The History and Background of the Planning, Policy and Funding Frameworks of Mega Urban Transport Projects in Japan Since the Second World War

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Abstract

After the short period of recovery from the Second World War, Japan experienced an ever-growing era in terms of population, economy, energy consumption and motorization. During the latter half of the 20th Century, the Japanese national government had encouraged further growth while mitigating negative effects of that growth. At the beginning of the 21st Century, the Japanese national government faces a shrinking era, on the contrary, in terms of population. In this paper, after giving an overview of administrative framework in relation to transport planning and policy, we review the history and background of the planning, policy and funding frameworks of Mega Urban Transport Projects such as expressways and Shinkansens in Japan since the Second World War, mainly focusing on the history of national land planning reflected in the Comprehensive National Development Plans. We also discuss current issues on Mega Urban Transport Projects in Japan, especially in the context of the New National Spatial Planning Law and related issues, and disaster prevention and public investment in transport projects.

Keywords

Comprehensive National Development Plan, expressway, Shinkansen, disaster prevention

Introduction

After the short period of recovery from the Second World War, Japan experienced an ever-growing era in terms of population, economy, energy consumption and motorization. During the latter half of the 20th Century, the Japanese national government had encouraged further growth while mitigating negative effects of that growth. At the beginning of 21st century, the Japanese national government faces a shrinking era, on the contrary, in terms of population, expectedly followed by reduction in the number of automobiles, energy consumption and even perhaps gross domestic product in national total.

In this paper, we review the history and background of the planning, policy and funding frameworks of Mega Urban Transport Projects in Japan since the Second World War by revising a preceding paper in 1989 by Ohta [1]. We give an overview of the planning and policy framework, mainly but not limited to the context of Mega Urban Transport Projects in PART I. We also review the funding framework of Mega Urban Transport Projects especially focusing on inter/intra-city expressway, inter-city high-speed rail, also known as Shinkansen, as well as various types of inter/intra-city public transport systems. In PART II, we discuss current issues on Mega Urban Transport Projects in Japan, especially in the context of the New National Spatial Planning Law and related issues, and disaster prevention and public investment in transport projects.

PART I

Efficient transport supports the foundation of regional socioeconomic development by providing smooth connections among spatially separated locations. Transport planning is therefore a vital element in furthering socioeconomic planning at various spatial levels, such as the national, regional, prefectural and municipal levels. Hereafter we give an overview of administrative framework where transport planning and policy are formulated and Mega Urban Transport Projects are approved and implemented. We also review the history of the Comprehensive National Development Plans. The Japanese national government has formulated the Comprehensive National Development Plans five times after the Second World War. Each Comprehensive National Development Plan reflected the social and economic backgrounds behind planning in respective planning period, and played an important role in authorizing public investment in social capital including Mega Urban Transport Projects based on the centralized national-local government relationship. To formulate Mega Urban Transport Projects is somewhat different from to implement the projects. In the last section of PART I, we review funding framework in respective transport projects, road, rail and other public transport systems.

Transport Planning and Policy Framework

Administrative framework in relation to transport planning and policy

The Japanese administrative system is divided into two parts: the national and the locals. The Japanese national government does not operate by the republican system. Therefore the national government engages in all administrative matters besides foreign affairs and national defense. As the centralized national-local government relationship, the national government formulates the administrative framework, according to the City Planning Law, for example, and guides in the administration of the local governments. The local governments operate the administrative procedures specified by the national government. The national government sets standards of execution through guidance and subsidies to the local governments.

Local governments have two administrative layers: prefectures and municipalities. There are 47 prefectures and about 2,000 municipalities operating as local government administrative units. The prefectures are under the direct guidance of the national government, and the municipalities are under the prefectures. The prefectures are historically and geographically separated and form the current administrative units. The municipalities consist of cities, towns and villages. Their functions are basically the same. Generally, a city has an average population of 50,000 to 500,000, and a town or a village has 5,000 to 20,000 people [2].

In the Japanese legislative setup and planning system, land planning at the national level, which determines the spatial framework of the nation, is closely related to economic planning, a basic element of government policy. Economic planning efforts involve formulating middle-range economic programs with a span of about five years using Gross National Product forecasts and other economic indicators as targets for the national economy. Goals and priorities for government intervention such as financial measures or public investments are then clarified. In contrast, land planning based on the Comprehensive National Land Development Law legislated in 1950 indicates the deployment of the developments of national socioeconomic activities within the spatial framework of nation’s land resources. Land planning covers a longer time span, about 10 to 20 years, than the economic planning, yet mirrors the policies laid down in the economic plans. In this sense, land planning and economic planning are closely correlated, and any revisions to the economic plan in response to changes in economic development and trend will lead to revisions to the land plan.

