Australia Indonesia Partnership
Kemitraan Australia Indonesia

FUTURE INDONESIAN RAILWAYS

AN INTERFACE REPORT TOWARDS THE NATIONAL RAILWAY MASTER PLAN




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Dr. Suyono Dikun

Jakarta, 23 August 2010

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Currently, Indonesia's transportation systems and infrastructures are dominated by road-based modes of transportation. Due to some fundamental reasons such as the extremely sectoral nature of national transportation policies and the lack of a long term vision, the national road network bears the brunt of the movement of passenger and freight across the country, overlooking other modes of transportation. In more economically advanced regions such as Java and Sumatera, the road network accounts for over 90 percent of the movement of mining, industrial, plantation and agricultural products to domestic and international ports, either for domestic consumption or for the export market. In both of these regions, as well as in Kalimantan, Sulawesi, and other regions, the road network has experienced excessive pressure due to the increasingly large volume of heavy vehicles with high axle loadings. Progressive road condition deterioration has also been caused by various factors including natural disasters, inundation, landslides and earthquakes. Excessive overloading, way beyond the standard axle load of 8-10 tons, has compounded the negative impacts on the endurance and service life of roads, causing deterioration much earlier than their design life. Consequently, Road User Costs (RUCs) have increased exponentially from time to time, mainly caused by increased travel time, worsening congestion, increasingly inefficient use of fuel, increased vehicle damage and other unexpected travel costs. Congested and damaged road networks have led to higher economic costs, diminished competitiveness, and suppressed economic growth and distribution.

Box 1

Political Economy of Transportation

Political and economic unity of this island nation can only be preserved, among other factors, by an efficient, reliable, and integrated transportation network across the country. A strong integrated transportation system is a major pillar for the growth and economic equality of the whole country: the archipelago. Without that, Indonesia is only a collection of islands separated from each other by the sentiments of regionalism, ethnic differences, and narrow primordialism.

The Indonesian economy has been projected to grow gradually and consistently from roughly 5.5 percent in 2010 to approximately 7-8 percent or higher in 2014. Indonesia is projected to become a developed nation by 2025; and the country has all the natural, mineral and maritime resource potential needed to promote its economy. Goldman Sachs has even predicted that Indonesia will become the eleventh most economically powerful country in the world by 2050 with a Gross Domestic Product

(GDP) of approximately USD 5.0 trillion (2005 dollar price)[1]. The Indonesia Forum Foundation has given a far more optimistic perspective, with a projection of joining the "big five world economic powers by 2030, with a per capita income of USD 18,000"[2]. These optimistic economic projections are dependent on the establishment, by 2025 – 2030, of a transportation system and network which functions efficiently and effectively to support this national economic development [3]. With such ambitious economic projections, the movement and mobility of the Indonesian economy cannot be borne entirely by the road networks. For these valid reasons, Indonesia has to develop its national railway infrastructure, industry and services to an extent in which the railway network becomes a rational and efficient alternative, capable of withstanding the weight of the national economic movement in the future. Furthermore, from various aspects, rail is an extremely competitive and efficient mode of transportation in terms of its use of energy, noise, CO2 emission; and it is environmentally more friendly than road-based modes of transportation.

Indonesia has a new legal foundation to support major changes in its national railways. The issuance of Railway Law no. 23/2007, Government Regulations no. 56/2009 and no. 72/2009 have paved the way for a massive and rapid rebuilding of Indonesian railways. Indonesian railways will no longer be monopolised by the State; therefore, its development may be conducted either jointly or individually by Multimodal Transportation Systems, local governments, state-owned enterprises (SOEs), local state-owned enterprises (LSOEs), or the private sector. The ultimate objective is to improve the market share of railways in the mobility of the national economy and to modernise the national railway industry and services in order for them to be capable of serving as the backbone of the national logistical and distribution system in the development of the Indonesian economy.

However, the road towards the modernisation of the national railways will not be a 'walk in the park'. The new law on railways was absolutely required; however, it is not the only requirement for the implementation of major changes. After the issuance of the new railway law, the Government established the Joint Team for National Railway Revitalisation, headed by the Coordinating Minister for the Economy, with members from the Ministry of Transportation (MoT), the Minister of Public Works (MPW), the Minister of Finance (MoF), and the Minister of National Development Planning/ Head of the National Development Planning Agency (BAPPENAS) as the Directing Team. The Implementing Team was headed by the Director General of Railways (DGR), with members of the first echelon from within the related ministries. A Technical Team was lent to the Implementing Team, which subsequently offerred proposals for future

[1] BRICs and the World Economy. Jim O'Neill. Managing Director and Head of Global Economic Research, Goldman Sachs, November 2006

[2] Indonesian Forum Foundation, 2008

[3] Economic projections and plans for achievements in the transportation sector can be seen in several formal planning documents such as RPJP 2005-2025, RPJM I 2005-2009, RPJM II 2010-2014, and several Strategic Plan documents for relevant sectors. These are very normative and do not include integrated investment planning between the public and the private sector. The sectoral master plan is intended to fill the gap.

revitalisation measures. The Joint Team for National Railway Revitalisation performed its duties until December 2009. In its final report, presented to the Multimodal Transportation System Committee, the Technical Team outlined four revitalisation programmes, namely:

(1) revitalisation of the railway sector;

(2) institutional revitalisation;

(3) corporate restructuring; and

(4) capacity building of the institution and human resources quality.

Furthermore, the Technical Team also recommended that strategic ('quick-win') projects be established immediately and if collaboration with the private sector remains an issue, the Government should conduct and finance the development. The Technical Team concluded the final report by recommending several policy changes and a comprehensive restructuring[4]. Since it is still a long way towards the railway restructuring program, on 8 March 2010, the Coordinating Ministry for Economic Affairs (CMEA), in the United Indonesia II Cabinet, re-established the Joint Team for National Railway Revitalisation under Decree no. Keppres-14/M.EKON/03/2010 defining responsibilities for coordinating the preparation of general policies and revitalisation acceleration strategies, formulating an action plan for the implementation of revitalisation, and establishing the strategic measures for the acceleration of the national railway revitalisation. This Joint Team shall perform its duties until December 2010, and it is expected that the results and recommendations of the policies and investment designs of this Team will be considered in line with the preparation of the National Railway Master Plan (NRMP).

1.2 THE NATIONAL RAILWAY MASTER PLAN

The NRMP is mandated by Articles 7 to 12 of Law no. 23/ 2007. Article 7 declares that the NRMP is required to realise a National Railway Order integrated into other modes of transportation. Article 8 mandates that the NRMP be prepared by taking into consideration the national general spatial plan and the master plans of the other modes of transportation and shall at least contain the following principles:

- The direction of the policies and roles of the national railway within the context of all other modes of transportation.

[4] Complete recommendations on Indonesian railway revitalisation can be seen in the Final Report of the Technical Team of the Joint Team of Indonesian Railway Revitalisation, December 2009. These TRKA recommendations remain relevant for consideration and incorporation in the policy changes in the NRMP. The Technical Team for phase II is currently working to complete the recommendations for policies and actions to be adopted in three major areas: (1) asset separation and restructuring; (2) achieving three million rail passengers in Jabodetabek in 2014; and (3) NRMP. A summary of these recommendations will be found in Chapter 5 of this report.

- The projection of passenger and freight movement, based on origin and destination of travel on a national level.
- The national railway infrastructure requirement plan.
- The national railway means requirement plan.
- A human resources needs plan

The Technical Team for Railway Revitalisation strongly recommends that the Government complete the NRMP immediately, by taking into consideration the recommendations of the Team in its final report. The initial draft of the NRMP was completed by the DGR in April 2009 and has been discussed with the stakeholders in a series of seminars and workshops from various aspects of planning. The effort to complete and improve the quality of the substance of the NRMP was then supported by the Indonesia Infrastructure Initiative (IndII) which recruited a team of international consultants to deepen the substance of the NRMP. This team has already completed seven Working Papers including:

- The Policy Framework of the Transportation Sector in Indonesia;
- Operating Conditions of Indonesian Railways;
- Market Analysis and Forecast;
- Development Priorities of Indonesian Railway;
- Institutional Options of Indonesian Railway;
- Strategic Conditions for the future of Indonesian Railways; and
- Development of a Regional Railway Master Plan.

All Working Papers prepared by the team of international consultants aim to enrich the contents of the NRMP, particularly those related to the learning experience, best practice and operating patterns; as well as the restructuring of the railway sector in other countries which are ahead of Indonesia in integrating railways into their national transportation system. These Working Papers and the team's Consolidated Final Report, will also provide a benchmark and building blocks for the development of the NRMP policy framework. Indonesia does not need to follow completely the revitalisation process and the recommendations outlined in the seven Working Papers; it also has to reap the lessons learned from the railway restructuring in England, considered a failure, as well as the railway restructuring in Japan, considered a success. The form, rhythm and agenda of railway restructuring in Indonesia should find its own ways to achieve the optimum balance from the currently existing and developing political, economic, and public service order[5].

[5] The summary of the seven working papers of the International Team has been discussed within a series of *Focus Group Discussions* in May 2010. The results of these FGD will become part of the Final Report of the international team. Their Interface report will also be completed as an Interface Paper to integrate the results of the work of the international team with the final preparation of the Railway Master Plan. The Directorate General of Railways has established its own team in order to complete the preparation and writing of the NRMP. The materials submitted both by the international team and the National Team

However, it has been realised from the beginning that disparities will arise between all the Working Papers and the NRMP, either in substance, format, language or other aspects related to the industry, infrastructure and services of Indonesian railways. Disparities will also occur between the international atmosphere of the Working Papers and the wisdom and the local socio-political situation affecting all decision-making processes, involved in the preparation of the final draft of the NRMP.

1.3 OBJECTIVES OF THE INTERFACE REPORT

The Final Draft of this Interface Report was scheduled to be completed in June 2010. The Working Papers of the international team were completed in April 2010. The abstract and summary of the Working Papers were also completed by the end of April 2010. These were then discussed within the series of Focus Group Discussions (FGDs) in May 2010. The final preparation and formulation of the NRMP will be made by the DGR which has assigned a Team dedicated solely to the work. Disparities are predicted to occur between the Working Papers and their summary and the NRMP. The Interface report will serve as a connecting mechanism to translate the substances of the Working Papers into the NRMP. The systematics of writing and the substance of the Interface report will lead towards the final draft of the NRMP, along with the international content and the local strategic environmental considerations. The NRMP will therefore include a combination of international experiences and local wisdom. It remains, however, that this Interface report is not intended to be the draft of the NRMP.

ThisInterface Report, as well as the NRMP, will seriously consider the recommendations of the principles and policies of national railway revitalisation as presented within the Final Report of the Technical Team for National Railway Revitalisation. The contents of the Directorate General of Railways Draft NRMP will also be used as valid material in the preparation of the forthcoming NRMP. The formulation of policies and programs in the Interface report contains the thoughts included in Law no. 23/2007 and considers the views and thoughts of all stakeholders and parties involved in the Indonesian railway sector. Nevertheless, this Interface report in not intended to be the NRMP Draft, despite the fact that its contents may represent a substantial part of the NRMP.

1.4 SYSTEMATICS OF THE INTERFACE REPORT

The systematics of writing this Interface Reportis different from the systematics of the Consolidated Report of the international team. This report does not describe the present condition of the railways as has been done by other reports, including the

should be seriously considered by the Formulating and Writing Team of the NRMP of the Directorate General of Railways.

NRMP Draft of April 2009, which are known by all stakeholders. This Interface report has a more futuristic orientation. Further writing and the systematics of writing of this Interface report are divided into several Chapters as follows.

1.4.1 Chapter 2 : ECONOMIC DIMENSION OF INDONESIAN RAILWAYS

This chapter is the principle foundation for the future development of Indonesian railways; consisting of three essential parts, namely: (1) the macro-economic conditions in Indonesia since the crisis of 1997/ 1998 until now; (2) the migration of the transportation sector from a state monopoly towards a more open market; and (3) the territorial dimensions of the railway sector. Since it is intended to be the backbone of the national economic mobility, the future development of Indonesian railways must seriously take into consideration and follow the development of national economic growth and the distribution and development of the regional economy. In the economic context, this chapter briefly discusses the development achieved during the National Medium Term Development Plan (RPJM) I for 2005-2009 and projections for RPJM II for 2010-2014, as the basis of the national economy on which the plans of the transportation sector and the national railway are to be developed. Indonesia is projected to become an economically advanced country in 2025 and the national economic mobility can no longer be borne by the highway networks alone. Great effort must be exerted in order to place the railway as the backbone of the national economic mobility.

The Indonesian transportation sector and the railway subsector are currently undergoing the preliminary stages of migration from a state-monopolised economy to the open market for industrial services. The process began when transportation legislation changed in nature from laws mandating a state monopoly into laws mandating an open transportation industry market for private sector and business investments. Therefore, in addition to the ever-dominant role of the government, the future of the national railways will also be determined by the role of the private sector. This chapter also discusses the territorial dimension of Indonesian railways with national spatial planning as the foundation for sector development, integration between sectors and regions, and integration of several related sectors in support of regional development. National spatial planning is regulated within the Law no. 26/2007, while the regional spatial plan is regulated within Government Regulation no. 26/2008. Development of a massive railway infrastructure network will surely affect spatial planning, either national or regional. On the other hand, regional spatial plan determines the extent to which railway networks shall be developed and which economic corridor shall be prioritised in order to develop the railway services. This chapter will also discuss the interactions between spatial planning and railway development and how best to anticipate the impacts of large-scale railway development on future spatial planning. This chapter tries to indicate several significant changes in the national railway subsector; the NRMP must anticipate these significant changes and incorporate them in various future policy, investment and railway development plans.

1.4.2 Chapter 3: FUTURE INDONESIAN RAILWAY DEVELOPMENT

This chapter discusses the future of the national railway, as mandated by the law, viewed from the regulatory, institutional, infrastructure network condition, performance, human resources and safety aspects. This chapter also discusses several descriptive analysis concerning the potential for the development of both the passenger and freight markets as well as their implication on the railway traffic volume forecast and on the investment potential in railway infrastructure, whether viewed on a national or a regional scale. This chapter discusses a grand plan to revitalise the urban transportation sector by building a rail-based urban transport system as the primary mode of passenger movement in urban areas. As indicated in the the Draft of the NRMP, April 2009 version, large Java and Bali cities such as the Jabodetabek region, Surabaya, Bandung, Semarang, Yogyakarta, Malang, Denpasar, as well as those in Sumatera such as Medan, Palembang, Pekanbaru, Padang, BandarLampung, and in Sulawesi such as Makassar have been included in a priority program for railway revitalisation. Generally, these large cities have reached extremely high levels of population density and motorised vehicle ownership, accompanied by inadequate conditions of public transportation resulting in severe urban road network congestion. With the exception of Jabodetabek, these cities do not have an urban rail-based transport network as an alternate mode of travel. Therefore, the NRMP must lay down a solid foundation for the future development of urban railways, starting from developing transportation political agreements between the city governments through the planning and development stages. For cities without existing urban railway networks, this political agreement is essential to ensure the smooth development of urban railways while recognising the socio-political impacts they may inflict.

The preparation of the NRMP must lay down a solid and valid foundation for the large-scale development of the national railways until the year 2030 with a structured schedule and stages, enabling it to be referred to nationally beyond political and government administrative boundaries.

1.4.3 Chapter 5 : INVESTMENT AND FINANCING PLANS

This chapter discusses the railway investment designs until the year 2030 and makes some projections of the magnitude of the investments required for the strategic (‘quick-win’) Indonesian railway projects, particularly within the five year term of RPJM II 2010-2014. Also discussed are some financing alternatives, either through government investments, the private sector, or through Public-Private Partnership (PPP) schemes. The NRMP may need to establish these investment designs in three stages, namely the Short Term Stage, 2010-2014; the Medium-Term Stage, 2015-2020; and the Long Term Stage which spans until the year 2030. Some ‘quick win’ projects such as Jabodetabek Railway, the Soetta Airport Rail Link and coal transportation railways in South Sumatera need to be facilitated within the short-term plan of the NRMP if they are to be realised.

1.4.4 Chapter 6 : SUB-NATIONAL RAILWAY PLAN

This chapter discusses the general design of local railways and the technical guidelines for the regions to formulate a Regional/Local RMP. Even though the law enables regions without a railway network to develop, finance and manage their own railway, it is important to underline the importance of their national integration within the railway network in a way that optimises investments and national economic efficiency. Therefore, the NRMP should become the unifier and integrator of all regional railway designs potentially contributing to the Indonesian railway development agenda. Furthermore, Regional RMPs must take into consideration the interactions between the local railway and the regional economy, and establish rail as the mainstay of local economic movements.

1.4.5 Chapter 7 : STRENGTHENING OF THE INSTITUTIONAL CAPACITY AND HUMAN RESOURCES

Despite the long term downstream position of human resources within the planning corridor, the fact remains that the quality, perception, knowledge and capacity of human resources (SDM) holds the key to the overall problems of the national railway. The development of Indonesian railways until the year 2030 will require a great number of high-quality railway human resources capable of applying modern railway technology and management. The NRMP needs to map the situation of railway human resources in several institutions – the DGR (as regulator), PT Kereta Api Indonesia (PT KAI) (as operator), and the State Ministry of SOEs (the major shareholder in PT KAI), the national railway industry (PT INKA), and other potential shareholders; – and design strategic measures to build the capacity and quality of human resources within those institutions in preparation for the future modern Indonesian railway.

CHAPTER 2: ECONOMIC DIMENSION OF INDONESIAN RAILWAYS

2.1 RAIL AND THE ECONOMY

Future development of the transportation sector, including Indonesian railways, should be based on the projections of demands for passenger, freight and service movement which will occur as a result of the economic growth of Indonesia and the distribution of the growth, within a time frame extending until 2030; which means in the next 20 years. Therefore, the preparation of the NRMP must not overlook this long-term economic perspective, because a master plan is designed for a sufficiently long term ahead, despite the fact that it can be revised on a five-year basis and adapted to suit the current strategic condition and environment development. In addition to national economic growth, measured by the national macro-economic stability, it is also important to consider macro-regional stability, namely the dis-tribution of growth within the territorial dimension and the dimension of the sector within the region, judging from the regional economic potentials and perspectives. The review of the Indonesian economy as a basis for railway development is based on the economic potentials and prospects from both the macro-national and macro-regional levels. It is assumed that the development of the railway network may become an efficient solution for the economic movements within the region, and can therefore support the regional economic growth and the national economy. Therefore, rail as a mode of transportation will have a strong linkage to the economy at the regional and national levels; railways have to play a leading role in supporting the quality and capacity of international competitiveness in a global economy.

Box 2

Economy and Transportation

It doesn't matter whether it is the economy that gave birth to transportation or transportation which triggered the economy. The problem is the fact that when the wheel slid on the asphalt seamlessly smooth and stable, when the iron wheels are whirring on the rail, while ships are unloading in the dock, and when the airplane landed and sped off the runway, then that's when the economic rotation happens, on which lies public welfare and national civilisation.

Presently the railway hardly holds any positive correlation to the national economy. For several decades, under the state monopoly, rail has been concentrated largely in the public service sector, subsidised by Government, to transport passengers. For several decades, rail has operated as a popular vehicle, becoming the cheap, fast, backbone of long-range transportation. Due to its subsidised tariff, rail worked without any profit targets, sometimes even incurring losses due to the fact that many passengers did not purchase tickets or through operational leakage in the field. Some innovations with the business and executive class of passenger traffic, as well as several segments of freight transport in Java and Sumatera, despite their potentials, have failed to contribute high economic value and competitiveness towards the national railway. There are at least

two indicators which can explain these phenomena. The first is the small contribution the national railway makes towards GDP (Table *2.1*) and the second is the insignificant role rail plays in national freight, logistics, and distribution transportation (Figure *2.1*). The data presented in Table 2.1 and Figure 2.1 show that the road sector dominates the mobility of the national economy. Also visible is the inferiority of the railway sector compared to the road sector. Out of roughly 3 percent of the contribution the transportation sector makes towards the national GDP, the rail sector's contribution has been minuscule. Furthermore, in 2005, out of the total of 2.4 billion passenger trips and 2.8 million tons national freight traffic, the rail contributed merely 7.32 percent and 0.67 percent each for the passenger market and for the national freight market.

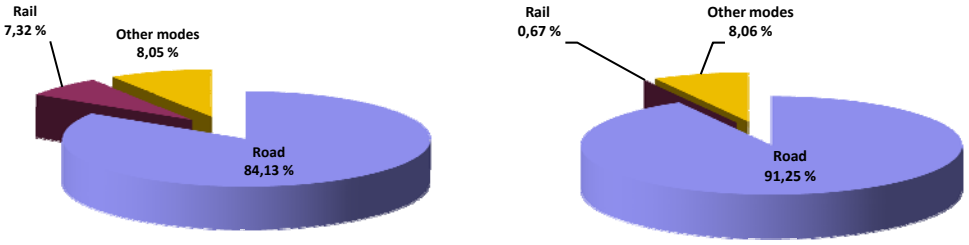
Table 2.1: Contribution of the Transportation Sector Towards National GDP (2009 Rp Billion,%)

Year	Rail	Sea Transportation	Air Transportation	Road	Inland Waterways	Transportation Supporting Services
2005	1,238.3 (0.0%)	13,974.4 (0.5%)	11,979.2 (0.4%)	58,133.0 (2.1%)	3,881.9 (0.1%)	20,950.5 (0.8%)
2006	1,355.4 (0.0%)	16,106.1 (0.5%)	14,669.3 (0.4%)	81,270.6 (2.4%)	4,487.5 (0.1%)	24,881.1 (0.8%)
2007	1,397.5 (0.0%)	16,043.4 (0.4%)	16,547.2 (0.4%)	85,183.4 (2.2%)	4,655.9 (0.1%)	26,146.1 (0.7%)
2008	1,649.8 (0.0%)	16,019.2 (0.3%)	19,665.9 (0.4%)	100,500.4 (2.0%)	5,570.3 (0.1%)	27,841.2 (0.6%)
2009	1,615.9 (0.0%)	15,344.1 (0.3%)	24,248.8 (0.4%)	103,527.9 (1.8%)	6,213.6 (0.1%)	30,666.1 (0.5%)

Source : BPS 2009

The disparity in the use of modes of transportation causes inefficiency in the national transportation system. The road modes excessively dominate freight transport (91.25 percent) and passenger transport (84.13 percent), while the national road network, particulary that of the provincial and kabupaten roads, has always been in unstable condition; a large part of it is even under light damage or poor condition. In addition, many primary road links for the economy are in unstable condition due to damage, congestion, and everlasting road maintenance and rehabilitation projects. The national road networks, particularly those on the main economic causeway on the northern coast of Java and the eastern coast of Sumatera have also suffered continuous pressure caused by excessive overloading, causing permanent damage.

Figure 2.1: Market Share(a) Passenger Traffic; (b) Freight Traffic



Source: PT KAI 2007

2.2 POST-CRISIS INDONESIAN ECONOMY

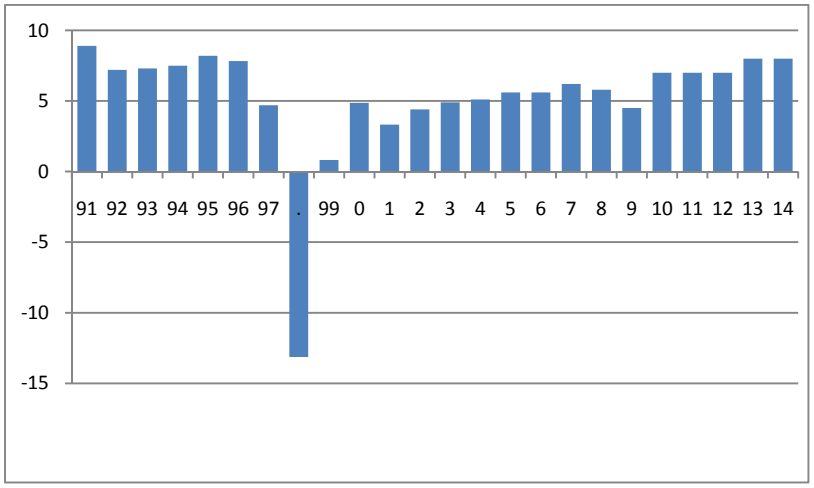
2.2.1 Post-Crisis Economy

Over the course of the last decade, Indonesia has undergone various economic and political crisis. Figure 2.2 shows the historic development of the Indonesian economy prior to, during, and after the 1998 economic crisis. As we all know, the severe economic crisis in 1997-1998 caused a great contraction in the economy, falling from 7.8 percent in 1996 to 4.7 percent in 1997 and reaching an all-time low of minus 13.1 percent at the peak of the crisis in 1998. At the beginning of 1998, the rupiah depreciated by over 70 percent when its exchange rate reached over Rp 15,000 per US dollar and inflation went to an all-time high of 77 percent. At that time, the BI rate was increased dramatically to 70 percent. The 1997 economic crisis caused a major setback in every aspect of the Indonesian economy, including infrastructure facilities which suffered an extremely significant breakdown in the level of service. Even now, the impact of this crisis can still be felt due to the economic condition of the real sector which has not fully recovered to its condition prior to the crisis. Furthermore, infrastructure has not been fully functional in supporting economic movements due to the stagnant investment during the crisis and the insufficiency of funding needed in the years following the crisis to maintain and rehabilitate the deteriorated infrastructure network.

However, Indonesia has managed to gradually and consistently improve the economic condition after the peak of the crisis in 1998. Within the period of 1997-1999, the economy was still declining at minus 2.9 percent per year.

