CITY PLANNING LABS (CPL)

TOWARDS AN INTEGRATED TRANSPORTATION AND LAND USE PLAN FOR SEMARANG
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<th>Description</th>
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<td>BAPPELA</td>
<td>Badan Perencanaan Pembangunan Daerah (Development Planning Agency)</td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CPL</td>
<td>City Planning Labs</td>
</tr>
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<td>GHG</td>
<td>Green House Gas</td>
</tr>
<tr>
<td>LRT</td>
<td>Light Rail Transit</td>
</tr>
<tr>
<td>LVC</td>
<td>Land Value Capture</td>
</tr>
<tr>
<td>MRT-FS</td>
<td>Mass Rapid Transit Feasibility Study</td>
</tr>
<tr>
<td>OPD</td>
<td>Organisasi Perangkat Daerah (Government Agency)</td>
</tr>
<tr>
<td>RPJMD</td>
<td>Rencana Pembangunan Jangka Menengah Daerah (Mid-Term Development Plan)</td>
</tr>
<tr>
<td>RTRW</td>
<td>Rencana Tata Ruang Wilayah (Spatial Plan)</td>
</tr>
<tr>
<td>TOD</td>
<td>Transit Oriented Development</td>
</tr>
<tr>
<td>TRA-MP</td>
<td>Transportation Master Plan</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
</tbody>
</table>
1 EXECUTIVE SUMMARY
A government's transportation policy develops both transport infrastructure and the regulations that govern it, to improve mobility. Land use policy regulates where industrial, commercial and residential developments are allowed. Transport policy and land use policy can impact each other in both positive and negative ways. Without policy coordination, land use policies may undermine the effectiveness of transportation policy and vice-versa.

The Semarang government desires to improve its integrated transportation and land use planning as part of the actions needed to reactivate its economy while improving city liveability. Semarang used to have a strong industrial sector but the economy has shifted to the trade and service sectors.

The government supports the premise that good transport land use integration reduces the need for resources and fosters sustainable development by enabling actions that are more likely to achieve the desired city vision. At its best, transportation land use integration generates new opportunities for public investment. In general, model cities in terms of transport land use policy integration have partnerships with the private sector.

There is a desire to generate economic growth in Semarang in a sustainable way. This means that new transport infrastructure will be planned to provide positive outcomes for all citizens, for example, reduced travel distances and use of more sustainable modes. The city vision is to attract businesses that generate employment to Semarang. The location of these businesses, influenced by the transport networks, has the potential to transform the city. New employment hubs may be accessed by citizens primarily by walking, cycling or through use of public transport.

Integrating land use and transportation policies is not easy as it requires strong institutional arrangements, modification of traditional planning processes and community participation. Integration needs to be seen as a long-term objective.

City Planning Labs (CPL), initiated by The World Bank, undertook a consultancy process from November 2016 to April 2017. Its purpose was to advise on changes that needed to be made to two key policy documents: The City Spatial Plan (RTRW) and the Transport Master Plan (TRA-MP). Advice was given based on information from existing policy documents and on-site work conducted between 27th November and 2nd December 2016.

Information and analyses obtained during the process were complemented with a gap analysis in key areas. This analysis found that Semarang has opportunities for better mobility than other Indonesian cities as the current average travel speed
Semarang is also a very green city with important regional connections. However, several challenges were also identified during the gap analysis. Population densities are low and the level of land use diversity is also low. This creates the need for longer travel times. There are limited employment opportunities around the city port, which is a key focus area for a city that desires to grow based on trade and services.

The public transportation network does not provide appropriate population cover, as only 48% of residents are within its reach. Semarang has a bus rapid transport (BRT) system and minibuses called Angkot. The BRT has been implemented without segregated bus lanes, which compromises operational efficiencies and safety. There are over 2000 of Angkot minibuses operating over 96 routes. The Angkot fleet is old and has only limited control of carbon emissions. The Angkot system is extensive and serves the needs of many, but its fleet is old and services compete inefficiently with the BRT lines.

As a consequence of a poor transportation network, the majority of trips in Semarang are made by motorcycle. The second most popular mode is private car. This is because the city has developed residential areas but there is no appropriate public transport or non-motorized infrastructure, which has led to many residents of Semarang being car dependent.

Walking infrastructure is only present in the centre of the city and it is of low quality and is not continuous. Cycling infrastructure suffers from the same problem; a fragmented network is only provided in the city centre.

The current planning system in Indonesia does not encourage policy integration and key integration strategies require legal changes. Additionally, the relationship between transportation and land planning institutions does not have a framework under which coordinated actions can be taken.

In order to address these gaps, this consultancy suggests the following key changes for the RTRW and TRA-MP policy documents:

For the RTRW, land value capture mechanisms, better implementation mechanisms and a transportation land use planning strategy are critical. Also, the new version of the RTRW should create additional protection mechanisms for land around the outer-ring road and other proposed road infrastructure near protected areas (environmental protection overlay). The role of the TRA-MP should be expanded from being an infrastructure wish list to including overarching policy directions for sustainable development. TRA-MP should agree with RTRW. It should also direct objectives and outcomes for the LRT.
feasibility study, propose new funding mechanisms for infrastructure, improvements to operations and strategies for stakeholder management as well as explore water based transport options.

In addition to these changes, the city must strengthen the institutions involved in transportation and land use planning. Innovation, capacity building and continuous improvements to planning processes are necessary actions to achieve long-term transportation and land use integration in Semarang.

All of these recommendations will fail if there is no buy-in from key political stakeholders including the Mayor and Parliament. In this respect, BAPPEDA should look for champions who, on a political level, believe in a more sustainable Semarang with higher population densities, a better mix of land use, less car and motorcycle travel, state-of-the-art public transportation and non-motorised networks for walking and cycling.

Significant changes occur in cities only with support from their own residents. If participatory planning is not included in planning processes, changes are not likely to be sustainable in the long-term. The community, led by key political figures, could make Semarang a low-emission, highly sustainable city in the middle term. The role of BAPPEDA is to light up the path for changes to occur. To do this it needs to build capacity within its ranks and within those of other public institutions.

**Where to start?**

Cities that have achieved high levels of integration have started by building technical capacity within their public offices. This is followed by political support to change planning and investment processes. Good integration also requires participatory decision-making where community members are highly involved.

The best indicator for a good start in Semarang would be the adoption of an integrated transportation land use plan backed by a clear investment strategy. The creation of this plan is a key recommendation for Semarang.
2 INTRODUCTION
This is the final report of a consultancy that was undertaken between November 2016 and April 2017 as part of technical assistance by CPL initiatives. The objective of the consultancy was to support Semarang in developing transportation and land use planning integration policies. This support comes in the form of recommendations for two policy documents: the draft spatial plan (RTRW) and Transportation Master Plan (TRA-MP).

Integration between transportation and land use policies is fundamental for every city as actions in any of these two areas mutually affect each other\(^1\). For example, a new large commercial or industrial development puts pressure on the transportation system, while a new Bus Rapid Transit (BRT) service promotes residential and commercial developments in the areas it serves. If there is proper integration, the city can react to these changes by creating the appropriate environment for public and private investment in such way that the vision for the city is achieved.

Lack of integration, on the other hand, creates difficulties such as congestion and illegal or unauthorized settlements. The city is then on reaction mode (instead of on action mode), which leads to several members of the private sector benefiting from the chaos, but the long-term outcomes desired for the city are not achieved. This consultancy investigates these problems and proposes policy changes to be included in RTRW and TRA-MP.

This consultancy report is divided in six parts. This first chapter presents the consultancy objectives and its scope, the methodology used, and the information and resources used to draw recommendations. The next chapter presents a theoretical study of the need for integrated planning, its theoretical complexities and opportunities. Then, the gap analysis is discussed in which challenges and opportunities for integration have been discovered. Chapter 5 presents the consultancy recommendations, which are divided into the following sections:

- Recommendations to be included in the draft RTRW
- Recommendations to be included in the TRA-MP
- Other strategic recommendations required for on-going integration

Chapter 6 includes ideas for change that have been derived from best experiences around the world. The final chapter presents the conclusion.

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2.1 Consultancy objectives and scope

This study seeks to support Semarang in integrating its transportation and land use planning. The main objective was to provide implementable recommendations on appropriate content to be included in two important policy documents currently under review: the draft RTRW and TRA-MP.

General steps that the city could take towards integrating transportation and land use planning were also highlighted. The following table explains the scope of the study and areas that were not covered in this consultancy (but are important for implementation of the recommendations outlined in Chapter 5).

<table>
<thead>
<tr>
<th>Included in the scope</th>
<th>Outside the scope</th>
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<tbody>
<tr>
<td>• To provide advice based on best practices in other cities around the world.</td>
<td>• This project did not conduct a technical evaluation of the actions suggested;</td>
</tr>
<tr>
<td>• To suggest specific actions for the city of Semarang to be considered when reviewing RTRW and TRA-MP.</td>
<td>the feasibility of ideas is based on expert knowledge of existing information and planning documents that the city shared for review.</td>
</tr>
<tr>
<td>• To document differences in approach or policies across transportation and land use stakeholders.</td>
<td>• Although the project conducted extensive one-on-one discussions and a multi-stakeholder workshop, obtaining agreement from all stakeholders for the changes proposed was not within the scope of the study.</td>
</tr>
<tr>
<td>• To identify areas where additional technical analysis is needed.</td>
<td></td>
</tr>
<tr>
<td>• To identify key best-practice mobility principles that can shape the RTRW.</td>
<td></td>
</tr>
<tr>
<td>• To develop new mobility ideas that the city has not yet considered.</td>
<td></td>
</tr>
<tr>
<td>• To present a general concept for an efficient and comprehensive public/mass transportation system (including review of the existing Angkot system).</td>
<td></td>
</tr>
<tr>
<td>• To describe the concept for integrating transportation (covering all aspects of mobility, including pedestrian, cycling and universal accessibility).</td>
<td></td>
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<tr>
<td>• To present concepts and ideas for how the integrated land use/transportation approach can reduce energy consumption and lower emissions.</td>
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Table 1 Scope of The Consultancy
2.2 **Methodology**

The following diagram shows the methodology used:

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<tr>
<td>During the course of the consultancy, documents were reviewed in order to understand the baseline for Semarang.</td>
<td>Gap analysis aimed at understanding the differences between the current baseline and the desired future for Semarang. From the gap analysis, challenges and opportunities were identified.</td>
<td>Interactions with key stakeholders were used to confirm gaps identified and to develop recommendations. The procedure included a one-day multi-stakeholder workshop.</td>
<td>Based on results from all preceding activities, recommendations were developed.</td>
<td>A feedback loop was created to adjust recommendations based on input from the city of Semarang</td>
</tr>
</tbody>
</table>

*Table 2 Consultancy Methodology*

The Gap analysis covered seven areas, and for each area technical studies were conducted or obtained to identify lack of integration. At the end of the gap analysis for each area, a summary of key observations for the RTRW and TRA-MP are identified.

Interactions with key stakeholders were used to confirm gaps identified and to develop ideas. The procedure included a one-day multi-stakeholder workshop.
The objectives of the workshop were:

- To discuss the importance of integrated planning with participants
- To understand stakeholder visions for the future of Semarang
- To obtain feedback from participants on gaps identified from documents and interviews
- To seek input for possible solutions to identified gaps

The appendix at the end of this report includes a list of workshop participants. Based on results from all activities, recommendations were developed. A feedback loop was created to adjust recommendations based on input from the city of Semarang. Feedback was received as part of a video-conference on December 28th 2016 in which officers from BAPPEDA and members of the academic community offered their opinions. This report, which included a final conclusion, was written based on the revised version.

2.3 Information and resources used to draw conclusions

The following table presents the policy documents reviewed as part of this consultancy and how they were used to develop recommendations.