The Comprehensive National Land Development Law was completely revised into the new National Spatial Planning Law in 2005. However, because the planning process under the new law is still on-going and has much room for uncertainty, we review the planning process under the old law in PART I, and discuss the backgrounds and issues regarding the new National Spatial Planning Law in PART II. The diagram

of the planning framework under the old Comprehensive National Land Development Law is presented in Figure 1.

The land plan is a general socioeconomic plan or basic plan that includes public investment in social capital. During the planning process of the statutory nationwide land development plan, known as the “Comprehensive National Development Plan”, the scale and location of public investment in social capital including Mega Urban Transport Projects such as inter-city expressways, inter-city high-speed rails, or Shinkansens, other inter-city rails and international airports, are discussed and formulated. There are also the statutory regional land development plans, the “Regional Development Plans” and the “Specific Area Development Plans.” The Regional Development Plans cover the National Capital Region including Tokyo, the Kinki Region including Osaka and the Chubu Regions including Nagoya, and seven other local regions of Tohoku, Hokuriku, Chugoku, Shikoku, Kyushu, Hokkaido and Okinawa. Some of the Mega Urban Transport Projects such as intra-city expressways, rails and public transport systems are planned during the planning process of “Regional Development Plans.” As of the relationship between the Comprehensive National Development Plan and the Regional Development Plan, the Comprehensive National Development Plan sets the premises for the Regional Development Plans. Specific Area Development Plans cover specially targeted areas for development.

The Japanese national government has formulated the Comprehensive National Development Plans five times after the Second World War, and we will return to discuss the detail of each Comprehensive National Development Plan with the social and economic backgrounds of respective planning period in the following section. Even if some Mega Urban Transport Projects are included into the Comprehensive National Development Plan or the Regional Development Plan, they cannot be implemented without sufficient funding. The Mega Urban Transport Projects are funded and implemented based on the respective transport infrastructure development laws such as the Road Law and the Rail Business Law. We will review funding framework in respective transport infrastructure development projects in the last section of PART I.

As an example of “Regional Development Plans”, the National Capital Region is one of the regions of the statutory regional land development planning framework. The National Capital Region Development Law defines the National Capital Region as the area of Ibaraki, Tochigi, Gunma Saitama, Chiba, Tokyo, Kanagawa and Yamanashi Prefectures. The Law also requires the Ministry of Land, Infrastructure and Transport to formulate the National Capital Region Development Plan. The Plan consists of three plans, the Basic Plan, the Development Plan and the Project Plan. The Basic Plan sets the basic framework such as population and employment and formulates planning guidelines. The latest Fifth Basic Plan in 1999, whose planning period is from 1999 to 2015, adopts “the decentralized network structure” as the ideal structure

for the region where the major cities form their self-sustained areas with surrounding locals while they interact among themselves and with other regions for complementing functions and further corroborations. The Fifth Basic Plan also adopts the development of the five designated areas that takes account of their local characteristics. The Development Plan sets land development projects, transport projects, and others of respective areas for every five years, while the Project Plan sets the specific projects to be implemented for each fiscal year that the Development Plan includes. Some of the Mega Urban Transport Projects, such as intra-city expressways, rails and public transport systems, are formulated and implemented under the Regional Development Plan framework.

While the “Comprehensive National Development Plan” framework formulates public investment in social capital at the national and regional levels, the “National Land Use Planning” framework guides in land use at the national, prefectural, and municipal levels based on the National Land Use Planning Law in 1974. The National Land Use Planning Law was legislated soon after a sudden land price hike induced by the land development boom in the early 1970s. The Law aims at comprehensive and plan-led national land use and requires prefectures to formulate the “Basic Land Use Master Plans.” In 1974, the National Land Agency was also established for overseeing the National Land Use Planning Law and the Comprehensive National Development Law. The “Basic Land Use Master Plans” classifies the national land into five areas, namely: urban area, agricultural area, forest area, natural parks, and nature conservation area [3]. The land use in each area is regulated further in detail by respective separate laws.