Figure 2.2 shows that within the period 2000-2004, the economy had grown by an average of 4.5 percent and increased consistently to reach an average of 6.0 percent within the period 2005-2008.

Figure 2.2: Economic Growth 1991-2009 and 2010-2014 Projection(%)



Source : Various Sources

The global financial crisis at the end of 2008, caused a decrease in the growth rate of roughly 4.5 percent in 2009, yet Indonesia did not seem to suffer significantly as is indicated by the growth that remained positive in a situation where many developed countries suffered economic contractions. For over a decade since the crisis, the Indonesian economy has gradually grown from 0.8 percent in 1999 to 6.4 percent in the first semester of 2008. The national economic growth decelerated slightly due to the impact of the global crisis although continuing to grow significantly. The economic growth of the first quarter of 2009 was 4.4 percent and in the second quarter declined to 4.0 percent. In the third quarter of 2009, the economic growth started rising again to 4.2 percent, which indicated the recovery of the national economy along with the improving world economy. From the demand side, economic growth was promoted by government spending and public spending each growing by 15.1 percent and 5.2 percent respectively. From the production side, the high economic growth was mainly motivated by the agricultural sector which improved by 3.4 percent; and the tertiary sector, namely the eletricity, gas and water; and transportation and telecommunication sectors which grew each by 13.9 percent and 17.6 percent

The economy of 2010-2014 is projected to be growing significantly, reaching roughly 7.7 percent in 2014[6]. Since the beginning of early 2009, domestic consumption has become the main contributor towards economic growth, especially related to the sustained buying power of the public and efforts to accelerate budget absorption. Most domestic economic indicators have improved since the beginning of 2009, as indicated by the improved customer confidence and improved sales of retail and automotive products; industrial activities improved after declining at the end of 2008.

[6] The whole explanation of this economic prospect comes from the Draft of RPJM II, explained by the Coordinating Minister for the Economy in the plenary cabinet meeting in Tampaksiring, Bali, as well as other documents such as Presidential Directive 1/2010.

Towards the end of the year 2009, the global economic recovery process continued to show improvement and this had a positive impact on the performance of the external sector for the whole of 2009. Economic growth is also illustrated by the national income per capita which had reached US$ 2,271 by the end of 2008, lifting Indonesia into the category of countries with 'medium-low' income.

2.2.2 Long Term Development Plan

National development planning documents of Indonesia have been regulated in Law no. 17/2007 concerning Long Term Development Plans (RPJP) 2005-2025, promulgated on 5 February 2007. RPJP has been established as a national reference in sustainable development after the removal of the National Development Guidance (GBHN) and the enforcement of regional autonomy and government decentralisation. The preparation of RPJP is mandated in Law no. 25/2004 concerning the National Development Planning System (SPPN). Based on Law no. 17/ 2007, RPJP will be divided into four Medium Term Development Plans (RPJM) and has a visionary planning paradigm. The vision of national development within 2005-2025 is to realise an independent, advanced, just, and prosperous Indonesian population.

In the transportation sector, the RPJP established the target of the availability of a reliable and integrated transportation infrastructure network. RPJP also sets the direction of economic development in order to realise a competitive nation, namely by reinforcing the globally oriented and competitive domestic economy. Therefore, the national industry and infrastructure services will be developed in accordance with the national economic policies, in order to be able to support the improvement of production and global competitiveness in line with the principles of international best practice. In order to meet these directives, the RPJP explicitly established that the Government role will be focused on policy formulation, while the role of the private sector will be intensified to develop commercial projects. Cooperation with the private sector, according to the RPJP, will be directed for the development of transportation infrastructures.

In infrastructure and transportation, the RPJP outlines the stages and priority scale of long term development in each RPJM as summarised by Table 2.2 below. The mandate of the RPJP within RPJM I 2005-2009 has been fulfilled, namely the improvement of the role of the private sector in providing infrastructure and laying the foundation for policies and reform of regulations as well as institutional restucturing. Policy reform will be enforced in line with the change of strategic environments. This mandate is reconfirmed in RPJM II, namely to improve the role of the private sector in the development of transportation infrastructure networks. In the context of RPJP, the role of the NRMP becomes of vital importance in order to prepare the national railway sector to face the era of long term growth and sustainability. The NRMP has a time horizon until 2030, five years after the end of RPJP in 2025. The vision of RPJP 2025 is to realise a developed, independent, prosperous and just Indonesia. Within the next 15-20 years, all development efforts will be directed towards the achievement of quality and sustainable economic growth where the income per capita will reach the

level of developed countries with merely a 5 percent unemployment rate and a 5 percent poverty rate. Therefore, it is logical that by 2025 the national transportation system and network must be well-established and functioning efficiently and reliably in order to sustainably support economic growth. At that time, the railways will have to be functioning as the primary mode for economic movement and the backbone of freight, passenger and service mobility both at the national and sub-national level. The task of the NRMP is to lay down the foundation for planning and policies in order to gradually take the railway to the desired condition. One of the objectives of railway revitalisation is to render the railway the backbone of the national economic movement. A structured and scheduled program is urgently needed to position the national railways in Java and Sumatera in the anticipated economic perspective, while rail services in Kalimantan and other regions should be developed based on specific and urgent local economic needs.

Table 2.2: Direction of RPJP towards the RPJM of Transportation

RPJM	Development Strategies
First (2005-2009)	• To accelerate infrastructure development through an increase in the private sector role. • To lay down foundations for policies, reform, and regulation and to perform an institutional restructuring for the transportation sector.
Second (2010-2014)	• To accelerate infrastructure development by improving the cooperation between theGovernment and the business world. • To develop a transportation infrastructure network, renewable energy for electricity, post and telematics, water resources, and housing and settlements.
Third (2015-2019)	• Availability of infastructure in line with the spatial plan indicated by a developed transportation infrastructure network. • Develop a rural transportation infrastructure to support agricultural development.
Fourth (2020-2025)	• Realisation of an efficient and reliable transportation network

Source : Law no. 17/2007 concerning National RPJP

2.2.3 Medium Term Development Plan I 2005-2009

During the period of RPJM I, which was from 2005 until the first semester of 2008, the Indonesian economy experienced a significant growth at an average rate of 5 to 6 percent. Indonesian economic growth suffered a minor setback at the end of 2008 due to the global financial crisis. The decline in the economic growth continued until the second quarter of 2009. The economic growth of the first quarter of 2009 was 4.4 percent and in the second quarter the growth rate decreased to 4.0 percent. In the

third quarter of 2009 the economic growth rate rose again to 4.2 percent, which indicated the signs of national economic recovery along with the improvement of the global economy. The economy until the third quarter of 2009 grew to 4.2 percent.

In mid-2009 the economy had started to show signs of recovery along with the improvement of the world's economy and the increasing prices of international commodities. Domestic consumption since early 2009 has become the main contributor to economic growth, particularly related to the retention of the public buying power and efforts to accelerate budget absoprtion. In order to accelerate economic recovery, the efforts to reduce export decline and the slow growth of investment are intensified. Furthermore, public consumption is attempted to be maintained by maintaining the public buying power through inflation control and various poverty reduction programs. The effectiveness of government spending is also improved by a stimulus program to maintain the public buying power and improve investments. Taking into consideration the external influence of various policies taken, the economic growth of 2009 is projected to be roughly 4.3 percent.

In 2009, the fiscal policies are directed to keep sending stimulus for the economy, while at the same time maintaining its endurance. This is done considering the greatest impact of the global economic crisis is predicted to have happened in 2009. Therefore, the fiscal policies implemented to save the national economy by expanding the economic stimulus program through APBN 2009 (national government revenues/expenditure budget), making basic assumption changes to give the public the right signal; and several adjustments on the magnitude of state revenue, state expenditure, deficit, and budget funding.

2.2.4 Medium Term Development Plan II 2010-2014

On 3 February 2010, the Government published the Medium Term Development Plan (RPJM) II 2010-2014 whose substances were outlined in the Presidential Regulation no. 5/2010. The RPJM II contains the Government's vision, mission and program which in principle were derived from RPJP 2005-2025. RPJM II becomes a national reference for the sectoral ministries and local governments in sector development and regional development. Table 2.3 shows the primary targets of the national development in economy and transportation in RPJM II. Within the next five years, the economy will grow consistently and gradually from an average of 5.55 percent in 2010 to an average of 7.35 percent in 2014.

The average growth for five years is 6.55 percent (Table 2.4). From the spending side, the economy will be supported by public consumption, investments, and export of goods and services which will grow with an average of 5.35 percent, 9.95 percent, and 11.15 percent, respectively. From the production side, growth will be triggered by the manufacturing industry and other non-oil and gas industry with roughly 6.4 percent growth. Entering the year 2010, the economy is projected to grow at 5-6 percent with an APBN deficit of 1.3 percent of GDP and an inflation rate of roughly 4 – 6 percent. In this RPJM II period, the Government has confirmed it is going to develop the

infrastructure by firstly consolidating various policies related to land acquisition into a one stop service in line with the consolidation and improvement of national spatial management.

Table 2.3: Primary Objectives of the National Development within RPJM 2010-2014 Economic and Transportation Sectors

Indicator	Target 2010-2014
Economic growth	Average of 6.3 – 6.8 percent per year, before 2014 growth of 7 percent
Inflation	Average 4 - 6 percent per year
(Open) Unemployment rate	5 - 6 percent by the end of 2014
Poverty rate	8 - 10 percent by the end of 2014
Development of transportation corridors	Up to 2014 with a length of 19,370 km in Sumatera, Java, Kalimantan, Sulawesi, NTB, NTT, and Papua
Development of infrastructure network and provision of integrated intermode and inter-island means of transportation	In line with the National Transortation System and blue print of Multimodal Transportation, completed by 2014
Transportation system and network repair in four large cities	Completed by 2014 in Jakarta, Bandung, Medan, Surabaya

Source: RPJM II, 2010

2.2.5 Domestic Connectivity

In Presidential Instruction no. 1/ 2010, issued on 19 Februari 2010, the President instructed the Ministers of the United Indonesia Cabinet II and other senior Government officials to accelerate the implementation of national development priorities for 2010. There are 14 priority programmes included in this Presidential Instruction, one of which is infrastructure. One of the programmes in the infrastructure sector is Domestic Connectivity, in which all main economic transporation corridors in Sumatera, Java, Bali, Kalimantan, Sulawesi, NTB, and NTT (1,579.79 kms) are to be completed, including the maintenance and capacity improvement of national roads and bridges. This includes the development and management of railway infrastructure with new tracks including double tracking, rail traffic signalling on the Medan-Belawan route and the detailed engineering design of the Waru-Juanda Airport railway line. The 2010 completion of the basic design for the Jakarta MRT and the continuation of the Jakarta Monorail project are also included.

In the context of this connectivity, it is necessary to accelerate the preparation of the National Transportation System and the Government Blue Print.These two large

planning and investment strategy documents in the transportation sector will function as the master document, based on which other transportation subsector strategic documents, including the NRMP, will be developed. However, the completion time target of December 2010 seems hard to reach considering both of these documents require a comprehensive economic approach rather than being merely sectoral documents. Nevertheless, in the grand concept of Domestic Connectivity, the Indonesian railway sector will hold a vital strategic role which will remain relevant beyond 2010, and will continue to fulfill the policies and strategies of natonal railway development until the year 2030.

Table 2.4: Macro-Economic Framework of Indonesia (%) (RPJM II Version, 2010-2014)

Indicator	2010	2011	2012	2013	2014	2010-2014
Economic Growth	5.5-5.6	6.0-6.3	6.4-6.9	6.7-7.4	7.0-7.7	6.3-6.8
Spending Side						
Public consumption	5.2-5.2	5.2-5.3	5.3-5.4	5.3-5.4	5.3-5.4	5.3-5.4
Government consumption	10.8-10.9	10.9-11.2	12.9-13.2	10.2-13.5	8.1-9.8	10.6-11.7
Investments	7.2-7.3	7.9-10.9	8.4-11.5	10.2-12.0	11.7-12.1	9.1-10.8
Export of goods and services	6.4-6.5	9.7-10.6	11.4-12.0	12.3-13.4	13.5-15.6	10.7-11.6
Import of goods and services	9.2-9.3	12.7-15.2	14.3-15.9	15.0-16.5	16.0-17.4	13.4-14.9
Production Side						
Agriculture, plantation, livestock, forestry	3.3-3.4	3.4-3.5	3.5-3.7	3.6-3.8	3.7-3.9	3.6-3.7
Mining and excavation	2.0-2.1	2.1-2.3	2.3-2.4	2.4-2.5	2.5-2.6	2.2-2.4
Processing industry	4.2-4.3	5.0-5.4	5.7-6.5	6.2-6.8	6.5-7.3	5.5-6.0
Non-oil and gas industry	4.8-4.9	5.6-6.1	6.3-7.0	6.8-7.5	7.1-7.8	6.1-6.7
Electricity, gas and water	13.4-13.5	13.7-13.8	13.8-13.9	13.9-14.0	14.1-14.2	13.8-13.9
Construction	7.1-7.2	8.4-8.5	8.8-9.3	8.9-10.1	9.1-11.1	8.4-9.2
Trade, hotel, and restaurant	4.0-4.1	4.2-4.8	4.4-5.2	4.5-6.4	4.6-6.6	4.3-5.4
Transportation and telecommunication	14.3-14.8	14.5-15.2	14.7-15.4	14.9-15.6	15.1-16.1	14.7-15.4

Indicator	2010	2011	2012	2013	2014	2010-2014
Finance, real estate, company services	6.5-6.6	6.6-6.7	6.8-7.0	6.9-7.0	7.2-7.3	6.8-6.9
Services	6.7-6.9	6.9-7.0	7.0-7.1	7.1-7.2	7.2-7.4	6.9-7.1

By the year 2014, the Government will have completed the development of transportation corridors in major islands such as the Trans-Sumatera, the Trans-Java Arterial Road, Bali, Trans-Kalimantan, Trans-Sulawesi, Nusa Tenggara Barat, Nusa Tenggara Timur, and Papua. The total length of all these links is approximately 19,370km. Therefore, Indonesia needs to develop a transportation infrastructure network rapidly and massively. The period 2010-2014 seems to be a critical window of time for Indoneaia to develop a transportation infrastructure.

The development of a multimodal transportation sector is one of the agenda items the National Summit discussed and prioritised. The investment required to develop Indonesian infrastructure is roughly Rp 1,400-1,500 trillion for the next five years or roughly Rp 280-300 trillion a year. In addition to Government investments, which will still play a key role, most investment in transportation infrastructure will come from the private and public sectors. Therefore, the financing pattern must emphasise PPP project financing and the Government's role in the acceleration of transportation development must be revitalised. The rail sector will be projected as the core transportation mode.

2.3 SPATIAL CONSIDERATION AND THE REGIONAL ECONOMY

Transportation serves as the connector between regions, enabling them to interact and to mobilise their resources efficiently. For that reason, transportation is often referred to as a need derived from the existence of spatial interaction. On this ground, the development of transportation infrastructure networks, including railway, shall take into consideration the territorial interaction patterns to be served. The directions of regional development in Indonesia are implemented within the RTRWN (National Spatial Plan) which is provided in hierarchies from the National, Island, Provincial, Kabupaten/kota, to Regional scale. The RTRWN is prepared to coordinate the structure and pattern of spatial or area development between regions in Indonesia, in order to establish synergy, coordination, and to avoid interregional competitions. Various issues are explained in the preparation of the RTRWN, from global issues (environment, globalisation), national (disparities versus disintegration, autonomy) and local (public involvement). In the context of national integration strategy, RTRWN has tried to accommodate the will to narrow the disparities between regions by attempting to synchronise the growth dimension with the distribution dimension. Given the establishment of strategies and policies for spatial use, the hierarchy of the economic system is no longer centralistic in dimension; yet it also considers the dispersal of

centers of economic activities (including transportation) to all points considered to be nationally strategic (in the political, economic, social, and defense and security contexts).

Within the RTRWN, regional Sumatera has the greatest number of key regions with 41 regions, followed by Regional Java with 28 regions, regional Sulawesi with 27 regions, regional Kalimantan with 21 regions, regional Bali and Nusa Tenggara with 15 regions, regional Irian Jaya Barat-Papua with 12 regions, and regional Maluku with eight regions. In RTRWN, an island is considered to be an essential unit in regional development. Each island is considered to be able to provide a greater pulse in the classification of regional development in the national scope. The translation of the direction of island regional development within the RTRWN is outlined in Table 3.1. From the table it can be concluded that generally, the direction for regional development of the islands is given to the primary or extractive sectors, tourism, processing industry or upstream industry and industries supporting the primary sector. Indonesia is a region with potentials in the extractive sector. Natural resources are distributed almost evenly across the whole of Indonesia. Strategies for territorial development should be based on this reality, not on some system that does not suit the characteristics of regional development or national characteristics. This island direction is then translated into the direction of key regions and confirmed in the regional direction at the provincial and kabupaten/kota levels. Establishment of a National Centres of Activities (PKN), Regional Centers of Activities (PKW) and Local Centers of Activities (PKL) in the RTRWN can be used as instruments in developing the patterns of economic interaction to shape the patterns of passenger and freight movement in the development of transportation systems, particularly railway systems.

Box 3

Transportation and Regions

Massive centralisation no longer applies. Massive decentralisation is not the best option for Indonesia, either. The best may be the empowerment of the region to develop its own transportation system, including railway infrastructure and services networks as well as relevant businesses and industries. The Central government prepares the legal framework and strategic national policies, establishes master plans, certification, feasibility, and safety systems nationally to which the regions refer. The regions can then develop their own railway system based on the strategic plan.

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Table 2.5: Direction of the Spatial Planning of Islands

Island	Planning Direction
Java-Bali	National food development region. Space-saving natural resources, especially inland capture fishery, plantation with agro-tourism, mining, oil and non-oil processing industry which are space and water-efficient and environmentally friendly; controlled housing.
Sumatera	National food development region. Natural resources, especially forestry, capture fishery, tourism and plantation with agro industry and marine industry, oil-gas and non oil-gas mining.
Kalimantan	Nature conservation areas (rainforest) and water, natural resources, especially forestry, capture fishery and plantation with agro/forest and marine-industry, oil-gas and non oil-gas mining; processing industry.
Sulawesi	Development region of national food centers, space-saving natural resources, especially inland capture fishery, tourism and plantation with agro/ forest and marine-industry, oil-gas and non-oil and gas, development of processing industry.
Nusa Tenggara	Development region of national food centers, natural resources especially fishery and marine industry, non oil and gas mining and tourism; processing industry.
Maluku-Papua	Areas of natural conservation, water resource development, especially inland capture fishery, tourism, forestry and plantation with agro/ forest and marine industry, oil and gas and non oil and gas mining industry; processing industry

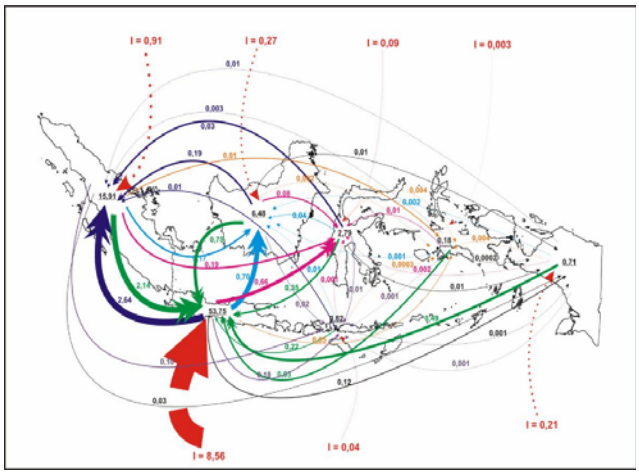
Sources: National Spatial Plan

From the structures of the hierarchies of the centers of activities in every major island (Sumatera, Java, Kalimantan, Sulawesi, Nusa Tenggara, Maluku Islands and Papua), the system of infrastructure networks and transportation service networks can be developed by taking into consideration inter-regional spatial relationship and the existing condition of the available transportation infrastructure. This integration of transportation policy and spatial planning on the national scale is expected to be able to provide a strong structure of regional interaction patterns which are capable of supporting economic efficiency, distributing development results, and maintaining national integration. There are several key variables to consider in this territorial approach, namely population variables, economic development potentials of priority sectors, efforts to narrow regional disparities, and anticipation of regional and global economic cooperation. The units of territorial planning in this case are the large islands, namely Java, Sumatera, Kalimantan, Sulawesi, Nusa Tenggara and Papua. The national railway planning through the territorial approach should be centered around these six major islands, taking into consideration the potentials for economic development in the future.

2.4 NATIONAL PRODUCTION INPUTS AND OUTPUTS

Most (74.4 percent) of the production outputs and national trade volumes occurs in the large islands. The domestic trade between islands reaches a mere 8.59 percent, consisting mainly of the Java Bali – Sumatera flow (4.77 percent) and Java Bali – Kalimantan (1.43 percent). The remainder is Java Bali - Sulawesi (0.84 percent), Java Bali - Maluku (0.07 percent), Java Bali - Papua (0.42 percent), and between Java Bali and Nusa Tenggara (0.39 percent). Therefore, the trading of products between regions outside Java Bali is merely 0.67 percent. (Figure 3.1 and Table 3.2). This condition shows that the trade centers are still restricted to Java Bali. Most exports are still made from ports in Java (Figure 3.2.). Therefore, the challenge that lies ahead in the next five years is to open the lines and expand the inter-regional trade network, as well as promoting development of trade centers in Sumatera, Kalimantan, Sulawesi, Nusa Tenggara, Maluku and Papua. This means developing greater domestic connectivity and transportation networks between these regions in order to improve productivity and investments outside of Java. Java Bali has become the trade center for raw materials and national products. With such trade patterns, investment activities whether in Java Bali or outside Java Bali will contribute a greater value for Java Bali either in the form of increasing demands for raw materials or increasing demands for consumption products. Increased investments outside Java Bali will be followed by the increase of raw materials coming from the Java Bali region, such as fertiliser, chemicals, cement, machinery, vehicles and heavy equipment.

Figure 2.3: Flow of Production Inputs between Regions (% of Total National Output)



Source : RPJM II, 2010-2014

This condition also confirms that the development of production and trade centers in Kalimantan, Sulawesi, Nusa Tenggara, Maluku and Papua becomes essential and urgent in reinforcing inter-regional linkage. The data on inter-regional input/output for 2005 shows that the Java Bali leads in the supply of raw materials and products to other regions in the form of industrial products and direct con-sumables such as food and beverages, textiles, footwear, pulp and paper; as well as rubber and rubberised materials; raw materials for production such as chemicals, cement, iron and steel and non-iron basic metals and eletrical machinery and electrical equipment, together with their transportation and maintenance apparatus.

Table 2.6: National Production Input and Output Matrix

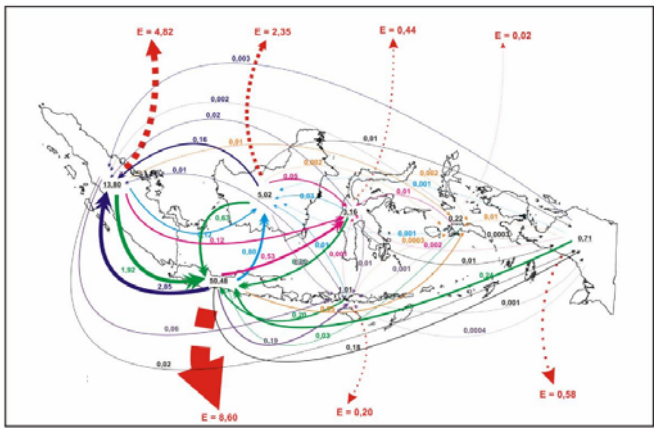
Input-Output	% of Total Output Value
Intra Region (products to be used by its own respective region)	74.40%
Inter Region (products to be traded to other regions)	8.59%
Products exported overseas	17.01%
Java Bali – Sumatera Trade	4.77%
Java Bali – Kalimantan Trade	1.43%
Java Bali – Sulawesi Trade	0.84%
Java Bali – Maluku Trade	0.07%
Java Bali – Papua Trade	0.42%
Java Bali – Nusa Tenggara Trade	0.39%

Source : RPJM II, 2010-2014

The production structure of the Java Bali region shows that 44 percent of the total output is acquired from the processing industry sector which uses mostly imported raw materials. In the meantime, for the Sumatera, Kalimantan and Papua regions, total production value comes from primary products, either forestry or mining products. The composition of primary products in Sumatera reaches 37.29 percent, Kalimantan reaches 57.29 percent, and Papua 79.18 percent. These conditions implicitly state that increases in consumption demands in any region will be followed by increases of production in the Java Bali processing industries and therefore in their importation of raw materials.

The reinforcement of inter-regional linkage must also take into consideration the economic structure of the region, particularly in sectors that contribute to the Regional GDP; sectors promoting economic growth; and sectors absorbing manpower. The structure of the national economy is supported by the processing industry sector with 25.91 percent, the trade sector at 18.46 percent and agricultural sector at 15.27 percent. The agricultural sector becomes the main contributor of Regional GDP in all regions, with the greatest contribution from Maluku (32.6 percent) and the lowest from Java Bali (11.3 percent). The processing industry sector is developing in three regions, namely Sumatera, Java-Bali and Kalimantan. In other regions the processing industry sector is not so dominant. The mining sector is amongst the three greatest contributors to the regional economies of Sumatera, Kalimantan, Nusa Tenggara and Papua.

