IGES Working Paper No.2014-01

Governing Sustainable Transport in Indonesia

Andreas Jaeger[1], Sudarmanto Budi Nugroho[2], Eric Zusman[3], Ryoko Nakano[4] and Rachel Daggy[5]

May 2014

Abstract

Indonesia has pledged to reduce 26% (and 41% with international support) of its greenhouse gas (GHG) emissions by 2020 against a business-as-usual (BAU) baseline. Over the past three years, it has sought to define how this pledged national appropriate mitigation action (NAMA) could be translated into implementable actions in key sectors at the subnational level. One area where there will be important lessons is the transport sector. This paper draws on the literature on sustainable low carbon transport and multi-level governance to develop a framework for assessing provincial plans in Indonesia's Sustainable Urban Transport Initiative (SUTI). The assessment of SUTI—a set of transport plans that have developed in parallel with its NAMA—suggests that many of the plans fall short of "best practice" recommendations counselled in this literature. This assessment suggests that international organizations and the national government will need to fortify the design, financing, and monitoring to fill this shortfall, especially for solutions featuring the integration of public transport and spatial planning. Two focused case studies suggest that population density, economic diversity, and experience with international organizations might be behind the cross-provincial variation.

Key Words: Sustainable low carbon transport, multi-level governance, nationally appropriate mitigation actions (NAMAs)

[1] The Institute for Global Environmental Strategies, Hayama, Japan, jaeger@iges.or.jp
[2] The Institute for Global Environmental Strategies, Hayama, Japan, zusman@iges.or.jp
[3] The Institute for Global Environmental Strategies, Hayama, Japan, nugroho@iges.or.jp
[4] The Institute for Global Environmental Strategies, Hayama, Japan, r-nakano@iges.or.jp
[5] The University of Texas at Austin, Lyndon B. Johnson School of Public Affairs, Austin, Texas, rachel.daggy@utexas.edu

Table of Contents

Acknowledgements

Research activities on the vertical integration of Indonesia's sustainable transport NAMA was made possible through the financial support of the Ministry of Environment of Japan.

1. Introduction

In the lead up to the 2010 Copenhagen Accord, Indonesia pledged to reduce 26% of its greenhouse gas (GHG) emissions by 2020 against a business-as-usual (BAU) baseline. Over the past three years, it has sought to define how this pledged national appropriate mitigation action (NAMA) would be translated into implementable actions below the national level. Indonesia is a particularly interesting case-study because of the speed and scope of its NAMA rollout. Indonesia is one of a handful of developing countries moving quickly to link global goals to local actions across numerous sectors. Research on how Indonesia vertically integrates its climate change plans could prove illuminating for other countries contemplating comparable courses of action.

Indonesia's experience with the transport sector promises to prove particularly revealing. Much of the responsibility for designing and implementing transport NAMAs has fallen to Indonesia's local governments. The article draws upon literature on sustainable low carbon transport and multi-level governance to develop a framework for assessing provincial plans in Indonesia's Sustainable Urban Transport Initiative (SUTI). The assessment of SUTI—a set of transport plans that have developed in parallel with its NAMA—suggests that many of the these plans fall short of "best practice" recommendations counselled in this literature. This assessment suggests that international organizations and the national government will need to fortify the design, financing, and monitoring to fill this shortfall, especially for solutions featuring the integration of public transport and spatial planning. Two focused case studies suggest that population density, economic diversity, and experience with international organizations might also contribute to cross-provincial variation in the ambition of subnational transport plans.

The remainder of the paper is divided into four sections. The next section synthesizes literature on sustainable low carbon transport and multi-level governance. The third section compares how different provinces in Indonesia perform based on this synthesis. The fourth section infers what two outlier provinces suggest about the reasons behind subnational variation. A final section concludes with directions for future research.

2. Literature Review

More than a decade ago, transport specialists began turning their attention to the contribution to climate change from transportation in developing countries (IPCC, 2001). This literature did more than warn of a potentially sharp increase in GHG emissions from developing countries; it underlined the importance of measuring transport emissions from the bottom-up rather than the top-down (ADB 2009, ADB 2010). More concretely, instead of calculating emissions as the product of the amount of fuel sold and emissions factors at the national level, focus shifted towards analysing changes in activity levels and modal structures at the local level. Driving this re-orientation was the belief that steering clear of a climate crisis would require not only cleaner fuel and technology; it would necessitate avoiding unnecessary travel and shifting toward more efficient modes (Schipper et al, 2000).

The interest in avoiding unnecessary travel and mode shifting found support in a host of real world experiences. Many European cities had controlled transport demand with non-motorized transport and urban planning (UITP, 2001). Transport-oriented development (TOD) in Singapore, Hong Kong, and several Japanese cities illustrated the merits of strategies capitalizing on land use and public transit synergies outside of Europe (World Bank, 2013). The adoption of Bus Rapid Transit (BRT) programs

in Latin America lent additional credence to transport strategies that put walking and public transport ahead of clean fuels and vehicles (Wright and Fulton, 2005). In many parts of the world, attention to mobility as opposed to motorized transport helped avoid the lock-in in long-lived infrastructure commonly found in energy-intensive North American transport systems.

The attention on bottom-up measurement and a range of supportive success stories helped to popularize a scheme that divided transport interventions into three categories:

(1) Does the action help **AVOID** the need to travel? Measures include parking management, road charging, urban design and mixed land-use, car-free city areas.

(2) Does the action promote a **SHIFT** towards, or maintain the share of, sustainable modes in the transport sector? Measures include bus rapid transit (BRT), light rail transit (LRT) as well as interventions to encourage walking, cycling and the use of electric bicycles.

(3) Does the action **IMPROVE** the efficiency of a mode? Measures include the replacement of combustion engines with electric or fuel cell technologies, promoting eco-driving practices or introducing more efficient tires.