The urban area is designated as the City Planning Area where the City Planning Law is applied. The City Planning Law was originally legislated in 1919, completely revised in 1968, and amended again several times between 1980 and 2006. Prefectures and municipalities are normally the implementing bodies of the City Planning. Prefectures authorize major elements of the City planning, while municipalities do the rest. The City Planning Law guides prefectures and municipalities in

(1) designating “City Planning Area,”
(2) formulating “Policies on Improvement, Development and Conservation,”
(3) designating “Urbanization Promotion Area” and “Urbanization Control Area,”
(4) designating “Zones and Districts,”
(5) operating “Land Development Permission System,”
(6) formulating “City Planning of Public Facilities,”
(7) formulating “City Planning in Urban Development Project” and
(8) authorizing “Body of City Planning and Decision Procedures.”

Prefectures and municipalities formulate Mega Urban Transport Projects in the City Planning Area under the City Planning of Public Facilities, and under the due process of the Decision Procedures.

As of the relationship of the City Planning Law with other related laws, the laws of higher categories which regulate City Planning include those that determine public investment in social capital at national level such as the Five-year Road Improvement Program based on the Road Law, and the Basic Land Use Master Plans based on the National Land Use Planning Law. For example, the alignment of roads approved in City Planning is decided according to the national road programs. However, in reality they are determined by interactive adjustment of related laws based on which higher category laws might be altered accordingly. In addition, under the Local Autonomy Law, municipalities draw the “Basic Concept Plan” for operating comprehensive and plan-led governance. The Plan covers the issues on planning and policies in the City Planning as well as in other sectors and requires the Policies on Improvement, Development and Conservation in the City Planning to be in accordance with the Basic Concept Plan in the municipality.

In transport planning and policies, the task of providing transport services is in most cases left to the private sector. Apart from guaranteeing a minimum level of service as far as the safety, environmental and social aspects are concerned, the main role of the government is to formulate transport industry policies aimed at creating a free market for the sound development of transport, and also the development of the transport infrastructure as an important element of the social capital. Because of their spatial impacts, planning and policies for improving transport infrastructure such as roads and rails are particularly important in regional development.

In coordination with economic planning and land planning, transport planning and policies are formulated and implemented within the respective public works programs. The former Ministry of Construction formulated development plans for roads, namely, the former Five-year Road Improvement Program, while the former Ministry of Transport oversaw development plans for airports and harbors, namely, the former Five-year Airport/Harbor Improvement Programs. The Ministry of Construction, the Ministry of Transport, the National Land Agency as well as other development related national agencies were merged into the Ministry of Land, Infrastructure and Transport in 2001. Those public works programs were also integrated into the “Prioritized Social Capital Development Plan” in 2003.

The administration of road transport, the main means of transport, is also decentralized, or rather fragmented. The former Ministry of Construction was in charge of road construction and maintenance, and the former Ministry of Transport was in charge of bus, taxi, and truck services. The National Police Agency is in charge of traffic regulation. To coordinate transport planning and policies in the different government offices is a difficult problem even after the establishment of the Ministry of Land, Infrastructure and Transport. In particular, the fact that it has never been clear which government office is in charge of private automobile transportation is one

cause for the delayed response to motorization after the Second World War.

While the Ministry of Land, Infrastructure and Transport formulates and implements transport planning and policies, some implementing arms of the national government have been separated from the national government and privatized. The Japan National Railways used to be in charge of public rails across the nation. But due to its inefficient management and accumulated deficit, the Japan National Railways was subdivided into the Hokkaido/East Japan/Central Japan/West Japan/Shikoku/Kyushu Railway Companies, the Japan Railway Freight Company and other companies in 1987. The Japan Highway Public Corporation used to be in charge of inter-city national expressways and the Metropolitan Expressway Public Corporation in charge of intra-city expressways in Tokyo, Kanagawa and Saitama prefectures. But the two public corporations as well as the Hanshin Expressway Public Corporation and the Honshu-Shikoku Bridge Authority were privatized into the East/Central/West Nippon Expressway Company Limited, the Metropolitan Expressway Company Limited and other companies in 2005. The Teito Rapid Transit Authority in charge of subway operation in the city center of Tokyo was also privatized into the Tokyo Metro Company Limited in 2004.

Looking at transport planning and policies at national, regional and municipal levels, local governments have more chances to take an integrated approach toward their transport problems. However, because of the physical expansion of urban areas beyond the administrative area of local government, the provision of comprehensive transport planning and policies at the urban level becomes increasingly difficult. The National Council is also reviewing the current administrative framework of national, prefectural and municipal governments.