<table>
<thead>
<tr>
<th>Year</th>
<th>Document</th>
<th>Description</th>
<th>How document was used</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>RPJMD</td>
<td>Government plan for the next five years</td>
<td>Baseline and desired actions in the short to medium terms</td>
</tr>
<tr>
<td>2021</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>TRA-MP</td>
<td>Current master plan for transportation (guideline to develop transportation systems and construct infrastructure)</td>
<td>Main future investments in transportation infrastructure</td>
</tr>
<tr>
<td>2029</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>MRT – FS</td>
<td>Feasibility study for mass transit in Semarang</td>
<td>Baseline information and infrastructure desires</td>
</tr>
<tr>
<td>2011</td>
<td>RTRW (current and draft review version)</td>
<td>Policy direction on city development including city structure and land use plan</td>
<td>Baseline information land use policies</td>
</tr>
<tr>
<td>2031</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>World Bank CPL report on Urban Growth and</td>
<td>Overall urban assessment</td>
<td>Baseline, gaps and recommendations</td>
</tr>
</tbody>
</table>
### Other documents studied:

- RTRW presentation explaining review process
- Presentation developed as part of The World Bank Tokyo Technical Deep Dive workshop entitled “Moving together to be a Great Semarang”

### 2.4 Suggested implementation for outputs of this consultancy

Achieving true change for land use and transportation integration requires actions on multiple government levels. This effort, conducted by the World Bank, is the first step in the process towards successful integration of land and transportation policies. Continuous follow up actions by the city are fundamental for Semarang to be able to achieve real sustainable development. The following diagram explains the role of this consultancy and the need for further work led by the city.

*Figure 1 Diagram Explaining The Role of This Consultancy in The General Context of Semarang (Source: this consultancy)*

As this consultancy is only the starting point, and the next six months are crucial for the city as both strategies are to be adopted. Follow-up work is required to
engage with key stakeholders and to obtain their buy-in, ideally in the form of workshops and meetings in which the proposed changes are discussed and modified as the feedback is received.

Once documents are endorsed by Parliament and the Mayor, they need to be implemented, which will hopefully create better integration that is reflected in key performance indicators for cities (see section 3.5).
3 INTEGRATED PLANNING THEORY
In this section, the benefits of integrated transportation and land use planning as well as some of the challenges regularly faced by cities are explained. Sophisticated institutional arrangements and complex financial relationships are required in order to maximize the benefits of integrated planning.

### 3.1 Conceptual framework for integrated planning

Transportation plans relate to network expansions, operational arrangements, priorities to modes and levels of service. Meanwhile, land use plans regulate urban expansion, determine the concentration or mix of uses and regulate heights and intensity of activities. Both plans are influenced by each other in aspects such as travel emissions, mode choice, travel times and distance, lifestyle and congestion. However, there are historical and administrative reasons for a traditional separation between land use planning and transportation network development and operation. In most cities, particularly in the developing world, these two functions are separated through organizations with separate reporting lines.

Today, most cities are undertaking strong efforts to integrate transportation and land use plans. The top liveable cities in the world (in countries such as Australia, Canada and Denmark) are known for high levels of integration. Integrated transportation and land use planning recognises that transportation actions affect land use objectives (positively and negatively) and vice versa. A highly liveable city needs both good transportation and urban development to happen at the same time.

In an effective and integrated planning process, objectives are agreed upon and strategies are harmonized so that a common vision for the city can be achieved. Investments in transportation infrastructure and land projects should always support agreed upon common objectives.

The following diagram shows the conceptual design for transportation and land use integration in broad terms. This is the ideal theoretical policy development and implementation process.
When an integrated plan is developed, the policy development direction starts with an overarching vision, common objectives and then individual strategies for each sector (blue arrow in the diagram). For transportation and land use, before specific plans are created, an integrated transportation land use plan is first developed. Implementation, on the other hand, starts from individual actions within each sector (red arrow). Ideally, actions and investments across sectors are integrated as they support a common vision for the city.

Transportation and land use policies are interconnected through their outcomes. Although most cities today have organised their administrations to separate transportation and land use planning functions, the reality is that actions taken individually by each planning or transportation department significantly impact the other.

In order to guarantee policy integration, cities have followed different strategies. While some integrate both transportation and land use functions (such as Vancouver and Melbourne), others prefer to achieve integration through strong processes (such as London) but functions remain separate.

### 3.2 The transportation land use relationship

The following table presents some examples of how transportation policies have impacts on both the transportation sector and the land use planning sector.
Most actions involving accessibility would have an effect on where activities are located and vice versa. As depicted in Table 4, accessibility and activities are interrelated based on the transportation network and land uses.

Activity refers to jobs and where people leave. Ideally, there would be an equilibrium between activity and accessibility. However, the reality for most cities is that they are never in equilibrium, or that the equilibrium does not match the vision for the city. Cities are constantly changing as new activity emerges every day (new jobs are created or new people are born). Also, activity could be

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2 Paez, D. Escobar F. Urban Transportation scenario in LUCC model: a case study in Bogota – Colombia, in Geomatic simulation and scenarios for modelling LUCC. In review. Springer NY, 2016

3 Paez, D. Et al. To densify or not to densify? Mobility and urban life quality in a developing city. Panamerican Transport Conference, Santander España, 2014
reduced (for example when macro-economic changes occur or when people get old or die and the community shrinks); this creates the need for the transportation network to adjust to the new accessibility needs.

Similarly, new transportation technologies emerge (such as private car sharing or bike sharing schemes), which results in city activities (commercial, industrial and residential) being planned differently. This distribution is interactive and affects key transport aspects such as modal split, travel emissions and population densities.

![Interrelation Between Trip Patterns and Population Distribution](image)

**Figure 4** Interrelation Between Trip Patterns and Population Distribution

### 3.3 Modal split, transportation emissions and population density

Ideally, cities would establish transportation modal split (what percentage of trips are taken by walking, cycling, public transportation and private vehicles) using a law or decree. However, modal split is a market indicator within which there are complex relationships between transportation users, infrastructure and regulations.

In cities in the Netherlands cycling transportation dominates their modal split due to a high level of investment in infrastructure, complete networks, cultural changes and disincentives for private vehicles (such as parking restrictions). Comparatively, in Paris, which has outstanding pedestrian walkways, the majority of trips are taken by walking (60%) and then by public transportation (27%).
Transportation emissions, which are usually measured in CO2 tons, are related to modal split, urban form and energy sources. A city with very low car ownership, but where population centers are far from commercial and work centers, would emit proportionally to the distance that those in private vehicles travel. Conversely, emissions are low in a city with a large fleet of private cars, such as Melbourne, where most of the fleet is new.

Moreover, and additionally for Melbourne, the majority of the public transportation uses non-emission electric engines rather than fossil fuel based combustion engines. This could suggest the city has low emissions. However, Melbourne uses coal plants to power their trams and trains' electrical engines, which makes it a city that per person contributes highly to Green House Gas (GHG) emissions.

In Semarang, most trips are in private vehicles (both cars and motorcycles), and the current public transportation fleet (mainly the Angkots) are old and have low emission standards. As a result, transportation emissions per trip are high given that the vehicles are high emitters and they travel long distances. Low-density cities such as Semarang lead to people having to travel long distances each trip, which exacerbates the emissions problem.

A city that wants to have cleaner air and reduce GHG emissions needs to integrate transportation and land use. First, public transportation networks and other low emission modes such as cycling and walking should have complete networks that cover the majority of the city. Ideally, new residential and commercial constructions would only be allowed to be located near reliable public transportation networks or non-motorized networks. Achieving this requires both transportation and land use regulations.

Secondly, the vehicle fleet should be of high standard, particularly the public transportation fleet, which is regulated through transportation policy. Thirdly, population densities and mix of land uses should be high to encourage shorter trips and the use of more efficient systems such as a metro. In this case capital investment for a metro is high and the only way to justify it is by having highly dense areas in which a lot of people would use the service.

Proper integration planning, at a minimal level, would guarantee that sustainable modes are in place right when new residents arrive. At a more advanced integration level, the city would have a partnership with the private sector in order to level resources to build public transportation infrastructure (see section 6.33 in which the concept of land value capture is explained).
3.4 The challenges for integration

Although most cities recognise the need for integration, the biggest challenge is the speed of change. While people might change transportation modes every day, workplace location or where people live change more infrequently.

Figure 5 represents the different speed of change in the different areas and how they are connected.

Integration does not only occur at a higher level. Low scale city interventions, for example creating a walkable or cyclable neighbourhood, requires precise integration as actors in a local area are many and complex. Proper cycling and walking paths are not safe if there is no commercial activity on the ground level.

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4 Adapted from a presentation by Luis Angel Guzmán at Los Andes University
of buildings\textsuperscript{5}. Similarly, proper street furniture for these two modes cannot be installed if they were not included in the land plan provision.

Similarly, desired walkability outcomes will not be achieved if public lighting is not adequate or social conditions do not allow for it to happen\textsuperscript{6}. In consequence, many variables affect vulnerable modes such as walking and cycling as most of our senses are exposed to the environment (sight, hearing, smell and touch). If there is proper integration, clear priority is given to each mode and the vision of the city; this, in most cases, is to foster sustainable modes such as walking, cycling and public transportation.

Therefore, efforts made already in Semarang to improve cycling and walking need to be reviewed under the context of a holistic approach to understand key land use planning needs such as active frontage and public lighting.

The following picture shows an intersection in Melbourne where the pedestrian crossings are clearly marked in yellow, and there are green-painted exclusive cycling lanes. Trams have priority at the traffic lights based on when they arrive at the intersection.

\textsuperscript{5} Lindsay Maurer Braun, Anna Read, Anna Ricklin, A29 - The Benefits of Street-Scale Features for Walking and Biking, Journal of Transport & Health, Volume 3, Issue 2, Supplement, June 2016,

\textsuperscript{6} Stephanie L. Fowler, David Berrigan, Keshia M. Pollack, Perceived barriers to bicycling in an urban U.S. environment, Journal of Transport & Health, Available online 23 April 2017
Physical integration in a city, as in the above example in Melbourne, demonstrates high coordination between land use and transportation policy. Without proper road reservation (such as the photo in Melbourne), each mode could not have had a segregated space. At the same time, each operator of the system (tram, bicycle and pedestrian) needs to agree to allow the existence of the others and the conditions under which they need to share an intersection space. All these could not have been achieved without strong institutions and technical capacity behind each mode and a clear integrated policy. Melbourne adopted this policy for the first time in 2003. Melbourne has a directorate within the transport department dedicated to plan walking and cycling and at the same time new infrastructure developments are coordinated by a cycling and walking manager within the road development agency called Vicroads.

The example demonstrates that developing cities, such as Semarang, require enhancement of their technical capacity for each transportation mode and within the land use planning department. Also, Integration is complex and
positive results are normally achieved on the ground in the long-term after institutions and their policy documents are coordinated. Good coordination between RTRW and TRA-MP would be a strong step in the right direction. Semarang also needs a transportation and land use integration plan that supports development for the next 25 years.

3.5 Strategies to measure integration level

Understanding the level of integration in a city is difficult as it is highly dependent on local conditions. Complex indicators are in the literature to follow integration progress\(^7\). Unfortunately, few cities around the world would have the required data to apply them.

To identify if a city is heading in the right direction (if it is achieving its vision) it is necessary to look at key output indicators. These indicators should be directly related to its vision.

Examples of output indicators that are applicable for most cities:

- Percentage of trips in non-motorized transportation
- Public transportation fleet emissions per kilometre per passenger
- Population density
- Mix use indicators
- Average length of trips per mode
- Level of public participation
- Annual transportation CO2 emissions

4 GAP ANALYSIS
This section presents challenges that have been identified to integrate transportation and land use planning in Semarang. The relevant questions on the topic and analysis conducted served as a focal point to be able to develop recommendations that were to be implemented in the review of the RTRW and TRA-MP documents.

The gap analysis covers seven areas and, for each area, technical studies were conducted or obtained to identify any gaps in integration. At the end of the gap analysis, a summary of the main challenges to be faced is presented.

### 4.1 Planning system

The current planning system in Semarang does not establish a clear relationship between land use and transportation. Land use planning in Indonesia is governed by federal regulations that limit the possibilities for local regions to integrate. Transportation plans are normally local and their policy development is conducted by BAPPEDA while implementation is normally controlled by the Transportation Department.

![Figure 7 Planning System in Indonesia](https://www.mlit.go.jp/kokudokeikaku/international/spw/general/indonesia/index_e.html)

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8online at : Source:https://www.mlit.go.jp/kokudokeikaku/international/spw/general/indonesia/index_e.html
As part of a stakeholder engagement conducted during the consultancy, the existing policy gaps in terms of transportation and land use integration were identified. Figure 8 details the stakeholder inputs received for the RTRW implementation after it has been approved by parliament.

![Figure 8 Planning System Gap in Semarang](Source: input from BAPPEDA officers)

The main gaps identified as part of this exercise were related to the implementation stages. As RTRW provides strategies, there is an integration gap between these strategies and the transportation sectoral plan. For example, a Transit Oriented Development (TOD) strategy in Semarang needs to be included in the sectoral plan in such way that the areas selected for TODs are part of either current or future transportation corridors.
Additionally, officers identified that there are planning integration gaps related to budgeting. Tax and revenue regulations have not included Land Value Capture (LVC) strategies (see section 6.3 that explains LVC).