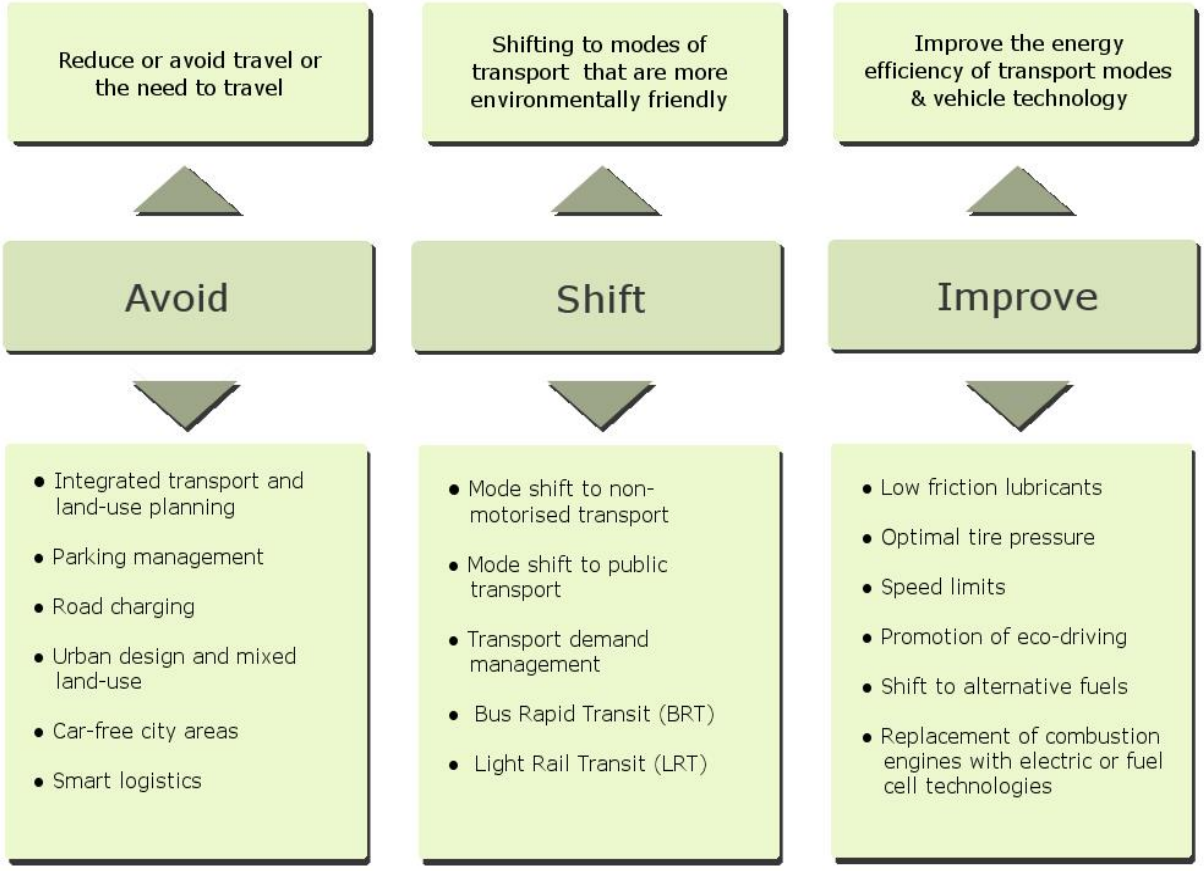


Figure 1: The Avoid-Shift-Improve Paradigm *(Based on: energypedia.info)*

While not stated explicitly, underlying the popularity of the ASI approach was a belief in leveraging the positive interactions between the A and S options. Since 2007, land-use and public transport options have become the cornerstones of sustainable low carbon transport planning for many governments, development banks, and international organizations (ADB, UNEP and IEA). The Asian Development Bank (ADB), for instance, introduced its Sustainable Transport Initiative (STI) in a deliberate effort to move resources from building roads and infrastructure to offering public transport and urban planning (ADB, 2010). Indonesia, to highlight a relevant example of a national government, adopted a national transport plan with multiple references to ASI to accompany its aforementioned 26% NAMA pledge (Situmeang et al. 2011).

Around approximately the same juncture, a set of similarly themed studies pointed to the challenges of putting ASI into action. Some of this work noted the need to combine planning, regulatory, economic, information and technological instruments (Dalkmann and Brannigan 2007). Others appropriate the acronym ASAP to characterize the fundamentally different decision making needed to finance such strategies: 1) **Analyze** sustainability impacts of financing decisions; 2) **Shift** resources away from financing actions with negative sustainability implications; 3) **Add** resources to programs with sustainability benefits; 4) consider the full cost implications to be **Paid** (Sakamoto et al. 2010). More recent work underlined innovative partnerships needed to raise these resources for ASI in developing countries (OECD 2013). Yet others underlined the need for sufficient financial and administrative capacities to bring to life a strategy grounded in ASI principles (Silva de Harran and Matsumoto, 2012).

Another strand of literature makes similar points about the importance of supportive governance reforms, but with reference to NAMAs across different sectors. These studies maintained that the performance of NAMAs would hinge on a sequence of reforms to cement linkages between international pledge and local actions—what was referred to as vertical integration. This process began with the identification and prioritization of measures, followed with a robust financing plan and clearly defined institutional structures. Stakeholder consultation (including NGOs, research institutions, private sector, international experts, etc.) at all levels was deemed to be important to further strengthen implementing capacities. Systems for measuring, reporting and verifying emissions to track progress were identified as a fourth and final piece of the governance architecture.

Also around the same period, studies on multi-level governance were highlighting that many local governments were in fact taking on responsibilities for climate change. Originating from research on the shift in decision-making authority to local and supranational authorities in the European Union (Marks and Hooghe, 2001), the multi-level perspective was exported to help illuminate the growing attention on combating global climate change by local governments. These studies showed that where national governments struggled, local governments were innovating and experimenting (Betsill and Bulkeley 2006). Some of this work went beyond merely highlighting that local governments could address global problems, but that they could not do it alone. Making a more subtle point, these articles noted that national and international non-government actors could provide critical backstopping functions for local governments that lacked the administrative and financial resources to implement inventive ideas (Buckley and Broto 2012; Anguelovski and Carmin

2011; Andersson and Ostrom 2008).

While both the multi-level governance and vertical integration studies provide insights into the governance of NAMAs, neither focuses specifically on the transport sector. Further, much of this scholarship draws inferences from single successful cases rather than multiple experiences within a country. This nonetheless creates an opportunity to analyse how subnational transport plans perform against a set of good practice recommendations drawn from this literature. The following set of questions will help structure that assessment:

(1) Do subnational transport plans include actions to avoid travel and promote a shift towards lower carbon modes?

(2) Have clear institutional arrangements been made for implementing identified actions?

(3) Have finance and cost estimates been considered?

(4) Is there a robust monitoring and evaluation system (where an emissions reduction estimate is seen as a precursor to M&E)?

Before these questions are used to assess how subnational governments in Indonesia perform, some additional information about Indonesian planning for emission reductions is outlined.

3. Indonesia's GHG Emission Reduction Plans

As suggested at the outset, Indonesia planned for a GHG reduction of 26 per cent compared with the business-as-usual (BAU) baseline[6] by the year 2020. This 0.767 Gigaton CO_2 equivalent reduction is expected to be financed by the Republic of Indonesia itself—what is known as a unilateral NAMA. A more ambitious reduction of 41 per cent by 2020 is deemed feasible with external funds (Supported and Credited NAMAs). Estimated emission reductions for transport and energy constitute between 1.3 to 1.9 per cent of total national emissions. This seemingly low percentage can be attributed to the significant savings potential from forestry and peatland (22.8% - 35.8%).