The history of the Comprehensive National Development Plans

As described above, Japanese regional development policies are formulated in line with economic planning and within the land planning system. Their basic goals are set at the national level, then incorporated in specific regional plans and implemented in the public works programs for each sector. Development of the transport infrastructure is a major consideration, and it affects regional development and the spatial distribution of industry and population. Therefore, transport planning and policies and land planning systems are vitally interdependent. Because it gives the public a long-term indication of the spatial structure of national economic development, land planning, including regional development planning, clarifies the direction of development of transport infrastructure, and guides transport operators in supplying transport services. When the role of land planning in transport planning and policies is viewed in this light, any examination of the revolution of transport planning and policies in Japan necessitates a review of development of land planning. For background information, the trend of passenger and freight transportation demand

are shown in Figure 2, while current inter-city expressways and high-speed rail, or Shinkansen networks are indicated in Figure 3 to 4.

After the Second World War, the first tasks necessary to reconstruct the devastated nation were to guarantee food supply, prevent floods, and ensure energy supply. In the initial stage after the war, top priority was given to resources development policies such as augmentation of the food supply, hydroelectric power development, and promotion of coal production. Emphasis was also placed on mountain forest restoration and river development that were useful in preventing floods and simultaneously developing water resources.

The basis of the land planning system was established by the legislation of the Comprehensive National Land Development Law in 1950. Under the Law, the Comprehensive National Development Plan must cover a wide range of elements, namely:

(1) the use of land, water, and other natural resources,
(2) the prevention of flood damage, and other disasters,
(3) the adjustment of the size and placement of cities and rural communities,
(4) the appropriate siting of industries, and
(5) the size and placement of power, transportation, communications, and other vital public facilities and the protection of resources related to culture, welfare, and tourism, and the scale and placement of the related facilities.

With the goal of promoting areas whose development was lagged behind owing to the special limitations, a legal setup was also provided for various Specific Area Development Plans, including the development of outlying islands. The comprehensive national development plan was preceded by separate regional development plans for Hokkaido and Tohoku under the respective new laws which had great resource development potential.

The Korean War sparked sudden growth in the Japanese economy, and by 1955 the Japanese economy had regained its prewar level. The Japanese economy then began to move from a period of recovery to one of growth, and the policies promoted in such economic plans as the “First-year Plan for Economic Independence” in 1955 and the “New Long-term Economic Plan” in 1957 aimed at economic independence and growth spearheaded by processing of imported materials for re-export. In 1960, the “National Income-Doubling Plan” was formulated, and policies began to move toward real economic growth.

Major harbors around the country were no longer able to handle the rapid increase in ocean cargo, and a demurrage problem arose. The problem of insufficient harbor capacity became more and more severe. Traffic crowding in major cities and commuting problems worsened, and traffic bottlenecks became marked. Faced with these serious capacity problems, the national government started construction of

major transport facilities such as the inter-city high-speed rail, or the Tokaido Shinkansen, and the inter-city expressway, or the Meishin Expressway. At that time, developing efficient major transportation arteries was the key factors toward achieving rapid development of the national economy based on processing of imported materials for re-export.

Against this background, the first “Comprehensive National Development Plan” was drawn up in 1962 based on the Comprehensive National Land Development Law legislated in 1950. The main issue in this plan was the location of industrial bases necessary for realizing the National Income-Doubling Plan. The “Pacific belt zone concept” aimed at utilizing the concentration of industrial base in the existing four major industrial regions namely: Tokyo/Yokohama, Nagoya, Osaka/Kobe, and Kitakyushu, on the Pacific coast. But, owing to strong opposition from other regions calling for a reduction in the regional income gap, the concept of the “Balanced National Development” was adopted. This consisted of the “Growth Poles Development Concept” whereby areas that were remote from existing major metropolises and lagging behind in development were regarded as the areas for development, and industries were to be dispersed among these areas. The “New Industrial Cities Construction Plan” specified growth poles located throughout the nation. In addition, aiming at utilization of the spreading effect engendered by the existing major metropolitan areas, the national government designated the “Special Areas for Industrial Consolidation” with the goal of systematically introducing industry into these areas. Thus, industrial development proceeded with a focus on coastal industrial zones as the key points for trade based on processing of imported raw materials for re-export. Improvement of transportation, therefore, was regarded as an indispensable component of industrial development. The emphasis was on resolving transport bottlenecks through harbor improvements, including the development of industrial harbors, and preceding improvement of major arterial routes such as the development of inter-city expressways, the double-track electrification of trunk rail lines, and the Tokaido Shinkansen project between Tokyo and Osaka, with the aim of organically linking growth poles with existing major metropolitan areas.