Figure 2.4: Flow of Production Outputs between Regions (% Total National Output)



Source : RPJM II, 2010-2014

The trade situation and the development of intra- and inter-regional sectoral commodities provides a strong positive indication for market opportunities for railways to develop freight transportation services in Java, Sumatera and other large islands in Indonesia. This illustration of the domestic trade patterns provides an adequately powerful indication for the preparation of a railway development plan in regions serving as trade centers and regions which currently have a small role in the national economic flow. Using the aforementioned technocratic and political approaches, the NRMP is designed with the agenda of railway development based on the territorial approach. The railway economic and investment plans in the NRMP are on a network scale, going beyond regional administrative boundaries; therefore, a spatial approach in the development of future railway services is considered to be the best approach. Every region has the potential for railway development, whether viewed from the technical or the political perspective.

2.5 POPULATION PRESSURE

The development of the Indonesian railway network must be closely related to the predicted growth of the population. In this context, Table 3.3 shows the Indonesian population by region as projected by the National Development Planning Agency-BPS-UNFPA[7] in 2005. The population of Indonesia grew at a rate of 1.36 percent a year within 2000-2005, which led to the total population of 220 million people in 2005. The population of Indonesia will increase consistently from 220 million in 2005 to close to 274 million people in 2025, a growth rate of an average of 2.7 million per year. The Island of Java will remain the most densely populated with roughly 151.5 million people, followed by Sumatera with 63.3 million, Sulawesi with 20.3 million, Kalimantan with 17.9 million, Bali, NTB and NTT with almost 15 million, and Papua, Maluku and Maluku Utara with only 5.8 million people. It is interesting to note that the combined population of Java-Sumatera will number close to 215 million people in 2025 which will create a significant socio-economic potential for the marketing of rail transport in the future. These population disparities will continue until 2025 and are likely to remain so

[7] Indonesian Population Projection. Bappenas-BPS-UNFPA, July 2005

unless Indonesia introduces a grand strategy to overcome these population and regional development issues.

Until at least 2030, the development of Indonesian railway network and its underlying policies must take the predicted demographic situation into consideration. Development of solid and valid Indonesian national railway policies must recognise, among other factors, the demographic phenomenon of the Java Island, which by 2025, will be inhabited by roughly 152 million people, 82 percent of whom will reside in large cities and other urban areas. In reality, the population growth to 274 million people by 2025 would not pose such a big problem if the distribution to non-Java islands could be encouraged in a more equitable manner by the promotion of their economies to create new growth centers and absorb more of the regional workforce. This is where the roles of transportation and railway can be optimally utilised. In Java, railways must be able to accommodate the large growth of passenger and freight mobility as well as the urban economic mobility, particularly in large cities. In Sumatera, the railway has to improve its role in the transportation of mining, plantation, and industrial commodities. Within the next two decades, even Kalimantan, Sulawesi and Papua will have developed sufficiently to justify making rail the primary mode of passenger and freight transportation.

Table 2.7: Projection of Indonesian Population 2005-2025 (Million People)

Year	Sumatera	Java	Bali, NTB, NTT	Kalimantan	Sulawesi	Maluku, Malut, Papua	Total
2005	47,192.3	127,793.1	11,861.3	12,583.2	15,997.7	4,470.7	219,898.3
2010	50,868.2	134,357.7	12,715.4	13,905.7	17,115.1	4,817.3	234,139.4
2015	55,340.2	140,685.7	13,528.3	15,255.4	18,217.4	5,153.0	248,180.0
2020	59,395.1	146,508.9	14,293.0	16,598.9	19,275.5	5,468.2	261,539.6
2025	63,318.8	151,468.0	14,988.5	17,881.9	20,337.2	5,747.0	273,651.4

Source: BPS-The National Development Planning Agency-UNFPA, July 2005

2.6 MASSIVE URBANISATION

Another big problem is the massive urbanisation which has been occuring for a long period of time and will likely continue in the future, unless Indonesia implements a valid regional development strategy. On the Island of Java, roughly 82 percent of the total population in 2025 will reside in the urban areas. The ratio of urban population in Bali is 79.6 percent, while in Kalimantan it is 59.8 percent, Sumatera 57.3 percent and Sulawesi 46.2 percent (Table 3.4.). Massive urbanisation affects the ability of the cities

to provide adequate living facilities for their inhabitants. Furthermore, the urban transportation network and infrastructure facilities are incapable of bearing the burden of the passenger movements in and out of the cities. As a result, the urban transportation system suffers from worsening degradation. New urban transportation policies, particularly for large metropolitan cities, are therefore essential in the face of this population challenge. The increasingly massive population mobility cannot any longer be borne on the existing urban road network within the prevailing urban economies. This is where rail must step in to take over a greater share of the urban transport requirement by developing an effective urban rail network and providing services integrated with the urban spatial plan and other modes of transportation. Proposals for developing a rail-based urban public transport system must constitute an essential part of the NRMP with urgent priorities for the large cities in Java and Sumatera.

Table 2.8: Average Projection of Urban Resident Ratios (%)

Year	Sumatera	Java	Bali, NTB NTT	Kalimantan	Sulawesi	Maluku Malut	Papua	Indonesian Average
2005	37.8	63.5	39.2	41.3	30.2	27.9	22.8	48.3
2010	42.9	69.4	44.7	46.2	34.1	28.7	23.5	54.2
2015	48.0	74.5	49.8	50.9	38.1	29.7	24.3	59.5
2020	52.7	78.7	54.3	55.4	42.2	30.6	25.1	64.2
2025	57.3	82.2	58.3	59.8	46.2	31.8	26.0	68.3

Source: BPS-The National Development Planning Agency-UNFPA, July 2005

2.7 INTER-REGIONAL DISPARITIES

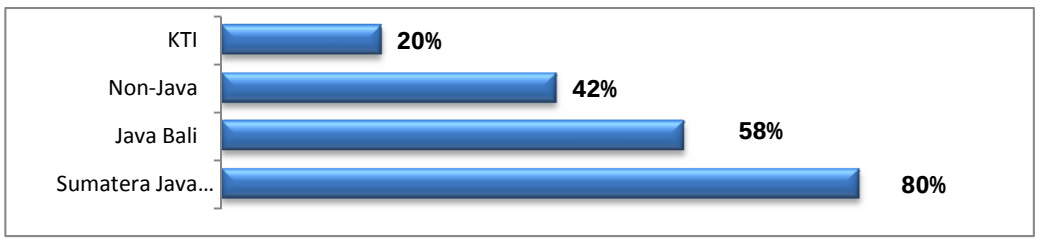
In line with the population issues, in the context of regional economy and also in its relevance with the issue of inter-regional economic disparities, it is necessary to examine the phenomena in which the Western Region of Indonesia (Java, Sumatera, and Bali) has for a long period contributed an average of 80 percent of the national economy (Figure 3.3). The economic dominance of Java and Sumatera seems likely to continue for a long period in the future. However, the island of Java has experienced what is referred to as a great paradox; on one hand it is the mainstay of the national economy, on the other hand it is suffering from the degradation of its economic carrying capacity. The island of Java will remain the center of national economic growth; however, with a land area of only roughly 7 percent of the total area of Indonesia and with increasingly scarce natural, water and mineral resources, Java is slowly but steadily suffering from a decline in its supporting ability, marked by the

decrease of the availability of raw water, deforestation, energy shortages, and a decline in the quality of basic infrastructure services such as roads, rail, irrigation and sanitation.

Figure 3.3 shows that economically the islands of Java and Sumatera form a solid union supporting each other. The reduction in the supporting ability of Java will be offset by an improvement in the supporting capability of Sumatera. The over-population of Java should be relieved by an improvement in the economic and population activities on Sumatera. The economic unity between Java and Sumatera will determine the future of the national economy and support the promotion of the welfare of the Indonesian people as a whole. How the regional economic concept will promote the economic supporting ability of the union of Java and Sumatera and what role the rail infrastructure will play in support of the economy, pose a challenge for further examination. The preliminary plan of the Government to build a Sunda Strait Bridge, carrying a double rail track, may be an answer in the not so distant future.

Meanwhile, the Eastern Region of Indonesia (KTI), namely Kalimantan, Sulawesi, Papua, Maluku and Nusa Tenggara – a vast region, rich in natural and mineral and marine resources, is only capable of contributing roughly 20 percent of the national GDP. One of the main causes of this regional disparity is the disparity in infrastructure, including transportation. The transportation infrastructure in these KTI regions is miniscule. Therefore, the future development of national transportation sector policies must recognise this regional disparity by developing sea, air and land transport infrastructure in the eastern region of Indonesia. In the meantime the development of railway networks in Kalimatan, Sulawesi, Papua, and Nusa Tenggara can help accelerate the economic development of these regions, particularly by accelerating the flow of domestic freight and exports from industrial centers to the ports, even if the development is implemented gradually.

Figure 2.5: Average Distribution of Regional GDP 1975 – 2006 (%)



2.8 DECENTRALISATION AND REGIONAL AUTONOMY

Decentralisation and regional autonomy have become a real political reality and a fact of the government system. The authority of provincial governments and kabupaten/kota in regional transportation must be examined as a strategic environmental factor in the preparation of future railway reform policy. Urban

transportation, in which rail-based urban public transport will play an essential role in the mobilisation of urban residents, has already become the responsibility of the city government despite the fact that the central government will still play a great role in strategic policy and planning, safety standards and technical specifications. The national policies in this case become the umbrella for local policies. Therefore, in the preparation of reform policies and the NRMP, local policies become an integral part. Communication with the governments becomes essential and national policies must cultivate local wisdom in order to create a regional railway transportation system which is integrated to the national policies.

The role of local governments in railway operations is implied in several essential articles of Law no. 23/2007 concernng railways which divides the railway into national, provincial, and kabuaten/kota levels. For regions which do not yet have railway networks, the law allows local governments to develop and operate public railway facilities and infrastructures. Table 3.5 contains quotations from the law which allow local governments to operate new railway infrastructure and facilities as well as to issue licenses for the operation of specialised trains.

Table 2.9: Local Government Role in Railway Operation

Provision	Elucidation
Article 23 Paragraph 2	In the absence of an enterprise to operate public railway infrastructures, the government or the local governments may conduct the operation of railway infrastructures.
Article 31 Paragraph 2	In the absence of an enterprise to operate public railway rolling stocks, the government or the local governments may conduct the operation of railway infrastructures.
Article 33 Paragraph 4b	Provincial governments may grant licenses for the procurement, development and operation of specialised railways with routes crossing the boundaries of kabupaten/kota within a province upon approval of the central government.
Article 33 Paragraph 4c	Kabupaten/kota governments may grant licenses for the procurement, development and operation of specialised railway with routes within the boundaries of kabupaten/kota, upon recommendation of the provincial government and approval of the central government.

Source : Law no. 23/2007

Article 7 also mandates the government to prepare the Provincial and Kabupaten/kota RMPs which imply a wider vision of the development of Indonesian railways. Several provinces in Sumatera have the opportunities to develop a railway which would become an integral part of the Sumatera railway which will eventually be developed as a continuous network from Aceh to Lampung. Large islands such as Kalimantan,

Sulawesi and Papua which presently do not have railways are regions in which the local governments have great opporunities to develop local railways with reference to both the National or the Regional RMPs. This is the central essence of decentralisation, in which the regional authority and finance, assisted by external financing, are to be utilised for the development of local railways. It would be beneficial for the central government (DGR) to build a dialogue with local governments in order to prepare the technical capacity, knowledge and skills required by the regions in planning regional railway development.

CHAPTER 3: BUILDING INDONESIAN RAILWAYS

3.1 LAW CHANGES

The Indonesian transportation sector is currently undergoing the initial migration process from being a Government owned and operated monopoly to the opening of the industry and its market to private sector investment. This has been marked by changes in the transportation laws which provide wider breathing space for the private sector. Under the new law, the private sector is granted full access to invest in the development of and operation of transportation infrastructure and services without having to collaborate with related SOEs. This migration of the transportation sector marks a new era in the provision and financing of future transportation infrastructure. Under the old law, the state owned, managed and financed the operations of all transportation facilities. This state monopoly was delegated to the relevant SOEs which operated and managed transportation facilities under a monopolistic right; this rendered the SOEs unaccustomed to competition. The history of Indonesian railways entered a new phase in April 2007 with the promulgation of Law no. 23/2007 (Figure 3.1) which states that the rail service industry and market is no longer monopolised by PT KAI; instead, it is now open to private sector enterprises which are capable of functioning as a Railway Facility andor as an Infrastructure Enterprise, particularly in situations where railway development is required in regions without an existing railway network. For several decades, PT KAI reserved the monopolistic right for the implementation of Indonesian railways vertically integrated without any competitor whatsoever. However, under the new railway law, the regulatory function is now separated from the operating function and the private sector is given equal rights to make investments, own, manage, and operate railway systems in Indonesia.

Figure 3.1: Railway Law

Railway Law no. 13/1992 mandating a state owned and operated monopoly has been revised into Law no. 23/2007 which mandates an open market industry for the provision of railway services by private sector investors, local governments and SOE or Local SOEs. This openness of the railway market is confirmed in Articles 23 and 31. This law has been supplemented by Government Regulations 56/2009 and 72/2009.

3.2 THE FUTURE OF INDONESIAN RAILWAYS

With the aforementioned change in the law, the Indonesian transportation sector is currently undergoing a 'change of face'. The planning, financing, development, management and operation of transportation services and infrastructure are now open to the private sector. PT KAI no longer reserves the monopolistic rights and it will now be treated equally with private enterprises in the implementation of railway transportation services and infrastructure. How will the face of Indonesian railway look in the future? The answer relies greatly upon how soon and how effectively railway sector planning and development will commit to change and open its market, and how soon the Government will be willing to create the institutional changes and develop the necessary conducive climate for the private sector and the business world to invest in the sector. The journey from monopoly to an open market is not a short 'walk in the park'. Indonesia still has to search for a new equilibrium between these two poles; not in either extreme but in a median position which will optimise high levels of benefit and support for national economic mobility while providing political comfort across the nation.

Future Indonesian railway development planning should also observe the role of railway in international trade which is very important for the country's global competitiveness and export performance. In reality, where railway access is built to the ports and airports, either domestic or international, the railway will have a direct impact on the economy. The rise of transportation costs due to massive congestion on road access to ports will lower trade volumes and reduce export competitiveness. The increasing costs of distribution and the logistical system for international trade, due to massive overload in the supporting transportation system may also lower the feasibility of a commodity export activity, despite the fact that Indonesia has to grab the big opportunities presented by the current drastic increases in trade volume and global investments. Global freight and service volumes have increased dramatically for the past three decades. So has the global foreign direct investment (FDI) flow from the developed to the developing countries, including Indonesia.

Indonesia is also lagging behind in developing multimodal and intermodal transportation systems, particularly for freight transport. Presently, in developed countries, multimodal transportation systems have managed to reduce the costs and time of freight and service delivery with what are referred to as "door-to-door",or "just-in-time" shipment of goods. As a result, transportation has become a major factor in accelerating economic globalisation affecting every aspect of a country's economic life. For the past two decades, the global freight traffic with containers using multimodal transportation facilities keeps on growing, so does freight traffic using air transportation, rail and container trucks. These developments indicate that transportation should be judged as an integrated system instead of a collection of individually functioning modes. Multimodal and intermodal transportation systems are capable of improving the performance of distribution and logistics, but it takes a major investment to develop the infrastructure necessary to remove bottlenecks, build network capacity and to improve the efficiency of freight management in ports in order to ensure that the transfer of freight from one mode to another goes smoothly,

efficiently and safely. Indonesia also has to anticipate the growth of economy and trade between two major Asian developed countries which have become global players and world economic powers, namely China and India. In the development plan, *Trans Asian Railway Network,* published by the United Nations in 2009, the whole railway networks in Sumatera and Java were considered to be an integrated entity.(Figure3.2). Therefore, it is necessary to develop port, road and rail infrastructures capable of bearing the weight of the global trade and investments between Indonesia, Asean, China, and India.

The trade and financial centers of the world will also shift eastward, notably to Singapore, Hongkong, and Korea. These Asian regions only enjoyed 4 percent of the world economy in 1960. At present these regions contribute 25 percent of the global economy, a statistic which will increase dramatically as China and India continue to grow as the new world economic super powers.

The Indonesian railway system must be able to interact with the new global economy. One thing is for certain; since the national economy constitutes an inseparable part of the global economy, the national transportation system shall also be able to become an integral part of the global transportation system; this necessitates a high level of compatibility, otherwise Indonesia will be left out in the dynamics of the world trade and finance. There is a great investment consequence of this compatibility and it shall not be borne by the government alone.

Figure 3.2: Trans Asian Railway Network

Source: United Nations, 2009

The NRMP is a formal government document outlining the policies, strategies and a structured, detailed and scheduled program concerning the revitalisation of the national railways, including the investment design and the business plan for the next 20 years. Therefore, the NRMP has to explicitly define the need to develop positive interactions and correlation between the railway and the national economy, the global economy and the regional Asian economy. Table 3.1 shows several policy and action plan initiatives the Government can take in order to develop a correlation between the national railway and the economy.

Table 3.1: Correlation between Railway and Economy

No	Policy	Action Plan
1.	Passenger market	• Radically improve the market share of railways for the passenger market from the present 7 percent to 12 percent by the year 2025, with an increasingly efficient, reliable and professional level of service.
2.	Freight market	• Radically improve the market share for the freight market from the present 0.67 percent to 15 percent by the year 2025, by opening rail access to ports, airports, and industrial, agricultural, mining, forestry and other economic growth centers.
3.	Domestic connectivity	• Develop economic connectivity between regional economic growth centers within a railway network or corridor, thereby creating a regional logistical and distribution system
4.	Budget politics	• Progressively improve the government's development budget to invest in railway infrastructure and facilities, including signaling systems, electric power, rolling stocks and other control devices. • Improve the government's budget politics, namely by improving the balance of the investment ratio between government investments for the railway and road networks.
5.	Policy intervention	• Make policy interventions in the form of fiscal and non-fiscal incentives and disincentives, promoting a gradual migration of freight transport from road to railway, thereby creating a more balanced market.
6.	Investments	• Improving the investment portfolio of railway projects in cooperation with, or fully developed by, the private sector • Create a very conducive climate for private sector and business investments in the national railway, by providing government support, either fiscal or non-fiscal.
7.	Institutional	• Reinforce the DGR by creating a Special Delivery Unit and/or a PPP-Node in order to facilitate and implement strategic large-scale railway projects, using APBN funding as well as PPP or Private Financing Initiative (PFI).

There are wide open opportunities to increase the market share of the railways, both for passenger and freight traffic. The large population in Java and Sumatera, accompanied by the high level of economic activity on both these islands ensures the availability of market incapable of being carried by road transport, given the capacity of the existing road network. Many mining, agricultural, plantation and manufacturing industry products presently need rail services due to the congestion on the existing road network which renders it incapable of coping with the growth of freight traffic along strategic economic corridors.

What should be included in the NRMP to serve as a "road map" for the creation of a modern Indonesian railway with clear-cut and explicit stages, either in investment design or in the regulatory, policy and institutional framework required to support it. The future, modern Indonesian railway systems must be designed regardless of current economic, institutional and regulatory constraints; it should be based solely on the level of service required by the predicted highly developed and independent national economy of 2030.

Developing the future Indonesian railway based on the economic development projections requires the NRMP to project the size of investments required, facilities, infrastructure and all operational equipment of the railway, including the signaling, telecommunication, electrical and institutional investments, and human resource requirements. It would be beneficial to link the planning and investment stages to RPJM periods, creating NRMP planning stages for the Short Term (2010-2014), Medium Term (2015-2020), Long Term (2019-2025) and for a period following the RPJP, namely 2025-2030. This later being a period in which the revitalised railway system is fully functioned in support of the national and regional economy.

3.3 LAW NUMBER 23/ 2007

The main driver for the preparation of the NRMP and the national railway revitalisation program is the issuance of Law no. 23/2007 concerning railways as a substitution for Law no. 13/1992. The new Law essentially terminated the state monopoly of railway operation which had been on-going for over a century and opened the market and the national railway industry for the private sector investments. Therefore, it is possible that in the future the national railway industry and services will see some fundamental changes, namely competition in national railway operations between SOE, Local SOE, local governments and the private sector. Law no. 23/2007 confirms that the railway is operated with the purpose of accelerating the mass movements of passengers and/or freight and to support distribution, growth, stability, encouragement, and drive the national development. The spirit of this Law is that Indonesia needs to view the national railway from a totally different perspective, namely that the railway is an economic sector which needs to be operated economically, efficiently and professionally. The previously bureaucratic infrastructure appoach to the provision of railway services need to be changed to that of a corporate business providing reliable, efficient passenger and freight transportation, directly interacting with the economy and industry. Therefore, this Law opens the opportunity for the unbundling the lines of

control of the national railway, either by horizontal unbundling, vertical unbundling, or spatial unbundling. In principle, this Law mandates that the Government immediately proceeds with a comprehensive revitalisation of the national railway sector upstream and downstream.

Law no. 23/2007 concerning Railways marks a new era for Indonesian railway, with three ground rules, namely (a) abolishing the SOE monopoly and opening the opportunity for the private and the local government in the railway business, (b) making possible the separation of the previously integrated operations and infrastructure, and (c) establishing the Government as the advisor and the supervisor in charge of the railway operations. Law no. 23/2007 establishes that the operation of railway facilities and infrastructure shall be done by enterprises, either SOE/Local SOE or the private sector, or by public/ private partnerships. Law no. 23/2007 also confirms that corporate restructuring be carried out in accordance with Article 214, related to the operator of PT KAI, to adjust its approach to the spirit of Law no. 23/ 2007 with regard to competition and openness. Therefore, the Government, in addition to assisting PT KAI in its corporate restructuring, also has to provide opportunities for the private sector to enter the railway business through the railway revitalisation program.The entrance of the private sector should be viewed as a catalyst for the creation of a healthy competitive climate, making possible improvements in the quality of railway service. Engaging the private sector in railway operation does not necessarily mean selling Government owned assets; it may also be realised in giving concessions through PPPs, franchising, leasing or Build Operate Transfer (BOT). In order to accelerate the participation of the private sector in railway operations, railway infrastructure management should be separated from the railway operation management, enabling the infrastructure managing agency to grant equal access indiscriminately for use by all operators. Therefore, the corporate revitalisation must be carried out simultaneously with the railway institutional revitalisation.

Included in the institutional revitalisation is the question of railway decentralisation arising from the Law which enables local governments to operate their own railway. Therefore, Government must be flexible in applying its administrative, regulatory and licensing authorities, keeping them from hindering the development of local railway services and infrastructure. The Central Government has to provide guidance and facilitation of the local capacity in developing railways, reinforcing the local capacity, and conducting education and training in railway techniques and management for local human resources.

3.4 REVITALISATION STEPS

3.4.1 Role of Railway in the Transportation Sector

The Law no. 23/ 2007 concerning railways compels the Government to position rail as the backbone for mass passenger and freight transportation, supporting the growth of the national economy. This is a major task demanding the commitment and dedication of the stakeholders to realise and a comprehensive reform from upstream to

downstream. Therefore, the revitalisation of the railway sector must be taken seriously by the MoT to improve the role of rail as the primary mode of passenger and freight transportation. This improvement of the railway role will create an integrated multimodal/intermodal transportation system, which will unify and integrate the rail, road, sea, and air modes of transportation. It is necessary to build rail access to ports for freight transportation and to airports for passenger transportation. Interactions between railway and settlement areas, industrial areas and other special economic areas has to be planned and built; construction financing must be procured, and cooperation with related agencies, the private sector and industries must be developed. The Government should position railway revitalisation as a mainstream policy and must strive to acquire the neccessary financial resources.

IImprovements in the role of rail in the economy can also be achieved by developing the interaction between the rail network and industrial areas, agricultural centers, mining areas and other special economic areas. In urban areas, rail-based urban public transport should interact with central business districts, settlement areas, real estate developments, malls and department stores. Therefore, the NRMP must be revised immediately and its legal status be upgraded into a Presidential Regulation or at least a Minister's Decree.

Government must also increase the budget for the development and construction of basic urban railway and intercity inter-regional railway infrastructures. The Government shall also play a role in creating a conducive climate and provide various incentives in order to attract the private investors to invest in railway industry, particularly for urban passenger transportation. In line with that, the Government can improve the services provided by the domestic railway industry by increasing public and private investments in passenger transportation. In the meantime, the revitalisation of the national railway will also serve to improve the role of the railway in freight transportation, gradually by investing in all areas of railway operation; infrastructure, locomotives, control systems, freight cars, including means for container transportation. In the long run, improvement of the role of railways in freight transportation in the Islands of Java, Sumatera and Kalimantan can be achieved by attracting the participation of the private sector either nationally or internationally. The transport of coal from mining locations to the ports can be a promising business, especially if it is correlated to regional development and the development of related infrastructure sectors, such as ports, power plants, and other industrial growth areas. In the short term freight traffic to the ports of Tanjung Priok, Tanjung Perak and Tanjung Emas on Java Island should be urgently facilitated.

3.4.2 Multimodal Transportation

The Multimodal Transportation System is a relevant and legitimate economic concept in solving the issue of economic freight movement in support of export, investment,and in creating an efficient national logistical and distribution system. However, the Indonesian Government has not developed an operational and management approach which could integrate the various modes of transportation and

provide an efficient logistical and distribution system..Government must develop a systematic, structured and planned multimodal system as an inseparable part of the national economic movement system in support of national economic competitiveness. The Government must create a solid legal foundation for the development of the system in the form of Government Regulation under Law no. 23/2007, the Road Law, and other transportation laws currently being revised, in order to give the system a solid legal basis. Several studies have been carried out and are being done to advise Government of the requirement but implementation is still far from certain.