The NAMA development process in Indonesia was relatively top-down. In 2011, Indonesian and international experts (Guizol, Haeruman, Jinca et al. 2011) drew up guidelines for National Development Planning Agency (BAPPENAS) of the Ministry of National Development Planning. These guidelines note that the national GHG reduction plan or the National RAN-GRK is to form the basis of the NAMA. The National RAN-GRK is embedded in the national government's mid- and long-term plans[7]. Notably, sub-national governments were not involved in National RAN-GRK's formulation (Anggraini, Boer, Dewi, 2011). It was only after the National RAN-GRK was in place that subnational governments were called upon to develop their own local GHG reduction plans or Local RAN-GRK[8]. Local plans were intended to suit local development priorities and account for institutional capacities while fitting within the key areas identified in the overarching national framework.

To help facilitate the planning process, BAPPENAS worked with the Environment and Home Affairs Ministries to develop guidelines for the local plans. Below the national level, Provincial Governors enacted related regulations and provided deliverables at the request of the national level. A

[6] The climate change baseline is a projection of GHG emissions until 2020, assuming that no policy measures or technologies are introduced

[7] RPJMN 2010-2014 and RPJPN 2005-2025 respectively

[8] (1) Sustainable Peatland Management; (2) Reduction of Deforestation and Land Degradation (3) Carbon Sequestration; (4) Promote Energy Saving; (5) Alternative and Renewable Energy; (6) Solid and Liquid Waste Reduction; (7) Shift to Low-Emission Transport Modes.

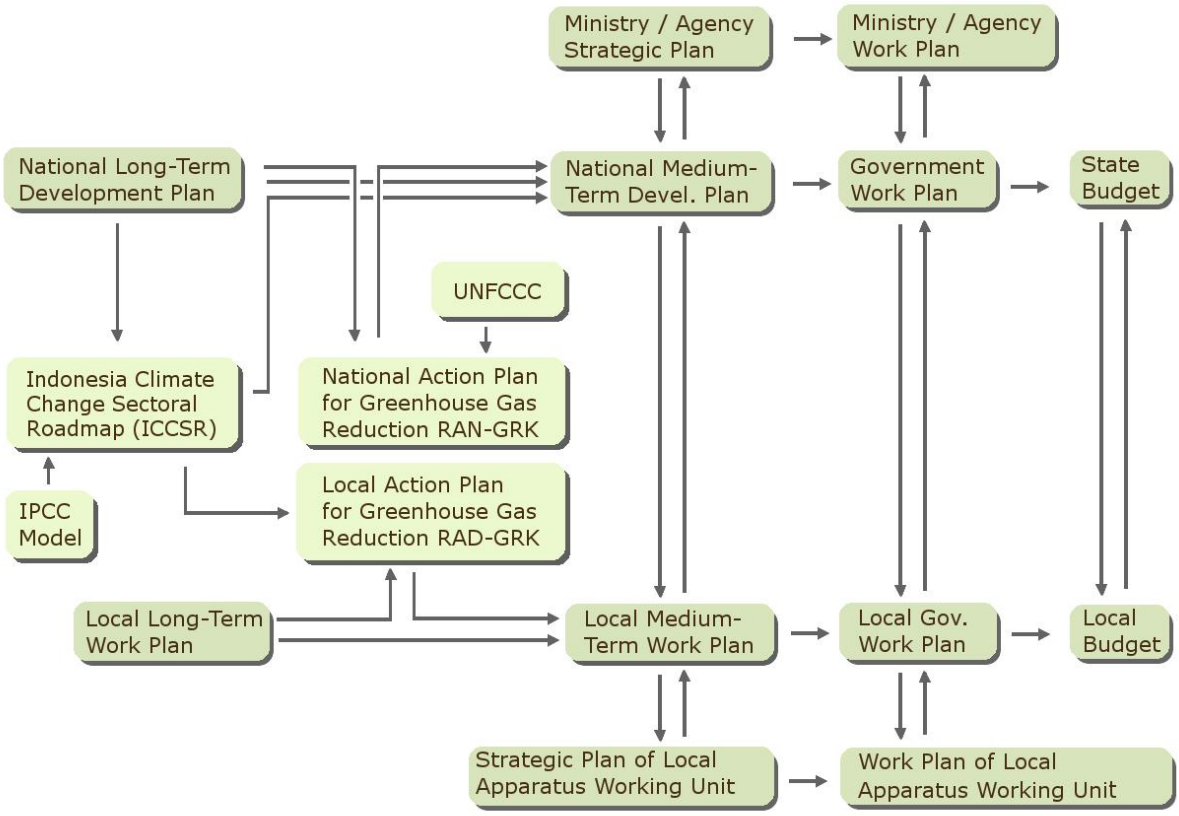


Figure 2. Framework for local and national strategic planning in Indonesia. Based on: Guideline for Implementing Green House Gas Emission Reduction Action Plan (BAPPENAS. 2011)

national working group, including central ministry and local government representatives, experts and other relevant stakeholders, was established to support implementation from the national to local level.

To strengthen implementation in key sectors, a Coordinating Unit (CU)[9] and six sectoral working groups were also created. Working Group IV was made responsible for low-carbon transport planning; it was chaired by a representative of the Local Transportation Service. Members of the Working Group IV were government officials from Spatial Management Service, Environmental Impact Management Agency, Bureau of Statistics, Directorate General of Highways and other local government work units. Representatives from the private sector and associations as well as NGOs, universities and research institutes served as additional members. The CU and its sector-specific working groups regularly convened over a nine-month period to outline preparatory activities, data collection, baselines/emissions savings calculations and plan formulation. The nine months culminated in a finalized set of formal procedures and dissemination activities for the sector-specific plans (BAPPENAS 2011). The flow chart in Figure 2 illustrates the overall process.

[9] The CU consists of a Focal Person (head of region), a Chairperson (local secretary), a Secretary (Head of BAPPEDA) and members representing local government work units.

4. Comparing Subnational NAMAs

4.1 The Big Picture

Despite the relatively top-down nature of the NAMA planning, the key elements of the SUTI exhibit wide ranging variation across the four categories drawn from the literature review: 1) the attention to the A and S in ASI; 2) the detailing of implementing arrangements; 3) the identification of financing (with relevant backup functions); and 4) the creation of monitoring protocols.

The variation is evident even before turning to the analytical categories of interest. Of the 34 provinces (71%), only 24 have thus far submitted information on a total of 101 projects. All but two provinces are planning between two and five projects, with an average of 2.97 projects per province. The Riau Islands (12) and East Java (13) have the most ambitious number of projects. Approximately 21 per cent of the provinces have not provided starting dates for the implementation of actions. The 19 provinces that have submitted starting dates range between 2010 and 2018. The majority of actions (86%) are expected to be implemented over six years or more. A BRT project in Jakarta is estimated to take the longest (11 years) with intelligent transport systems (ITS), traffic impact assessment, parking management, providing BRT / Semi-BRT in North Sumatera estimated to take the shortest period of time (one year).