During the subsequent economic growth beyond all expectations, the spatial structure of the nation’s land underwent a major transformation. Population and industry became increasingly concentrated in metropolitan areas, the regional income gap widened, and the problem of simultaneous overpopulation and depopulation worsened. The “New Comprehensive National Development Plan” was formulated in 1969 to counter these problems. The main theme of this plan was the development of depopulated areas remote from the existing major metropolitan areas, under the concept of the “Large-scale Development in Remote Areas,” utilizing scale economies of large-scale development. As well as supporting the development of remote areas, this plan also made a strong call for the formation of high-speed transport networks,

such as the Shinkansens and expressways, based on innovations in technology that enabled a movement toward an information-based society with greater speed. The aim was to correct the uneven distribution of population and land use, as well as the regional income gap, by increasing development potentials throughout the nation while integrating it with existing concentrations of central control functions. Heavy industries such as the steel, shipbuilding, and petrochemicals were the leading forces in the growth of the Japanese economy at the time, and these industries developed in coastal industrial zones. Behind this lay the global energy revolution accompanying the switch from coal to oil, and the resulting upheaval in the industrial structure contributed to the transformation of the spatial structure of the nation's land. Mountain and forest areas and coal-mining districts' economies collapsed, while coastal petroleum-based complexes appeared. Contrary to the goals of the first Comprehensive National Development Plan, population and industry became even more concentrated in metropolitan areas, and the Pacific belt coalesced to form the Tokyo-Nagoya-Osaka megalopolis.

To increase development potentials throughout the nation, the New Comprehensive Development Plan called for the formation of a new high-speed nation-wide transport network through large-scale transport projects. The Plan cited the following specific improvement to arterial transport facilities, namely:
(1) nation-wide airline network,
(2) nationwide express trunk rail networks,
(3) arterial expressways,
(4) international airports,
(5) distribution base harbors, and
(6) international harbors.
With the New Comprehensive National Development Plan as the turning point, the Law for Nation-wide Construction of New Trunk Railroads was legislated in 1970. The National Council for Transport Policy carried out a full-scale examination of the comprehensive transport system and submitted the report in 1971. Transport planning and policies gradually became firmly established within the administration of the government. Successive plans were drawn up for large-scale transport projects, including various expressway routes, the Tohoku and Joetsu Shinkansens, the Seikan Tunnel, and the bridges connecting Honshu and Shikoku, and work commenced on these projects.

In the 1970s, the regional dispersion of industry gradually proceeded, but environmental problems such as water and air pollution from industrial sources became a pressing social problem. The sudden onset of the oil crisis in 1973 put an end to the period of high growth in the Japanese economy, and the nation was faced with a new turn in the economy. Following the revision of the economic plan, land planning was also reviewed, and in 1977 the "Third Comprehensive National Development Plan" was drawn up. With stable economic growth, a lessening of the

rate of depopulation of rural areas, increased dispersion of industry in these areas, the transformation of industrial structure, and the increasingly sophisticated and diversified value systems of the people, the Third Comprehensive National Development Plan contained the concept of the “Integrated Residence Policy” as its basic planning strategy. On the premise of the limited land resources available, the goal was to improve the general environment of human settlements while respecting local history and traditions and ensuring harmony between man and nature. The plan focused on improvement measure for local level spatial units called “Integrated Residence Spheres”, or communities with relatively permanent populations. The plan encouraged local governments to take the initiative in making improvements to local living conditions. Thus, the Third Comprehensive National Development Plan advocated regional development from bottom up, in contrast to the previous plans designed from top down from national or regional viewpoint. In this respect the plan had characteristics to meet the needs of the new “age of local regions”. With government finances becoming increasingly tight, however, the plan failed to set forth effective new improvement programs.

As far as transport planning and policies were concerned, the Third Comprehensive National Development Plan sought to alter the concentration of the arterial transport system in Tokyo, and took up the reconstruction of a nationwide arterial transport system as its basic theme. The plan assumed that the new arterial transport system would basically consist of an integrated combination of land, sea, and air transport networks. The following specific targets were laid down for each transport sector.