The CMEA, who is expected to be an integrator (the championing institution) must provide coordination and consolidation direction in realising this multimodal system. Furthermore, due to its inter-sectoral nature, the CMEA and/or the National Development Agency must immediately take the initiative to conduct a comprehensive and consolidated assessment of all aspects of the Multimodal Transportation System; the required legal and regulatory framework, the development initiatives, institutional requirements, tariff policies, and the role of the private sector. In the meantime, the MoT, the MPW, and Local Governments should jointly agree on the concept of multimodal transportation and the development of integrated intermodal inter-connection facilities, namely rail access from railway stations to land transportation terminals, ports, and airports.

3.4.3 Government Funding

Opening the railway industry and services market to private investments does not necessarily mean a diminishing government investment. As a result of the global financial crisis at the end of 2008, global financing for infrastructure projects has been significantly reduced, and private investments do not seem imminent. The Technical System of the railway revitalisation programme identifies projects for the next 10 years where, the role of the private sector will only reach 10-20 percent of the total investment. Therefore, the Government will still have to bear 80-90 percent of the investment requirements if it has the political commitment and willingness to develop the national railway. Even after the recovery of the global finance, large-scale private investments will still wait for a proper time and a more conducive atmosphere, particularly relating to regulatory certainty, government assurance, and the future direction of the railway restructuring. Therefore, for the next few years, the Government will remain the key to the success of the revitalisation programme. The Government will have to increase the budget for national railway development because the revitalisation programme requires a huge investment in railway facility and infrastructure expansion, whether for short term, medium term or even long term developments.

3.4.4 Private Sector Funding

Due to the limited budget available from Government through APBN, a situation which will continue for the foreseeable future, investment by the private sector on infrastructure, facilities, business activities and the supporting industry will become an essential part of the development of Indonesian railways. When it comes to engaging the private sector in railway development, several aspects need to be met to ensure the success of the PPPs. Not all railway development can be conducted by the private sector and not all private parties are capable of conducting railway development. There are at least five necessary conditions for the success of a PPP in railway development, namely:

- **Strong market demands for railway transportation services**

A feasible return on investment for an operator of a rail transport can only be realised if it is based on a strong market demand. Demand here not only refers to commercially promising amounts/volumes of transportation, but it must also be supported by the customer's ability to pay at the established price. Establishing artificially low prices/tariff will indeed boost demand; such as was the case on the Jabodetabek economy class train where with an average rate of Rp 2,000 for a one-way journey and a production cost of roughly Rp 3,000, a considerable level of demand arose; 120 million passengers per year, or 400,000 to 450,000 passengers per day. However, the pricing below the production cost compeled the Government to come up with Rp 120 billion in subsidies in 2007. Without this subsidy, PT KAI would have suffered a roughly Rp 20 billion loss in that year. In this case, it is obvious that despite the large demands in Jakarta, the economy class will not be sufficiently attractive to engage the private sector without an assurance of continuing government subsidy.

For railway in Jakarta, it is interesting to pay particular attention to the non-economy market segment where the current tariff is approximately Rp 6,000 per passenger. This non-economy class constitutes merely 10 percent out of the total number of passengers; however, viewed from the revenue side, it represents around 40 percent of the total revenue generated by PT KAI in Jabodetabek. The potential of this non-economy class is currently large and passengers will use the railway services if PT KAI is capable of meeting the needs of the middle-upper class; this includes safety, comfort, punctuality, easy access to various railway stations in Jabodetabek, and rolling stock which provides a comfortable and modern image, similar to MRT in other large cities in the world. If this can be achieved non-economy service in Jabodetabek has a great potential to attract private investments, as well as to meet the needs and demands of the market.

- **Strong Government Support**

As previously discussed, lucidity and firmness is required in the relevant Government Regulations in order to reduce the financial risks accompanying long-term railway projects. Law no. 23/2007 is a preliminary step which shows the willingness of the Government to engage the private sector. This law is one of the absolute requirements, yet it is inadequate to encourage private involvement. Furthermore, it

will take further sets of regulations, including safety regulations, technical requirements for railway operation, regulations concerning service level and infrastructure operation along with a definition of the track access charges (TAC) and the procedures for establising tariff structures. In many of these aspects, we can learn from the deregulation of the air transportation sector which has managed to promote sector growth, encourage private investment and promote healthy competition which in turn promotes efficiency. Nothing symbolises capitalism better than the stock market, but what is often forgotten is that stock markets are loaded with regulations governing all market players, from stock brokers, security staff, bond and share issuers, and corporate investors to individual investors. These regulations are made transparent, continuously updated based on market development, and are consistenly supervised in their implementation. The offenders will be penalised, either through criminal or civil law, where due process is also done consistently and transparently. This is the kind of regulatory spirit that will have to be engenered for the successful development of the railway sector.

Another aspect requiring strong government support is the provision of infrastructure (particularly tracks and signalling). It is improper to rely solely on the private sector in the development and operation of railway infrastructure, because infrastructure is not a commercially engaging project. The government still has to develop the infrastructures for a railway project of extreme importance for the economy in order to promote multi-operators to operate rail on the facilities.

- **Financially strong private investors**

For any project, the party to bear the final risks is the investor, as a residual claimant. Some (if not most) of the various risks mentioned above are controllable if the private investor in question has a strong capital position, as well as the financial flexibility to inject cash if and when needed. An example would be land acquisition for infrastructure projects. If the investor is not financially strong, a stagnant project develops and the investor simply becomes a concession broker. The case of the Jakarta monorail and several toll-road projects are examples worth observing, due to the improperly measured private investor quality.

- **Well-designed project structure**

The preparation of the project structure – in terms of identifying risks, and the allocation of those risks to the most competent parties will determine the viability of the project. A well-structured project will minimise risks and reduce the financial costs involved. On the other hand, a project not well-structured will increase the risks and lead to high financial costs. As a result, the project will not be viable and bankable. This means that a project not well-structured will experience difficulties in obtaining funding from banks or financial markets. The toll-road projects prior to the 1997 economic crisis and the monorail case have served as examples of poorly structured programmes which never reached any financial closure.

- **An effective legal and judicial system to uphold long-term agreements made by the parties**

Financing long-term railway development projects is full of risks, depending on the quality and credibility of the legal and judicial system which forms the basis of the various legal agreements. However, uncertainties regarding the legal cases and the existing remedial provisions has positioned Indonesia as a country with the worst legal and judicial system in Asia. This will lead potential investors to avoid Indonesia if at all possible. In such circumstances, the ultimate viability and bankability of railway development will depend on the other four requirements and, particularly, on the credibility and strength of the financial sponsor or private investors involved. The Government's intention to conduct a revitalisation of the national railway must be consistently followed up with a strong political will to support the financial requirements of the programme. The CMEA, together with the MoF, The National Development Planning Agency and the MoT must consolidate their efforts towards an integrated programme for railway budget enhancement, as well as to create the policies, regulations and incentives required for the private sector to become involved in the Indonesian railway industry, either through PPP schemes or by direct investments. Furthermore, the MoF, The National Development Planning Agency and the MoT must conduct a critical review of the funding mechanisms of Public Service Obligation (PSO), Infrastructure Maintenance and Operation (IMO) and TAC and implement the various changes in policy needed to improve the effectiveness of the financing scheme.

3.4.5 Institutional Revitalisation

Law no. 23/2007 outlines the need for an institution to operate railway infrastructure. Therefore, the Government needs to divert the operation of railway infrastructues to an operating agency. The development and maintenance of railway infrastructures which have been done jointly by the MoT and PT KAI has to be done by a dedicated operating agency. The testing and inspection functions of the railway facilities and infrastructure will be carried out by a regulating agency. This change of policy has the purpose of offering a fair opportunity for the private sector to become involved in railway operations. Nevertheless, it is necessary to apply a transitional scenario during which, in the next five years for instance, PT KAI will remain the party managing the infrastructure.

On 23 April 2010, the MoT issued the Decrees of the MoT nos. 217, 218, 219, 220, and 221/ 2010 each concerning licenses granted by the government for PT KAI in relation to:

- public railway operating licenses which remain valid as long as PT KAI remains in business
- public railway operating licenses, which are valid for five years from 23 April 2010 and can be extended, based on the prevailing laws and regulations

- assignment as the executor of existing public railway infrastructure which remains valid as long as there is lack of an established enterprise to operate public railway services; this will be evaluated annually by the DGR
- public railway infrastructure licenses which remain valid as long as PT KAI remains in business, and
- operating licenses for public railway infrastructure which remain valid as stated in the assignment as the executor of existing public railway infrastructure, to be evaluated annually by the DGR.

These Decrees of the MoT can be a starting point for the establishment of a new railway infrastructure enterprise with a premilimary transitional stage during which PT KAI remains appointed as the infrastructure manager. However, further stages have to be taken in which the infrastructure-managing right of PT KAI is then supplemented with an agreement or contract between the Government and PT KAI with the terms and conditions designed to pave the way for the establishment of a more independent and accoutable Infrastructure Enterprise (BUP) and for the creation of a future multi-operator condition. Afterwards, the NRMP will establish the next transitional process until the condition arises in which the BUP is fully established; creating the transitional agenda shown in Table 3.2 below.

3.4.6 Ownership of National Railway Assets

Article 403 of the Government Regulation no. 56/2009 concerning the implementation of railway development states that all state assets related to the operation of the railways that had become state property may only be used by a third party based on the regulations for corporations licensed to participate in railway operation. Therefore, the MoT and/or the Minister in charge of SOEs should immediately establish regulations regarding the use of existing railway facilities and infrastructure in cooperation with third parties, and the conversion of state owned property to joint usage.. The MoF is expected to immediately establish the status of railway infrastructure assets which are yet to be privatised as most railway facilities, including track, stations, and operational facilities (signals, telecommunications and electric power installations) are still state property. Clarity of ownership and rules for the use of this infrastructure is a crucial issue in determining the concession, contract framework, operation, maintenance (asset management) and network access regulations (network statement) and for the accountability of state assets.

Table 3.2: Transition Towards Railway Infrastructure Enterprise

Period	Action	Transitional Scheme
23 April 2010- 23 April 2011	Decree of the Minister of Transportation nos. 217, 218, 219, 220, and 221 of 2010.	Infrastructure and facilities provision license for PT KAI.

Period	Action	Transitional Scheme
23 April 2011- 23 April 2012	Amendment to Decree of the MoT with the Agreement (Contract) between the government and PT KAI and its mutually agreed terms and conditions	PT KAI to form a subsidiary to manage the infrastructure in contract with the government as an embryo of the BUP.
23 April 2012- 23 April 2015	MoT and the Ministry of SOEs jointly conduct monitoring and evaluation of the embryo Infrastructure Enterprise. Government develops the human resources, institutional capacity of the enterprise, and facilitates the final stage of the transition to the independent infrastructure enterprise.	The infrastructure subsidiary was established as an independent, professional and accountable company. Gradually, the human resources, institutional capacity and other organisational functions are developed.
23 April 2015-onwards	Government oversees the formation of a full scale infrastructure enterprise and signs a long-term contract for the management of railway facilities	Independent infrastructure enterprise is fully operational and ready to serve multi operators.

Considering there are several Ministries involved in the regulation of railway infrastructure, it is necessary for the CMEA to act as the mediator and final decision maker before seeking House of Representatives approval, if necessary. The NRMP shall include an agenda for restructuring the ownership of railway assets, ensuring their ownership, regulating the transfer process and establish the Independent Enterprise responsibilities.

3.4.7 Infrastructure Maintenance

As the owner of the infrastructures, the Government still will play a crucial role in the operation of the National Railway and will need to allocate more funds for the maintenance of railway infrastructure. Currently, the maintenance budget available is merely a third of the total fund needed; therefore, it can only be used to replace the rails and sleepers that no longer function properly due to decay, strengthen some old colonial-age bridges, change signaling equipment, etc. Increased maintenance costs (IMO) will reduce accident rates and improve the punctuality and frequency of railway services. The government needs to evaluate the effectiveness of the mechanism of payment for operating costs, infrastructure maintenance and TAC. TAC are currently established in the Joint Decree of the MoT, MoT, and the Head of The National Development Planning Agency no. 19/1999. Implementation of IMO and the TAC concept, namely the payment mechanism for IMO and TAC between PT KAI and the government will be amended to separate the regulating role and the operating role, based on the assumption that infrastructure maintenance would remain the responsibility of the Government. However, in practice, the financing of track repairs is made by PT KAI itself and does not use IMO funds from the Government. The Government never reimburses or finances these activities. On the other hand, the

Government does not require PT KAI to pay the TAC. IMO from the government for the operator (PT KAI) is significantly greater than the TAC from the operator.

The government needs to set more effective rules on IMO and TAC. In addition to the state financial accountability, they would also serve to attract private investors since it is very likely that, in the short term, investors will not develop their own railway infrastructure; instead it will be rented from Government. For the Government, revenues from the TAC are needed to finance IMO. For the purposes of financing station repairs and maintenance, the government may permit the imposition of user charges as are applied in many airports.

3.5 CORPORATE REVITALISATION

3.5.1 Role of PT Kereta Api Indonesia

Attracting new investment from government, the private sector and overseas investors to open a new network and improve Indonesian rail transport capacity may take a relatively long time. What seems to be the most proper and fastest way to achieve the realisation of these options is the corporate revitalisation of PT KAI. This means that PT KAI, as the incumbent managing the existing assets, should be empowered whenever possible to achieve and realise these options. This corporate revitalisation should be included in the thoughts and action plans for the National RMP. Articles 23 and 31 of Law no. 23/2007 asserted that the implementation of the public railway facilities and infrastructure shall be carried out by an enterprise as the provider, either individually or through cooperation. And in the event that there is no enterprises to provide public railway facilities and infrastructure, government or local government may assume that responsibility. Article 33 confirms that the implementation of specialised railway facilities and infrastructure shall be carried out by private enterprises to support their own primary activities. These articles explicitly identified "Enterprises", which is interpreted as opening the markets for public and specialised railway operations to the business alongside the incumbent PT KAI. Article 214 states that PT KAI still holds the railway facilities and infrastructure based on Law no. 23/2007 and provides three years for PT KAI to conform with the provisions regulated by the new legislation. This means to prepare themselves for competition.

Although PT KAI was given only three years (until April 2010) to restructure the company in accordance with the law, the restructuring of the railways sector is likely to be running for a long time to come. Therefore, a well-planned staging is required in the NRMP. The revitalisation and corporate restructuring of PT KAI shall also be done gradually according to the phases of the sector, but with a higher level of certainty and precision. Restructuring of PT KAI will be closely linked to the strategic options contained in Article 23 of Law no. 23/2007 concerning Railway Infrastructure Provider Enterprises. There are three possible options: (i) whether the facilities and infrastructure (railway tracks, signalling systems and traffic control, stations and other operating facilities) will be transferred or delegated to PT KAI, (2) whether to set up a joint venture consortium of PT KAI with other companies, and (3) whether the

government will establish a new company or SOE to become the infrastructure enterprise. As discussed in previous presentations the government has chosen an interim option by issuing Decrees of the MoT nos. 217, 218, 219, 220, and 221 in 2010. When deemed appropriate this interim option can be upgraded to the establishment of a stand alone Infrastructure Provider Enterprises. In the meantime the market was opened to private investors to implement multi-operator systems by paying rent (TAC) to the infrastructure enterprise. Implementation of this interim option must be done quickly and accurately and the government should be determined in conducting it because this option directly affects the future prospects of Indonesian railways. Furthermore, PT KAI itself should willingly and wholeheartedly accept the transfer of the implementation of infrastructure to the new division, subsidiary companies or infrastructure enterprises.

The time given by law to the government and PT KAI to restructure the company expired on April 25, 2010. Meanwhile, the next tasks for the government and PT KA,I as indicated in the elucidation to Article 214 of Law no. 23/2007, are namely (1) a thorough audit of PT KAI, (2) conduct an inventory of the facilities and infrastructure assets of PT KAI, and (3) the initial balance sheet of PT KAI has not been completed. This is a very big job and it requires the political will, commitment and endeavour of the government to complete it consistently. The NRMP should make a more detailed plan and schedule in order for these tasks to be completed by competent, impartial and professional personnel. PT KAI is expected to assist with these tasks by preparing all the necessary data and information.

3.5.2 Utilisation of the Assets of PT KAI

Many of the assets of PT KAI are also state assets, abandoned and not utilised for the advancement of the company and the national railways. Signficant areas of land assets are occupied by local people and other third parties without any compensation. Government, together with PT KAI, must conduct a comprehensive audit and inventory of all infrastructure assets; this is a very important initial step to determining the future utilisation of PT KAI's assets.

Railway revitalisation in the medium and long term will include the development of new railway infrastructure networks and supporting facilities. In the design of future investment programmes it is likely that the abandoned property will be utilised. Government, in cooperation with related agencies, is expected to secure and recover those assets which are illegally occupied. In this case the MoF, through the Directorate General of State Wealth is very interested in restoring the country's assets for the greater interest of the nation. The Technical Team of National Railway Revitalisation has started this work by inviting the government and PT KAI to conduct a comprehensive audit and inventory of all railway infrastructure assets. Aside from the new Law, the existing railways are currently de-facto monopolised by PT KAI through vertical integration. But there is no clear ownership of the railway assets; they are owned by the government, which owns PT KAI so they are either "noone's property" or

else they are "having two owners." The NRMP has a duty to clarify this as an integral part of the procedure for the separation of assets, as follows; -

- **Asset Inventory and Separation Phase 1: 2010-2014.** In this period the process of separation between PT KAI as the operator with a special unit within the company as the administrator of infrastructure which is owned by the government and operated by PT KAI. During this period, PT KAI still owns and operates the national railway infrastructure. Legally, this process has been running under the MoT Decrees nos. 217, 218, 219, 220, and 221/ 2010.
- **Asset Inventory and Separation Phase 2: 2015 onwards.** At this stage a Railway Infrastructure Enterprise (BUPP) has been established and a "multi-operator" has been running in the market where the railway was opened to private operators. The operation auction process conducted by the government (or its designated agency) designated the operating areas or corridors for the specific service lines. Ownership of infrastructure and equipment will be completely under government control and managed by BUPP and PT KAI as competing incumbent operators.

TRKA recommendation for the separation of assets of PT KAI is based on the following principles: (1) separation of ownership and operation for both infrastructure and mobile assets by considering the application of multi-system operators particularly in the commercial corridors, and (2) transfer of the book value of PT KAI's healthy assets in order to prepare PT KAI to face competition in the future.

CHAPTER 4: URBAN RAILWAYS

4.1 BACKGROUND

Chapter 2 has provided a quick description of the level of urbanisation in the cities of Indonesia, along with projections till 2025. This is a very serious problem and needs government attention, particularly city governments, to seriously look for ways to cope with the explosion of urban population and the ways to accommodate the increasing and massive movement of people. Urban transportation with all its issues are no longer solely transportation issues but have become so complex with social, economic, and cultural issues. Even the city transportation is actually a political issue, although the government's policies on urban transportation are unclear. In the future, the government should have a clear economic policy siding with the movement of people instead of the movement of vehicles and gradually eliminate the situation where poor people are denied a structured system of adequate, cheap and safe public transport service. At least for a certain period of time the city government should have put these issues into their mainstream policies.

Box 4

Paradox of Urban Transportation

In urban transportation, it is the movement of people, not the movement of vehicles, which is the main concern. However, our urban transportation is currently falling into a latent and prolonged stagnation, particularly because urban public transportation never budges from the structural poverty of quality and service. We are stuck in a state of helplessness to change. Cities in Indonesia - metropolitan, large, medium, small cities, are all going through "urban decay" in which intricacy, crime, and anarchy mix with passenger and vehicle movement. Urban transportation, particularly terminals and public transport which are primitive and without system are the main contributor of the decay.

Urban transportation is always marked by uncontrollable congestion and is a very complex problem which results from the interaction and combination of many aspects of life and city life. Urban transportation which is physically visible in the congestion in vehicles and people traffic is a logical consequence of economic development, lack of vision of the city government, a national policy that is too sectoral and does not fit, use of city land for socio-economic activities, increased revenues of city inhabitants , uncontrolled urbanisation, and growth in vehicle ownership. The characteristics of the people and vehicle traffic is also a manifestation of cultural behaviour and attitude of the city inhabitants. Meanwhile, traffic congestion in urban areas indicates, from a different perspective, the unpreparedness of the city administrators (city government and bureaucracy administering the city and all city intellectual support of urban planners) to anticipate increased needs for mobility of freight and people developing rapidly with the economic development of the city, while the skill and precision of the bureaucracy in

overcoming it moves very slowly. Sometimes the bureaucracy does not master the issues of city transportation, they are often limited by the shortage of human resources and funds, but it is not unusual for problems to go on because of simple causes, namely the arrogance and ignorance of the bureaucracy. The complexity of urban transportation problems closely related to the socioeconomic and cultural problems of urban society often makes the city administration unable to see the urban transportation problem fully and comprehensively.

Transportation studies and research on cities in Indonesia has been widely applied. In Jabodetabek, for example, the study originated from Jakarta Metropolitan Transport Study (JMATS) beginning in the 1970s and ended in SITRAMP (Study on Integrated Transport Master Plan for Jabodetabek) in 2004. Apart from these two studies, there are also many urban transportation studies conducted by international institutions like the World Bank and Japan International Cooperation Agency (JICA). Almost all studies made recommendations about the need to build a mass public transportation quickly and without hindrance. In the future, it is no longer possible to efficiently and reliably maintain massive urban movement without functioning rail-based public transport networks. But none of the cities in Indonesia, except Jabodetabek has these systems; even so, the level of service and comfort is still far from adequate. But inspite of so many urban transportation studies with solid and relevant recommendations, city transportation downturn persists. There was no correlation between the results of good studies with public decision-making process within the government bureaucracy. Many of the causes include the lack of a sense of ownership and emergency (sense of urgency) in the level of the superstructure, the absence of vision, and loss of incentive and commitment for change, and the process of ignorance.

The city is a large business and economic entity. Urban economic contribution to national GDP is also quite large. Urban economic movement is therefore instrumental in supporting the economic activities in the city. Four metropolitan cities in Indonesia with a population ratio of 14 percent of the population contributes about 30 percent of national GDP. Table 4.1 shows that the Jabodetabek area contributes around 20 percent of national GDP, followed by Surabaya (6 percent), Bandung (3 percent), and Makassar (1 percent). Agglomeration of small towns and medium cities with the core cities form the social economic forces that contribute to economic productivity of urban economy. The four large cities have an average economic growth of 7 percent, higher than the national average.

However, the high level of urban economy is somehow competing with the urban poverty as a result of the urbanisation where the migrants from rural areas have flooded into the city without adequate skills and education to live in amid tighter competition of the city. These immigrants are in turn excluded from the intense competition and form a layer of urban poor whose mobility is dependent upon cheap and mass public transportation. This layer is growing increasingly large inline with the urbanisation and becomes the deciding factor in economic policy and transportation in major cities. Resilience of the major cities are now determined by how big the capability of the city administration is to manage urbanisation while maintaining the city as an economic domain and growth center. The city government must have an

excellent ability to dynamically manage urban planning, asset and land management, as well as financing and investment.

Table 4.1: City Population and Regional GDP (2006)

Metropolitan	Population	Growth Rate	Regional GDP	Growth Rate	% National GDP
Jabodetabek	15,202,546	2.0%	309,879	6.0%	20.0%
Greater Bandung	6,450,386	1.0%	40,370	7.0%	3.0%
Greater Surabaya	7,676,518	0.2%	102,174	6.0%	6.0%
Makassar	1,521,158	2.0%	12,260	8.0%	1.0%
Total	30,850,608		464,683		30%

PDRB Non-oil and gas (Rp billion, prices effective 2000)

Urban poverty has become an integral part of the structure and dynamics of the city. Rural people migrate to cities to escape rural poverty, but then they form the urban poor. Some succeed in going up the social ladder and form the lower middle class economic strata. They then buy and use cheap motorcycles or car as a means of social and economic mobility. The number of motorcycles exploding up to 4-5 million in Jabodetabek marks the presence of this group. The city government now has to think of a more efficient and effective way of accommodating the massive movement of motorcycles and personal cars in urban areas, including public transportation that dominates the streets of the city and causes massive consistent congestion. The big cities have to increase investment (either through the national budget, regional budget, or private sector investment) to build the infrastructure of the city and improve access of citizens to affordable transportation. This is one way to redistribute of income (income redistribution) from the urban rich to the urban poor.

4.2 RAIL-BASED URBAN TRANSPORTATION

With a very solid argument as outlined above, Indonesia should immediately build its rail-based urban transportation system. Urban road network has reached a stage of extreme congestion and saturation and can no longer be relied upon for increased economic mobility of transport of freight, passengers, and the movement of other services. Expansion of the city road network is nearly impossible because the city land that is not available, the cost of land acquisition, and the resulting social problems often hamper implementation. Meanwhile, Indonesia's economy grows increasingly concentrated in urban areas and becomes one of the main causes of massive urbanisation. Only with a mass rapid rail-based transport system, the congestion levels in cities in Indonesia could be reduced significantly. Without it, large and medium cities are threatened by mass congestion (total gridlock) that could cripple their economy.