In contrast to the advice counselled in the ASI literature, there is a clear weighting in favour of measures that improve or shift (**67% improving actions and 30%** that shift) (See also Figure 2). Only the **three** provinces, South Sulawesi, Bengkulu **and Central Java, propose actions that could be classified as "avoid**." The most common transport project planned in provinces is "smart/eco-driving" (13 of 24 provinces). **Five provinces** focus only on measures to improve efficiency. The rest have a combination of mode shifting and improving efficiency elements. Two provinces have considerably more plans for improving efficiency (Riau Islands and East Java). As will be noted later in the article, the emphasis on improve may be related to funding levels.

The information provided in the SUTI also suggests a departure from the multi-stakeholder institutional arrangements advocated in the literature. The vast majority of actions are to be solely implemented by the local transport authority (51 versus 21 projects involving other stakeholder or consortia together with the local transport authority). Two provinces stand out for having proposed actions that entail considerable stakeholder involvement: for two actions in North Sumatera, participation includes the transport authority and police as well as a consultant, developer and private company. In East Java, actions involve a broad range of stakeholders in the implementation process; participating agencies range from the port authority, planning agency, income agency, public works, citizens, academic society, the organization of Angkot, gas supplier, and a bus company.

Also contrasting the literature, there is a limited discussion of how projects will be financed. Only 2 of 24 provinces have submitted cost estimates for actions: Bangka-Belitung estimates costs of 2.7 billion Indonesian Rupiahs for its school campaign and smart driving program; the cost estimate submitted by the province of Gorontalo adds up to 732.15 billion Rupiahs, of which 600 billion are associated with a mass transit project and just under 130 billion are earmarked for converting public transport fuel use into natural gas. A possible reason for the lack of cost estimates is that only 6 of 24 provinces have identified funding sources besides local and national levels. Of the 47 actions for which funding sources have been indicated, 15

involve the private sector. Despite the emphasis on international support for some NAMAs, only two provinces appear to be interested in seeking international financing for projects. Namely, Jakarta hopes to tie a BRT project to bilateral / multilateral mechanisms and North Sumatera is exploring external support for a ITS project.

Much like the other categories, estimations of emission reductions vary, with a little less than half providing no information. Most provinces expect annual per capita CO_2 savings of 00.2 to 5 kg, while Gorontalo Province anticipates savings of around 184kg per capita per year. The greatest emissions estimates are expected for the project of 'natural gas conversion of public transport' in Gorontalo Province; the project promises total reductions of 46 million tons of CO2 or annual per capita savings of 800kg. As suggested in Figure 3, there is a modest correlation between number of actions and estimated reductions. There also appears to be two tiers of provinces with those in the red circle (Central Java, West Kalimantan, Lampung, North Sulawesi) planning for relatively larger projects and those in the green circle planning for smaller projects. (additional information is provided in Appendix 7).

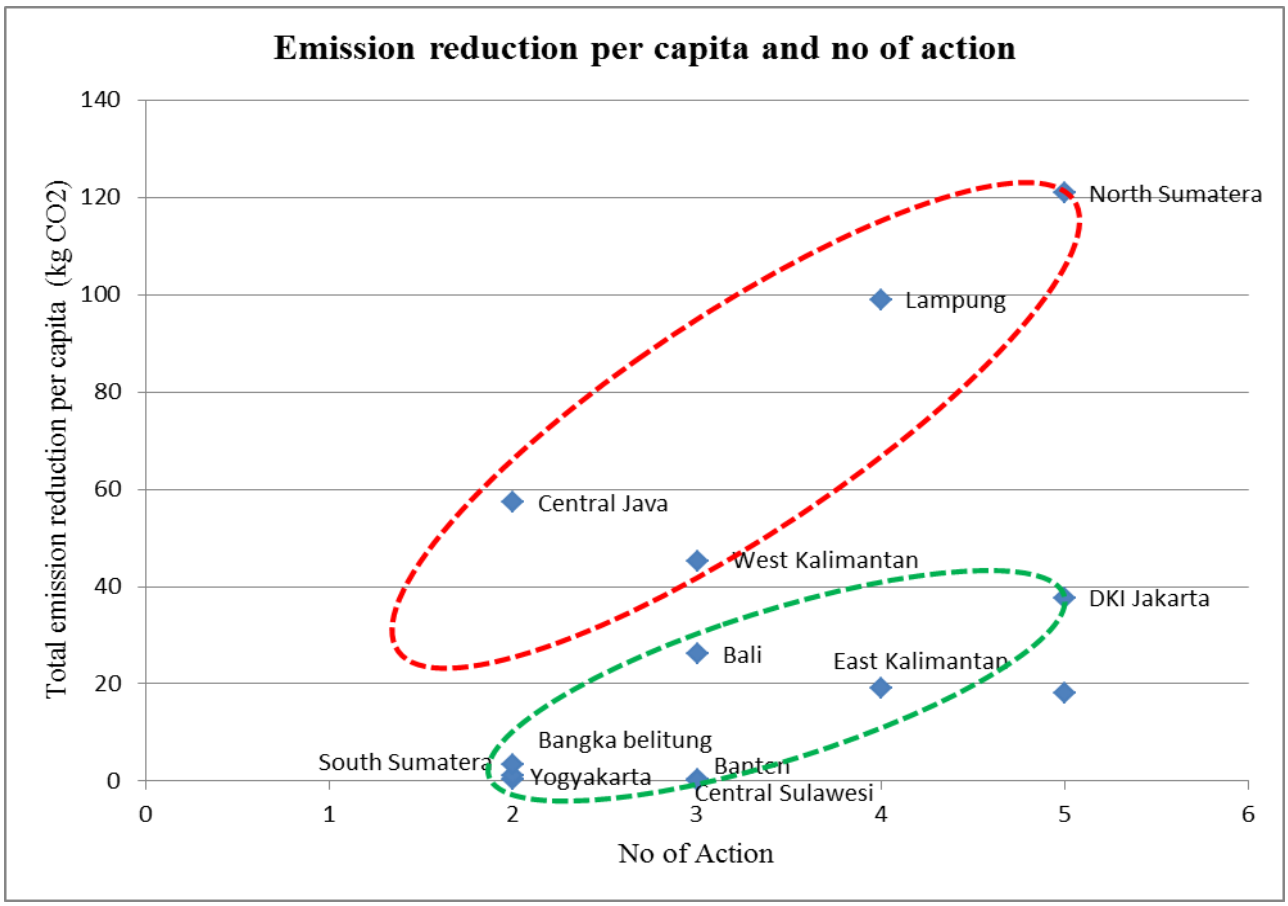


Figure 3. Emissions reductions per capita and number of actions

The overall picture that emerges can be succinctly summarized by Figure 4. The figure demonstrates that only six provinces have developed a plan, outlined implementing arrangements, identified financing, and made efforts (begun to take actions). Interestingly, most of the provinces have identified implementing arrangements, though it is important to keep in mind that this typically involves local government agencies identifying themselves (with some national level support in a few instances). A related inference concerns possible funding constraints. In eight provinces, actual effort is being made without financing, while in another six financing has been identified but there is no actual effort. The effort without financing may relate to the high proportion of "improve" actions discussed previously; actions such as eco-driving (identified in 13 of 24 provinces) do not require the significant investment needed for urban planning or mode shifting options. The provinces that have identified funding but have yet to use it may also suggest a reluctance to invest funding into transport, especially because the funding is likely to come from public coffers. While the overall picture suggests a heavy reliance on government agencies and a reluctance to commit government resources, it offers limited insights for the considerable variation across provinces.