4.1.1 Key takeout for RTRW and TRA-MP

Semarang’s current planning system has not included key elements for the development and implementation of land use and transportation integration. These elements are related to funding strategies, institutional arrangements and integrating policy documents based on local capacity building. RTRW and TRA-MP need to address this gap and find ways to influence national-level regulations.

4.2 Geography

- Could current transportation systems and modes be expanded into hilly areas?

Natural barriers affect accessibility and urban development. Some areas permit the presence of high-rise buildings and the growth of mass transit. As Semarang’s geography is significantly varied, considerations on where transportation and land use integration can occur is important.

Ideally, in the future, new residential developments, particularly those for the poor, should be next to a BRT or other public transportation systems. There should also be walkable and cyclable areas for short trips. In terms of BRT as a mass transit system, international experience recommends a maximum slope of 7% for main roads with design speeds of 60km/h for public transportation. BRT systems can run on slopes of up to 12%, but the operation speed would be reduced to 20km/h, making them commercially unviable. The following table, taken from Atlanta’s (USA) road design policy, illustrates the limitation of roads due to geographic conditions.
Table 5 Slope and Speed

Based on the information provided, urban growth areas are set to expand into hilly areas. Semarang expansion areas mainly extend into hilly areas in the south and south-east. As can be seen in the maps below, these two growth directions are characterised by slopes that range between 15% and 25%. Growth to the south is of particularly concern as slopes could be higher than 40%; this creates a natural barrier for the extension of public transportation systems. Public transportation options that can accommodate topological conditions and steep slopes are discussed in further detail in section 6.1.

*Source: Design Policy Manual Atlanta*

http://www.dot.ga.gov/PartnerSmart/DesignManuals/DesignPolicy/GDOT-DPM.pdf
Figure 9 Hilly Areas\textsuperscript{10}.

\textsuperscript{10} Semarang Resilience Strategy, 2015
An analysis was conducted using Geographic Information Systems (GIS) and elevation data from NASA satellites. The digital elevation model obtained allowed the slopes in Semarang to be calculated. The two maps below illustrate the results obtained.

Figure 10 Viable Areas for Urban Freeways and Local Roads
While the majority of conditions in Semarang allow for the construction of local roads (slopes up to 17%), areas to build proper highways that allow efficient BRT and other mass transit systems are limited. Corridors are commonly interrupted by high slope areas, which make it expensive to build.

**4.2.1 Key takeout for RTRW and TRA-MP**

Planners should consider whether a mass transit system could be built in areas in which residential development is proposed. Otherwise, the city would continue growing into areas that are car dependent as only local roads can be built. An alternative for these hilly areas is reforming the Angkot system, a topic that is later discussed. RTRW and TRA-MP should start integration by establishing a mechanism to coordinate transportation and land use development.

**4.3 Water provision**

- **How would expansion to the south and east affect water provision?**

It is important that the expansion of BRT gradually grows with an increased coverage of public services. If only the public transportation network is extended, people will live farther away and their connection to public services will be more delayed; thus, their quality of life will be affected. Access to potable water and an efficient sewage system is important to prevent disease. One of the main challenges in providing potable water to the citizens of Semarang is the diverse topographic conditions. PDAM, the water company, cannot provide any water service to locations where the slope level is between 20-40%. New infrastructure would be required in order to supply water to the hilly southwest areas.
Analysing a digital version of this map allowed us to conclude that 52% of Semarang has access to clean water. Further geospatial analysis allowed us to conclude that from this 52% the majority of users are within the Central Business District (CBD) area (almost half), and that outer areas, where future growth is expected, already have that largest amount of people without clean water (37% of the 48% do not have access to clean water).

<table>
<thead>
<tr>
<th>Type</th>
<th>Proportion of Clean Water</th>
<th>C.W Inside Ring</th>
<th>C.W Outside Ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Customers</td>
<td>48%</td>
<td>11%</td>
<td>37%</td>
</tr>
<tr>
<td>Customers</td>
<td>52%</td>
<td>29%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table 6: Proportion of clean water

4.3.1 **Key takeout for RTRW and TRA-MP**

Proper transportation and land use integration requires that the water system be taken into consideration. RTRW should include a new planning mechanism that allows for a high level of coordination between city departments.

4.4 **Population density**
Population density refers to the number of residents per area. It is usually measured as population per square kilometre. The map below shows the density layout in Semarang, which follows a typical monocentric city pattern: a high-density concentration in the central business district (CBD) and a low density in the outskirts.

Figure 12 Population Density of Inner and Outer Areas

<table>
<thead>
<tr>
<th>No</th>
<th>Kecamatan</th>
<th>Population</th>
<th>people/km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mijen</td>
<td>56.570</td>
<td>983</td>
</tr>
<tr>
<td>2.</td>
<td>Gunungpati</td>
<td>75.027</td>
<td>1.387</td>
</tr>
<tr>
<td>3.</td>
<td>Banyumanik</td>
<td>128.114</td>
<td>4.991</td>
</tr>
<tr>
<td>4.</td>
<td>Gajah Mungkur</td>
<td>63.380</td>
<td>6.993</td>
</tr>
<tr>
<td>5.</td>
<td>Semarang Selatan</td>
<td>82.921</td>
<td>13.990</td>
</tr>
<tr>
<td>6.</td>
<td>Candisari</td>
<td>79.890</td>
<td>12.217</td>
</tr>
<tr>
<td>7.</td>
<td>Tembalang</td>
<td>142.936</td>
<td>3.234</td>
</tr>
<tr>
<td>8.</td>
<td>Pedurungan</td>
<td>175.652</td>
<td>8.483</td>
</tr>
<tr>
<td>9.</td>
<td>Genuk</td>
<td>91.527</td>
<td>3.342</td>
</tr>
<tr>
<td>10.</td>
<td>Gayamsari</td>
<td>73.583</td>
<td>11.913</td>
</tr>
<tr>
<td>11.</td>
<td>Semarang Timur</td>
<td>78.557</td>
<td>10.245</td>
</tr>
<tr>
<td>12.</td>
<td>Semarang Utara</td>
<td>127.897</td>
<td>11.661</td>
</tr>
<tr>
<td>13.</td>
<td>Semarang Tengah</td>
<td>71.263</td>
<td>11.673</td>
</tr>
<tr>
<td>14.</td>
<td>Semarang Barat</td>
<td>158.971</td>
<td>7.313</td>
</tr>
<tr>
<td>15.</td>
<td>Tugu</td>
<td>30.904</td>
<td>972</td>
</tr>
<tr>
<td>16.</td>
<td>Ngallyan</td>
<td>120.887</td>
<td>3.182</td>
</tr>
</tbody>
</table>

Table 7 Population Density

Densities in Semarang are still low compared to most developing economies. Even more problematic, uneven densities signify difficulties in planning the transportation system. The result of the current density is a monocentric

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11 BPS Kota Semarang, 2013
pattern. High densities (over 10,000 people per square kilometre) are good for the development of mass transit and are the ideal densities for transportation land use integration strategies such as Transit Oriented Development (see page Error! Bookmark not defined. for a full explanation of the concept).

Of the sixteen regions in Semarang, only six can be considered to have high densities. The remaining regions have densities similar to those found in rural zones. Cities with high densities, such as Bogota, allow for the optimization of transportation infrastructure due to the fact that more people have access to key transportation corridors. Average density in Bogota is over 20,000 people per square kilometre, and low-income zones have densities over 40,000 \(^{12}\).

However, previous studies have found that new development high-density areas without proper public transportation links are problematic\(^{13}\). In these areas, high density will inevitably increase traffic and pollution, and new residents will be car and motorcycle dependent. Thus, the challenge is to anticipate and implement public transportation systems before densities increase in order to ensure that existing and future inhabitants use public transportation instead of private cars\(^{14}\). This will, in turn, shift the balance away from cars.

Normally, poverty is found on the outskirts of cities in areas that have lower densities. The literature says that it is hard to implement a massive public transportation system in a low-density area due to operational costs. For these zones, it is important to find other solutions such as feeder systems to the principal trunk road (see section 4.8, which addresses gaps in the public transportation system). In particular, this problem is relevant for Semarang as new expansion areas need to provide public transport in order to reduce car dependency of future residents.

\(^{12}\) Paez, D. Et al. To densify or not to densify? Mobility and urban life quality in a developing city. Panamerican Transport Conference, Santander España, 2014
\(^{13}\) Takemi Sugiyama, Rachel Cole, Russell Thompson, Shannon Sahlqvist, Thiago Hérick de Sá, Alison Carver, Thomas Astell-Burt, Area-level socio-economic disparities in active and sedentary transport: Investigating the role of population density in Australia, Journal of Transport & Health, Available online 29 April 2017
\(^{14}\) Li Tian, Biqing Ge, Yongfu Li, Impacts of state-led and bottom-up urbanization on land use change in the peri-urban areas of Shanghai: Planned growth or uncontrolled sprawl?, Cities, Volume 60, Part B, February 2017,
It has been shown that mixed land use is beneficial in reducing travel distance and helps to encourage walking and non-motorized modes. Additionally, there are also economic benefits for property owners as the value of real estate increases due to proximity to commercial sectors. Semarang does not have significant land use mix, and consequently, low land use mix leads to longer travel distances.

In many places, including Semarang, the density increase potential is on the outskirts of the city. The challenge is for sustainable transportation infrastructure to keep pace with increasing density so that transit services are available before people become car dependent.
4.4.1 Key takeout for RTRW and TRA-MP

There are opportunities to increase population densities in the outskirts of Semarang. Both policy documents should consider density as a key factor for planning as it difficult to provide low-density communities with public transportation. Increasing land use mix also appears to be needed in Semarang.

4.5 Regional Considerations

- Where is Semarang in comparison to other cities in Indonesia?

It is important to understand the relationship between Semarang and the region in which it is located. Semarang is one of the seven major cities in Indonesia due in part to the fact that it has a railway network that connects it with other provinces. In the following table, gross domestic product and income per capita are compared for the major Indonesian cities.

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Regional GDP (RP Billion)</th>
<th>Income per capita (RP Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jakarta</td>
<td>26,611,622</td>
<td>332,971</td>
<td>13.00</td>
</tr>
<tr>
<td>Bandung</td>
<td>8,924,019</td>
<td>24,941</td>
<td>2.79</td>
</tr>
<tr>
<td>Surabaya</td>
<td>8,829,295</td>
<td>67,695</td>
<td>7.67</td>
</tr>
<tr>
<td>Medan</td>
<td>3,949,103</td>
<td>29,352</td>
<td>7.43</td>
</tr>
<tr>
<td>Semarang</td>
<td>3,585,973</td>
<td>18,142</td>
<td>5.6</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>3,504,752</td>
<td>18,307</td>
<td>5.22</td>
</tr>
<tr>
<td>Palembang</td>
<td>1,323,169</td>
<td>14,992</td>
<td>11.33</td>
</tr>
</tbody>
</table>

*Table 8 Gross Domestic Product (GDP)*
*(Source: BPS, 2009, constant price of 2007)*
4.5.1 Key takeout for RTRW and TRA-MP

Today Semarang is not among the wealthiest cities in Indonesia. Other urban areas, such as Jakarta or Surabaya, have significantly more income per capita. Even though Indonesia is a centralised country, regional areas have significant autonomy to both raise and use financial resources. RTRW and TRA-MP should provide a mechanism to increase availability of resources for city investment in sustainable development.

4.6 Road infrastructure

- Does the city have the regional and national resources to develop the proposed ring roads?

In 2004 Central Java had 3,848 km of roads (4% of the total amount of roads in the country) divided into 1,298 km of national roads (3.7% of total national highway) and 2,550 km of provincial roads (6.3% of the total amount of provincial roads in the whole country). The annual national and provincial
highway growth in Central Java was 1.6% and 0.24% respectively during 2000-2004, while for the same period Indonesian overall road growth was 7.1% for national and 3.6% for provincial highways.

These figures demonstrate that the expansion plan for provincial roads in Semarang is bold as it proposes the development of key roads such as the middle road and the outer ring road. Combined, these add more than 120 kilometres of new highways. The following map shows the proposed road development plan included in the current version of the RTRW plan.

Using advanced analysis in GIS, we identified the proposed or existing land uses of these two ring roads.