This interface report supports the urban railway development program as designed by the DGR in the NRMP Draft April 2009 version. Although the approach is empirical and linear, urban railway development plan April 2009 version is quite realistic to be implemented as a master plan for rail-based urban public transport in Indonesia until the year 2025 - 2030. In the draft urban railway transportation development in Indonesia has so far been concentrated in seven major cities: Jabodetabek, Bandung, Surabaya, Medan, Semarang, Yogyakarta and Palembang. Some basic economic indicators to seven major cities are shown in Table 4.2. With the exception of Jabodetabek, other cities are still in the planning stage. There is also potential for the development of urban railway in the cities of Denpasar, Malang, Pekanbaru, Padang, and Bandarlampung. Revitalisation of national railways and the implementation of the investment post Law no. 23/2007 indicate the need to build urban rail systems and this should be outlined in the NRMP.

Table 4.2: Economic Indicators of Major Indonesian Cities

Indicator	Population	Regional GDP (Rp. Billion)	Income per capita (Rp. Million)
Jakarta	26,611,622	332,971	13. 00
Bandung	8,924,019	24,941	2. 79
Surabaya	8,829,295	67,695	7. 67
Medan	3,949,103	29,352	7. 43
Semarang	3,585,973	18,142	5. 06
Yogyakarta	3,504,752	18,307	5. 22
Palembang	1,323,169	14,992	11. 33

Source:BPS, 2009, constant price of 2007

Needs for urban railways in Indonesia is assessed with the approach that the provision of services should be available in large cities with population of more than three million or the internal movement of people in the city already require mass transport in the form of urban rail. Urban trains will serve commuter travel (commuter trips) of the population of the suburbs or downtown to the core city or city center and local travel (intra trips) whose service is integrated with other modes of land transportation. Table 4.3 shows the calculation of NRMP Draft April 2009 version about the need for urban railway development program in 13 major cities in Indonesia. Urban Rail program is scheduled to be held in the period 2010-2025 which will build a 3,700 km long railway with a total of 672 series of trains and electricity needs of 5.2 million kWh per day. The total investment cost is estimated at Rp 59 trillion.

In this context of urban railway it may be important for the NRMP to consider laying the groundwork for planning and implementation of the concept of Transit Oriented Development (TOD). This is a concept in which the trains and stations interact intensely with space and zoning in the area around the railway facilities. Urban railway station

located downtown and in the business district and can be used as the TOD with the intervention of a conducive tax policy to be paid by an office area or the property around such station. This is in line with "best practice" in the big cities of the world where property, real estate, and the central business district interact positively with urban railway in the city's economy with the principle of mutual benefit. For other cities without rail, TOD planning can be started early in line with the planning of railway network and rail station. It is also necessary to emphasise in the NRMP the importance of integration between the National Urban Railway with Inter-City trains, particularly in the design of the central station.

Table 4.3: Optimistic Needs of Urban Railway – 2025 Projection

City	Length of Rail (km)	Electricity (kWh/ day)	Number of series per day	Year of Development
The Java Bali Region				
Jabodetabek	900	1,353,614	128	2010-2025
Bandung	160	197,393	32	2015-2025
Surabaya	420	601,808	80	2015-2025
Semarang	240	255,467	48	2020-2025
Yogyakarta	80	75,906	32	2020-2025
Malang	140	140,206	32	2025
Denpasar	150	154,599	32	2025
Non Java Bali				
Medan	240	280,455	48	2020-2025
Palembang	260	286,762	48	2020-2025
Pekanbaru	370	408,348	64	2025
Padang	340	369,956	64	2025
Bandarlampung	180	188,981	32	2020-2025
Makassar	170	194,651	32	2025
Total	3.700	5,176,050	672	

Source: Draft NRMP April 2009

4.3 JABODETABEK RAILWAY

4.3.1 Background

With a population of more than 26 million people, and the income per capita amounting to Rp 13 million, the Jabodetabek metropolitan area has the highest rate of welfare in Indonesia; yet this region is facing a great paradox because of the increasingly large burden of movement of people and vehicles, while road space and capacity of urban areas will not experience significant increase. Regional carrying capacity is wearing out and the existing transportation infrastructure can no longer support the weight of population movement and extra vehicles. Jabodetabek is threatened to be experiencing the most massive congestion (total gridlock) if capacity and effectiveness of the urban movement with rail-based public transport that is much more efficient and effective than the current system are not built. Building a rail-based public transportation system means to build more modern, larger capacity, and far more efficient Jabodetabek railway. Jabodetabek railway network as shown in Figure 6.1 requires an increase of expansive capacity and service quality. Scale, magnitude, and complexity of the economic movement in the Jabodetabek have become very abstruse, so the solution will also be radical, although implementation can be done in stages.

Table 4.4 shows that during the past five years the number of passengers carried by the Jabodetabek railway network has seen consistent increase from about 100 million people in 2005 to more than 151 million people in the year 2009. This number represents about 60 to 70 percent of the total national passengers transported by train, but only about 7 percent of the national total passenger transportation. In line with that, productivity has also increased from 14.3 billion passenger-km to 20.8 billion passenger-km in the same period. The increase in the number of passengers in 2008 compared to the previous year was due to the addition of services to transport commuters (commuter trips), namely Jabodetabek AC economy. The travel needs of these people will increase along with the unstoppable urbanisation in the Jabodetabek area and the increasingly expanding role of this region in the national economy. Therefore, Jabodetabek does not have much choice except for a strong, efficient railway network.

Projected population of Jabodetabek and the possibility of a drastic improvement of the economic mobility of the population require the government to act quickly and accurately. Figure 6.2 shows that only about 4 percent of total commuters travel from the area of Tangerang and Bekasi to Jakarta city center by train and 18 percent of the commuters come from Depok-Bogor. Most commuters use personal vehicles including motorcycles. Several studies and surveys conducted are of the conclusion that in the last seven years, the problems of limitation of mobility of people and vehicles in the Jabodetabek area have grown increasingly severe. Several indicators of this are namely:

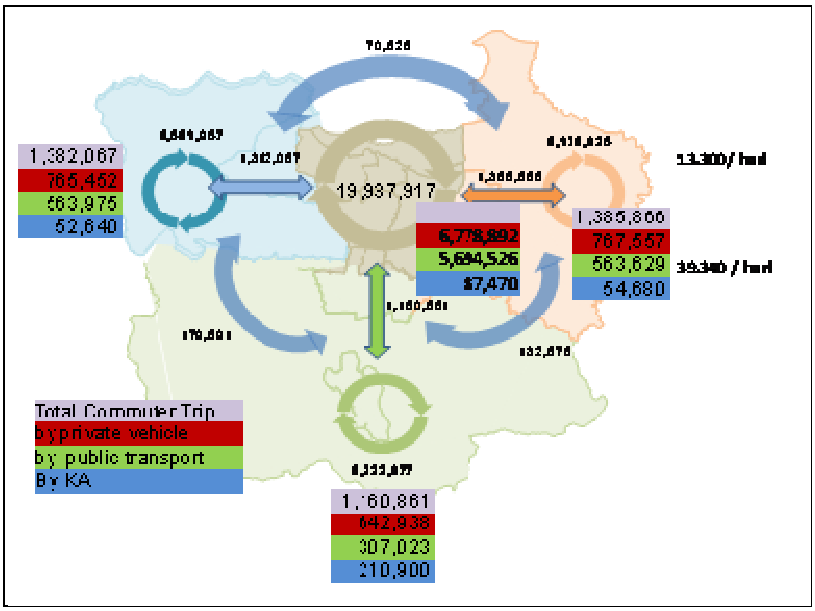
Table 4.4: Performance of the Railway Transportation 2005-2009

DESCRIPTION	UNIT	YEAR				
		2005	2006	2007	2008	2009*
Productivity of Passenger Traffic						
Passenger – Km	million passenger–km	14.344	15.438	15.871	18.509	20.791
Passenger	million people	151. 49	161. 29	175. 46	197. 77	220. 07
Jabotabek Passenger	million people	100. 97	104. 42	116. 66	126. 70	151. 26
Non Jabotabek Passengers	million people	50. 52	56. 87	58. 80	71. 07	68. 81
Net PSO-IMO-TAC	Billion Rp	270.00	450.00	425.00	544.67	535.00

Source: Ditjen Perkeretaapian & PT. KAI, 2009, figures for 2009 is temporary

- only about 40 percent of the total average travel time is used to move;
- the speed of vehicles went down 25 percent from 26 km/hour to 20 km/hour;
- the number of motorcycles has increased three-fold;
- clean air in Jakarta only existed for 60 days a year;
- only 43 percent of private vehicles and 18 percent public transport vehicles meet the requirements of flue gas;
- a total of 47 percent of the population spent about 20 percent of their income on transportation costs and another 16 percent spent about 30 percent of their income on transport alone;
- economic losses due to inefficient transportation system is estimated at Rp 5.5 trillion/year and due to poor air quality Rp 2.8 trillion/year.

Figure 4.1: Daily Travel Patterns in Jabodetabek



Source:SITRAM 2004/PT KCJ processed by the CMEA

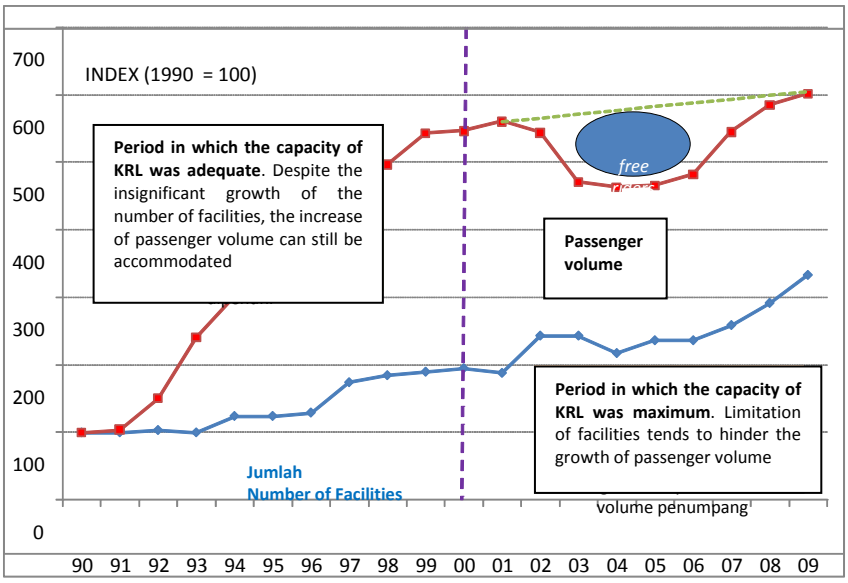
Figure 3.6 shows the situation of the number of passenger railways in Jabodetabek by comparing it with the availability of the facilities serving them. In general, since 2000, there has been a limited capacity of the means that limits the number of passengers transported. The "do-nothing" option or "do something but in a conventional way" option will deliver Jabodetabek to massive congestion, painful to all parties and of course is an option all of us do not desire. Therefore, the option "do-something significant and quick" must be adopted by the government together with local governments of the Jabodetabek region to reduce congestion and create efficiency and reliability of more humane and dignified passenger travel in Jabodetabek. This option is to build a much larger capacity of the Jabodetabek railway to transport far more passengers in future years. Investment needed for this option must be borne by the government and local governments jointly developing the necessary infrastructure, while strategic alliances can be built together with the private sector for the procurement of rolling stocks, station management and aspects of its business, and the operation of its train system in PPP scheme which is more progressive created specifically for the Jabodetabek railway.

4.3.2 Achieving Three Million Passengers Per Day

In this context the Jabodetabek Railway Revitalisation Technical Team (TRKA) makes quite an ambitious plan, to develop Jabodetabek facilities and infrastructure systems to accommodate the movement of three million passengers per day by 2015. This is a fairly progressive investment scheme but requires a lot of institutional changes to make it happen. Changes and design referred to are illustrated in Table 5.6. The ultimate goal of the Jabodetabek railway restructuring is to create rail-based

metropolitan independent, professionally-managed railway system operator with new urban railway technology. Therefore, the spin-off of PT KAI Jabotabek into PT KCJ as a subsidiary of PT KAI is actually the first step of the restructuring. Since its establishment in September 2008, PT KCJ has not succeeded in improving the quality and service capacity because there is no certainty of operational responsibilities, management of infrastructure and lack of clarity about government policies on PSO. Therefore, PT KCJ must be transformed into a professional and independent urban railway company apart from PT KAI.

Figure 4.2: Jabodetabek Railway – Passenger versus Facilities



The amount of investment required to reach three million passengers estimated at approximately Rp 36.0 trillion of infrastructure investment consisting of Rp 12.5 trillion for infrastructure investments, Rp 9.9 trillion for rolling stocks, Rp 9.9 trillion for level-crossing facilities, and institutional reinforcement Rp 100 billion. NRMP needs to modify the design of these investments because of the past budget year 2010 and the Draft State Budget 2011 has entered the final stages making it difficult to get the Jabodetabek area allocated for the Rp 8.4 trillion. Perhaps this investment program needs to be drawn backward and starts from 2012 until 2016. Therefore, there is still time to do some additional analysis as an argumentation of the concept of three million passengers. In addition, it is necessary to also design how the investment of Rp 36 trillion can be cooperated with private investors, both domestic and international, especially on investment of facilities, stations, and other related businesses. It is again emphasised here that for the infrastructure, government still has to take a dominant role and allocate the national budget and the regional budget to build a rail road expansion, fly-overs, underpasses, and electrical facilities, signaling, and telecommunications.

Table 4.5: Revitalisation Program of Three Million Rail Passenger Jabodetabek 2010-2014

Revitalisation Program	Measures Taken	Recommendation of Policies and Programs to be Implemented in the NRMP
Operator Institutional	• This process is already running with the "spin-off" of PT KAI Jabodetabek into a subsidiary of PT KCJ	• To realise a solid, independent, and professional Jabodetabek railway company separate from PT KAI • PT KJC is then prepared to be independent PT KAI Jabodetabek and is given full authority to carry out the railway operation in Jabodetabek area, including management of facility, infrastructure, and human resources.
Government Role	• The government has been investing the national railway infrastructure. • The role of government is expected to continue for at least 10 years ahead. • Local governments will play a role in the formation of regional railways.	• The Central Government increase investment to build railways in the future, particularly to build infrastructure, including railway overpass, fly-over, signaling systems, electrical systems, telecommunications, and other support systems. • The private sector should be given the opportunity to modernise the station, the provision of rolling stocks, and operational management.
Public – Private Partnership	• Until now there has been no investment in the private sector in the national railways, particularly the Jabodetabek railway. • Once a plan of cooperation was devised with a consortium of Saman (Korea) / PT PP for the operation of the Circular Line. • There had been a PPP plan in Soekarno-Hatta Airport Railway (PT Railink).	• Establish the PPP-Node in the MoT and the Sub-Node in the DGR in particular to handle development projects of railway PPP scheme. • Building a "knowledge center" of PPP Railways as well as human resources to professionally work in Sub-Node PPP. • Sub-Node prepares Jabodetabek railway projects for cooperation with private investors including the government's guarantee scheme and the required risk allocation.

Revitalisation Program	Measures Taken	Recommendation of Policies and Programs to be Implemented in the NRMP
Rolling Stock Investments	• Investments in means such as cars and locomotives have been running well with government investment and investment corporation PT KAI. However, medium and long term needs will require many more cars and locomotives.	• PT KJC, PT KAI, and DGR to plan the necessary infrastructure requirements, including the identification and depot support Balai Yasa. • Provision of 1,200 units of means. • Building depo (4 units) and balai yasa (1 unit). • Define the role of domestic industry. • Identify needs and sources of financing required.
Infrastructure Investments	• Investments in infrastructure over the past five years have been running very slowly while the railway road network development for three million passengers require high speed and financing. • There are many level crossings.	• PT KJC, PT KAI, dan DGR develop a plan on the need for necessary infrastructure networks including operational system, signaling, electricity and fly-over or underpass. • Define the role of the Central government, local government, SOEs, and private investors • Identify needs and sources of financing required.

Table 4.6: Investment Design of Jabodetabek Three Million Passenger Railway (Rp Billion)

Facility	Unit	2010	2011	2012	2013	Total Investment
Infrastructure		2,650	4,600	3,400	1,850	12,500
• Electricity	157 MW	600	500	300	200	1,600
• Signaling	1 Package	-	1,000	1,000	400	2,400
• Rail Road	80 percent	2,000	3,000	2,000	1.200	8,200
• Telecommunication	1 Package	50	100	100	50	300
Means/Rolling Stock		2,080	2,460	2,620	2,740	9,900
• KRL Armada	1.200 units	2,000	2,000	2,000	2,000	8,000
• KRL Depo	4 units	80	160	320	140	700
• KRL Balai Yasa	1 units	-	300	300	600	1,200
Station		850	950	880	970	3,650
• Station Building	40 stations	500	500	500	500	2,000
• Platform	10 stations	300	350	350	450	1,450
• Station Emplacement	10 stations	50	100	30	20	200
Fly-over/ Underpass	62 locations	495	3,465	3,465	2,475	9,900
Institutional Capacity	1 package	10	20	30	40	100
Total Investments		5,640	8,380	7,280	5,850	36,050

Source: Technical Team of TRKA, 2010

CHAPTER 5: INVESTMENT AND FINANCING DESIGNS

5.1 ANALYSIS OF MARKET POTENTIALS

Needs or demands for transportation services, including rail mode of transportation, are derived demands, demands arising for the needs of economic mobility in the form of movements of passengers, freight, and services conducting economic activities or transactions or other social activities from one place to another in a relatively great distance. This economic mobility is projected to grow larger along with the economic growth, population growth, and ease of access from and to growth centers, ports, and other economic centers of activities, either at the national, regional, local, and rural levels. Chapter 2 concerning the background of Indonesian economy has explained about the prospects and projections of Indonesia's macro-economy ahead. These macro-economic prospects and projections should have been translated into the projection of national economic movements; how great the mobility of passengers and freight and services are to happen from one region to another in Indonesia within the next 5-20 years. Therefore, the macro planning of the transportation sector should be based on the projection of economic mobility, and on this basis division of modes and investment designs are projected. How these economic prospects and projections are translated into economic mobility and demand for the railway transportation service and infrastructure system will be assessed on its own. Unfortunately, this kind of macro planning is yet to be done and the law has demanded that master plans of transportation sector be prepared.

Box 5
Political Economy of Transportation

Indonesia requires an investment of Rp 10,000 trillion to support an economic growth of 7-8 percent per year in the next 5 years. Only approximately 30-40 percent can be provided by government investments and other public sector expenditures. Therefore, private sector investments become very important and instrumental. However, so far Indonesia has merely been occupied by the annual ritual of APBN and does not build the mainstream of PPP. In reality, in addition to APBN funding, the Government should also provide funding in the attempt to attract private investors to come and invest. "Mainstream PPP" shall be built outside the "Mainstream APBN". If the government wants the private sector to invest, the Government must also dare to invest.

However, a master plan is a planning document serving at the same time as the political statement of the Government in its determination to develop the Indonesian railway. Therefore, the preparation of the NRMP shall be done through two approaches, namely:

Technocratic, by observing all economic and financial principles and the feasibility of the transportation development and focusing on commercial projects (*ship follows the trade*),

Political, a top-down approach with an instructive nature for a political reason, namely to distribute development; alter the balance of the modes of transportation; to save energy; to conserve the environment; and regional development. This approach is used for basic service, non-commercial projects whose development is the obligation of the government *(trade follows the ship).*

Both these approaches can be used to develop the Indonesian railway ahead. The first approach can be used for existing potentials such as coal transportation in South Sumatera and Central Kalimantan, urban passenger transport such as Jabodetabek and other large cities in Java, as well as other commodity transportation in Java and Sumatera. This first approach is done, whenever possible, using the financing pattern of PPP or fully by private sector (*private financing initiative*, PFI), even though the role of the Government remains, particularly in land acquisition, fiscal and non-fiscal incentives, as well as the guarantee for political and regulatory stability. The second approach is used for railway projects politically and economically desired by the public, yet not or less financially feasible, requiring the Government to finance their development. This approach reflects the political will of the Government to promote railway in Indonesia and does not to seriously take financial feasibility and commercial aspects into consideration.

Indonesia's economic development during *RPJP* until the year 2025 needs very large financing needs. United Indonesia II Cabinet in his early projections estimated the need for investment of Rp 10;000 trillion for a period of five years, from 2010 to 2014, to sustain economic growth of 7-8 percent a year. Infrastructure development is estimated to require an investment of Rp 1500 trillion for the same period. Revitalisation of the railways is estimated to cost about Rp 100 trillion for the next five years or approximately Rp 20 trillion per year. What the more accurate investment magnitude is will depend on how large the infrastructure and means network are to be built. NRMP should make details of the magnitude of five-year short-term investments and an indication of long-term investments until 2030.

Great investment is necessary to modernise the Indonesian railways within the next 15-20 years. Depending on the needs and staging, Indonesian railway technology, either facilities and infrastructure, should be improved in accordance with the development of world railway technology industry development. Furthermore, within the next 20 years the railway networks in Java and Sumatra should be prepared to transport passengers and goods far more massive than the current conditions when the population of Java reached 152 million people and in Sumatra reached 64 million inhabitants and when the national freight mobility grows increasingly larger due to the greater economic growth and regional development of the two islands. In addition, during the period of the next 20 years, railway has to be built and operated in Kalimantan, Sulawesi, and Papua, depending on the socio-economic and political conditions that require it as well as the implementation of regional development

strategies. There are at least 3 basic options of the development of railway networks on major islands:

- **First is the development of railway lines or corridors** This option has been developed for the Java and Sumatera Islands with large population density along the corridor and high intensity of economic activities potential to promote the growth of freight transport market. The development of these main railway lines is done to support corridor connectivity.
- **Second in the development of specialised or semi-corridor railway.** Railway network is developed from the production center of a particular economic activity to the port where the products of the economic activity are exported, either to the domestic or to the international market. This option is for the transportation of coal and other mining products, which is a vast market for railway in Kalimantan and part of Sumatera. Specialised railway networks are especially developed from the mining, plantation and industrial centers to the export ports. These specialised railway networks may one day also transport other commodities in addition to those special products.
- **Third is the development of the cluster system.** This system is more suitable for regions with low corridor density and development of economic activities concentrated on certain sub-regions. Included in this option are the urban railway and commuter railway (commuter trains). Development of railway to serve this cluster development is probably more suitable for other islands in Indonesia, such as Sulawesi, Nusa Tenggara, and Papua. For these three regions, phasing and scheduling of freight railway development shall be considered carefully in line with the stages of the development of forestry, marine, mining and agricultural industries.

The NRMP is an instrument for the planning and design of large-scale investments on national railway. In the territorial dimension, the NRMP designs the investment and development strategies of the railway lines in order to support the development of economic corridors and develop corridor connectivity capable of accelerating regional economic development. The advantages of Java-Bali-Sumatera economically is something absolute that needs to be faced by accelerating economic growth and regional development. Integrated multimodal transportation networks should be built on the strategic economic corridor of Java and Sumatera in order to support the ever-increasing economic movements and to maintain the momentum of economic growth in these two major areas. Nevertheless, regional development policies and transportation systems shall also be directed to promote acceleration of development in Kalimantan, Sulawesi, Nusa Tenggara, Maluku and Papua. This will also promote the reduction of economic development disparities between regions.

One of the strategies for regional development and development of transportation networks supporting it is the concept of a large corridor economic development as shown in *Figure 5.1*. This study is ongoing and conducted by the *Boston Consulting Group* (BSG) under the coordination of the CMEA. This study divides Indonesia into several economic corridors and performs analysis of priority economic sectors within the corridor and makes a recommendation of modes and transportation networks

necessary to support the growth of that sector and to develop the economy of the corridor and related regions. Rail mode seems to be an essential part of the recommendation.

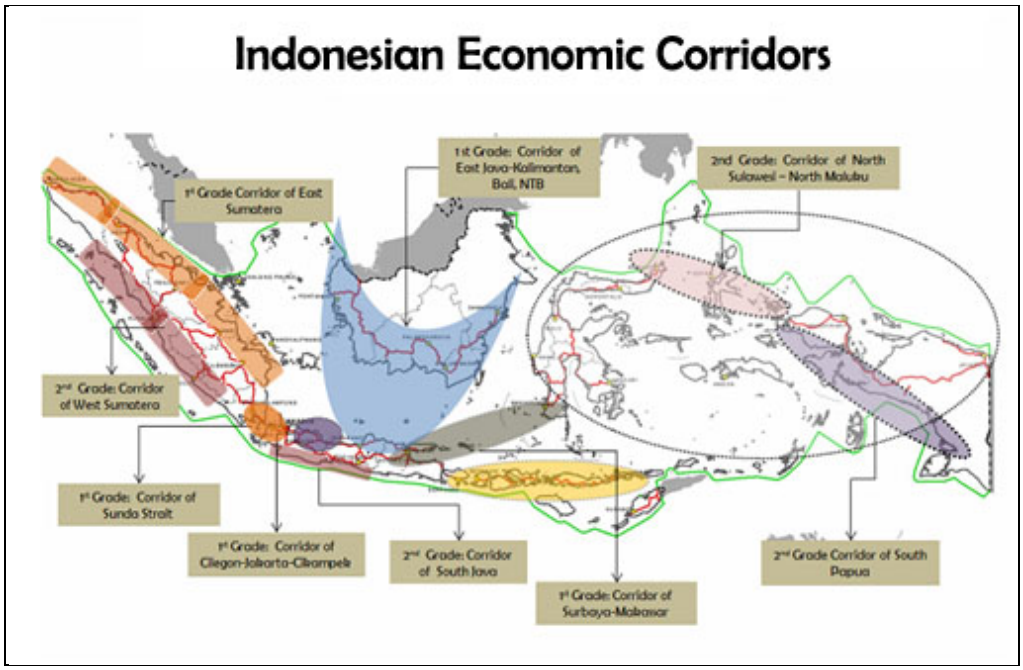
5.1.1 Passenger Market

Seriously considering the economic mobility and population pressure of the next two decades, Indonesian railway must become the backbone of freight and passenger transportation. For the passenger transport, currently there are at least three potential market segments to be developed. Jabodetabek market is by far the most potential market in the amount of travel (number of trips) and its development has been described in the previous section. Passenger market which traditionally is also potential in the context of productivity (passenger-km) is the passenger transport market on the island of Java which will continue to grow as population and economy grow. Although the current railway passenger transport market in Sumatera is still relatively small in number and productivity, the potential for future development in highly prospective given the very large economic potential of Sumatera as the second largest island in contributing to national productivity.