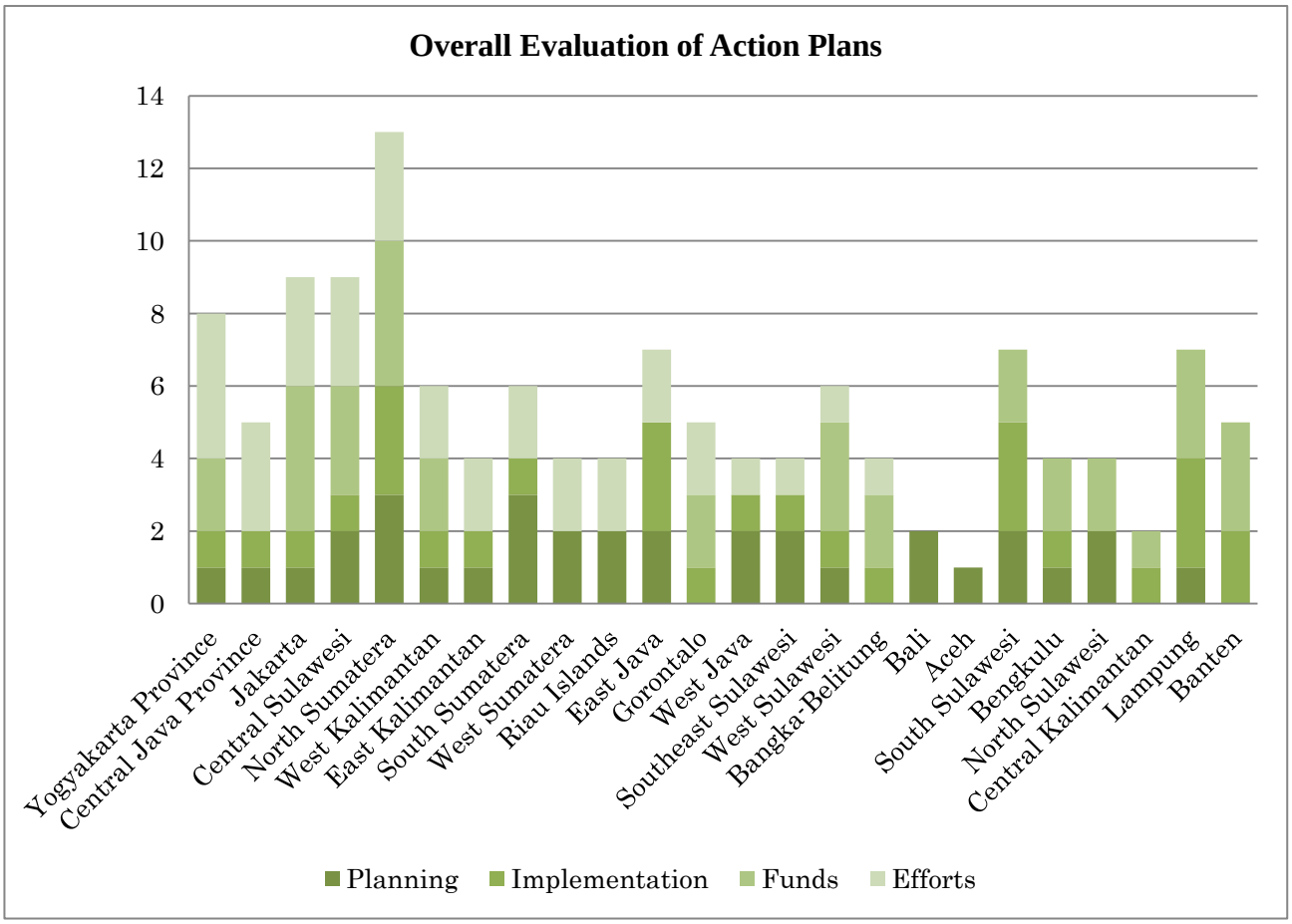


Figure 5. Overall Evaluation of Result

4.2 A Closer Look

To get a clearer picture of reasons for this variation, the article looks at two provinces with similar action profiles but markedly different estimated reductions: East Kalimantan and North Sumatera. East Kalimantan emissions reductions are much higher in North Sumatera. How can these differences be explained?

Any explanation would begin with the differences in East Kalimantan and North Sumatera geography and economy. East Kalimantan lies on the island of Borneo and is Indonesia's second largest province. Home to about four million people, it had the highest gross regional domestic product (GRDP) per capita, standing at Rp 105.85 million (US$10,986) per year[1]. While the province's GRDP is highly dependent on extractive industries, only 5.6 percent of the working population is employed 50 percent of the population depends on agriculture[2]. On the other hand, North Sumatera is bounded by the semiautonomous province of Aceh to the northwest, by the Strait of Malacca to the north and northeast, by the provinces of Riau to the southeast and West Sumatera (Sumatera Barat) to the south, and by the Indian Ocean to the southwest and west. The total area of the province is 72,981 km² and the population was 12,985,075 in 2010. The GRDP in 2011 was 314.2 trillion IDR. The province has a strong industrial (23%), agricultural (23%) and trading, hotel and restaurant sectors (19%). However, North Sumatera is best known for estate agriculture that supplies the world market with large quantities of rubber, palm oil and tobacco[3]. As suggested by this comparison, two possible reasons are North Sumatera population density (a factor of 10 greater than East Kalimantan) and economic diversity (that increases

	East Kalimantan	North Sumatera
Number of proposed actions	4	5
Type of action	Smart driving Regeneration of public transport ITS BRT	ITS Developing traffic impact assessment Parking management Providing BRT / semi-BRT Regeneration of Angkot
Duration of action	8 years	1 - 8 years
Planned year of project launch	2013	2014
Planning agency	Special Agency for Climate Change	Regional Planning and JICA
Funding source	Local	National, local, private company
Total expected emissions reduction associated with project (t CO_2 eq.)	6000	883880
Emissions reduction per capita	19.04	120.96
Avoid –Shift-Implement plans	1 Shift 3 Improve	1 Shift 4 Improve

Table 1. Comparison of East Kalimantan and North Sumatera using the evaluation matrix and A-S-I framework

1 http://www.thejakartapost.com/news/2013/01/17/escaping-resource-curse-e-kalimantan-tipping-point.html

2 http://www.thejakartapost.com/news/2013/01/17/escaping-resource-curse-e-kalimantan-tipping-point.html