Land uses in RTRW were digitalized and an interpolation mechanism was used to determine the surrounding areas. Please note that Alternative 2
could not be calculated because information on land uses outside of the Semarang study area was unavailable.
The results of this analysis show that although ring roads cross mainly residential areas, 9% of the inner ring and 16% of the outer ring (alternative 1) cross through protected areas. Similarly, construction of these roads is challenging as we have identified that for both roads around 6% cross through bodies of water.

Additionally, information from the central java transportation study conducted by the Japanese cooperation agency (JICA) reveals that current travel patterns for both cars and motorcycles do not follow the direction of the proposed ring roads. This study also reveals how much larger motorcycle usage is compared to car. Public transportation usage is very low.

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It can be concluded from the JICA analysis that both car and motorcycle users’ main travel directions go from the CBD to the south, east and west. The proposed rings (both outer and middle) do not effectively cover these routes.
4.6.1 Key takeout for RTRW and TRA-MP

When a new road is constructed, development alongside it follows. The ring roads could potentially attract illegal developments on protected areas as well as affect significant bodies of water. RTRW should develop a protection mechanism to reduce protected areas potentially being affected by new roads. Additionally, Semarang needs TRA-MP to be a comprehensive transportation plan that considers behavioural aspects alongside infrastructure proposals and operational changes.

4.7 Modal split

- Do we want to continue with the current modal split and its trend in the Semarang?

According to the Mass Rapid Transit Feasibility Study conducted in 2014, growth of motor vehicle use over the last five years has risen sharply. Motorcycle use from 2009 to 2011 grew by 12.8% per year. Car use from 2009 until 2011 grew by 9.9% per annum. In 2011, the proportion of motorcycles reached more than 80% of the total amount of vehicles. The majority of trips are clearly made by motorcycle, followed by cars and then public transportation (see graph below).

![Graph showing modal split of trips](image-url)
The growth of motorized transportation is unsustainable in the future as road infrastructure is unable to grow at the same pace. Research into car usage showed that in Vienna (Austria) trips made by car have decreased over the last few years\textsuperscript{16}. This was possible because this Austrian city decided to take strong actions to change car dependency patterns. Strategies such as the reorganisation of parking space in the city, eliminating free parking, removal of parking from historical places and street and parking permissions for residents where key actions in making these changes.

Even though private transportation dominates Semarang, average speeds in the city are high compared to other Indonesian cities. The table below shows that there are opportunities for Semarang to use its current travel conditions to encourage better public transportation.

<table>
<thead>
<tr>
<th>City</th>
<th>Average Speed (km/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JABODETABEK</td>
<td>19</td>
</tr>
<tr>
<td>DKI Jakarta</td>
<td>10-20</td>
</tr>
<tr>
<td>Bogor</td>
<td>15.32</td>
</tr>
<tr>
<td>Tangerang</td>
<td>22</td>
</tr>
<tr>
<td>Bekasi</td>
<td>21.86</td>
</tr>
<tr>
<td>Depok</td>
<td>21.4</td>
</tr>
<tr>
<td>Surabaya</td>
<td>21</td>
</tr>
<tr>
<td>Bandung</td>
<td>14.3</td>
</tr>
<tr>
<td>Medan</td>
<td>23.4</td>
</tr>
<tr>
<td>Palembang</td>
<td>28.54</td>
</tr>
<tr>
<td>Semarang</td>
<td>27</td>
</tr>
<tr>
<td>Makassar</td>
<td>24.06</td>
</tr>
</tbody>
</table>

\textbf{Table 10 Average Speed}
(Source: BSTP Directorate, Ditjenhubdat, Kemenhub, 2013)

While BRT in Jakarta, Cairo, and all Colombian cities run on a segregated and exclusive busway, the operational arrangements of Semarang’s BRT are different. In Semarang, BRT buses depend on traffic conditions as they are mixed with the rest of the traffic. This mixture limits operational performance and increases the likelihood of road accidents.

\textsuperscript{16} Ralph Buehler, John Pucher & Alan Altschuler, Vienna’s path to sustainable transport, Journal International Journal of Sustainable Transportation Volume 11, 2017 - Issue 4
Do you think the growth of car ownership would be maintained in the future?

Figure 19 Transmilenio in Bogotá, MIO in Cali, Transcaribe in Cartagena, Metroplus in Medellín, Megabus in Pereira, Metrolínea in Bucaramanga and Transmetro in Barranquilla.
Experience has shown that without strong government action, the lack of public transportation combined with opportunities for further wealth generation increases the likelihood of greater private vehicle ownership.

An increase in individual income will probably result in a higher degree of car or motorcycle ownership. The following diagram compares multiple cities throughout the globe. Cities that fall outside the trend have significant disincentives for private ownership such as Singapore or a difficult urban environment for the car such as Hong Kong. Most Singaporeans simply cannot afford a car. Singapore’s government makes owning a vehicle extremely expensive through high taxes (a car is taxed at least 100 per cent of its open market value) and a certificate of entitlement is also required. In Singapore, a strategy for demand management called the congestion charge has also been implemented. This strategy is fully explained in section 6.44. Other examples include Colombia which has built seven BRTs throughout the country, reducing the need for car ownership.

Nigeria, a country in which BRT systems have been implemented only in a limited fashion, shows how the low level of public transportation investment combined with growing wealth increases the significant car ownership per 1,000 people.

Figure 20 Income and Passengers.
(Source: Megacities and Megatrafﬁc http://www.accessmagazine.org/articles/fall-2010/megacities-megatrafﬁc/)
4.7.1 Key takeout for RTRW and TRA-MP

RTRW should find strategies to balance the need for economic development while sustainably growing the city. This, in practice, means reducing the current trend of car and motorcycle ownership while simultaneously creating opportunities for new development that is well served by public transportation. TRA-MP should consider operational changes in order to improve the efficiency of current BRT services.

4.8 Public transportation system

- What public transportation system do we want for Semarang?

According to information in the resilience strategy, public transportation in Semarang is limited. There are 2,000 minibuses (called Angkots) that operate 96 routes covering a limited proportion of the city. Uncovered areas use informal public transportation, such as motor taxis. The following map shows Semarang’s public transportation network.

Figure 21 Public Transportation Network in Semarang
(Source: Semarang Resilience Strategy)
Advanced spatial analysis using GIS was conducted to determine the current public transportation coverage compared to existing and proposed land uses.

![Map of land use categories](image)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Total Area (km²)</th>
<th>Buffer 1000m (km²)</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>140.38</td>
<td>23.13</td>
<td>16%</td>
</tr>
<tr>
<td>Commercial</td>
<td>2.53</td>
<td>2.21</td>
<td>87%</td>
</tr>
<tr>
<td>Industrial</td>
<td>15.87</td>
<td>10.44</td>
<td>66%</td>
</tr>
<tr>
<td>Natural resources</td>
<td>57.47</td>
<td>8.03</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>10.39</td>
<td>4.76</td>
<td>46%</td>
</tr>
<tr>
<td>Residential</td>
<td>158.06</td>
<td>73.80</td>
<td>47%</td>
</tr>
</tbody>
</table>

Figure 22 Coverage of The BRT System for Different Land Uses in Semarang
(Source: this consultancy using information from multiple sources)
The table shows that the residential land use has a 47% coverage which means that half the population has less access to job opportunities and there is an increase in non-regulated transportation to meet this deficiency. This low level of coverage justifies the modal split in favour of private cars and motorcycles. Commercial areas have the highest coverage, indicating a desire by commercial developers to locate themselves close to public transportation.

For each sector, the transportation needs are different; for example, agriculture needs trucks to reach markets while mining and industry normally use trains and heavy trucks. On the other hand, the hospitality and financial services sectors need public transportation and other transportation infrastructure such as nearby parking. If Semarang wants to be a city that promotes services and grows this sector, transportation infrastructure must be provided. Public transportation, roads, non-motorized transportation and parking are elements that the city will need. However, the current objective of developing the service sector is not matched by the city’s urban form and investment in transportation infrastructure.

In some areas, high density is aligned with good BRT coverage; however, in others good coverage is not matched by optimal densities (see Figure 233 below). To optimise coverage, the BRT system needs to reach more areas with feeder services for lower densities. The following map shows a geographic analysis of hotspots for low BRT coverage and high population density.
From an operational perspective, the current BRT has significant difficulties. In contrast with most BRT systems in the world, no segregated lines have been provided. Access platform are not consistently designed. Stations are unsafe with significant gaps between the bus and the platform.

Pedestrian paths, required by all users, are generally inappropriate and poorly maintained. Even in BRT stations in the CBD, recently constructed footpaths are not well maintained and users face physical barriers moving to and from stations. BRT in Semarang is not accessible for people with limited mobility that require a wheelchair or use a walking aid. The ticketing system is based on manual interaction at some stations. It creates low levels of service for users while demanding high operational costs.

BRT lines have not been planned to reduce duplication and in many cases BRT services face competition by Angkot. Additionally, the expansion of the system has been slow and it has not covered key low-income population areas. Private operators have low levels of investment in the system. As a result, the bus fleet is of a low standard and not always properly maintained.

Semarang’s financial structure limits any future investments. Semarang receives only a small amount of economic resources from the BRT fares
compared with Bogota’s BRT. The percentage of a minimum salary spent is only 11% in compared to 17.5% in Bogota.

<table>
<thead>
<tr>
<th>Location</th>
<th>Local Currency</th>
<th>USD</th>
<th>BRT Fare (USD)</th>
<th>Percentage spent monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semarang</td>
<td>Rp 1,909,000</td>
<td>142.24</td>
<td>0.26</td>
<td>11.0%</td>
</tr>
<tr>
<td>Colombia</td>
<td>$ 689,454</td>
<td>223.48</td>
<td>0.65</td>
<td>17.5%</td>
</tr>
</tbody>
</table>

Lower public transportation rates mean that maintaining a high level of service is difficult and city officials are forced to find alternative financial resources to subsidise the operation of the public transportation system.

The city’s Angkot system is a key public transportation component in Semarang. Proposals to modify Angkot operations in order to convert it into a feeder system were presented during stakeholder workshops and in the 2016 CPL report conducted by the World Bank. From an operational perspective, the Angkot minibuses would operate as part of the BRT system by feeding passengers from outer areas to the BRT’s key transportation hubs.

This proposal appears to offer significant benefits as Angkot services would not compete with BRT services (as is the case today). At the same time, fare integration would allow the government to have better control of resources and solve issues such as current ticketing.
Experiences in places where public transportation reform has been conducted show that improvements are rarely made in operational arrangements, and less competition between services results in financial gains. In most cities, transportation operation reform means that the city is required to provide additional subsidies to the transportation system in order to cover the changes (see section 6.1 about Transportation Reform).

It is likely that for Semarang, the feeder system strategy would require significant public investment in the form of subsidies. As an example, due to contractual problems during the implementation stage, traditional transportation services reform in Bogota today costs US$200 million a year in government subsidies\(^\text{17}\).

**What is a successful BRT?**

\[^\text{17}\] More information about bus reform can be found in the World Bank blog at: http://blogs.worldbank.org/transport/how-have-recent-bus-reforms-changed-accessibility-bogot
BRT is a relatively new mass transportation system. Most cities that have decided to implement it are facing operational challenges. Ideally a successful BRT includes:

- Segregated infrastructure that allows operational efficiencies (Bogota – Colombia does this well)
- High level of coherence between residential and commercial developments with BRT services (Curitiba – Brazil provides good examples)
- Integrated ticketing systems that work in all modes (Melbourne – Australia has achieved full integration)
- Road safety and passenger comfort at stops; access to the vehicle must be comparable with other mass transit modes, such as metros or tram systems (In Cali – Colombia stations and vehicles balance passenger and operational needs well).

### 4.8.1 Key takeout for RTRW and TRA-MP

The public transportation network should be aggressively grown. RTRW should provide funding sources for new investments while TRA-MP should look at operational opportunities such as the feeder system and segregated bus lanes for the city. TRA-MP should mandate additional transportation studies to evaluate the feasibility of the proposed feeder system.
4.9 **Non-motorized modes**

- Where are people more likely walk or ride their bikes?

*Figure 26 Topography and Density in Semarang (Source: Semarang Resilience Strategy)*
Both population density and topography (slopes) are key drivers and deterrents for non-motorized transportation. People will usually ride bikes on slopes lower than 9%. The table below shows the speeds that can be reached by the mode.