Figure 5.2 shows that after experiencing a decline in service from 2000 to 2004, the national railway passenger travel has grown by around 15 percent during the past decade, while productivity has increased by about 9 percent. Jabodetabek passenger transport market increased by 50 percent with an average growth rate of 9 percent per year. Inter-city passenger transport market in Java increased by 40 percent since 2004, with growth rates averaging around 7.5 percent. In Sumatera there is a decrease of passenger transport market and its productivity but the freight market shows an increasing trend since 2004 with an average around 3.5 percent per year.

But on a more macro level, railway passenger transport market is very sensitive to the policy and competition with other transportation modes. Airplane ticket prices which tend to decline, the operation of toll roads, increasing personal car ownership due to ease of purchase, and macro policies of the other sectors affect railway passenger market fluctuations, particularly for long range, such as Jakarta-Surabaya and Jakarta-Yogyakarta. Inter-modal competition is inevitable as long as there is no straightforward national policy to revive the vital role of rail as mass rapid transport for passengers and trains have yet to demonstrate the level of service and comfort of traveling both in the scale of urban and inter-city travel. For this particular intermodal competition the NRMP shall consider what policy interventions should be made by the government for at least over a certain period to give a kind of priority (priveleges) for accelerating the development of railways without having to compete with other modes.

Figure 5.1: Development Concepts of Economic Corridors

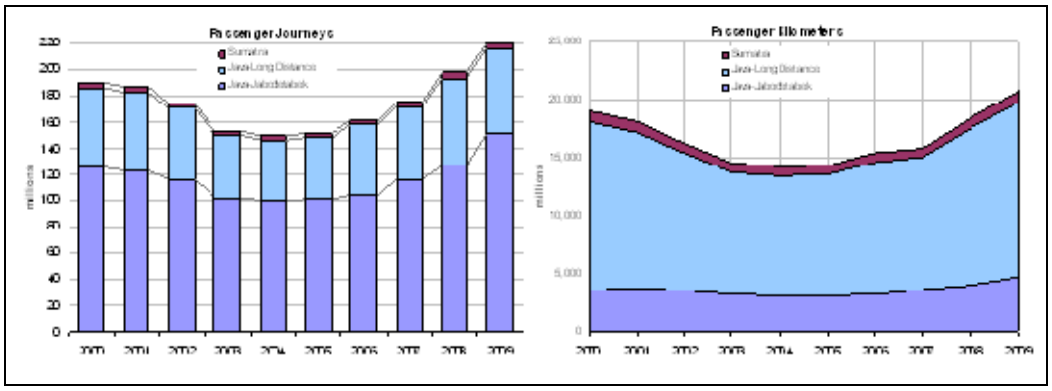


Source : Economic Corridor Study, CMEA, BCG, 2010

5.1.2 Freight Market

Currently freight train transport market is miniscule. Furthermore, the freight rail market is not too profitable for several reasons: (1) transport distance from production centers to shelter the end (ports, airports, warehouses) are not too great (only about 250-300 km), (2) the low strength of undercarriage that can only withstand a low axle load limits the total load of freight. The ratio between the weight of freight compared to weight of vehicle (nettare ratio) is very low, i.e. less than two, whereas a modern freight train should have a ratio above three. This is in contrast with road modes of freight transport, where trucks mostly have a very large ratio due to excessive loading (excessive overloading).

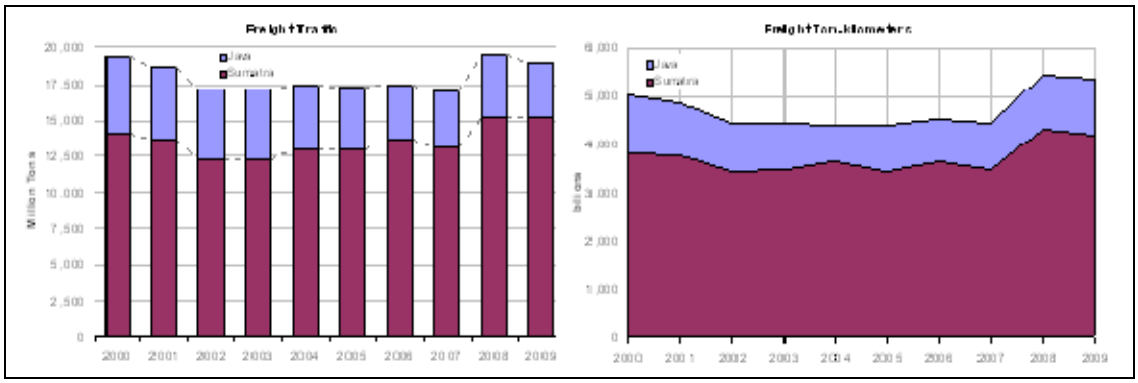
Figure 5.2: Indonesian Railway Passenger Transport Market



Source : Consolidated Report IndII, April 2010

This leads to a "productivity per vehicle" in the trucking appearing to be more competitive than rail for the same distance of transport. Figure 5.3 shows the volume and productivity of freight trains in Indonesia, which is more dominated by the transport of freight in Sumatera. There was a decline in the volume of freight transported of about 19 billion tonnes in 2000 to around 17 billion tonnes in 2002 and the trend of stagnation from 2002 to 2007 before then increased again in 2008 to a level of 19 billion tonnes. Productivity of freight transport also had the same tendency in the year 2009 and reached the level of about 5500 billion tonnes-km. The tendency of a rise in freight transport was highlighted by the increase of coal transport, in addition to other commodities such as fertilisers, palm oil, cement, and container transport. Meanwhile, the railway transport of goods in Java are relatively stable in recent years despite an increase in land transportation distance of about 200 km in 2000 to approximately 300 km in the year 2008.

Figure 5.3: Indonesian Railway Freight Market



Source : Consolidated Report IndII, April 2010

5.1.3 Competition with Other Modes

Rail is very efficient in transporting passengers in large numbers and long distances. Rail is also very efficient in the transport of goods, particularly commodities in bulk form, in large quantities and with long distances. To transport bulk freight from one point of origin to point of destination, the train is still competitive even within short distances. The only weakness is in its inability to perform services "door-to-door" without the other modes as complementary. For non-bulk freight, rail still has to compete with road transport in the tariff per km. While rail still has to compete with the road modes of transportation in the efficiency and effectiveness of freight transport, on routes with a single highly specific origin-destination pair, rail still holds a good prospect. An example is the transportation of mining products in which the movement of goods is concentrated in one point of origin (mining) and destination (port) with several terminal points needed. Another possibility is to build logistics centers and warehouses and other distribution facilities with train as the transportation between the factory, mining, ports, and those logistics centers.

Figure 5.4 shows the types of commodities transported by Indonesian railway, consisting of coal, oil products, cement, fertilisers, and other products. The volumes of the commodities transported seem a bit stagnant, with merely 19 billion tonnes per year from the year 2000 to the year 2009 with a decrease into 17 billion tonnes between the years 2002-2007. Again, this shows the fact that most commodities are still transported by roads. Indonesian transportation politics should not have come to the decision to put the transportation modes into a free competition, which means they are relying solely on the market mechanisms. The development of national transportation system still requires government policy and financing interventions. Therefore, railway does not have to compete freely with other modes; rather, it should be developed with the policies, regulations and institutions sponsored by the government given the nature of its politics.

5.2 CENTRAL ROLE OF THE GOVERNMENT

It is necessary to underline that the investments on Indonesian railways, for at least the next 10 years, still need to be dominated by government investment, particularly for infrastructure network and the development of a new road network. This is a consequence of the political economy of the government to enhance the role of railways in the national economy and create a more efficient multimodal transportation system and to support the development of the connectivity of Indonesian economic corridors. In addition, the government program to build domestic connectivity will also be much more efficient if the train is radically developed as an alternative to highway transportation. Perhaps after the government invests heavily to build railway facilities and infrastructures, the private sector investment will start to grow gradually. However, in certain segments such as transportation of coal where the market is mature enough and financially feasible, private investment can occur immediately without government investment. Both the government investment and

private investment need excellent institutional capacity and capability and a clear and transparent investment design in order to execute it.

National RMP is intended for the national railway development 20-25 years ahead. At that time the railways have had to play a major role in the national economy, competing professionally with other transportation modes in bearing the economic mobility and together face the global competition. The great task of the NRMP is to bring the national railways from its current conditions where the market share of passenger and freight transport is very small into the modern railway, where market share and its role in the economy becomes very large. Therefore, it is fair if NRMP outlines clear policies regarding the need for Indonesia to use the new technical standards for railways that can position the railway in the national and global economic arena. This new standard should be able to create the railways with more capacity of the axle load and pressure of the movement, as well as signaling technology and modern telecommunications.

Modernisation of Indonesian railways within the next 20 years requires reinforcement of track infrastructure and all its equipment and increase of the quality and quantity of rolling stocks. Reinforcement will increase the amount of stiffness and track modulus of the rail tracks and allow higher train speeds. Thus, NRMP needs to prepare a program or gradual investment plan beginning with renewal of track with a more robust construction. The ultimate goals of the design of railway infrastructure investment are to:

- Achieve a minimum axle pressure of 22.5 tonnes on all current main lines and to receive axle load of 25 tonnes on the new rail road.
- Reinforcing the bridge on all main routes, to receive the axle pressure of 25 tonnes.
- Building construction under railway stronger to withstand greater loads, particularly in urban areas to anticipate 2-floor cars and in special economy tracks to hold the greater load of freight cars.
- Construction of special tracks for specialised freight trains such as coal, oil palm, and other mining products from the mouth of the mine to the port and into the growth centers of other areas including the transport of containers.
- Modernisation of the signalling system on passenger routes operating with the speed of more than 90 km/hour either with electrical system or radio control.

5.2.1 Indonesian Railway Infrastructures

To anticipate the increasing passenger and freight transport in the future, Indonesia needs to enhance the capacity and capability of the existing rail roads. The condition of the existing infrastructure is not strong enough to withstand the load of movements and tonnage of freight and passenger of the modern Indonesian railways ahead. Large-scale investment is needed to increase the capability of Indonesian railways. Meanwhile, out of the 6,797 km of total length of railway network in Indonesia, only

3,327 km is integrated as a network, namely on the Island of Java, while the railway in Sumatera is still partial on three regions and not yet integrated with one another. Out of the total length of railway road network only 4,675 kilometers will be operational, while 2,122 km is not operational (Table 5.1). In terms of axle load, Indonesian railway network remains of a low-standard, i.e, only about 9-18 tonnes with relatively low size and rail weight, namely between 33 kg/ m (R33) to 54 kg/ m (R54). Both characteristics of rail strength and carrying capacity of this load limit the capacity and capability to support the load of railway network in Indonesia. Figure 5.5. shows the use of types and weight of rail by locations in Indonesia.

Table 5.1: Indonesian Railway Network

Currently Existing Railway Network in Java, Sumatera, and Madura: 6.797 km	Operational Network: 4.675 km	Sumatera: 1,348 km	Main Line: 1,329 km Feeder Line : 19 km	North Sumatera: 516 km West Sumatera: 169 km South Sumatera: 663 km
		Java 3,327 km	Main Line : 2,966 km Feeder Line : 361 km	West Java : 1,125 km Central Java : 1,130 km East Java: 1,072 km
	Non-Operational Network: 2.122 km	Sumatera: 512 km	North Sumatera: 428 km West Sumatera: 80 km South Sumatera: 4 km	West Java: 1,125 km Central Java: 1,130 km East Java and Madura : 615 km
		Java and Madura: 1,610 km		

Source : Directorate General of Railways, 2009

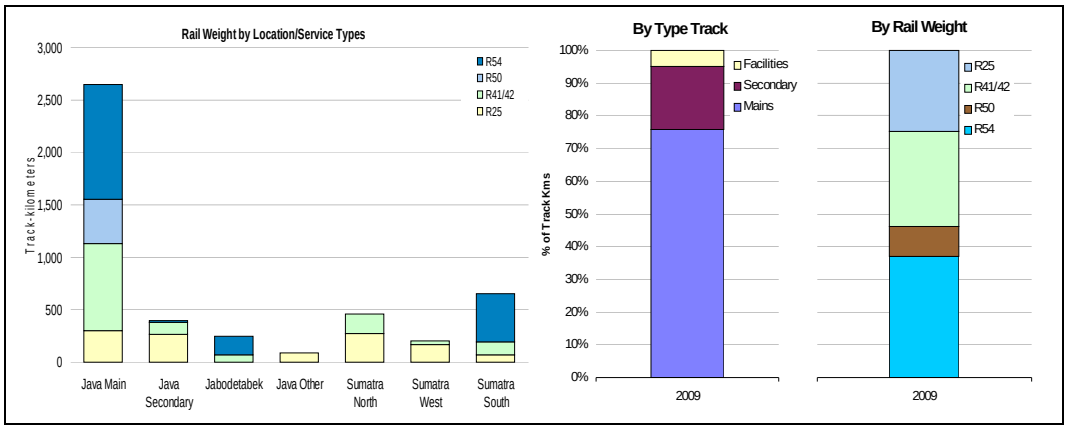
The NRMP has to plan from the beginning improvement of quality and carrying capacity of the ballast and the lower foundation to increase the axle load enabling the use of locomotives with great power to transport passengers. Similarly, with freight transport, an axle load of 25 tonne shall have become standardised in Indonesia in the near future. Meanwhile, specialised tracks for the mining and plantation product transportation to port and production processing centers with greater load of freight may use the axle load of greater than 25 tonnes. Track Modulus Improvement in Indonesian railways could lead to the use of R60 type rails on the main track with concrete pad located approximately 60 cm from each other and the construction of much stronger ballast. This will allow faster train traffic with greater axle pressure.

5.2.2 Rail Bridge Investments

Increased carrying capacity and strength of Indonesian railways brought the need for increased carrying capacity of bridges. The number of railway bridges in Java alone

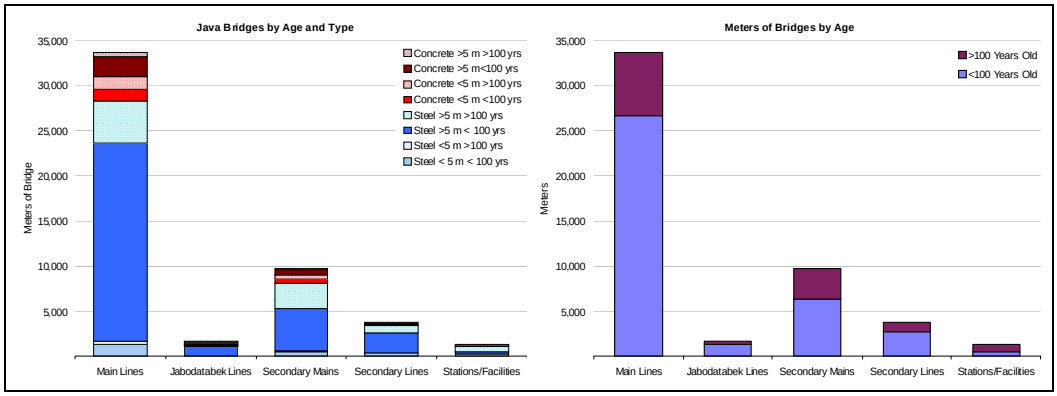
reached about 4,500 with the length of about 50,000 feet. Around 1,500 of the bridges are of the Dutch colonial era and more than 100 years old, which require immediate replacement. Table 5.2 provides a quick description of the rehabilitation and replacement of bridges required in Java. Figure 5.6 shows data on age distribution in accordance with the type of bridge construction. NRMP should identify the location of these old bridges, especially on routes where the railway construction will be subjected to heavier traffic and greater axle load. These bridges require rehabilitation program and/or replacement with new construction with a larger carrying capacity. In a period of 25 years a rehabilitation and replacement program of these bridges shall be scheduled.

Figure 5.4: Rail Weight According to Types and Locations in Indonesia



Source: Consolidated Report IndII, April 2010

Figure 5.5: Rail Bridges in Java Based on Types and Service Life



Source: Consolidated Report IndII, April 2010

According to IndII Consolidated Report, the average cost of rehabilitation and replacement of the bridge varies from USD 1,00,000 (Rp 900 million) per meter if the bridge span is less or equal to 5 meters, up to USD 2,00,000 (Rp 1.8 billion) per meter for the bridge that spans longer than 5 meters. On the basis of this estimate the total

cost required to program the railway bridge strengthening and replacement to be able to accommodate higher speeds, greater axle pressure and heavier volume of traffic will reach USD 1,300 million within the next 25 years. Meanwhile, the analysis conducted by the World Bank indicates the amount of investment amounts to Rp 60-70 trillion to rehabilitate and improve the capacity and carrying capacity of railway infrastructure of Indonesia, including bridges, signaling system, and stations, but not including land acquisition costs[8].

Table 5.2: Condition of Railway Bridges in Java

Region	Number of Bridges	Length of Bridges (m)	Conditions of Bridges older than 100 years
Jabodetabek	157	1,600	28 percent of the structure or around 18 percent of the bridge length
Java Main Corridor	2,900	34,000	39 percent of the structure or around 21 percent of the bridge length
Total Java	1,443	14,400	30 percent requires rehabilitation and replacement

Source: Consolidated Report IndII, April 2010

5.2.3 Railway Facility Investments

Indonesian railway infrastructure assets are mostly old. Replacement of the entire asset is estimated to require an investment cost of USD 5,133 billion (Rp 46.5 trillion). Several carriages and locomotive assets worth USD 1.7 billion (Rp 15.4 trillion) is estimated to still operate despite being beyond the age of its economic life. Meanwhile, within the next 25 years there will be a lot of facilities reaching the age of its economic life, so they need to be replaced and will cost approximately USD 2.7 billion (Rp 24.4. trillion). All equipment that has run out of its lifetime will constitute 85 percent of all rolling stock assets existing today. It is important for NRMP to arrange the agenda and funding scheme of large program to renovate, rehabilitate, and replace the entire infrastructure of new Indonesian railways for a period of 20-25 years. The average age of locomotives operating currently is about 26.4 years. In a short while, about 248 locomotives had to retire (25 years). The cost to replace the exhausted locomotives amounts to approximately USD 620 million (Rp 5.6 trillion), although some may still be rehabilitated and reconditioned. Within the next 25 years, approximately 132 locomotives will be retired or rehabilitated at a cost of about USD 330 million (Rp 3.0 trillion). While the decision whether to buy a new locomotive or to recondition the old ones will greatly depend on the financial condition of the government (and PT KAI),

[8] World Bank estimates the cost of rail road investment of USD 1.8 million/kilometer using *standard gauge track*; approximately USD 1.4 billion is used for Indonesia due to the use of Cape gauge standard.

NRMP needs to plan a schedule and agenda for the replacement or rehabilitation or a combination of both. Furthermore, technological factors need to be considered; since the age of locomotives may reach 25-30 years, the more advanced locomotive technology should become part of the Indonesian modern railway ahead.

In the year 2009, Indonesia operated as many as 106 units of diesel multiple unit (DMU) cars with an average age of around 17 years. With DMU price per unit of USD 2.5 million, the replacement unit will require an investment cost of USD 265 million (Rp 2.4 trillion). However, not all DMUs need to be replaced. Half of the number of DMU (53 units) is still new, aged about three years, while the other parts (53 units) had an average age around 29 years and have had to retire in the near future. In addition, Indonesia also has 524 railway carriages unit EMU (electric multiple units), out of which 82 units will be retired soon. Cost for replacement of 408 units of EMU is estimated at USD 900-million (Rp 8.2 trillion).

Indonesian Railway currently has approximately 1550 long-distance passenger carriages which are quite old and should they be replaced with new ones funding needs will be around USD 2.8 billion (Rp 25.2 trillion). As many as 539 cars are now aged over 40 years and the cost to replace it is about USD 1 billion (Rp 9.05 trillion). Within the next 25 years, there will be about 830 cars had to be replaced at a cost of about USD 1.5 billion (Rp 13.6 trillion). There are about 4,000 freight cars owned and operated by the Indonesian railway today with an average capacity of about 30 tonnes per wagon. Approximately 3,500 of the carriages are carriages with four axle pressure (4-axle freight wagons) and air braking system. The renewal of this fleet of 3500 cars will cost around USD 260 million (Rp 2.35 trillion). Weight and capacity of freight cars is limited by carrying capacity of the railway which remains under 20 tonnes. Table 5.3 shows the number of freight cars presently owned by PT KAI. If the average age that can be used for the operation was 40 years, there would be about 1,480 cars to be retired in the near future. The average price per wagon ranged between USD 75,000 - USD 85,000. Replacement of the entire fleet of freight will cost approximately USD 212.5 million (Rp 1.92 trillion).

Table 5.3: Number and Types of Freight Cars

Type of Freight Car	Number (units)	Average Economic Life
Box Wagon	500	32.5 years
Flat Wagon	540	28.6 years
Gondola Wagon	2,100	24.6 years
Tank Wagon	830	45.0 years

Source: Consolidated Report IndII, April 2010

Development of a freight train system in the future in Java, Sumatera and Kalimantan will require the procurement of new freight carriages from the various types, capacities, and sizes. It is estimated that there will need about 5,000 more cars within the next 20 years with investments of about USD 425 million (Rp 3.85 trillion).

5.3 SUMATERA RAILWAY INVESTMENTS

There are about 1,348 kilometers long railway tracks in Sumatera with approximately 660 kilometers of which is the economically strategic main line. But only in South Sumatra is there around 400 km of track with high-capacity and carrying capacity for freight traffic. (Rails type R54 with concrete pads). Rail type used in North Sumatera and West Sumatera are generally R33/38 axle with low pressure. RPJM directs the development of Sumatera region to become a production center and processing industry of agricultural, plantation, and fishery products. Sumatera has also been projected to become a national energy silo, trade and tourism center making Sumatera one of the main regions of the Association of South East Asian Nations (ASEAN) Economic Community. The east coast corridor of Sumatera can be considered dense enough with various industries of products of palm, rubber, and other plantations. Meanwhile, central and south Sumatera are rich in mining products such as coal. It is necessary to develop corridor connectivity in this corridor, which is created by, among others, a system of freight railway capable of transporting mining and plantation products to the nearest port rapidly, efficiently and affordably. The development of railway in order to support the east coast economic corridor of Sumatera is based on the argumentation that domestic connectivity in this region will accelerate the economic development of the region. Developing corridor connectivity ensures the flow of movement of priority industrial products in Sumatera, such as palm oil, rubber, and coil keeps growing with easy and rapid access to the domestic and the global markets. Corridor connectivity also has positive impacts for other sectors. In time, the corridor connectivity of Sumatera will also be connected to the corridor connectivity of Java and cities along the corridor, creating a multiplier effect on the distribution of the ease of economy and transfer of knowledge, technology, and information to other undeveloped regions.

Several arguments underlie the development of railway as well as the dvelopment of domestic connectivity in the Sumatera corridor.

Figure 5.6: Sumatera Railway Network

- **More equal distribution of economic development**. Development centers in Sumatera serving as National Centers of Activities (PKN) are directed to: (1) promote the development of the City of Lhokseumawe, Dumai and Batam in the eastern region and the city of Padang in the western region as the primary service center; (2) control the development of the urban areas of Medan-Binjai-Deli Serdang, Bandar Lampung and the surrounding areas, and Palembang as the primary center of service according to its environmental supporting ability; and (3) promote the development of the cities of Pekanbaru and Jambi as secondary service centers. Domestic connectivity established by the railway network not only facilitates the development of the PKN; it also makes possible the relocation of industry and other growth centers to other locations along the presently underdeveloped corridor. This will trigger the emergence of small towns and local economic activities along the corridor.

- **Agglomeration of Production**. The series of industrial centers and PKN united by the railway network and connectivity will form an agglomeration of production capable of accelerating the development of the region and its economic growth. In this regional agglomeration, cities will develop more rapidly in line with the industrial development connected to one another within an efficient corridor connectivity.

- **Reduction of the Cost of Business Transaction.** Corridor connectivity with railway network will reduce the transportation costs and travel time from the production centers along the corridor to the ports, reducing the risk of damaged freight, improve market access, and in turn improve economic efficiency, distribution and

logistical chain, as well as production effectiveness. The continuance is the creation of employment, reduction of unemployment and poverty, and

- **Social Benefits**. Slightly underdeveloped areas around the corridor will gain social benefits from the corridor connectivity to railway or road passing through them. The access of rural economy to health services, education, basic needs, energy and other social activities will be easier.

In general, the targets of the development of Sumatera railway until 2030 are to develop high-capacity transportation network for passenger and freight transportation, particularly for large-scale commodity products, high speed, capable of withstanding axle load of up to 25 tonnes with concrete pads. This program is done in stages in accordance with the demand for freight transportation which is estimated to increase from time to time. The NRMP shall reconfirm the integration program of the three Sumatera railway system, gradually done in the period of 2010-2025 while doing economic and financial feasibility studies required to develop network integration. Therefore, in the period of 2025-2030, the Sumatera railway as a network system will have become interconnected into a unit of Trans Sumatera Railway, from Nangroe Aceh Darussalam to Lampung.