(1) The goal for the high-standard arterial road network, or expressway network, was the development of an approximately 10,000 km network, including the National Development Trunk Roads of 7,600 km for which plans had already been made based on the Five-year Road Improvement Law. Also, 4,500 to 5,000 km of this network was to be opened during the duration of the plan.
(2) The goal for the high-speed rail network, or the Shinkansens, was to complete works on Tohoku and Joetsu Shinkansens, and to take socioeconomic conditions into account for the five other routes already in the planning stage.
(3) The goal for the airports was to complete the entire plan for Narita International Airport and to promote the construction of Kansai International Airport.
(4) The goal for the harbors was to form the Pacific route and the Japan Sea route arterial networks linking distribution base harbors, and to improve international harbors.

The content of these improvement goals was basically carried over from the new Comprehensive National Development Plan. With the formulation of the Third Comprehensive National Development Plan, the large-scale transport projects that had been temporarily suspended since the oil crisis resumed.

During the period between the preparation of the Third Comprehensive National Development Plan and the second oil crisis in 1979, several significant socioeconomic

changes occurred. The influx of people to the three major metropolitan regions subsided and the population of the other local regions began to rise, as so did their income levels, significantly reducing the regional income gap. According to the 1980 National Population Census, Tokyo was the only prefecture that saw a decline in population, with all of the other 46 prefectures registering an increase compared with 1975. The "age of local regions" became recognized during that time. This subsequently began to change, and curbs on financial expenditure continued. The impetus of the financial transfers from the central to local areas weakened, and regional economies gradually became sluggish due to the general stagnation of the national economy under restructuring of the world economy. Meanwhile, information society and internationalization proceeded with new technological innovations, and Tokyo regained its vitality. Since 1982, the population of Tokyo had again taken an upturn, and the regional income gap also began to widen. Since the first oil crisis, the birth rate, which dropped suddenly, had remained low, and the total population was expected to decline in the future. It also became evident that percentage of elderly people in the total population rapidly increased, and that the aging of the society would proceed.

After economic sluggishness following the first oil crisis, domestic passenger transport grew relatively smoothly until the second oil crisis, but had since fallen off. Motorization moved forward despite the two oil crises. While passenger transport by automobile expanded, the share of the Japan National Railways and buses declined, which caused difficult management problems. Domestic freight transportation slowed down after the first oil crisis, and then subsequently took an upturn. But, since the second oil crisis, it again declined. Broken down by transport modes, the share of railways declined rapidly, while trucking rose substantially and coastal shipping remained at about the same level. Thus, along with stable economic growth, overall demand for transport stagnated, and a major shift occurred in the transport structure from rail to automobile. This made streamlining the management of the Japan National Railways and shipping firms a major task. The government decided to reconstruct the Japan National Railways by splitting it up and privatizing it in 1987. The severe curbs on financial expenditure since 1979 held back public investment, and it became difficult to achieve the goals of the Five-year public investment plans for harbors and airports. Despite this, there was progress in several transport projects, such as completion of the Tohoku and Joetsu Shinkansens and most of the major routes of expressway network, and the commencement of work on the Kansai International Airport.

Under the impact of these fundamental socioeconomic changes, the National Council set up a long-term vision committee that forecast the socioeconomic status of Japan in the 21st Century when internationalization, aging of population, and matured society would happen. The Council submitted the report under the title "Japan in the Year 2000" in 1982. The follow-up work on the Third Comprehensive National

Development Plan was carried out based upon this report, and this was also published under the title "Japan: Its Perspective of the 21st Century" in 1984. The Fourth Comprehensive National Development Plan was drawn up on the basis of this report in 1987. The theme of the Fourth Comprehensive National Development Plan was "Building a Country to Act as the Place for Interactions". The Plan aimed at interactions between people, regions, and nations, interactions between people and nature, and exchanges of information. In the Plan, the 21st century, when internationalization, aging of population, information society, and urbanization would advance, was pictured as a high-mobility society. The Plan took the view that speed, reliability, and comfort would be demanded of transport in such a society. It forecast that a high-speed transport network based on airports capable of accommodating jetliners, the expressways, and the Shinkansens would be developed, and that the network would enable a choice among several different routes and transport modes. The Plan took the view that, in addition to the conventional vertical links between major metropolitan areas, regional hub cities, and regional core cities, it would be necessary to prepare the network that placed importance on the horizontal connections among major cities. The plan indicated that the transport network would evolve from the "tree-type" transport network of the 20th century into a full-scale transport network in the 21st century. A major task facing Japan was to promote investment in social capital including transport infrastructure during the 20th century while the economy still had vitality and before the average age of the population rose.