<table>
<thead>
<tr>
<th>Slope</th>
<th>Length(m)</th>
<th>25 to 75</th>
<th>75 to 150</th>
<th>&gt;150</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% to 5%</td>
<td>35km/h</td>
<td>40km/h</td>
<td>45km/h</td>
<td></td>
</tr>
<tr>
<td>6% to 8%</td>
<td>40km/h</td>
<td>50km/h</td>
<td>55km/h</td>
<td></td>
</tr>
<tr>
<td>9%</td>
<td>45km/h</td>
<td>55km/h</td>
<td>60km/h</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 Bike Speeds and Slope

It is important to understand that the growth of bike users depends on factors such as security, good bike networks, bike parking, etc. Semarang needs more cycling paths to offer its residents another way of moving in the city. Biking is the most sustainable because it is cheap, environmentally friendly and inclusive.

The master plan is looking forward to the construction of cycling paths, as is shown in the next section.

Even though Semarang has proposed developing cycling infrastructure for over nine years, the project is not yet complete. The current cycling network
in Bogota is around 300 kilometres for a city of 10 million people\textsuperscript{18}. Semarang, aims to have a quarter of that figure or 75 kilometres of infrastructure.

### 4.9.1 Key takeout for RTRW and TRA-MP

Investment in non-motorized transportation has not been a priority for Semarang. RTRW and TRA-MP should provide walking and cycling areas with high visibility, and find additional resources to invest in them. TRA-MP should propose tactical urbanism as a mechanism to improve awareness (see section 6.6 where the concept of tactical urbanism is explained). Despite this, and considering Semarang’s topology, the RTRW and TRA-MP should be realistic in terms of where people will use the cycling lanes.

### 4.10 Institutional Issues

- What are the motivations for BAPPEDA and the Transportation Department to be better integrated?

Concepts such as joined-up government for transportation is primarily a derived demand. People travel as means of accessing activities. These activities drive the demand for travel and they are explicitly connected to the arrangement of land uses.\textsuperscript{19}

Cities such as Vancouver have been taking a broader approach to urban planning and transportation since the 1970s. Vancouver is widely regarded as an international leader in integrating land use transportation policy and planning.

Institutional agreements share some form of institutional coordination between land use planning and public transportation planning. This is sometimes achieved through simple coordination between departments, which can sometimes be assisted by more formal administrative integration; for example, the creation of Translink, a real estate department within the public transportation sector. This demonstrates the commitment to integration in Vancouver.

\textsuperscript{18} Caviedes, A. Paez, D. Cycling trips assignment on a four-step transport model: Success approach using geographic information systems and discrete choice modelling. Transport Research Conference, Washington DC, USA. January 2015

\textsuperscript{19} Handbook on Transportation and Urban Planning in the Developed World. Michiel C.J. Bliemer, Corinne
Based on the input provided during the workshop and information in the Resilience Strategy, there is limited integration on an institutional level between land planning and transportation planning.

![Challenges to the capacity of Semarang](image)

Figure 28 Challenges  
(Source: Semarang Resilience Strategy)

It appears that the main difficulty occurs because both institutions do not understand how they can benefit from each other, they also do not understand about transportation operational changes, changes in travel behaviour and, therefore, land use coverage over time.

From a contextual perspective, transportation systems that need to be reformed could do so by producing changes in a systematic manner (see diagram below). Vancouver in Canada or London in the UK are examples of systematic changes that have taken place over decades in where their transport institutions have been allowed to think outside the square.

An alternative, which has been significantly beneficial in places like Vienna, is a system that is flexible and allows individual modification of its parts. This system could work in the following way: land use planning could undertake a reform and, in parallel, the transportation department could also undertake one. Although there are risks with large-scale modification, opportunities appear to make faster changes and integrations while the work is being done.
4.10.1 Key takeout for RTRW and TRA-MP

RTRW and TRA-MP should be the first step for planning system reform. An integrating mechanism should be included in current activities, and participatory planning should also be included (see section 6.5 for a complete explanation of participatory planning).
5 RECOMMENDATIONS
This section contains specific changes suggested for inclusion in the RTRW and TRA-MP as well as overall strategic recommendations to make the changes effective. Recommendations consider the legal review process of the RTRW (spatial plan) that is shown below.
One of this consultancy’s objectives has been to produce practical and implementable recommendations in order for Semarang to immediately start integration. Therefore, this report specifically highlights actions that the city can take in the near-term in order to create better transportation and land use policy integration. These actions are strategic for the overall planning process as well as being for both the RTRW and TRA-MP documents.

Recommendations are first summarised. These are followed by a table which describes each idea in further detail. The column entitled “text to be included in RTRW and TRA-MP” includes specific changes to be discussed in the document that is to be sent to Parliament for approval. However, BAPPEDA and other agencies in charge of implementation also need to make parallel additional efforts. The column “Work to be Done” provides specific ideas for tasks that can be started now in order to integrate transportation and land use in Semarang.

It is important to highlight that the recommendations for RTRW and TRA-MP policy documents are actions that should be implemented in the short term (next six months). Strategic recommendations at the end of this section are suggested for a six to 18-month timeframe.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Rationale</th>
<th>Relevance</th>
<th>Text to be included in RTRW and TRA-MP</th>
<th>WORK TO BE DONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendation after review</td>
<td>Specific changes to RTRW to achieve the idea</td>
<td>Why we think the idea is important for the city</td>
<td>Task identified to achieve real change</td>
<td></td>
</tr>
</tbody>
</table>

Technical Justification for the idea

Practical steps to promote integration in Semarang
5.1 Recommendations to be included in the Spatial Plan (RTRW)

RTRW recommendations focus on improving strategic directions and implementation tools.

<table>
<thead>
<tr>
<th>Gaps identified in RTRW</th>
<th>Suggestions to be included in the RTRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTRW revision has limited strategic directions regarding the need for integrated transportation land use planning and how to achieve it.</td>
<td>1. Enable funding tools for infrastructure that uses land use planning principles such as Transit-Oriented Development (TOD) (^\text{20}).</td>
</tr>
<tr>
<td>RTRW evaluation undertaken has not considered implementation challenges and future funding needs.</td>
<td>2. Establish the need for an integrated transportation land use strategy while implementing the RTRW.</td>
</tr>
<tr>
<td></td>
<td>3. Create specific tools involving the community to protect land around the proposed outer ring road.</td>
</tr>
</tbody>
</table>

*Table 12 RTRW Recommendations*

---

\(^{20}\) Transit-Oriented Development (TOD) has been a strategy whereby commercial/mixed-use/shopping centres or high-density residential buildings are located next to a transportation hub. Developers pay part of the cost of the hub in order to have the rights to construct close by. For a complete explanation of TOD see section *Error! Reference source not found.*
### Recommended Actions

<table>
<thead>
<tr>
<th><strong>Recommendation</strong></th>
<th><strong>Rationale</strong></th>
<th><strong>Relevance</strong></th>
<th><strong>Text to be included in the RTRW</strong></th>
<th><strong>Work to be Done</strong></th>
</tr>
</thead>
</table>
| 1  The RTRW should create transportatio n land use funding sources | Given that the RTRW is a local law, opportunities exist to expand its role such that future transportation projects e.g., expansion of BRT or the feeder system could be funded by having land value capture tools. | If land value capture is included in the RTRW, the mandate to improve funding sources is given. Also, future regulations could define specific tools and sites based on the mandate outlined by the RTRW. | • Include general policy directions around land value capture.  
• Justification through highlighting the issue of low implementation of transportation projects due to past funding problems.  
• Include a maximum two-year timeframe to implement the mechanisms. | • Explore examples in other Indonesian cities such as Jakarta and the regulations they have used/ plan to use.  
• Find champions in Parliament to support inclusion and future development.  
• Find appropriate mechanisms for resource use that abide by current laws and regulations. |
| 2  Provide policy directions to ensure integrated transportatio n and land use planning work together in the future | • Use the RTRW evaluation to include the need to develop (in the near future) an integrated transportation and land use strategy as a means to ensure sustainable development.  
• Focus on growth areas and areas with significant potential.  
| | • RTRW and TRA-MP new draft versions have been under development for long time, so there is only limited room for new strategic direction.  
• The opportunity exists for RTRW, as a local law, to create the mandate to undertake the integration. | • In the “Evaluation” section, explain that transportation and land use integration was not included in the original document.  
• In the “Assessment” section, include the mandate for BAPPEDA to develop a new transportation and land use strategy over the next two years with emphasis on the growth areas. | | • Analyse what it would take to develop an integrated transportation land use strategy.  
• Identify in what areas of the RTRW implementation the strategy could provide additional policy directions that are not clear today. |

---

*Land Value Capture is the process by which part of the increases in private land values due to public infrastructure construction is “captured” by the government through different taxes. Mechanisms range from simple schemes such as differential land taxes to complex ones currently used in Brazil such as development rights auction. For a full explanation see section 6.33.*
### Table 13 RTRW Recommendations

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Rationale</th>
<th>Relevance</th>
<th>Text to be included in the RTRW</th>
<th>WORK TO BE DONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Current plans for the outer ring road would lead to development in protected areas</td>
<td>• The RTRW should provide additional instruments to achieve the desired outcomes around the proposed outer ring road, particularly the prevention of development in land currently earmarked as ‘protected’. • Land acquisition, respecting private conditions, may be considered.</td>
<td>• As is the case today, land development in the future is likely to occur around roads. However, new transportation infrastructure (particularly the outer ring road), is being proposed close to environmentally protected land.</td>
<td>• Create a new buffer zone (distance to be determined by further studies) around the inner and outer ring roads in order to identify conservation areas at risk (preliminary we found that these are around 9% of areas crossed by this roads). • In this buffer zone, introduce heavy penalties for illegal and informal developments. • Establish community participation as a tool for land control.</td>
<td>• Map protected lands within close proximity to proposed roads. • Explore regulations that could strengthen future protection of these areas. • Study what would be the appropriate buffer size.</td>
</tr>
</tbody>
</table>

Table 13 RTRW Recommendations
5.2 Recommendations to be included in the Transportation Master Plan (TRA-MP)

The TRA-MP needs to move beyond its role as an infrastructure wish list and begin to provide strategic directions.

<table>
<thead>
<tr>
<th>Gaps identified</th>
<th>Suggestions to be included in TRA-MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRA-MP does not include clear policy directions. The main document output is a list of infrastructure needed, expressed with a vague sense of priority.</td>
<td>1. Include clear policy statements for sustainable development in the TRA-MP</td>
</tr>
<tr>
<td></td>
<td>2. Specify the objectives and desired outcomes from the LRT feasibility study</td>
</tr>
<tr>
<td></td>
<td>3. Include funding sources for the proposed infrastructure plan</td>
</tr>
<tr>
<td></td>
<td>4. TRA-MP should provide policies and ideas for the system to be better operated</td>
</tr>
<tr>
<td></td>
<td>5. Include the creation of an advisory committee for transportation land use integration</td>
</tr>
<tr>
<td></td>
<td>6. Create coordination between the RTRW and TRA-MP</td>
</tr>
</tbody>
</table>

Table 14 TRA-MP Recommendations
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Proposal</th>
<th>Relevance</th>
<th>Text to be included in RTRW</th>
<th>WORK TO BE DONE</th>
</tr>
</thead>
</table>
| 1 Expand the TRA-MP to provide high level policy directions for overall accessibility | - The TRA-MP should start with broad but clear statements that provide policy directions for future transportation infrastructure and operational decisions.  
- Reference reducing emissions from transportation systems as a means of addressing climate change (in line with the sustainable future vision for Semarang) | - Without clear overarching statements, policy documents limit their ability to influence decision-making in the long-term.  
- TRA-MP offers an opportunity for the transportation system to contribute to climate change mitigation and adaptation. | - Create an introduction section in the TRA-MP in which broad but clear statements commit the transportation sector to sustainable development.  
- Within this, express clear priority for sustainable transportation modes (BRT, public transportation, walking and cycling). | - Develop overarching accessibility statements based on inputs from stakeholders  
- Find political champions to support these statements  
- Negotiate statements with other departments and the community |
### Recommendation
2
The LRT feasibility study is a golden opportunity to conduct needed transportation analysis

### Proposal
- Use LRT feasibility study resources to conduct needed technical investigations for the transportation sector, particularly feasibility studies and costings of the proposed feeder system using Angkot services, a new electronic ticketing system and expansion of the BRT network (new lines and investigate segregated busways).

### Relevance
- Resources for technical studies are rare and if a LRT is to be developed, complementing actions in all public transportation services are needed.
- This scope for expansion might gain support from international organisations.

### Text to be included in RTRW
- Establish the scope and desired outcomes for the LRT feasibility study in the TRA-MP. Focus on a holistic system\(^\text{22}\) and the need for technical studies for costing.
- Encourage transparency in the process as a means of avoiding corruption in transportation studies and construction projects.