3 http://www.nzasia.org.nz/downloads/NZJAS-June09/16_Lindblad_3.pdf

	East Kalimantan	North Sumatera
Size of Province (km^2)	204,534.3	72,981.23
Population	3,553,143	12,982,204
Population density (per km^2)	17	178
GRDP (2011) (trillion IDR[1])	390.6	314.2
Available resources	Resource rich	Resource rich
Main economic sector	Agriculture (>50% population depends on it)	Agriculture (23%), Industry (23%), trade and tourism (19%)

Table 2. Other possible explanatory factors for the differences between North Sumatera and East Kalimantan

Table 2 suggests two other reasons for the difference. First, the planning process is carried out in North Sumatera by a regional planning agency and the Japan International Cooperation Agency (JICA), while in East Kalimantan it is handled by a local special agency for climate change. Second, the funding source is only local in East Kalimantan, while North Sumatera has national and local funding, as well as funding from a private company. This difference in funding sources could be explained by the fact that North Sumatera was hit hard by the 2004 earthquake and tsunami. The tsunami was a natural disaster that reverberated through all sectors of the North Sumatera economy and prompted an unprecedented international relief effort. International organizations in partnership with local governments forged a successful partnership not only to help survivors, but to build the essential conditions for sustainable development. [4] As a result, there are many international organisations active in the region and planning activities focus more on sustainable development, including transport.

5. Conclusions

This article began with a review of literature on sustainable low carbon transport and governance. It underlined that there is an important though underappreciated overlap in this literature. It then drew upon this literature to identify a set of analytical categories that could be used to assess whether and to what extent provinces in Indonesia are complying with the recommendations offered in this literature. A preliminary assessment of subnational action plans suggests that there is a considerable gap between those recommendations and subnational plans. For instance, provinces appear more inclined to propose low-cots improve actions that will be implemented chiefly by government agencies with limited monitoring. This preference stands in sharp contrast to the transport strategies that are anchored by avoid and shift options with multi-stakeholder implementation, creative financing, and robust monitoring protocols. While it is difficult to discern the reasons for this gap, funding constraints appear to loom large for many of the provinces. The article also looked more closely for the reasons for the variation in the

[4] http://www.undp.or.id/tsunami/

estimated reductions in two provinces with similar sets of planned actions. It underlined that North Summatra may be pursuing a more ambitious course due to its higher population density and economic diversity as well as outside support following the 2004 tsunami. The assessment suggests that international organizations and the national government will need to fortify the design, financing, and monitoring to fill this shortfall, especially for solutions featuring the integration of public transport and spatial planning.

As with all studies, this research also raises a number of questions. Arguably none is more critical than how implementation will be assessed. Since many programmes are still in the planning stage and have not yet been implemented, a comprehensive analysis of the actions is not yet possible. Additional research on implementation will be essential; stakeholder interviews and focus groups could add much needed qualitative insights to the empirical analysis. Another line of possibly fruitful inquiry involves the suitability of best practice recommendations for some of the provinces. In some contexts, low levels of access to essential goods and services may still present a fundamental hurdle to development. In these cases, it may be prudent to modify the first A in ASI to Access. That is, the overriding priority should access to resources needed to lift populations out of poverty.

Another possible modification to best practice advice involves how local governments translate this advice into resource constrained contexts. It seems that without a credible commitment to fund concrete projects, subnational governments will understandably prefer less costly and ambitious actions. This message is not only be important for national governments, but the proposed Green Climate Fund that is supposed to help allocate up to 100 billion US dollars of financial, technological and capacity building support by 2020. Indonesia, as one of the first countries to begin implementing its NAMAs, will continue to offer meaningful inputs into that process.

6. References

Ahmad and Mansoor. 2002. Indonesia: Managing Decentralization. IMF Working Paper WP/02/136. Fiscal Affairs Department and Independent Evaluation Office of the International Monetary Fund.

Andersson and Ostrom. 2008. Analyzing Decentralized Resource Regimes from a Polycentric Perspective. Policy Sci (41:71-93). Springer Science + Business Media, LCC.

Anggraini, Boer, Dewi. 2011. Study on Carbon Governance at Sub-national Level in Indonesia / Case Study: Jakarta Province. Institute for Global Environmental Strategies (IGES).

Anguelovski and Carmin. 2011. Something borrowed, everything new: innovation and institutionalization in urban climate governance. Current Opinion in Environmental Sustainability. Elsevier B.V.

Asian Development Bank (ADB) 2009. Transport and carbon dioxide emissions: forecasts, options, analysis, and evaluation, ADB, Manila, Philippines

Asian Development Bank. 2010. Sustainable transport initiative operational plan. Mandaluyong City, Philippines.

Averchenkova. 2010. How-to Guide: Low-emission Development Strategies and Nationally Appropriate Mitigation Actions: Eastern Europe and CIS. United Nations Development Programme.

BAPPENAS. 2010 Indonesia Climate Change Sectoral Roadmap (ICCSR). BAPPENAS. Indonesia

BAPPENAS. 2011. Guideline for Developing Local Action Plan for Greenhouse Gas Emission Reduction (RAD-GRK) - Translated English Version. Indonesia

Blodgett, Rohe, et al. 2012. Nationally Appropriate Mitigation Actions: A Technical Assistance Source Book for Practitioners. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Jakarta, Berlin, Hamburg.

Bulkeley. 2010. Cities and the Governing of Climate Change. 35:229-53. The Annual Review of Environment and Resources.

Bulkeley and Broto. 2012. Government by experiment? Global cities and the governing of climate change. Transactions of the Institute of British Geographers. Royal Geographical Society. United Kingdom.

Corfee-Morlot, Lamia Kamal-Chaoui, et al. 2009. Cities, Climate Change and Multilevel Governance. OECD Environmental Working Papers N° 14, 2009, OECD publishing.

Crooks, Guzman, et al. 2010. Asian Development Bank Support for Decentralization in Indonesia. Special Evaluation Study by the Independent Evaluation Department, SS-105. Asian Development Bank (ADB).

Dalkmann and Brannigan. 2007. Transport and Climate Change: Module 5e, Sustainable Transportation Sourcebook: A Sourcebook for Policy-Makers in Developing Countries. GTZ global.

Dalkmann. 2010. Case study of a transport MRV NAMA: TDM Measures in Jakarta, Indonesia – Applicability of Post 2012 Climate Instruments to the Transport Sector (Final Report of CITS Project). Asian Development Bank.

Guizol, Haeruman et al. 2011. Guideline for Implementing Greenhouse Gas Emission Reduction Plan – Translated English Version. Ministry of National Development Planning / National Development Planning Agency. Republic of Indonesia.

Hamada and Kawaguchi. 2012. Cross-Sectoral Metropolitan Coordinating Body for Urban Transportation in Developing Countries. Paper submitted for the 92nd Annual Transportation Research Board Meeting in January 2013, Washington D.C.

Hanik, von Lueple, et al. 2011. MRV NAMAs: Gap Analysis for the Development of Measurable, Reportable, and Verifyable (MRV) System for Nationally Apporpriate Mitigation Actions (NAMAs) in Indonesia. GIZ, Jakarta.

