking and cycling	Public Transport: 13.7% NMT: 0% of total trips TOTAL: 13.7%	Public Transport: 9.6% NMT: 15% of total trips TOTAL: 24.6%	Public Transport: 9.6% NMT: 15% of total trips TOTAL: 24.6%	Public Transport: 23.3% NMT: 15% of total trips TOTAL: 38.3%
Road safety A decrease of 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 (Target)
Affordability of public transport Percentage of disposable household income spent on public transport for the second quintile household income group	-15,5%	13,0%	20,5%	5,0% (Target)

Perspectives for implementation

Following official approval by the provincial authorities through a provincial and national decree expected in Q1 2024, the implementation of the SUMP will commence with 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.

Additionally, due to the development of the SUMP, with the financial support of the Agence Française de Développement and the World Bank, Medan city will benefit from the Indonesia Mass Transit Project. Under this project, Medan City will develop its first BRT line with a loan of USD 132 million. The study for the BRT line started in 2023, and it will provide 24 km of a BRT corridor, with 12 direct service routes and 45 stations.