### WORK TO BE DONE
- Review the existing Terms of Reference for the feasibility study.
- Explore options to expand funding to include a more holistic approach to the transportation system and not just a study of a future LRT system.

### Recommendation
3
TRA-MP needs to expand its role beyond being an infrastructure wish list

### Proposal
- A new section of the TRA-MP should provide strategies to fund future infrastructure.
- These strategies should incorporate the use of land value captures mechanisms, such as TOD, and reference successful national and international strategies.
- Without alternatives for funding, implementation agencies can only depend on national and local government budget allocations. Limited resources were a main cause of implementation challenges for the previous TRA-MP.

### Relevance
- Include a description, responsible agency and legislation changes needed for funding, such as:
  - Transit Oriented Developments
  - Public, private partnerships
  - Infrastructure related capital gain capture

### WORK TO BE DONE
- Investigate national and international examples of TOD and other strategies (for example in Jakarta)
- Develop options with the help of the Finance and Transportation departments

---
\(^\text{22}\) A holistic transport system is such that their different transport networks for each mode support each other. For example, a new traffic light could be located in a holistic way to cater for better pedestrian crossing, reducing car speeds to improve road safety and provide an access point to public transport users.
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Proposal</th>
<th>Relevance</th>
<th>Text to be included in RTRW</th>
<th>WORK TO BE DONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Infrastructure investments would provide desired outcomes if they are operated properly</td>
<td>• TRA-MP should also be a master plan for investment in operations, such as better use of road space, ticketing, policing and road safety.</td>
<td>Adding operational strategies and at the same time promoting desired infrastructure investment would strengthen the capability of the Transportation Department to achieve overarching policy objectives.</td>
<td>Policies for: • Connecting activity centres • Future feeder systems • Ticketing • Road safety • ITS and other policing techniques</td>
<td>• Negotiate with transportation operators, police officers when necessary • Research best practices nationally and internationally</td>
</tr>
<tr>
<td>5 Strong stakeholder management for transportation would benefit transportation and land use integration</td>
<td>• TRA-MP should create an advisory committee that oversees implementation and provides advice on challenges and opportunities. • Include both transportation and land use stakeholders in this committee.</td>
<td>Integrated planning requires a high level of coordination and a statutory body that has a clear mandate and is likely to focus efforts and guarantee continuity across political cycles.</td>
<td>• Mandate the formation of an advisory committee in the new TRA-MP. 23 • Include its scope, members and operational characteristics.</td>
<td>• Create a stakeholder map that identifies stakeholders and gaps relating to input and communication. • Develop draft Terms of Reference for the committee and negotiate it with key stakeholders.</td>
</tr>
</tbody>
</table>

---

23 During consultation with key officers in BAPPEDA, it was suggested that an existing committee could serve this purpose. Considering that new terms of reference are to be defined, using an existing institution might not provide the appropriate platform for change. In any case, if the decision is to modify an existing committee, there needs to be commitment by all members to integrate planning needs.
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Proposal</th>
<th>Relevance</th>
<th>Text to be included in RTRW</th>
<th>WORK TO BE DONE</th>
</tr>
</thead>
</table>
| 6 Coordination between RTRW and TRA-MP is fundamental | • Acknowledge in TRA-MP that RTRW is a higher level document, and that TRA-MP supports the achievement of RTRW policy objectives  
• Create processes that guarantee coordination so TRA-MP actions are coherent with policy directions given by RTRW | Coordination between policy documents is fundamental to avoid duplication and public sector efforts that diminish one another.  
Coordination between policies would guarantee both BAPPEDA and the transportation department cooperate and don’t compete for resources. | • The introduction of TRA-MP should include the RTRW policy direction  
• Committee to be formed to implement TRA-MP should report to existing RTRW governance mechanism | • Review TRA-MP to confirm coherence between policies  
• Meet with RTRW to negotiate areas of disagreement between policy documents  
• Review existing RTRW governance to guarantee opportunities to oversee TRA-MP development and implementation |

Table 15 TRA-MP Recommendations
Strategic recommendations required for ongoing integration

RTRW and TRA-MP changes need additional strategic actions in order to be properly implemented. Innovation, building capacity and continuous planning are necessary complementary actions to enable better land use and transportation integration over 2-5-years. Innovation is about introducing changes to established processes, roles and responsibilities. In planning, it is about finding new leverages, changing standard procedures and adapting to the planning environment. Innovation comes from people and their working environment. For example, Google dedicates significant resources to its work environment. Using tactical urbanism would allow for solutions to be refined and help get stakeholders on-board.

The key **innovation** actions proposed are:

1. Change the traditional role of policy documents and imagine them as flexible instruments for continuous improvement
2. Build mutual opportunities with the national government
3. Changes require new ideas that are supported by champions on a political level

The key **building capacity** actions proposed are:

1. Build multidisciplinary teams
2. promote transportation behavioural change within BAPPEDA officers
3. Train SKPD staff and heads of integrated planning

The key **Continuous planning** actions proposed are:

1. Develop a stakeholder management strategy for BAPPEDA
2. Create opportunities for focused actions across BAPPEDA and the Transportation Department
## 1 Innovate: Imagine policy documents as instruments for continuous improvement

**Objective:** The role of the current policy documents (RTRW and MRT-FS / TRA-MP) could be expanded to cover new areas such as resource generation and better systems operation, for example those achieved in Solo (Surakarta).

**Desired Outcome:** Text in future planning process to understand the fast changing environment in Semarang and, at the same time, allow opportunities for new ideas to be tried and standard thinking to be changed.

**Tactics:** Work with current leaders to show the benefits of an expanded role for policy documents. Write small changes in all documents and leave the door open for future big ideas.

<table>
<thead>
<tr>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term:</strong> Conduct an academic seminar based on the evolution of planning policy and current best practices. Explore examples in other Indonesian cities in which local policies are introduced that respect the national regulatory framework.</td>
</tr>
<tr>
<td><strong>Medium term:</strong> Include a section on transportation and land use integration as part of the local transportation regulation.</td>
</tr>
</tbody>
</table>

### Table 16 Innovate 1

## 2 Innovate: Build mutual opportunities with the national government

**Objective:** To leverage resources and improve local planning by developing a win-win relationship with the national government.

**Desired Outcome:** Better coordination between resource investment and policy decisions from the national government and the local needs in Semarang.

**Tactics:** Work within the legal framework and the hierarchical role of different laws. Build both individual and process based relationships.

<table>
<thead>
<tr>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term:</strong> Create a list of key stakeholders and map their relationships with BAPPEDA and other local agencies. Invite the national government to discuss challenges</td>
</tr>
<tr>
<td><strong>Medium term:</strong> Conduct a national seminar on integrated planning</td>
</tr>
<tr>
<td><strong>Long term:</strong> Generate funding opportunities for transportation and land development projects based on opportunities created with the national government</td>
</tr>
</tbody>
</table>

### Table 17 Innovate 2
3 Innovate: Find champions on a political level

**Objective:** As future investment and policy changes require buy-in from all levels of government, ensure that politicians in Parliament and the Mayor’s office are interested in the integration of transportation and land use planning.

**Desired Outcome:** Obtain approval for policy changes by having high-level politicians back the proposed ideas.

**Tactics:** Demonstrate the benefits of positive changes. Back political support with stakeholder support, particularly from community organisations.

<table>
<thead>
<tr>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term:</strong> Prepare a presentation for the Mayor about opportunities that will arise from transportation and land use integration. Share information and experiences from other cities in Indonesia with Parliament. Invite members of parliament to the seminar.</td>
</tr>
<tr>
<td><strong>Medium term:</strong> Involve an official delegation from Parliament to oversee transportation and land use integration.</td>
</tr>
<tr>
<td><strong>Long term:</strong> Create a parliamentary sub-committee to oversee transportation land use policy integration and implementation.</td>
</tr>
</tbody>
</table>

Long lasting changes would be the result of strong technical capacity within Semarang agencies (OPD – Organisasi Perangkat Daerah). Technical capacity refers to the ability of public officers to be up-to-date with the best practices around the world and have the capabilities to perform sophisticated analysis that allows for better decision-making on a political level.

Transportation for London has developed significant technical capacity by implementing strong training programmes. There are many examples of organisations that have training programmes, such as The World Bank and the UITP MENA Centre for Transportation Excellence.
1 Capacity building: Create a multidisciplinary team policy assessment

<table>
<thead>
<tr>
<th>Objective: Create internal technical capacity within BAPPEDA and the Transportation department in order to assess policy proposals, such as the LRT by using advanced tools.</th>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired Outcome: A strong technical force within Semarang that provides technical documents and analysis for policies and investment by the Mayor, Parliament and other decision-makers.</td>
<td>Short term: Implement actions that were established by the MSDI roadmap Invite international experts to seminars and make these open to all public officers in BAPPEDA and the Transportation department</td>
</tr>
<tr>
<td>Tactics: Promote current interest from international organizations. Use online resources. Demonstrate the need to invest in people and their capabilities on a political level.</td>
<td>Medium term: Conduct a study tour for BAPPEDA officers Apply to international organisations for resources</td>
</tr>
<tr>
<td>Long term: Conduct an international congress around integrated transportation and land use planning</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective: Create a passionate BAPPEDA team to promote sustainable development and integrated planning.</th>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired Outcome: Government officials are proud and rewarded for changing their own transportation habits.</td>
<td>Short term: Conduct a transportation behaviour survey aimed at government officials Conduct a cycling/walking challenge with a sister city</td>
</tr>
<tr>
<td>Tactics: Look within BAPPEDA for agents of change. Reward behaviour changes. Involve the highest levels of government.</td>
<td>Medium term: Develop a reward scheme for improved transportation behaviour</td>
</tr>
<tr>
<td>Long term: Use demand management strategies such as charging for parking and restricting government fleet usage</td>
<td></td>
</tr>
</tbody>
</table>

Table 19 Capacity Building 1

Table 20 Capacity Building 2
Continuous improvement in the planning processes would improve the ability to adapt future challenges. As in manufacturing, the concept of continuous improvement in planning consists of developing processes that allow cities to adapt to emerging changes that cannot be foreseen when policies are written.

Melbourne, currently the most liveable city in the world, has developed planning processes that provide OPD staff with greater decision powers to resolve particular challenges.
### Continuous planning: Develop a stakeholder management strategy for BAPPEDA

**Objective:** Conduct formal, transparent and effective stakeholder management

**Desired Outcome:** Good stakeholder management allows identification of drivers of change and strengthens the ability of BAPPEDA to produce sustainable outcomes.

**Tactics:** The community is a key stakeholder; transportation operators are also to be included. The Transportation department (National and Local) are a main focus. Broad participation is an opportunity for the better development of ideas.

<table>
<thead>
<tr>
<th>Proposed actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term:</strong> Map <strong>government</strong>, political, community, local and national key stakeholders</td>
</tr>
<tr>
<td><strong>Medium term:</strong> Include stakeholder involvement in the advisory committee for integrated planning</td>
</tr>
<tr>
<td><strong>Long term:</strong> Develop local regulations that encourage the participation of community and other stakeholders in all the planning processes</td>
</tr>
</tbody>
</table>

*Table 22 Continuous Planning 1*
Table 23 Continuous Planning 2

<table>
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<th>Objective:</th>
<th>Proposed actions</th>
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| Develop a demonstration project where best practices, with respect to integrated planning, are put into practice. | **Short term:**
| | Develop a technical activity between the Transportation Department and BAPPEDA |
| **Desired Outcome:** A tangible result (for example design or policy documents) where both the Transportation Department and BAPPEDA work together in an integrated manner. | **Find key stakeholders who are supportive of the Transportation Department idea** |
| **Tactics:** Pick an area or project that is of major interest to both departments. Start small but choose something expandable. Look for high visibility across government agencies. | **Medium term:**
| | Propose projects for high level approval (e.g. Mayor’s office) |
| | Create policy documents to support implementation of the project |
| **Long term:** Develop an office to coordinate between the two departments for future projects |
6 Ideas for change
6.1 Public transportation reform

Public transportation services today in Semarang are the result of long term involvement of private investment. In many cases, and for historical reasons, the private sector was delegated the task of running public transportation services. In most cities current services provided by the private sector and regulated by the public sector are not appropriate, due to significant growth and urban planning challenges. This is the case in Semarang where private owners of Angkot services operate across the city.