Hansen, Wienges et al.. 2012. Nationally Appropriate Mitigation Actions (NAMAs) – Steps for Moving from Idea towards Implementation. PowerPoint Presentation Version 8.6. GIZ Environment and Climate Change Division. Germany.

Harrison et al. 2013. Sub-national involvement in NAMA development: Current and emerging practice towards vertical integration. ECOFYS Germany GmbH. Cologne, Germany.

Huizenga and Bakker. 2010. NAMAs in the Transport Sector Case Studies from Brazil, Indonesia, Mexico and the People's Republic of China. Climate Instruments for the transport sector. Asian Development Bank (ADB) and Inter-American Development Bank (IADB).

International Union of Public Transport (UITP) (2001) *Millennium Cities Database*. Brussels: UITP.

Ivanyna and Shah. 2012. How Close is your Government to its People? Worldwide Indicators on Localization and Decentralization. Policy Research Working Paper 6138. The World Bank.

Jung, Vieweg et al. 2010. Nationally Appropriate Mitigation Actions – Insights from Example Development. Ecofys Germany GmbH. Cologne. Germany.

Mainguy. 2011. Towards a city-level transport NAMA. Institut Veolia Environment.

Marks and Hooghe. 2001. Multi-level Governance and European Integration. Rowman & Littlefield. Lanham, Maryland. United States.

Marks and Hooghe. 2003. Unraveling the Central State, But How? Types of Multi-Level Governance. Reihe Politikwissenschaft / Political Science Series 87. ISSN: 1605-8003. Department of Political Science, Institute for Advanced Studies (IHS).

The Center for Clean Air Policy. 2009. Nationally Appropriate Mitigation Actions by Developing Countries: Architecture and Key Issues. Washington, D.C.

Dion, Harrism Sawyer. 2013. Developing Financeable NAMAs: A Practitioner's Guide. Published in Mitigation Talks – Series on Nationally Appropriate Mitigation Actions. Volume 4 (2-3). The Energy and Resources Institute.

Sakamoto et al. 2010. A Paradigm Shift Towards Sustainable Low-Carbon Transport – Financing the Vision ASAP. Institute for Transportation & Development Policy (ITDP). P.23-24

Schipper et al. 2000. Flexing the Link between Carbon Emissions and Transportation. Prepared for the Environment Division, World Bank. Paris. International Energy Agency.

Sharma. 2013. Process of NAMA Development and Organizational Aspects. World Bank Institute Video Conference on "How to Develop a NAMA" *"MNA Network on Low Carbon Development for Inclusive Growth".* UNEP RISØ CENTER.

Situmeang et al. 2011. Development of the Indonesian NAMAs Framework: Background Study - final draft. Ministry of National Development Planning (BAPPENAS). Jakarta, Indonesia.

Suzuki, Cervero, Iuchi. 2013.Transforming cities with transit : transit and land-use integration for sustainable urban development. Urban development. Washington, DC: World Bank.

World Bank. 2012. *Indonesia - The rise of metropolitan regions : towards inclusive and sustainable regional development*. Washington D.C.

Wright and Fulton. 2005. Climate Change Mitigation and Transport in Developing Nations. Transport Reviews, Vol. 25, No. 6, 691–717, November 2005. Routledge, Taylor & Francis Group.

Zusman, Srinivasan, Dhakal, et al. 2012. Low Carbon Transport in Asia – Strategies for Optimising Co-Benefits. Earthscan. New York.

Zusman and Sutomo. 2010.Institutions and Low Carbon Transport: The Case of Decentralizing Indonesia. Institute for Global Environmental Strategies and Center for Transportation and Logistics Studies.

7. Appendix

7.1 Local Actions Aggregated at Provincial Level, Part 1

	No. of actions	Type of action	Duration in years	Planned year of project launch	Planning agency	Funding source	Total emissions reduction (t CO_2 eq.)	Emissions reduction per capita (per year)	Avoid	Shift	Improve
Aceh	3	Develop guidelines for transport planning; management and operation; develop transport policy includes public private partnership; develop and preserve							*Initiatives too broad*		
Bali	3	Road maintenance; logistics management; fuel efficiency.	8	2013			250890.5 (per year)	26.11		1	2
Bangka-Belitung	2	Smart driving; campaign and school.	7	2014	Transport Agency	National and Local	231500	3.44		1	1
Banten	3	Eco driving; car free day; road development .	3-8	2013	Transport Agency and Public Works	Local / Private Company	1648.3	0.021			3
Bengkulu	2	Improvement of public transport; inspection and maintenance.	8	2013	Transport Agency	National / Local			1	3	2
Central Java	2	Improvement public transport; parking management.	7	2014	Transport Agency		1854400 (per year)	57.27	1		1
Central Kalimantan	4	Traffic impact control; regeneration of public transport; converter kit; eco-driving.	2-8	2013 & 2018	Transport Agency	Local					4
Central Sulawesi	3	Providing bus; regeneration of public transport; upgrading drivers skill-public transport.	5-8	2013	Transport Agency	Local / National / Private	29477.5	0.387		1	2
East Java	13	Congestion road / road pricing; car free day; dry port; parking management plan; ITS; non-motorized transportation; BRT; regeneration of Angkot; intermodality for Airport; electric railway from city to Airport; electric diesel commuter railway; converter kit; smart / eco driving.								6	7
East Kalimantan	4	Smart driving; regeneration of public transport; ITS; BRT.	8	2013	Special Agency for Climate Change	Local	6000	19.04		1	3
Gorontalo	4	Mass transit; smart driving; inspection and maintenance; natural gas conversion of public transport.	6-7	2013 & 2014	Transport Agency	National / Local	62785620	1047.98		1	3
Jakarta	5	BRT (Busway); inspection and maintenance; bike path; parking management; ITS.	6-11	2010 - 2015	Transport Agency	National, Local, Billateral/Multilateral, Civil Society	2641100	37.69		2	3
Lampung	4	BRT; parking management; regeneration of bus; smart driving.	10	2011	Planning Agency, Private Sector	Local / Private Sector	9513963	99.02		1	3
North Sulawesi	3	ITS; parking management; eco smart driving.	8	2013		National / Local					3