Because of the increasing pressure for the internationalization of Tokyo as a global financial center, the further concentration of economic activities in Tokyo became the major issue in the last stage of the formulation of the "Fourth Comprehensive National Development Plan." After the intense discussions on the appropriate balance between Tokyo and other regions, the Cabinet finally accepted the Plan in 1987. The Fourth Comprehensive National Development Plan aimed to transform the nation's land structure from the existing "Tokyo-centered Unipolar Concentration Pattern" into the one based on a "Dispersed Multi-polar Pattern" by the year 2000. The major objective of the plan was the construction of a nationwide transport network, called the "Nation-wide One-Day Return Sphere." With the network, the major cities would be connected with each other within three hours and local cities with multi modes within one hour. To achieve this objective, the Plan proposed the construction of the High-graded Trunk Road Network of 14,000 km including the existing National Development Trunk Roads of 7,600 km, and about 50 to 70 commuter airports.

During the late 1980s and early 1990s, Japanese economy was booming and land price went up partly because of the Law of Utilizing Private Fund for Development in 1987 that enabled private sector participation in urban development, and the Comprehensive Resort Development Law in 1987 that promoted resort development in rural areas. However, it was an economic booming without economic growth in real terms. The collapse of "bubble economy" occurred and land price went down

sharply, which made Japanese economy into the worst period of long sluggishness. After the collapse of "bubble economy" during the 1990s, the formulation of the "Grand Design of National Land for the 21st Century", or the "Fifth Comprehensive National Development Plan" was much affected by globalization and innovations in information technology that proceeded rapidly. While the national government struggled for sustaining economic system seriously damaged by the collapse of "bubble economy," and stimulating a long sluggish economy under deflation, the world faced global competition of multinational companies armed with advanced information technology, and was concerned about the global environment such as global warming caused by emission of greenhouse gases. The decrease in the total population was expected in near future, and the increase in the share of elderly people went further. The movement of decentralization of power from national to local government was also accelerated, partly because the public was more concerned about the local environment. While the centralized national-local government relationship might work when public investment in social capital such as Mega Urban Transport Projects was efficient and effective, more decentralized governance was needed in response to increasing local needs appropriately. The corruptions conducted by governmental officials and construction companies also made the attitude of the public against massive public investment in social capital. After long sessions of the National Council, the Integrated Decentralized Governance Law was legislated in 1999, and the centralized national-local government relationship weakened. The vulnerability in major metropolitan areas was also recognized strikingly when the South Hyogo Prefecture Earthquake devastated the structure of expressway and Shinkansen in the Kinki Region in 1995. The Earthquake killed about six thousand people and damaged buildings and transport facilities. The damage cost was estimated at about 9.6 trillion yen in total, and reminded the people that the Japanese national land was subject to natural disasters such as earthquakes and typhoons.

Against these backgrounds, the Fifth Comprehensive National Development Plan was drawn up in 1998 and proposed four strategies, creation of residential areas with abundant nature, renovation in large cities, development of regional corroboration arteries, and formation of widely internationally interactive areas, by the target term from 2010 to 2015. The Plan attached weight to the "Participation and Corroboration" as the important planning procedure, and based its development on local initiative and responsibility. Taking into account the limitations of financial and human resources due to population decrease and aging society and the changes of the public concerns, the national government needed provision of information on national development, promotion of decentralization, support for the activities of volunteers and non-profit organizations, and utilization of fund and capacity of private sector in addition to public investment in fundamental social capital. The Plan made itself different from the previous plans in which it saw a longer term of the whole 21st Century than the target term in perspective and placed Japanese national land in Asia-pacific region from the global viewpoint. The Plan contained the concept of the "Multi-arteries Type

National Land Structure" changed from the "One-artery Unipolar Type" around Tokyo as its basic planning strategy. Finally, the Plan directed toward the prioritized and efficient public investment in social capital under the restructuring of financial system at that time. Because the goal was to give guidelines on national development in a long term, the Plan did not indicate the total amount of public investment as the previous plans did [4].