Although these services require very limited funding by the public sector, the challenge remains that they do not further the city’s overarching objectives. For example, a common strategy to encourage public transportation use is to provide services in new residential areas even where demand does not match supply. This cannot be conducted under the current arrangements as Angkot operators would not enter a new area where financial returns are insufficient.

The solution is public transportation reform. This means changing market conditions to create opportunities for public transportation services to contribute to a more sustainable city. In most cases this involves subsidies for operating the services.

Transportation reform is not new and have occurred in both developed and developing cities. In some cases, the reform has been just operational (where the routes go) and in others, the entire business of the private sector has been restructured.

Success in public transportation reform has varied. Some cities have achieved significant outcomes while in others the experience has caused the opposite effect. For Semarang, world experiences offers opportunities to learn from success stories and at the same time to avoid costly mistakes.

6.1.1 Benefits of public transportation reform

Public transportation reform is likely to be needed in most cities, particularly if the existing market structure was developed under objectives that are no longer appropriate to the current city conditions. In a general sense, cities look towards public transportation reform to:

- Improve service quality to users, measured in time reductions, more comfort and reduced ticket cost
CITY PLANNING LABS

- Generate public transportation services that compete with private motorized vehicles
- Reorganise routes and frequencies to meet current needs and not just meet private operators financial needs
- Have a ticketing system that allows high levels of control to implement strategies, such as providing subsidies to vulnerable populations
- Reduce service duplication and fleet oversupply
- Improve coverage across the city
- Match vehicle types with topological conditions, such as slope or road design
- Renew the fleet to newer and more comfortable vehicles with higher emission standards

6.1.2 Challenges of public transportation reform

It is unrealistic to think of public transportation reform as a silver bullet that will fix structural problems in the short term. Appropriate transportation reform requires significant effort to design and implement, and good integration with land use planning processes. From international experience, the challenges and consequences of poorly implemented public transportation reform are as follows:

- Service availability is reduced, lowering the quality of service to users
- Expected private sector returns are not achieved and, therefore, medium and long term investment plans can not be met. Operators cannot fund future investments and service quality is reduced
- Sophisticated ticketing systems are not properly implemented so users cannot access the system or they must do so using informal means. In developing cities this has created underground markets of electronic cards with extra costs to users
- Corruption during tendering processes creates inefficient use of public resoures. This compromises the sustainability of the system in the long-term.

6.1.3 Ideas for Semarang

Today Semarang has a significant proportion of it’s transportation system served by Angkot. These vehicles are privately owned and regulated by the public sector, in terms of fares and routes. Significant subsidies do not exist and the service is self-sustained. However, current service is characterized by an old fleet of vehicles offering limited road safety and limited passenger comfort conditions. Additionally, the public sector has minimal leverage to encourage Angkot services to match user needs in the service of reducing use of cars and motorbikes, for example.
Moreover, in many transportation corridors Angkot services compete with BRT lines. This creates inefficiencies that normally transcribe into high costs for the public sector to run BRT services and less revenue for Angkot operators.

A feasible solution to current public transportation problems appears to be conducting public transportation reform on Angkot such that they become a feeder service to BRT lines. At the same time, as vehicle owners they would be encouraged to renew their fleet. During the mission conducted in December 2016, in multiple instances, this reform was proposed. This has been previously identified in the CPL report. It is also a proposed strategy in the Semarang Resilience Strategy.

A public transportation reform in Semarang should consider addressing the following issues:

- Provision of better services in hilly areas outside the CBD where car and motorbike dependency is high
- Improve service quality (ie coverage, comfort and travel times) so public transportation is a realistic alternative for car and motorbike users
- Create an integrated ticketing system for both Angkot and BRT services
- Eliminate Angkot competition on BRT corridors
- Allow additional demand to BRT services so segregated bus lines are implemented.

### 6.1.4 How could a public transportation reform be initiated?

As previously outlined, public transportation reform is needed in most developing cities. However, it is a complex process and requires appropriate technical studies and realistic timeframes. The following diagram, Figure 31, outlines some general steps proposed for the initiation of the Semarang public transportation reform process:

![Figure 31 General Step of Initiating the Public Transportation Reform](image-url)
The first step of initiating the reform process, building capacity, requires Semarang to train its city officers, particularly in BAPPEDA and in the Transportation Department. Officers in charge of designing and implementing the reforms need to have high levels of understanding of the local Semarang conditions. At the same time, they need to work within teams with a strong technical emphasis. A public transportation reform requires the technical input of transportation engineers, land use planners, lawyers and financial modellers among others.

With a strong capable team, Semarang city officers needs to engage with the owners and operators of Angkot services to understand their current conditions around finances, revenue and operations. The public sector will also need to explain to Angkot services the substantive community need driving the reform and what the likely public investment will be. This second step of ‘mutual understanding’ between the public and private sectors provides important inputs to the technical design and allows for a robust reform structure to be developed. This allows reforms to be developed in such way that the financial implications for the public and private sector are fully understood. In addition, numerous technical studies (such us a forth steps transport model) are necessary to create a strong future business model for the private sector. Such studies include: financial models, demand models, fleet analyses and operational simulations.

Finally, the new scheme can be tendered so competition among private investors is generated. This phase is complex as it is vulnerable to corruption.
6.2 Transit Oriented Development – TOD

Mass transit systems, such as light rail transit (LRT) and other rail systems, are expensive. In order to optimise the investment, the city would ideally have its main activities (shopping, living and working) close to mass transit stations. The concept of encouraging development around transportation hubs is known as `Transit Oriented Development´ (TOD). The 800-meter area surrounding a public transportation station should contain shops and services as well as a high quality walking environment that allows for healthier, more active lifestyles. Within TOD, the streets create a sense of community and a secure environment for many hours of the day, for people walking and carrying out daily activities on foot. If people can walk from their work or living space to the station, this is a win-win situation for both the city and its residents. On one hand, the city creates high demand for the mass transit system and, on the other hand, residents save time and travel costs by having high access to a transportation hub.

TODs would ideally be located where opportunities exist for significant urban development due to vacant land or high population densities. Also, if the local government owns part of the land to be developed, additional opportunities are created to fund infrastructure projects through potential increases in public land values.

Hong Kong is commonly identified as an example TOD area with high levels of accessibility around mass transit stations. Additionally, most of the land used for Hong Kong’s TODs was publicly owned. This created significant opportunities for the city to gather resources for public infrastructure projects.

Most modern TODs involve land with mixed land uses made up of both residential and commercial land. This creates a better use of the mass transit system as passengers enter and exit the TODs throughout their daily routine.

6.2.1 Benefits of TODs

There are a number of benefits of TODs, including:
1. Reduced cost of housing as high densities are normally achieved.
2. Less traffic since people do not need their car to access the mass transit system. People living in a TOD drive 50% less than people living in typical neighbourhoods without public transportation.
3. Creation of a strong community based on walking, cycling and use of public transportation

6.2.2 Ideas for Semarang

TODs are an opportunity for Semarang. However, they need to be developed around mass transit. The current service provided by the BRT, which is not on a segregated road, would not provide a real opportunity for TODs. Future BRT lines should be segregated to provide a system that has a high capacity and reliable service. These are key characteristics of the BRT, which are needed in order to encourage urban development by the public sector.

If LRT were developed, opportunities for TODs would also appear. This is the scheme Jakarta is currently considering to fund its LRT by combining TODs and Land Value Capture (see next section).

6.2.3 How could transit oriented developments be initiated?

Starting a TOD is challenging. A starting point for Semarang could be to create a specific TOD around a new BRT line where there is a clear opportunity for private investment in commercial and residential developments. The proposed steps to initiate a TOD in Semarang are outlined below:

- Build capacity with officers
- Create a TOD project
- Obtain political backing
- Find interest in the private sector
- Implement TOD

*Figure 32 General Step of Initiating the Transit Oriented Development*

The first task, building capacity, requires Semarang to train its city staff, particularly in BAPPEDA. Possible strategies could be either organising a seminar with an international expert or international site visits (these are recommendations in the implementation section, but any other suitable ideas for the city staff and financial conditions should be considered).
A TOD project should then be created by identifying (with the help of the private sector and government information) where improvements to the public transportation network (in the form of a new LRT or a more efficient traffic segregated BRT) could be made. Candidate-areas should be evaluated in terms of their availability for development and land ownership situations (public land areas are always easier).

A parliamentary law is necessary so that a broad discussion of the TOD can take place. This is never an easy step, and political champions are needed. The new law should include strategies for land-value-capture and congestion charging (if appropriate).

On a public tender offer, redevelopment is a business opportunity for the private sector. It is fundamental that the private sector clearly understands the risks (what financial resources are needed, what is the expected return and what are the risks in order to obtain this return). Sensitivity analysis should be part of this task.

Finally, the TOD would be implemented. Normally, full implementation takes between 10 and 20 years such as those TODs located in Washington and London. However, benefits are seen as soon as the public investment in the transportation network is made and the new services are operational.
6.3 Land Value Capture

The purpose of Land Value Capture (LVC) instruments is to mobilize private resources in order to finance strategic city projects and, at the same time, increase the functional density and the use of mixed land use in these projects' area of influence. This means obtaining financial resources to be allocated to the different city projects.

LVC is not new, and cities have taxed their land for many centuries. What is new today is taxing not just the ownership of land but the opportunities for further development. The value of land is directly related to public investment. When a city invests in a new bus system or LRT, private lands around stations increase their value as the market recognises a higher price due to increased accessibility. Additionally, if the city has regulations that allow private land to be re-developed in a high-density manner, the value of the land increases.

Both increase in accessibility and additional development rights are taxed under a LVC approach. The principle is to share the wealth generation between the private and public sectors in a form that is a win-win for both parties. The following are examples of the land value mechanism:

- **Land taxes:** most cities have a land tax that either taxes ownership for an annual fee or land transactions taxes (for example when land is sold)
- **Project based taxes:** in order to pay for a particular infrastructure (for example a pedestrian bridge or a cycling path) a tax is charged to those situated close to the proposed project and who are likely to benefit from it
- **Land capital gains tax:** in this mechanism, when a city’s planning system allows land developments that increase the value of land (for example additional density or a complex mixed used), the individual plot of land that benefits from the regulation change is charged a tax. Normally, the estimated increase in the land value due to the better regulation is split 50-50 between the government and the private developer.
- **Development certificates:** A Brazilian invention that creates an action mechanism to force competition between developers. The main concept is to create market scarcity for urban development by restricting the maximum number of square meters that could be
developed every year. The developer then has to participate in an auction and bid for additional construction potential.

6.3.1 Benefits of Land Value Capture

Cities in developing countries generally struggle to find resources to construct transportation infrastructure. In the 1980s, the approach in most countries was to privatise public assets such as power stations and water systems. However, today most cities have limited assets left to privatise, and in many cases privatisations are not politically viable. Cities could acquire loans with international banks; however, their debt capacity is limited by the revenue streams.

LVC appears as a viable option as it allows cities to partner with the private sector in a win-win situation. The additional tax is normally happily paid by the private sector as the additional taxes bring further opportunities for high profitable business for urban developers. Therefore, LVC is beneficial for developing cities as it allows for resources to be raised for new transportation infrastructure investment and, at the same time, direct urban development based on sustainability principles.

Combining TODs with LVCs is difficult but it does open significant opportunities.

6.3.2 Ideas for Semarang

Semarang needs to create the legal framework for LVC to occur. Developed countries have a long tradition of private investment in public infrastructure. In developing countries, corruption is normally a deterrent for a healthy relationship. A strong regulatory framework that allows the private sector to visualize business opportunities and the public tools to create value is needed.

Additionally, a reliable land information system is necessary. Today, Semarang has land taxes, but they are based on a cadastre system that has incomplete information. Parcels are not properly evaluated based on market prices. In order to improve possibilities for LVC, cadastre information, particularly for areas where value could be captured, needs to be improved.

It is important to recognise that implementing LVC is likely to require broader discussion that would involve the national levels of government. Initiating
such discussions, possibly through working with other Indonesian cities, including Jakarta, is more likely to enable the change in national laws that may be required for implementation.

6.3.3 How could LVC be initiated?

Introducing LVC in a city is challenging unless there is a clear implementation plan demonstrating the overall benefits for the community and at the same time explaining the opportunities for private sector investment.

Below, some steps are proposed (see Figure 33) for Semarang to develop LVC as a strategy for infrastructure funding.

The initial step, building capacity, requires Semarang to train its city staff, particularly in BAPPEDA. Land value capture has been implemented in many cities around the world and the current knowledge base in the literature is extensive. Perhaps reviewing in detail the LVC activities of a neighbouring country (such as Singapore) could facilitate the development of technical skills of planning officers. A site visit and review of their policy would be an appropriate mechanism for capacity transfer.