Local Actions Aggregated at Provincial Level, Part 2

	No. of actions	Type of action	Duration in years	Planned year of project launch	Planning agency	Funding source	Total emissions reduction (t CO_2 eq.)	Emissions reduction per capita (per year)	Avoid	Shift	Improve
North Sumatera	5	ITS; developing traffic impact assessment; parking management; providing BRT / semi-BRT; regeneration of Angkot.	1 - 8	2012 - 1015	Transport Agency, Police, Colsultant, Developer, Private Company	National, local, private sector	883880	120.96		1	4
Riau Islands	12	Company bus; regeneration of Angkot; converter kit; inspection and maintenance; smart eco drive; ITS; BRT; impact assessment management; urban railway; car free day; traffic management system; non-motorized development.					275208200			4	8
Southeast Sulawesi	3	Fuel switching; public transport management system; inspection and maintenance.	6 - 7	2013 & 2014	Transport Agency					1	2
South Sulawesi	4	Planning for re-routing major transport; development of monorail Mamminasata 23; BRT; smart driving.	4 - 9	2012 & 2017	Transport Agency, private Sector	National for 1 of 4 actions			1	2	1
South Sumatera	2	Park and Ride in 4 locations; developing BRT / monorail.	5	2010	Transport Agency	Local	48988.5	1.02		2	
West Java	5	Inspection and maintenance; traffic management in 3 location (Bodebek, Bandung, Cirebon); traffic management for crossing railway and road; railway development; traffic management at provincial road.								1	4
West Kalimantan	3	BRT / semi-BRT; regeneration of Angkot; eco-driving.	5 - 7	2014 & 2015	Transport Aency	National and Local	2167001	45.1		1	2
West Sulawesi	5	Transport facilities; rehabilitation and maintenance of facilities; improvement of public transport; inspection and maintenance; infrastructure of inspection and maintenance.			Transport Agency	National, Local, Private Company	32000 (for 2 of 5 actions)				5
West Sumatera	5	Smart driving; blue sky operation; BRT; regeneration of Angkot; bike path and pedestrian.	8	2013			1391100	18.1		2	3
Yogyakarta	2	Traffic Management at Malioboro Road (Quick Win); Smart Driving.	2 - 8	2013 & 2014	Transport Agency	National/Local	11593	0.42			2

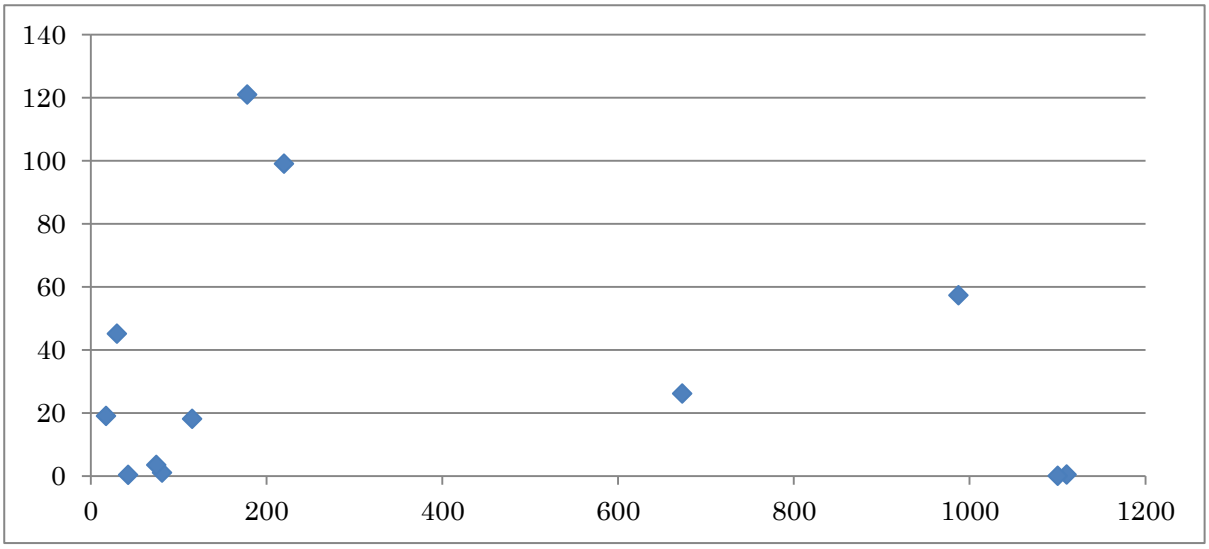
7.2 Initial Evaluation Matrix, Part 1

Evaluation Criteria / Province	Component of Actions				Impact Assessment		Time period	
	No of Actions	**Multi-components (includes freight)**	**Promote Public Transport**	**Multi-modes (include non-motorized)**	**Emission Reduction Targeted Clearly**	**Emission Reduction per capita (kg.CO2/year)**	**Multiyears and Continues**	**Short-Term and Medium term**
Yogyakarta Province	2		0			0.419		
Central Java Province	2		1			57.265		
Jakarta	5		1			37.691		
Central Sulawesi	3		1			0.387		
North Sumatera	5		1			120.963		
West Kalimantan	3		1			45.104		
East Kalimantan	4		1			19.047		
South Sumatera	2		1			1.020		
West Sumatera	5		1			18.099		
Riau Islands	12		1			a		
East Java	13		1			a		
Gorontalo	4		1			1047.976		
West Java	5		0			a		
Southeast Sulawesi	3		0			a		
West Sulawesi	5		1			a		
Bangka-Belitung	2		0			3.442		
Bali	3		0			26.113		
Aceh	3		0			a		
South Sulawesi	4		1			a		
Bengkulu	2		1			a		
North Sulawesi	3		0			a		
Central Kalimantan	4		0			a		
Lampung	4		1			99.023		
Banten	3		0			0.021		

Initial Evaluation Matrix, Part 2

Evaluation Criteri / Province	Multiplayers		Budgeting		Who made Plan	
	Multilevel (Vertical)	Horizontal (another agencies within similar level)	Secure fund (local budget)	Detail budget estimation	Adhoc Team	Agencies
Yogyakarta Province		0	0		No	Regional Planning
Central Java Province		0	0		Yes	GIZ
Jakarta		0	0		No	Environmental Agency
Central Sulawesi		0	0		No	Regional Planning, Natural Resource Agency
North Sumatera		1	0		Yes	Regional Planning & JICA
West Kalimantan		0	0		No	Planning Agency
East Kalimantan		0	1		Yes	Special Agency for Climate Change
South Sumatera		0	1		Yes	Regional Planning & University
West Sumatera		0	n/a		No	Regional Planning & Natural Resource Agency
Riau Islands		n/a	n/a		No	Transport Agency & Trading Agency
East Java		1	n/a		No	Transport Agency, Regional Planning, Environmental Agency, Natural Resource Agency
Gorontalo		0	0		n/a	n/a
West Java		0	n/a		No	Regional Planning, Natural Resource Agency
Southeast Sulawesi		0	n/a		No	Regional Planning, Environmental Agency
West Sulawesi		0	0		No	Regional Planning
Bangka-Belitung		0	0		N/A	N/A
Bali		n/a	n/a		No	Transport Agency, Public Works
Aceh		n/a	n/a		No	Regional Planning
South Sulawesi		1	0		No	Regional Planning, Transport Agency
Bengkulu		0	0		No	Regional Planning
North Sulawesi		0	0		No	Regional Planning, Transport Agency, Public Works
Central Kalimantan		0	1			
Lampung		1	1		No	Regional Planning
Banten		1	1			

7.3 Population Density vs. Total Estimated Emissions Reduction per Province



7.4 Emissions Reduction vs. GDP per Province