The integration program of Trans Sumatera Railway is done in line with the Sumatera Corridor Connectivity and consists of two strategic sub-programs, namely:

(1) Sub-program of development of connectivity of the systems of the cities on the coastal areas related to industry, mining, and tourism, to agropolitan cities, related to productivity of forestry, agriculture, and plantation.

(2) Sub-program of development of domestic connectivity of railway network with sea ports (Dumai, Tj. Api-api, Tarahan, Bakauheni, etc) in order to anticipate the Trans Asia Railways.

Table 5.4 shows the capacity building program of Trans Sumatera Railway as designed within the Draft of the NRMP April 2009 version. This program is expected to become a part of the whole development program of Sumatera railway network with greater capacity and axle load carrying capacity. Figure 5.7 shows the projection of program and investment of the modernisation of Sumatera railway infrastructures of approximately USD 580.6 million or Rp 5.25 trillion, in which the main lines of North Sumatera and West Sumatera railways will be improved to become equal with the main line in Java with an axle pressure of 22.5 tonnes. The main South Sumatera line transporting coals will be improved into an axle pressure of 25 tonnes in the period until 2014.

5.4 JAVA RAILWAY INVESTMENTS

For a period of some time ahead, the Java Island will remain the center of the national economy with a contribution of over 60 percent. However, with a vast number of population, Java is experiencing a great paradox. The development of Java as the

center of national economic activities poses a complex challenge. Within the next 20 years Java will face various strategic issues.

- First, an increased number of populattion, projected to reach approximately 152 million people, 120 millions of which will reside in the cities.
- Second, the change of economic structure towards the improvement of the service sector, and at the same time an increased quantity if the middle class accompanied by strengthening awareness of the basic rights.
- Third, decreasing carrying capacities of the natural and environmental resources, decreasing water resources, and infrastructures to support the economy.

In spite of the great paradox of the Island of Java, in quite a long period ahead, the regional development of Java-Bali is directed to maintain the function of the national food estate, controlled development of the processing industry, reinforcing trade interactions, as well as improving the quality of services and international grade tourism as the main region of the ASEAN Economic Community, while still taking into consideration the balance of the ecosystem and sustainable development principles. Development centers in Java Bali which serve as National Centers of Activities (PKN) shall be directed to: (1) control physical development of the urban areas of Jabodetabek, Bandung, Gerbangkertosusila, and Denpasar as primary service centers by taking into consideration the environmental supporting ability; (2) promoting the development of urban Yogyakarta and the surrounding areas and urban Semarang as a primary center of service; (3) promoting the development of urban Semarang and the surrounding areas, Serang and the surrounding areas, Cilacap and the surrounding areas, Cirebon and the surrounding areas, and Surakarta and the surrounding areas as secondary service centers.

Table 5.4: Capacity Building of Trans Sumatera Railway

Program	Locations
Development of block posts	Tanjung Enim-Tarahan line and Prabumulih-Kertapati line;
Partial development of double track and shortcut	The line between Tulung Buyut-Blambangan Umpu, Tanjung Enim-Baturaja, dan Rejosari-Tarahan;
Main line network system with high priority	Besitang – Banda Aceh – Uleeulee, Duri – Pekan Baru – Muaro, Teluk Kuantan – Muaro Bungo, Betung – Simpang, Simpang – Tj Api-api, KM3 – Bakauheni, Teluk Kuantan – Muarobungo – Jambi line;
Main line network system with medium priority	Rantau Prapat – Duri – Dumai, Jambi – Betung line
Main line network system with low priority	City of Padang– Bengkulu, Bengkulu – Padang, Sibolga – Padang Sidempuan – Rantau Prapat, Pekan Baru – Jambi, and Muaro – Teluk Kuantan – Rengat – Kuala Enok line;

Program	Locations
Coal Rail network system with high priority	Tanjung Enim – Prabumulih – Tarahan, Tanjung Enim – Kertapati – Tanjung Api-api line.
Construction/ development of urban railway in large cities	Medan, Lampung, Palembang, Pekanbaru and Padang;
Realising intramodal and intermodal integration	City of Palembang, Lampung, Padang, Medan and Pekanbaru
Activating feeder lines and re-activating inactive lines potential for freight and passenger traffic	
Development of new railway lines with an axle load of 18-22 tonnes with the width of spoor of 1,435 mm of approximately 1,200 km to equip the eastern corridor of Sumatera from NAD to Lampung.	

Source : Draft of NRMP, April 2009

Therefore, the Java railway system shall be developed to anticipate the socio-economic transformation of Java in the next 25 years. Both passenger and freight trains require modernisation and rehabilitation on a large scale. In principle, the railway infrastructures in Java shall still be built by the Government. However, the great economic productivity of Java provides a large space for investments of the private sector and related SOEs, particularly in the procurement of rolling stocks and their operation, as well as for particular segments of industry which would like to build their own railway access from the factories to the existing networks. High-speed trains with a great amount of investment shall be supported by the private sector in cooperation with existing railway enterprises, or enterprises newly built for that purpose. For the freight transportation, the local government along with the private sector can build terminals and dry ports. Meanwhile, the operation of freight and container trains can be conducted by a dedicated specific enterprise or in cooperation with enterprises in shipping and aviation to develop an intermodal freight transportation.

Figure 5.7: Projection of Total Investments Required to Rebuild the Sumatera Railway

Sumatra	Track Kilometers			Switches		
Item	<50kg **or** Steel/Wood	>50kg **and** Concrete	Total	<50kg	>50kg	Total
Trunk Routes						
North Sumatra	153.7	0.0	153.7	56		56
West Sumatra	12.6	0.0	12.6	7		7
South Sumatra	93.1	398.1	491.2	25	115	140
Subtotal, Trunk Routes	259.4	398.1	657.5	88	115	203
Secondary Main Lines	468.7	49.2	517.9	119	22	141
Total	728.1	447.3	1,832.9	207	137	344
Trunk Mains Only	259.4	398.1	657.5	88	115	203

Cost to Enhance	Cost/Km ($000)		Total ($000)	Cost per Turnout ($000		Total ($000)
Mains	$650	$300		$280	$280	
Secondary Lines	$400	$100		$180	$100	
Total	$356,116	$124,344	$480,461	$46,054	$34,403	$80,457
Trunk Mains Only	$168,642	$119,426	$288,068	$24,640	$32,200	$56,840

Level Crossings	
Crossing interval (in km)	10.0
No of Crossings for Protection-Trunk Mains Only	65.8
Cost per Crossing (000)	$300
Estimated Cost for Level Crossings/Mains	$19,726

Total Cost to Upgrade All Sumatra Main Lines	$580,644

Source: Consolidated Report IndII, April 2010

5.4.1 Passenger Transport Prospects

In the long run, the island of Java with a population of 152 million people by 2025 will become a very prospective market for long-distance passenger transportation. This was confirmed again with projections that more than 80 percent of the population of Java, or about 120 million people, will live in cities and urban areas. Java Island will become a kind of "Island City" and the mobility of population between urban areas will become very massive. Therefore, the government through the NRMP should outline clearly the role of Java in railway passenger transport and devise an investment strategy to modernise the Java railways. However, in the short term, the prospects for passenger transportation in Java Island are affected by two main factors, namely, macro and micro factors. Macro factors include regional economic scale, corridor density, growth rate, and the projected income per capita of population. These macro factors play an important role in determining the upper limits or the potential market demand for passenger transport services in the future. Micro factors have a much more important role in determining the market demand for rail service. Micro factors, among others: (i) tariff setting and quality door to door service that competes with other transportation modes, (ii) the tariff set by the government and the accompanying subsidy policy, (iii) a variety of activities involving various modes of transportation and other operators in the field of transportation, and (iv) various patterns of change most likely to happen in terms of population settlement and development of road

infrastructure. The interaction of these different factors will determine the amount of projected future passenger transport.

5.4.2 Java High-Speed Train

This is a long-term option of Java railway passenger transport, but very rational to be developed considering the density and population of Java's urban residents in 2025 (Figure 5.8). Currently high-speed trains on average are still below 100 kilometers per hour. This causes the distance between Surabaya - Jakarta (725 km) to be taken within a relatively long time, about 10 hours. If the travel time can be shortened to three hours, then the railway will add another option for people travelling between the two biggest cities in Indonesia. Java high-speed trains can use the route north of Jakarta-Cirebon-Semarang-Surabaya which is relatively straight. Another alternative is to build a railway line on the freeway from Merak to Banyuwangi. Development of Java high-speed train needs to be planned from the beginning considering the great contribution in boosting the economy. Government needs to involve national and international private sectors to build the Java high-speed rail. Various PPP schemes can be designed to realise this plan, where essentially the government gives concessions for the high-speed train operation for a long time (eg 70 years) and the private sector needs to build infrastructure and operates rail transportation service during the concession period. At the end of the concession period, the government can make a tender to define a new operator or to extend the concession to the old operator with the new cooperation scheme.

Box 6

Threat of Total Gridlock

Despite its macro economic strength, Java and its cities are threatened to be economically paralyzed due to the extra massive congestions far beyond the carrying capacity of the cities' land and economy. With a projected population of 152 million people in 2025, of which 120 million reside in the cities, Java cannot perform economic movements efficiently and is therefore unable to preserve its economic growth without the development of a massive, efficient, and reliable railway network and system.

Development of Java Island High-Speed Train with speed above 250 km/hour will require the construction of a new rail road with no crossings and fencing along the route of a parcel which it passes with forecasts of total cost of about USD 29 billion (Rp 263 trillion). The NRMP needs to prepare the agenda and work schedules of this long-term option, from the preparatory work, pre-feasibility study, feasibility study, to the construction preparation. If the high-speed railway system of Java is to be operational in 2030, preparatory measures shall commence now.

Figure 5.8: Density of the Java Corridor

5.4.3 Freight Transport Prospects

With the economic potential for 60 percent of national GDP and tends to increase, the potential mobility of freight is very large on the island of Java. But the task to increase the market share of freight in Java is a big task. Java regional macroeconomic factors alone do not guarantee the accuracy of the forecast demand for the transport of certain market segments. Some specific factors in the market are more important to be considered for an assessment of freight transport demand on the island of Java. These factors include: (i) the cost development of door to door service of its competitors, (ii) performance of rail in meeting the needs of freight users, (iii) changes in the pattern of industrial location and business practices in the global economy, (iv) the various actions competitors take in the transportation market, and (v) the interaction between these various factors. Figure 5.9 shows the Java railway road network and several points where the potential commodity can be transported by train.

Just as passenger transport, macro multimodal approach is not sufficient and micro approaches are advisable to apply based on a thorough analysis of consumer needs, including their transportation needs and growth potential of these requirements, various options available, quality of service given by the competitor, door to door costs, and alternatives to compete in the free market. For Java freight transport, the proposed recommendations remain the same, namely keep focusing on the needs at the level of facilities and corridors. Moreover, a gradual development needs to identify which priority corridors are the most important to take precedence in line with the potential of commodities to be transported by train. Therefore, it is necessary to make projections of the demand and traffic focusing on the main service capable of covering operational costs and initial capital. The purpose of the estimation is to identify the drawbacks and potentials for improved service quality for the customers and competing products. Meanwhile, demand projection shall also be accompanied and supported by an analysis of transportation costs in order to ensure this freight transportation service can cover the capital and operational costs. One action that can

be done in order to ensure customer loyalty is to engage the customer in operational funding, such as replacement of rolling stocks.

Figure 5.9: Java Railway Freight Transport Prospects

Source : Consolidated Report IndII, April 2010

5.4.4 Container Transport Prospects

Planning for freight transportation on the island of Java using trains should also include the planning of container transport (rail freight container). Figure 5.10 shows some of the points where dry ports can be constructed to be connected to container rail to the port of Tanjung Priok, Tanjung Emas, and Tanjung Perak. Some sections of Container railway, among others Gedebage-Tanjung Priok have been in operation even though their performance continues to decline. Container lines are an important part of the freight rail corridor in Java.

Figure 5.10: Java Railway Container Transport Prospects

Source : Consolidated Report Indii, April 2010

5.5 JAVA RAILWAY INFRASTRUCTURE INVESTMENTS

5.5.1 Rail Road

Figure 5:11 shows Java Island railway network routes with a total length of 1,680 km and 2,030 km long tracks. During recent years, even since Repelita VI in 1993-1997, work to improve the quality and capacity of the rail has been done, including building a double track across the north and south traffic. Most types of tracks use rails R50/ R54 with concrete pads but about 876 km of rail tracks are still using less than R50 with wooden pads. The priority for Java rail rehabilitation is along the 876 kilometers by replacing it with R50 or heavier, use of concrete pads at a separation of 60 cm from one another. Lower foundation is also strengthened including ballast and more modern iron fastener. Estimated cost of rehabilitation and replacement of rail is estimated at USD 650,000 per track-kilometer, or about a total of USD 569 million (Rp 5.1 trillion). The next priority is to strengthen the lower foundation with ballast construction deep enough along the 2030 track-kilometers, allowing the track modulus to reach 3,000 kg/cm. This is expected to require an investment of USD 300,000 per track mile along the 1156 kilometers of main traffic Java or about USD 347 million (Rp 3.14 trillion)

5.5.2 Railway Bridge

Rehabilitation and improvement of the capacity of the railway bridge in Java is prioritised to the north where the gradient of the route may increase train speeds up to 125-150 km per hour. Bridges must be capable of withstanding 25 tonnes axle load with such speed. Work to increase capacity and strength of this bridge is estimated to cost around USD 2.3 billion (Rp 20.8 trillion)

5.5.3 Signaling System

Following the modernisation of railways and bridges, the traffic signal at the north Java must also be improved with electronic and automatic control system on the train (in-cab signaling). This is to increase train speeds and greater axle loads. This signaling system improvement is estimated to cost around USD 560 million (Rp 5.07 trillion).

5.5.4 Level Crossing

A lot of railways in Java still use level crossing. For Java railways with speeds of up to 125-150 km per hour, intersection with roads must not use level crossing. Therefore, it requires the construction of special fly-overs or underpasses on major intersections. Illegal crossing not protected by safety equipment or not attended should be closed. Estimated cost of construction of the non-level crossing is approximately USD 122 million (Rp 1.1 trillion).

Figure 5.11: Java Railway Network

Source: Consolidated Report IndII, April 2010

5.5.5 Stations and Terminals

Java railway will be highlighted by rapid train opertaing at speeds ranging from 125 km/hour to 250-350 km/hour and by more intensive freight trains. Both need renovation and construction of stations and terminals capable of supporting the load of movements with high frequency and efficiency. Either modern stations or efficient terminals can be financed by private investors and is part of the railway business itself. However, these investments can also be done by government or local government as part of investment that can take the form of land acquisition, infrastructure support, and other fiscal and non-fiscal incentives. The total amount of investments for the rehabilitation and reinforcement program of Java railway is estimated to be approximately USD 1.93 billion (Rp 17.5 trillion), including investments on the Jabodetabek railway (Figure 5.12).

5.6 KALIMANTAN RAILWAY INVESTMENTS

Kalimantan has a strategic position of being geographically adjacent to the Malaysian states of Sarawak and Sabah within the framework of sub-regional economic cooperation of BIMP-EAGA (Brunei Darussalam – Indonesia – Malaysia – Phillippines East ASEAN Growth Area). According to the RTRWN, the development of the Kalimantan region is directed to maintaining and restoring areas with protective functions and environmentally critical in support of the sustainability of the utilisation of forest, mining, and agricultural resources, as well as marine resources, coastal resources and small islands. The development of Kalimantan ahead shall also be able to improve the internal accessibility of the Kalimantan island through acceleration of the functioning of trans road network integrated with the development of river transportation network, sea transportation network, railway network and air transportation. The development centers in Kalimantan serving as National Centers of Activities (PKN) shall be directed to: (1) promote the development of Balikpapan, Banjarmasin, and Pontianak as primary centers of service; (2) promote the

development of Palangka Raya, Samarinda, Bontang, and Tarakan, as secondary centers of service. Judging from the geographical and economic conditions of Kalimantan, the development of railway network in Kalimantan falls within the typology of cluster or semi-corridor, in which specific lines between growth centers and ports or lines connecting cities become attractive potentials to develop.

Figure 5.12: Projection of Total Investment Required to Rebuild Java Railway

Java	Track Kilometers			Switches		
Item	<50kg **or** Steel/Wood	>50kg **and** Concrete	Total	<50kg	>50kg	Total
Trunk Routes						
North Coast Main Line	395.3	576.3	971.6	99	445	544
South Main Line	436.8	465.6	902.3	172	356	528
Cirebon-Kroya	43.5	114.5	158.0	18	65	83
Surabaya-Bangil	0.6	38.5	39.2	6	16	22
Subtotal, Trunk Routes	876.2	1,194.8	2,071.0	295	882	1,177
Jabodetabek Lines	69.5	175.0	244.5	42	93	135
Secondary Main Lines	570.5	6.6	577.1	221	42	263
Total	1,516.2	1,376.4	4,963.6	558	1,017	1,575
Trunk Mains Only	875.5	1,156.3	4,924.5	289	866	1,155

Cost to Enhance	Cost/Km ($000)		Total ($000)	Cost per Turnout ($000)		Total ($000)
Mains	$650	$300		$280	$280	
Secondary Lines	$400	$100		$180	$100	
Jabodetabek Lines	$450	$300		$180	$150	
Total	$829,010	$411,605	$1,240,616	$129,940	$265,110	$395,050
Trunk Mains Only	$569,104	$346,893	$915,997	$80,920	$242,480	$323,400
Jabodetabek Cost	$31,291	$52,495	$83,786	$7,560	$13,950	$21,510

Level Crossings	
Crossing interval (in km)	5.0
No of Crossings for Protection-Trunk Mains Only	984.9
Cost per Crossing (000)	$300
Estimated Cost for Level Crossings/Mains	$295,469

Total Cost to Upgrade All Java Main Lines	$1,931,134

Source: Consolidated Report IndII, April 2010

The development of Kalimantan railway network is directed towards the development of a reliable, fast and cost-effective high-capacity network focusing more on freight transportation, without ruling out the possibility of using it for passenger transportation. Kalimantan railway network is developed in order to meet the needs for freight movement and to stimulate the regional growth with the south and central corridor, particularly coal transportation as well as to improve accessibility of freight movement towards Sarawak-Sabah, providing access to production centers (mines, plantations, forestry), as well as to support improvement of economic linkage between regions, particularly to open access to isolated areas and intraregional economic linkage with the neighbouring countries of Malaysia and Brunei Darussalam within the framework of Trans Asia Railways. The direction for the development of Kalimantan railway focuses on the development of railway infrastructures and facilities realised in stages based on priorities and potentials, including:

(1) Main network system with high-priority on the following lines: Samarinda - Balikpapan, Sambas - Kuching, Bontang - Samarinda, Samarinda – Tenggarong - Kotabangun, Pontianak - Mempawah - Singkawang - Sambas, dan Banjarmasin – Palangkaraya, and

(2) Network systems for lines with potentials for coals on the following lines: Batu Putih-Tj Bara (Senggata Line), Puruk Cahu – Balikpapan (Mahakam Line), Balikpapan - Tj Batu (South Balikpapan Line) dan Buntok – Tj Selatan (South Line).

Nevertheless, the development of intercity and urban railway has not become a main priority considering the number of urban residents in Kalimantan is relatively small (200.000 to 1 million people) and low density of the intercity corridor. The greatest potential lies on the freight transportation, particularly coal. This coal train is developed using a PPP pattern or through pure private investments. The development of new Kalimantan railway line planned for an axle load of 18-22 tonnes with a sppor width of 1,435 mm is shown on *Table 5.5*.with the total length of 687 km and total estimated cost of USD 981,8 million or approximately Rp 8.9 trillion.

Table 5.5: Infrastructure Investment Plan of Kalimantan Railway 2010-2030

Line	Distance (Km)	Cost (USD Million)
Samarinda-balikpapan	103. 5	146.9
Bontang-Samarinda	69. 0	98.6
Banjarmasin-Palangkaraya	138. 0	201.2
Samarinda-Tenggarong-Kotabangun	78. 0	111.2
Sambas-Kuching (Malaysia)	123. 0	176.2
Pontianak-Mempawang-Singkawang-Sambas	175. 5	247.7
Total	687. 0	981.8

Source: Draft of NRMP, April 2009

5.7 SULAWESI RAILWAY INVESTMENTS

The development of Sulawesi railway network system includes the efforts to develop high-capacity railway network, particularly for freight transport or transport of commodity products on a large scale, high speed, cost-effective with low energy consumption, as well as to support the development of integrated city systems through an integration of the cities on the coastal areas, either industry, mining, or tourism as well as agropolitan cities, either forestry, agriculture or plantation.

Table 5.6 shows the projected investment on Sulawesi railway. The indication and direction of development of railway in Sulawesi are focused on the development of freight and urban railway facilities and infrastructures as follows:

Table 5.6: Development Plan of Trans Sulawesi Railway

Line	Distance (Km)	Cost (USD Million)
Manado - Bitung	48	104
Gorontalo - Bitung	300	606
Makassar – Pare-pare	128	258

Source: Draft of NRMP, April 2009

- Network system with high priority on the Manado – Bitung, Makassar – Parepare dan Gorontalo – Bitung lines
- Network system with high priority on the metropolitan urban areas of Makassar – Maros – Sungguminasa – Takalar
- Development of a railway network on urban areas with metropolitan characteristics to support mass, rapid, safe and efficient movement of freight and passengers
- Connecting production centers to the ports in order to support export/import activities
- Opening isolated regions in Sulawesi;
- Construction/development of urban railway in the City of Makassar and its agglomeration.

5.8 PAPUA RAILWAY PROSPECTS

Development of the Papua Island as one of the largest islands in Indonesia poses a greater challenge compared to other regions. The greatest challenge is paying the same amount of attention to the whole coastal, mountain, and plain areas, as well as developing interregional linkage in a unit of spatial plan. The approach used has been to build a Trans Papua road network to connect coastal areas with the inlands. Considering the vastness of Papua, this approach seems to be increasingly ineffective not only because trans Papua roads will cost a huge amount for investments and long period of time for completion, a great part of the links on this network or perhaps even the whole network will be under minimum use due to the low volume of long-distance traffic. Therefore, the option to develop a rail network is not advisable, at least for the next 10-20 years. Even if it is needed, perhaps it would be necessary to develop railway network to the cities or to connect the cities to their economic buffer zones within a more cohesive and solid economic cluster.

5.9 INDONESIAN RAILWAY INVESTMENTS 2010-2030

In general, the fleet of passenger and freight transport in the Indonesian railways are old and most have to be retired in the near future. In the near future there will be USD 1.945 million (Rp 17.6 trillion) worth of facilities which must be replaced while within the next 20 years the facilities to be replaced will be worth around USD 4.700 million (Rp 42.5 trillion). In the long run, the Indonesian Railways is projected to become a major transportation system in the movement of people and freight across long distances through large landscape islands in Java, Sumatera, Borneo and other islands. The condition of the existing railway in the Java and Sumatera will be improved to withstand the axle pressure of the train up to 22.5 to 25.0 tonnes and can support the speed of passenger trains up to 150 km/hour on major lines. For this, investment is estimated at around USD 4 billion (Rp 36 trillion) for the period until the end of the Medium Term Development Plan II. Long-term program is estimated to cost around USD 7.74 billion (Rp 70 trillion). Improvement of railway infrastructure investment is expected to continue until the third Medium Term Development Plan, 2015-2019. High-Speed train in Java are estimated to be operational in 2025 with an investment of USD 25 billion (Rp 226 trillion at current prices at this time). However, it is necessary for the NRMP to put the agenda of the planning for this grand work planning the agenda of the start of preparatory work, feasibility studies, institutional, financing, and operation. The passenger transport in Java will also need to consider the vertical space required for passenger trains with two floors (the bi-level), while the transport of freight with any bi-level is possible for primary and specialised freight traffic. Railway investment plan shall be done in stages with the permanent use of existing assets as maximum as possible. Table 7:10 shows the recapitulation of the railway infrastructure investment in Java and Sumatera, Indonesia. Meanwhile, Indonesian railway infrastructure will require a lot of renovation and/or total turnover for its the remaining life is very old. The amount of infrastructure investment amounts to approximately USD 4.7 billion (Rp 42.5 trillion) and are shown in Table 7:11. Approximately USD 2.0 billion (Rp 18.1 trillion) is needed in the short term and USD 2.7 billion (Rp 24.4 trillion) for long term investment.

The total magnitude of Indonesian railway investments for the next 20 years is still open for further research in accordance with the feasibility study and development program prioritised. Both the consolidated paper and the draft of the NRMP merely come out with tentative figures of indicative nature. The draft of the NRMP comes out with a total investment for 2025 of USD 13.245 billion or approximately Rp 125 trillion to develop new railway network of 9,650 km. This is an aggregate figure based on new railway network investments and is very tentative. Meanwhile, the consolidated paper merely focuses on the existing railway network in Sumatera and Java and tries to indicate the magnitude of investments to improve the carrying capacity of rail roads and replacement of new facilities in accordance with the needs for rehabilitation of infrastructures and necessary replacement of facilities. Table 5.7 shows a recapitulation of the magnitude of investments of the Draft of NRMP version and of the consolidated paper version. Not included in those figures is the investment to develop Java High-Speed Train of approximately USD 29 billion. Both these versions are not comparable to one another due to the different analysis they use. Nevertheless,

Table 5.7 provides an indication of the magnitude of approximately USD 13.3 billion to develop new railway network and approximately USD 12.5 billion for the rehabilitation of railway infrastructures and facilities.