Once this is achieved, Semarang (supported by a consulting firm) should develop and document feasible LVC schemes. The schemes should be feasible from a financial, institutional and legal perspective.

For example, if project-based LVC is to be explored, a thorough understanding must be gained of the legal implications of its implementation and of the institutional arrangements that would be required. Through this, it may be understood whether the projected financial benefits of the scheme justify the reforms proposed. Where a tax is applied to properties considered to be beneficial to a transportation project, the most important aspect is to understand and measure the areas of influence of a transportation project.
The success of other schemes, such as a parking levy on specific areas of a city, depends more on determining the best parking levy rate to be charged.

In most cases, the creation of a specific parliamentary law is necessary for LVC to be implemented. This is never an easy step, and needs political champions. The new law should include strategies for LVC, along with other strategies such as congestion charging and the implementation of TODs. With the knowledge of the feasibility of the different options, Semarang should find political champions for each and decide which strategy is the most appropriate to pursue. LVC schemes are usually implemented independently from one another, as each scheme will face significant legal and technical challenges during implementation.

Once political backing has been secured and a new law has been passed, executive orders by the major of the city are normally required. These orders should clearly outline the project timeframes as well as expected financial resources to be raised.

Implementing LVC can occur once the implementation plan has been agreed upon and local institutions possess the appropriate technical capabilities. This final process of revenue collection is vulnerable to corruption. Those land owners that are required to pay taxes on the additional value gained by their properties may endeavour to affect the system in order to reduce the amount of tax they must pay.
6.4 Congestion Charges

In order to achieve a social optimum, for which drivers perceive an individual cost of each trip equal to the social cost they generate, it is necessary to implement a mechanism through which each user internalises the costs generated to the rest of society. The congestion charge is an economic tool to achieve this objective; it imposes a tariff on anyone who uses the infrastructure, and thus an optimum level of congestion is achieved.

Singapore, a country that has suffered from limited space for population growth, is referred to as the congestion charging pioneer. When entering the city centre in Singapore, the driver is controlled by electronic devises that charge the road users. The rate is dynamic, and changes are based on road demand.

Since 2003, the city of London has implemented a congestion charge in the city centre. The London scheme is based on delimited a collection area, and it is controlled by a 21 km² cord, which is reinforced by a camera system (ALPR). The charge is applicable from Monday to Friday from 7 am – 6 pm if the taxed area is entered. The value per day in 2003 was £ 5, and is currently £ 10 with a double payment disincentive after 10pm\(^2\).

Figure 34 Transportation for London

\(^{24}\) Full information for London congestion charging can be found at: https://tfl.gov.uk/modes/driving/congestion-charge
6.4.1 Benefits of Congestion Charges

A congestion charge is a strong tool for behavioural change as its application creates a clear disincentive for car users. Benefits from applying a congestion charge include:

- Increases in the use of non-motorised transportation
- Users of the private vehicle in the collection area internalise the cost they generate on society
- Reduction of CO2 emissions as traffic is reduced in the targeted area
- The more efficient use of infrastructure for private vehicles leads to reductions in maintenance costs

The relevant literature\(^{25}\) has also identified some negative impacts for congestion charges. These include congestion in the public transportation system, change to low income population travel patterns and non-charged areas normally becoming more congested.

6.4.2 Ideas for Semarang

Congestion charges are normally applied in consolidated central areas that have clear entry and exit roads. As such, Semarang CBD provides an ideal urban context for applying a congestion charge. Resources raised with the charge could be used to invest in a BRT so car users have a proper alternative. Developing the feeder system with current Angkot services would require subsidies from the public sector; congestion charges could be the way to fund this mechanism.

6.4.3 How could congestion charging be initiated?

Congestion charging is a transportation strategy that can be implemented in the short term (six months to one year). This has been true for cities as long as the right steps are followed and the timing is consistent with political cycles. Some steps are suggested below (see Figure 35) for Semarang to commence congestion charging:

The first step, as is common to most transportation strategies, is to build capacity. Officers need to learn about charging schemes and controlling technologies. Singapore would be a perfect training ground for Semarang officers as this city has the world’s oldest and most complete congestion charging scheme with variable fares.

With a strong technical capacity, Semarang would be equipped to best define an area where the congestion charge should apply. In Semarang, the most feasible area for congestion charging is clearly the central business district. The challenge is to define appropriate boundaries that are enforceable and that maximise both operational and financial returns.

Congestion charging requires supporting legislation, most likely at the local level but with national support. Given this, political backing is fundamental. Politicians would be more likely to support congestion charging if it was presented as part of a package along with other benefits, such as less congestion, better public transportation and additional financial resources for infrastructure.

The final step, selecting an appropriate technology for implementation, is not difficult as long as appropriate user payment and enforcement mechanisms are established. Without enforcement and payment options people would not be encouraged to leave their vehicles at home and use other modes such as public transportation.
6.5 Participatory planning

Participatory planning is systematic effort to envision a community’s desired future and planning for that future while harnessing the specific abilities and input of community residents, leaders and stakeholders. Participatory planning invites government officials to ask the community their needs and consult with them on proposed solutions.

In cities where this method is properly applied, the community has significant veto power for government decisions. There is a process to consult the community (not just inform them) for every planning exercise. Government officials see the community as a fundamental stepping stone for the planning processes, and the community understands that its role in the planning process is to defend community objectives over private interests.

The most liveable city in the world today is Melbourne in Australia. Its major planning exercise for the next thirty years, called Plan Melbourne, was developed through two years of extensive cross-governmental collaboration and a sustained dialogue with professional, industry and community stakeholders.

The discussion paper Melbourne, let’s talk about the future was released in October 2012. By March 2013, thousands of people and representative organisations had been able to have their say on planning for Melbourne’s future through a range of activities, forums, surveys and a formal submission process.

In October 2013, Plan Melbourne was released for comment, supported by community and stakeholder briefings and information; more than 450 submissions had been received. The final Plan Melbourne is the result of many people and organizations’ work. It reflects the passion that Melburnians have for their city, as well as the challenge of accommodating the rich and diverse views of hundreds of organisations and thousands of individuals.26

6.5.1 Benefits of Participatory Planning

Participatory planning is not an easy task and requires officials in the city to match the pace of change of a given community. Its benefits are:

1. It can enhance the quality of local governance by creating processes that are more democratic and equitable
2. Participatory planning encourages low income residents to be more involved with their local planning needs
3. Participatory planning can result in programmes that are better and more efficient as the community can help to optimize resources adjusted to low cost solutions
4. When the community is involved, transparency of governmental decision making is increased, and public resources are normally better used
5. Community participation can improve people’s mind-set on land ownership

6.5.2 Ideas for Semarang

During this consultancy, in multiple instances, government officials and other stakeholders worried about corruption. Participatory planning, which is something that the city could start immediately, would provide transparency to planning processes and, at the same time, get the community to defend a long-term vision of the city.

6.5.3 How could participatory planning be initiated?

Implementing participatory planning, in contrast with implementing TOD, land value capture or congestion charging, is a cyclical instead of linear
process. Participatory planning is something that cities learn through doing and improving. It begins with a willingness of public institutions to involve stakeholders actively in most transportation and land use planning, implementation and reviewing processes. The following diagram shows a simplification of all public sector processes:

![Participatory Planning Process Diagram](image)

Participatory planning cannot provide its full benefits the first time it is applied. This is important in the area of transportation and land use planning as stakeholders (i.e. the private sector and the community) need opportunities to learn and enhance their capacity to contribute. When initiating participatory planning, it needs to be included throughout the whole cycle (think, act and review) and not just within individual steps. Without participation in the entire cycle stakeholders cannot generate a high level view that produces benefits for the majority by minimizing negative impacts. This is particularly important for the private sector participants that normally begin with very narrow views which are expanded (particularly during the review phase).

A good starting point is to choose a control project where officers and high level politicians are willing to share the direction of an initiative with the public and other stakeholders. Even if the outcome is unexpected for city officers, the experience builds a relationship between the city and stakeholders.
6.6 Tactical Urbanism

Tactical Urbanism is an approach to neighbourhood building that uses short-term, low-cost, and scalable interventions and policies to catalyse long term change. One of the most emblematic recovery cases of public space in favour of commercial activity was Times Square, in New York, which used to be one of the city’s critical points in terms of traffic and prostitution. Change came from transforming public areas by transforming areas for traffic into places for pedestrians and segregated bike lines for pedestrians.

Tactical urbanism is about reducing the fear officials have to make difficult decisions by allowing a context in where pilot interventions, normally low-cost ones, are first tested before a long-term commitment is made. Typically, tactical urbanism is used to modify the use of road space by transferring areas into walking and cycling zones as well as promoting other passive recreational uses such as outdoor seating.

Figure 38 Times Square
(Source: Tactical Urbanism 2. Street Plans)

27 Tactical urbanist’s guide latest version can be found at: http://tacticalurbanismguide.com/
6.6.1 Benefits of tactical urbanism

1. Creation of new public spaces
2. Reduction of congestion in the areas in which it is applied
3. Temporal approach that permits adjustments
4. Low cost approach that allows for the model to be replicated

6.6.2 How could tactical urbanism be initiated?

Tactical urbanism, as well as congestion charging, is a strategy implementable in the short-term. However, the challenge is to identify an opportunity. For this, as with most strategies, BAPPSDA officers need a strong technical capability. Here are some proposed steps for initiating tactical urbanism (see Figure 39 below):

A good technical capability within offices allows them to see opportunities for tactical urbanism. These opportunities normally come from looking at circumstances from a different point of view. Is there public land in bad condition that nobody pays attention to? Could we use the opportunity of a construction project to change traffic conditions? As explained previously, tactical urbanism is about introducing significant change but with the promise of it being temporal or only for a trial period. The challenge, then, is to select an area and produce the change immediately (preferably overnight). As it is a temporal change that may or may not continue into the future, investment is small and implementation is easy. The commitment of the city for a temporal trial needs to be matched by a real change in traffic/road/bus conditions that happens overnight and users can notice immediately.

Finally, tactical urbanism projects need to be constantly reviewed and, hopefully, repeated when proven successful. The long term sustainability of
implementation is only guaranteed if the continuous review process has public support. As a result, usually tactical urbanism actions are complemented with participatory planning.
7 CONCLUSION
This report is the final product of a six-week consultancy that was conducted by CPL, initiated by The World Bank in the city of Semarang. Although previous studies have shown that Semarang has significant integration problems that are reflected in negative indicators (such as population density and modal split), the exercise conducted found key opportunities to change current transportation and urban form trajectory in Semarang.

With the help of stakeholders and a very enthusiastic government team from BAPPEDA, the report provides recommendations that, in the light of international experiences, are practical, achievable and high impact. Semarang needs to enter the world of TODs, land value capture and take strong measures to reduce vehicle travel by implementing a congestion charge and tactical urbanism.

All these recommendations would mean nothing if buy-in by key political stakeholders, including the Mayor and Parliament, is not obtained. As such, BAPPEDA should look for champions who, on a political level, believe in a more sustainable Semarang with higher population densities, better land use mix, less car and motorcycle travel and a-state-of-the-art public transportation and non-motorised network.

Significant changes occur in cities when the citizens want change. If participatory planning is not included as part of future planning processes, changes are not likely to be sustainable overtime. The community, led by key political figures, could make Semarang a low-emission, highly sustainable city in the middle term. The role of BAPPEDA is key to guide the way for changes to occur.

**Where to start?**

Cities that have achieved high level of integration have started by building technical capacity within their public offices. This has been followed by political support to change planning and investment processes. Good integration also requires participatory decision-making for which community members are highly involved in policy decision-making.

Deciding where to begin the change process is difficult. A good place to start is on an idea that has strong political backing and is likely to have positive technical implementation. Congestion charging and tactical urbanism are designed for short-term outcomes but they are complex to achieve without political will and technical capacity.
The best indication of good integration in a city is the presence of a transportation land use integrated plan that is backed by a clear investment strategy. The creation of this plan is a key recommendation for Semarang.
# List of Stakeholder

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<td>Purnomo Dwi Sasongko - Secretary of BAPPEDA</td>
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<td>2</td>
<td>M. Farkhan ST., MT. - Head of Planning and Infrastructure Division</td>
<td>BAPPEDA Kota Semarang</td>
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<td>3</td>
<td>Nik Sufiyani ST., MT.</td>
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<td>Safrinal Sofaniadi</td>
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