Table 5.7: Magnitude Indications of Indonesian Railway Investments

Region	Draft of NRMP		Consolidated Paper	
	Length of New Rail Road (km)	Investment (USD Million)	Infrastructures (USD Million)	Facilities (USD Million)
Sumatera	1,200	1,500	1,675	4,706
Java	3,500	3,850	6,065	
Kalimantan	1,100	1,595	-	-
Sulawesi	200	440	-	-
Intercity Rail	6,000	7,385	-	-
Urban Rail	3,650	5,860	-	-
Total Investments	9,650	13,245	7,740	4,706

Source: Draft of NRMP, 2009 and Consolidated Paper IndII, 2010

CHAPTER 6: SUB-NATIONAL RAILWAY PLAN

6.1 BACKGROUND

Law no. 23/2007 Article 23 and Article 31 gives a wide space for local governments to carry out service facilities and infrastructure of the railways, particularly in the absence of Railway Business Enterprise which operates it or no active railway network in the area. Therefore, regions in Indonesia, apart from Sumatera and Java have the opportunity to build, finance, operate, and manage industrial and railway services. New systems to be built will become Regional Railways and can form a Regional Railways Enterprise (BUPD), which will be the realisation of spatial separation (spatial unbundling). The local governments will surely be able to enter a cooperation with PT KAI or to establish a consortium with a private party, or to fully delegate it to a private consortium to operate the local railway, particularly for freight trains considered to be commercial and other specialised trains.

But of course it is not easy for local governments to build and operate the railways because of the lack of experience, knowledge, technology, management and financing of railways in the region. All these times accumulated knowledge, skills and experience on the train have been centered at PT KAI as holders of monopoly rights over the decades since independence. Therefore there must be processes and stages to go through before the railway business can be built in the area, from preliminary stage to operation stage. All these stages must be met by the region with technical guidance and management assistance from the DGR and PT KAI. To build local preparedness and capacity in the management of regional railways, a general planning process for regional railway network is required. This general planning is of this dimension of time of the year 2030 with a five-year phases and, in time, with various improvements substance can be converted into Regional RMP.

6.2 ANALYSIS REQUIRED

The scopes and stages of the general planning activities of local railway are as shown in Table 6.1 through Table 6.3 below. The first phase is the Analysis Phase, divided into several activity scopes. Politically normative, this analysis refers to all national formal planning documents such as RPJP, Medium Term Development Plan, National Spatial Plan, Sector Strategic Plan, and all planning documents and their derivative budgets such as RKP, Budget, and Fund Balance such as DAU, DAK, and other decentralisation funds. National Transportation Systems (Sistranas), Regional Transportation Order (Tatrawil), and Local Transportation Order (Tatralok) should be used as reference in this analysis, although all the planning documents have not fully-identified train as the main mode of the main traffic networks or in areas yet to be developed. Several transportation planning documents such as the National Road Network, The Government, National Logistics System, and development studies areas such as Economic Corridor Study can be used as a substantive reference in the development of

railway network in the region. However, the reference to the document is not a rigid and formal planning because most likely all of the documents have not yet recognised the need to build railways in the regions outside of Java-Sumatera. Thus all the formal documents of the national level are used to build the socio-economic and political foundation on which the regional railway development plan and its implementation are made. First, the need for revision or addendum to the National Spatial Plan (RTRWN) to include identification of railway track in an area without a railway network. This revision is in line with improvements of Sistranas planning documents which need to be viewed as the main transportation path (trunk lines) on the larger islands of the Archipelago.

Table 6.1: Scope of General Planning of Local Railway

Phase I: Analysis

Analysis	Scope of Activities	Indicators
A-1	Regional economic analysis to see and make projections, estimations, and forecast of regional macro-economic magnitudes within a short term, (2010-2014), medium term (2015-20219), and long term (2020-2030).	Regional GDP, economic growth, sector growth and contribution,
A-2	*Travel Demand Forecasting* based on the projections and predictions of regional macro-economic magnitudes resulting from A-1. In this A02, projection option of energy required and projection of emission may also be made.	Volume of passenger and freight traffic, volume of fuel, volume of CO2 emission
A-3	Analysis of Laws and Regulations as well as national and regional policies related to spatial planning, transportation sector, road sub-sector, and railway sub-sector.	List of articles related to railway development, results of assessments
A-4	Conducting a literary study and collection of data related to the condition and projection of long-term need for railway network	Results of assessments

In the context of spatial planning, it is necessary to ensure that the road network of railway is to be constructed within the master plan, or if not (and likely does not exist in the spatial plan) then RTRW needs to be revised or amended to include the railway plan in the spatial plan. So the need to prepare the political process is ripe for revision of this layout. This process will become easier if RTRWN already indicates a railway crossing point in the territory of a particular island. For that we need to seriously revise local regulations related to the revised layout. Another dominant factor is the consumption of energy policy. Nationally, the use of energy fuels in the transportation system is very inefficient. Likewise, the consumption of energy in transportation at the regional scale. It is probable that many areas do not have a policy on conservation and diversification of energy in transportation because this policy on a national scale is still not clear. However, the basic perception that must be developed in this regional

planning is that trains can reduce waste of energy and are more environmentally friendly compared to road transportation modes. Further analysis was by reference to the formal budget and planning documents such as the regional level RPJPD, RPJMD, Budgets, and Regional Strategic Plan.

Phase Two is a regional transportation study with the focus on the proposal of railway networks (Table 6.2). For regions with existing railway network, this study will observe the role of railway in regional economic mobility with the time horizon until 2030 as well as how to improve the role of railway along with the proposed investments required. For regions with non-existing railway, this study will focus on railway mode as an essential part of the regional transportation system. In this phase, the local governments shall have prepared the development budget to conduct a transportation study as well as further measures to prepare railway transportation in regional transportation development.

Table 6.2: Scope of General Planning of Local Railway

Phase 2 : Regional Transportation Study

Analysis	Scope of Activities	Indicators
A-5	Identification of problems, opportunities, challenges and threats which will affect the delivery of railway network ahead	List of SWOT indicators of local railway
A-6	Identification and study of carious medium and long term targets related to the operation of local railway network	Local railway investment design
A-7	Analysis of regional transportation system by taking into consideration the railway as a mode for passenger and freight transportation	Results of assessments in the form of list investment on railway facilities and infrastructures

The Third Phase is the preparation of the Long-Term General Plan of Railway Network (RUJP-JJKA). This is a technical work to prepare a general plan and investment design of local railway (Table 6.3). Discussion and socialisation with the stakeholders and transportation users are essential to do to gather the aspirations and improve the quality and validity of the draft of the general plan. In time, RUJP-JJKA while be perfected into a Local RMP in accordance with the mandate of the law.

Table 6.3: Scope of General Planning of Local Railway

Phase 3: RUJP-JJKA

Analysis	Scope of Activities	Indicators
A-8	Formulating a long-term plan to develop local railway network which is an implementation of the National RPJP, RPJP of the Transportation Sector, Strategic Plan of National Railway, and the NRMP as well as the direction of policies for the long-term development of railway network	Results of formulation and basic design of local railway network
A-9	Formulating the guidelines for the prepartion of long-term general plan of local railway network	Draft of Long-Term General Plan of Railway
A-10	Conducting discussion with the stakeholders, particularly legal practitioners, academicians, and future users of the guidelines to be made.	Inputs and considerations of the stakeholders
A-11	Completing the Guidelines for the Long-Term General Plan of Railway Network (RUJP-JJKA) 2030 and providing a legal umbrella using a Regional Regulation.	RUJP-JJKA 2030

6.3 TECHNICAL INSTRUCTIONS FOR THE PREPARATION OF THE REGIONAL RMP

In the preparation of the RUJP-JJKA and then Regional RMP, several technical criteria need to be considered seriously to create compatibility with the existing systems and to simultaneously prepare the local railway for the implementation and adoption of future railway technologies. Those technical criteria are among others:

6.3.1 Electrification

Newly constructed regional railways must first consider the availability of electrical energy in the region. Provinces that want to expand the railway network or build a new railway network should have their own power or have the extra reserves that can supply the required electrical power for the railways, including the high voltage transmission network. Long-term purchase contracts must also be prepared by regional railways to purchase electricity from generators. This is important because a rail-based system of urban public transport to medium scale would require at least 200 MW of power supply. For that matter, voltage and electrical frequency train is very important in the distribution of electricity for the railway. Pantograf system (catenary) widely used throughout the world for the new system is 25 kV/50 Hertz. Today new technology has enabled trains (rolling stock) to operate at various voltage and frequency electric power supply system with AC and DC. Therefore, 1.5kV DC system of Jabodetabek will not be a problem. Similarly pantograf system, power supply,

substations, and rolling stock can still operate with 1.5kV DC until the end of their service life. However, a new generation of rolling stock is already in operation with AC 25kV as well as 1.5kV DC. The "main-line EMU's", on the other hand, already has to operate with 750/1.5kV DC and/or 25 kV AC. Meanwhile electric locomotive may only be able to operate at 25kV AC because pantograf 1.5 kV used by Jabodetabek may not be powerful enough to supply electricity and EMUs simultaneously.

6.3.2 Spur Width

Indonesia uses spur width of 1067 mm (Cape Gauge of 3'-6 "), except for one now built in Aceh with the standard spur width of 1435 mm. What is the width of spur Indonesia should use in the construction of railways in the future? The answer probably lies in the vision of modern Indonesian train two or three decades ahead. When Indonesia is to build a new railway or rehabilitate existing railrod or to build a double track, in fact Indonesia has built her own future and therefore linkage with the past must be abandoned. The main considerations are the reason for the coming of the railways business where speed, rail infrastructure strength and its supporting structure, and technology has become a pillar of success.

6.3.3 Financial and Financing Aspects

A major factor in financial analysis and financing is the financial sustainability of regional rail services, how much revenue (fare-box revenue), how large the operation and maintenance costs and depreciation costs of assets are, and how much local governments are willing to contribute to fund and provide operating subsidies to railway system. As mentioned earlier, the financing of the construction and operation of railways still must be borne by the government; in local railways by local governments. For the transportation of passengers, revenue likely will not cover the operating costs and maintenance. Subsidies are usually going to be the way out for operation deficits. For certain market segments such as the Urban Railway where there is willingness to pay a fairly large segment of users or for commercial goods transportation, local governments can build their own railway system with the participation of the private sector. In time, if the local government establishes to operate either passenger train or freight train, a Regional/Local Railway Enterprise can be established either individually by the Local Government, SOE and Regional SOE, or by establishing a consortium with the private sector.

6.3.4 Public – Private Partnership

Government partnerships with the private sector (PPP) in the construction and operation of local railways can only be done for railway projects which are financially feasible. For projects that are financially less feasible but economically very feasible, PPP may still be possible with strong government intervention, for example in the form

of direct investment, equity, or in the form of guarantee that can increase the commercial feasibility of the project. The necessary conditions for private investment have been discussed in previous descriptions. But the construction of railway infrastructure projects using PPP schemes require specific preparation and knowledge to prepare the project financially feasible and can be financed by the banking sector (bankable) or by other non-bank financial institutions

At the moment, in The National Development Planning Agency funding facilities are available for the preparation of infrastructure projects that are ready for cooperation with the private sector. The facility was named Project Development Facility (PDF) financed by Asian Development Bank (ADB). Local governments can use this facility to prepare their projects to attract private investors. PDF can provide funds for the work of the project feasibility study and funding for experts who will work to prepare the project financial transactions and closing. Another determining factor is the release of land for railway project needs. This land acquisition, according to regulation, shall be the responsibility of the local governments and although they could be borne by the investor to compensate the concession period and/ or service rates, the land remains a problem which is decisive in the project preparation and development.

CHAPTER 7: STRENGTHENING OF THE INSTITUTIONAL CAPACITY AND HUMAN RESOURCES

7.1 INTRODUCTION

In the year 2025-2030, if everything goes according to plan and there are no significant political and social hindrances, economy continues to grow, and per capita income continues to rise, optimism developed is that the railway is estimated to have entered the modern, efficient, and fully functional stage as the backbone of the movement of people and freight. Sumatera railway network is projected to have been operated together as an integrated network from Aceh to Lampung. In Java, double track will have become fully operational at both the north and south lines, high-speed trains is estimated to have already started operating on the route from Jakarta to Surabaya, and freight trains will have been fully functional in supporting the highly dynamic economic mobility of Java. For all of the 2025 railway system, modern railway technology has been implemented with an axle pressure for freight traffic of up to 25 tonnes.

In order to anticipate the operation of modern Indonesian railways in 2025, it is important to prepare efficient and modern institutional capacity with advanced and professional human resources quality. Therefore, NRMP should prepare a long-term design of the institutional reinforcement of the national railway and the improvement of the quality of human resources who will operate and manage the modern Indonesian railway. Institutional reinforcement and improvement of the quality of human resources is a long term investment that must be done by the government from this point.

Institutional reinforcement of the railways includes building institutional capacity and capability in accordance with the respective main functions and tasks. There are several institutional spectrums of railway to be planned for capacity and capability reinforcement as outlined below. The National-RMP will as far as possible design a program of institutional capacity and quality of railway human resources in the future.

(1) **Directorate General of Railways.** As a regulator this institution is static and dynamic at the same time. It is static in a sense that the regulations and all technical and non-technical provisions in railway shall be standardised and applies rigidly, at least for the period established by the regulation or as long as the strategic environment such as the technology, economic development and energy consideration have not demanded changes. This rigidity and standard are required in order to ensure certainty in business and management of railway industry as well as the level of public service standards. It is dynamic in a sense that there are rapid technological changes, socio-economic interactions, management style, and “international best practice” in railway to follow by the Indonesian railway in order to ensure the realization of global compatibility and to improve economic and global business competitiveness. Furthermore, the regulator also requires the

practical knowledge and skills concerning railway, in order to be able to at least offset the knowledge of the field practitioners.

(2) **State Ministry of State-Owned Enterprises.** This institution is the owner of state-owned enterprises operating in the business of railways. As long as PT KAI and several state-owned enterprises related to the railway business are still operational, the role of the State Ministry of State-Owned Enterprises is still required. The state administrators from this Ministry so far only function to oversee the "corporate governance" of the State-Owned Enterprises to generate profit and provide large dividends for the government. However, the characteristics railway business and industry assigned by the government to deliver subsidized cost-effective transport are often not in line with the corporate culture to generate profits. Therefore, is is necessary to provide "enlightment" in the forms of education and training on the combined role of railway: to function as a business entity as well as to deliver public service.

(3) **PT Kereta Api Indonesia Corporation.** This operator is by far the only agency with knowledge and experience regarding railway, technology, management, human resources, facilities and infrastructures of railways. Nevertheless, due to the disparity in the level of technology used compared to modern railways operating in developed countries, the quality and capacity of this corporation still need to be improved in the management, operation and maintenance of assets with high technological values in the future. Operation of high-speed trains with advanced technology will surely be different from the conventional trains. So will more massive freight transportation with the greater tonnage and railway carrying capacity.

(4) **Private Railway Enterprises**. More advanced railway institutional capacity and quality with wider network in Indonesia cannot be expected solely out of PT KAI alone. The Government has already designed the emergence of new railway enterprises. Although commercial railway can be fully managed by the competent enterprises and foreign private investors, the need for skilled and competent national workforce is also great. An education and training program in railway with professional curriculum and teaching staff seem to be required immediately.

7.2 HUMAN RESOURCES CAPACITY BUILDING

Development and improvement of the quality of railway human resources (HR) are carried out in tiers and begins with a process of competency-based training (training-based competency) and then continues with training while working (training in work place) and subsequently to ensure that officers are able to carry out their duties in accordance with what is expected by the industry or a railway company, it is necessary to the perform a testing or assessment process. In some areas of expertise and skills pertaining to the security factor, safety and matters relating to other public services, then the officers in charge of these areas must be certified by an independent agency or institution and licensed from trusted authorities such as ISO certification or other agencies established by the Government according to law or government regulation

(National Professional Certification Board and the National Construction Services Development Institute (LPJKN)). The process of training human resources of railways are the most important part of the overall process that will ensure the formation of a mechanism of continuous improvement of standards of work competence or performance of the railway officer at the management, operator, and field technician levels. If this process can be managed successfully then it is expected that the levels of safety, security, and service become excellent, if possible, to get zero accident and zero defect of the whole railway service.

PT KAI currently has approximately 26 thousand employees, with varying demographic profiles, both in terms of age and education level. Overall the HR of PT KAI would be the largest power in the company to maintain its existence in an era of free competition by providing a more competitive service than its competitors. Therefore, PT KAI needs to do a complete mapping of its own human resources, then do a skill refresher with the target of getting as many staff as possible to earn international certification, providing employees about to retire with skills that can be used after retirement, and set up processes that are equally beneficial if eventually rationalization has to take place. The government needs to accelerate the certification and accreditation of all rail crew to reduce the high level of accidents due to negligence of human resources. As many as 35 percent of the 118 cases of train accidents occurring in 2008 were allegedly caused by human negligence. Data in the following years showed a similar trend. The government needs to seek professional education or training in railway services to enhance the skill and expertise of railway human resources.

To accelerate the training process, the government should cooperate with universities in order to fill a number of training modules and technical guidelines of railway operation. These professional certification and accreditation institutions do not need to vary because some are readily available, especially for the technical specifications of design. To improve the performance of human resources of the government, the change made is to alter the old paradigm which prioritises *supply driven* through procurement and incremental completion of physical projects into an *outcome oriented* paradigm, orienting to availability of quality public railway services across the nation. The fields to be certified are divided into two groups of officers. First are those related directly to railway operations as regulated in Law no. 23/ 2007 concerning Railway and Government Regulation no. 56/ 2009 concerning Railway Administration. Secondly, are the officers conducting development works, improvement and maintenance of railway infrastructures, regulated by the Construction Law of 1999 and Government Regulation no. 29 concerning Administration of Construction Services.

In line with the Indonesian railway modernisation program, the quantity and quality of railway human resources must be improved in a programmed, structured, and consistent manner with clear timetables and targets. It also takes into consideration the fact that the quantity and quality of existing human resources, as shown in Table 7.1 below do not illustrate the capability and institutional capacity to manage the modernisation program and the construction of Indonesian railways in the future. Railway human resources have not been structurally developed as a certified expertise

and as a profession. The strategic steps to overcome this substandard human resources are done by mapping the profile of the expertise of the workforce and institute the development of the existing national railway human resources, development of professionalism and competence standards of national railway human resources, and development of accreditation program for agencies granting certifications of periodic test on railway facilities and infrastructure, as well as postgraduate education for the middle and upper management staff.

Table 7.1: Quality and Quantity of Railway Human Resources in Indonesia

Latest Education	Directorate General of Railways		PT Kereta Api Indonesia	
	Number	Percent	Number	Percent
Elementary School	1	0.30	10,412	38.47
Junior High School	1	0.30	6,168	22.79
High School	119	35.84	9,330	34.48
D3	26	7.83	580	2.14
D4 and S1	128	38.55	474	1.75
S2 and S3	47	14.16	98	0.36
Number	332	100	27,062	100

Source : PT KAI, 2008

7.3 HIGHER EDUCATION IN RAILWAYS

It is necessary to realise that as a science, train has long gone of the academic realm. Even the once-existing higher education in railways does not exist any longer. Teaching staff of railway science are growing increasingly rare, whereas the government's grand plan to develop a modern railway in Indonesia will require reliable and competent mid-management and upper management staff. The management of Indonesian railways ahead will be faced with challenges of modernisation, technology, and reliable asset and corporate management. Therefore, it is necessary for the NRMP to formulate a program of railway higher education in cooperation with universities, making education processes and teaching of railway degree holders, either in strata 1 (technology, operational), or post-graduate (management, business, and corporate). In order to anticipate the increasingly complex science and technology in railways, it is necessary to devise a curriculum to suit the technological development and railway management as shown on Table 7.2. This curriculum is vast and simplifications should

be made based on the current need of Indonesia. Furthermore, this curriculum has not been classified into bachelor's degree and post-graduate (magister level) programs. However, the declaration of the need for this program to be made shall be included within the NRMP.

7.4 SOCIO-ECONOMIC ASPECTS OF INDONESIAN RAILWAY

By observing various issues described in the previous chapters, the development of future Indonesian railways is faced by a spectrum of varied challenges and opportunities and is the subject of various research aspects and can involve several disciplines of science. Furthermore, placing the railway in the economy will create the need for knowledge perspectives regarding carious related aspects. As an illustration only, Table 7.3 shows the classification or clustering of knowledge to emerge and to be required in the development of Indonesian railway, particularly at the level of middle and upper management of the industry and regulations. These variations of knowledge can be used as the starting point of the formation of substances of postgraduate education in the railway discipline to improve the quality and competence of railway human resources from the middle and upper management levels.

Table 7.2: Proposed Curriculum for Higher Education in Railways

Basic Competence
• Development of Indonesian Transportation.
• Regulation, deregulation, and privatisation of transportation sector in Indonesia.
• Public Private Partnership (PPP), Investment and Modern Project Financing.
• Legal and Regulatory Framework in Infrastructure PPP and Transactions.
• Investment and Expenditure of the Public Sector in the Transportation Sector.
Core Curriculum
• History, Institution, and Scope of Service of Rail-Based Transportation System.
• Economy of Transportation and Railway.
• System Analysis and Project Management.
• General Principles of Engineering and Management of Railway System.
• Parameters Influencing the Institutional, Industrial, and Technological Development of Railway Transport.
• Railway Safety Management.

Railway Technology Concentration
• Main Architecture for Guided Transport System.
• Performances of Rail Transport Systems.
• Management of Transport Systems.
• Choices and Constraints for Civil Engineering and Infrastructure.
• Electro – Mechanic Components: Maintenance of Infrastructure.
• Controls and Signaling: Concept for All Applications.
• Controls and Signaling: Specific Issues for Railway and Urban System.
• General Architectural and Design Criteria for Rail Vehicles.
• Energy, Propulsion, and Braking System.
• Bodywork and Fitting Out, Passenger Comfort.
Railway Management Concentration
• Transport Economics.
• Economic of Rail and Guided Transport.
• Sustainable Development of Railway Transport.
• Structural Development of Passenger Demand.
• Development of Demand and Specific Technology for Freight Transport.
• Urban and Regional Transport.
• Management of Railway Companies.
• Preparing and Implementing Transport Plans.
• Traffic Management and Allocation of Resources.
• Facing Real Life Cases: Adapting System management to Unexpected Circumstances or Demands to Critical Situations.

Table 7.3: Spectrum and Perspectives of Railway Science

Railway and the Economy The role and contribution of railway in the growth and productivity of the national economy are essential to know and examine in order to provide argumentations on public decision-making, particularly those related to the railway budget politics.	High-Speed Train This research group is established specially to conduct exclusive research on the implementation of High-Speed Trains in Indonesia, particularly on the Island of Java from various economic, technological, cultural and social perspectives.
Railway and Regional Development There has to be a positive correlation between the development of railway networks and the regional development and the efforts to reduce inter-regional economic disparities. This knowledge needs to be cultivated in order to place the railway as the triggering factor of regional economic growth and as an instrument in reducing inter-regional economic disparities.	Urban Railway The research to develop rail-based urban transportation system for every typology of city. This research also has a broad spectrum from the basic research to observe the modal choice to the urban economic impacts due to the implementation of urban railway system.
Multimodal Transportation System Researching strategies and policies to create a Multimodal Transportation System using the railway as the backbone of passenger and freight transportation.	Specialized Trains The research for the potential of development of specialised trains in the economic growth centers such as the Special Economic Regions, mining areas, large plantations, and other industrial areas needing rapid and efficient freight transportation to ports or airports for exports and imports.
Distribution and Logistical Systems Researching the role and contribution of railway in supporting the realisation of efficient and reliable national distribution and logistical systems.	Railway Infrastructures and Railway Civil Constructions Researching and engineering the strength, quality and reliability of lower construction structure of the railway, including the construction material, the strength and carrying capacity of the basic soil as well as other complementary constructions.
Machinery, Electricity, Telecommunication and Power Supply Systems Researching technology in machinery, electricity, power, and telecommunication system of railway particularly for its development in Indonesia.	Railway Facilities (Railcars, Locomotives) Researching technology on train, cars, locomotives, and development of railway industry in Indonesia.

Tramway System Research to develop the Tram system in small and medium cities in Indonesia. Tramway is capable of overcoming congestions caused by the exploding numbers of microbuses in Indonesian cities. The development plan of the Tram system will be done in the campus of the University of Indonesia in Depok as the pilot project and the laboratory.	Regulations, Policies, Planning, Institution, Financing, and Corporations in Railway This is a research on the policies (Policy Study) examining the evolution of legal framework, regulations, policies and the implementation in the corridor of national economic development. Vital components of this research includes the railway financing schemes and sustainability of national railway.
Human Resources and Reinforcement of Institutional Capacity Research to examine the quality and capacity of Indonesian railway human resources in facing the modernisation of railway. This research leads to the formal and non-formal education program to prepare for the modern era of Indonesian railway.	Culture and Behaviour of Train Users When trains in Indonesia become more modern, faster, and more efficient, the public culture and behaviour, particularly users of trains, must also change. The operator of railway services ahead must anticipate the change of patterns and behaviour of the train users as the railway modernisation process goes. Several social and cultural engineerings need to be done in preparing the new behaviour.