As of transport planning and policies, the "Nation-wide One-Day Return Sphere" from the Fourth Comprehensive National Development Plan for domestic transport continued, while the "Eastern Asia One-Day Return Sphere" was newly proposed in response to rapid increase in the number of international passengers and cargoes especially in the Asian Region with high economic growth. For domestic transport, in addition to the Nation-wide One-Day Return Sphere, the "Nation-wide Half-Day Return Sphere" was proposed that connected major cities with regional hub cities within one hour and with metropolitan areas and major distribution centers within two hours. The construction of the High-graded Trunk Road Network of 14,000 km that continued from the Fourth Comprehensive National Development Plan, and complementary "Wide-area High-graded Trunk Road Network" of 6,000 to 8,000 km was indicated for the formation of the Nation-wide Half-Day Return Sphere. The construction of the Second Tomei and Meishin Expressways, and the Tokyo Outer Ring Expressway and the Metropolitan Inter-city Expressway were included in the Plan. The current construction of the Hokuriku and Kyushu Shinkansens, and the extension of Haneda airports were continued. For the formation of the Eastern Asia One-Day Return Sphere, the Plan indicated the placement of international hub airports in major metropolitan areas and other international airports as the gateways that connected eastern Asia and domestic networks in other regions. The Plan promoted the extensions of the Narita and Kansai and the development of the new Chubu international airports. The Plan also advocated the placement of international hub ports in Tokyo, Osaka, and Ise Bays and northern Kyushu area and international ports in other regions. The Plan also promoted the formation of transport network that reduced the vulnerability of transport network against national disasters especially earthquakes, and that contributed to reduction in environmental burdens especially carbon dioxide emission.

It was also noted that the Plan included the discussion on the national development system precluded by the Comprehensive National Development Law, and proposed the major amendments to the Law in order to change the characteristics of land planning from public investment in social capital to guidelines on national development. The complete reformulation of the Comprehensive National Development Law will be discussed in PART II.

Funding Framework of Road, Rail and Public Transport Systems

Japanese national land is characterized by surrounding seas and mountainous areas that cover most of the national land. The plain areas are limited where most of the people live with high population density. The mountainous area means requirement of many tunnels and bridges while high population density implies high acquisition cost of land, both of which push up the construction cost of Mega Urban Transport Projects. The measures against natural disasters also incur additional cost for materials and structure which will be discussed in PART II. Geographical characteristics of Japanese national land set the premises for funding transport infrastructure.

Road projects

The funding framework of road projects is divided into two categories, general roads and toll roads. The First Five-year Road Improvement Plan in 1954 mainstreamed public investment in road projects after the Second World War in Japan. The Plan was prepared in coupled with the major amendments to the Road Law in 1952 and the new legislation of the Temporary Scheme Law for Funding Construction of Roads, which were the introduction of toll road system and the earmarking of gasoline tax for road projects. Under the toll road system, the revenue from the toll was pooled and used for investment in toll road projects in other section of toll road network. The National Development Trunk Motorway Construction Law and the National Motorway Law were legislated for promoting construction of national trunk road network in 1957, while the Japan Highway Public Corporation Law was legislated for establishing the implementing body of the National Development Trunk Motorway Construction based on the toll road system in 1956. From 1954 to 1966, the priority was given to improvement of existing national roads and extension of paved roads. Some trunk motorways and urban expressways were constructed, however, they were mostly independent projects and did not constitute trunk road network. During the period from 1967 to 1977, the National Development Trunk Motorway Law was legislated in 1966 and the National Development Trunk Roads of 7,600 km was given priority in road projects. At the end of the term, serious environmental problems and oil crisis happened and they limited investment in road projects. From 1978 to 1987, public investment in road projects, especially motorways, faced severe criticism, and the priority was given to public acceptance of road projects. From 1988 to 1992, the Fourth Comprehensive National Development Plan prioritized public investment in road projects and a long-term goal of the construction of the High-graded Trunk Road Network of 14,000 km including the existing National Development Trunk Roads of 7,600 km was established. The construction of the Tokyo Bay Cross Road, or the "Aqualine" was proceeded by introducing private fund in 1986. From 1993 to 2006, public investment in road projects was criticized again because the toll road system and the earmarking of gasoline tax were self-sustained and might induce unnecessary road projects where traffic volume was forecast to be small. After intensive discussion in the National Council, the Japan Highway Public Corporation was privatized into

the East/Central/West Nippon Expressway Company Limited in 2005.

As of the revenue sources for general road projects, there are a variety of the automobile related taxes imposed when one acquires, owns and uses an automobile. On acquisition, acquisition tax of five percent of purchase price and consumption tax of five percent of purchase price are imposed. The acquisition tax is prefectural tax for regionally earmarked road revenue source. The four percent of the consumption tax is national tax and the rest is local tax for general revenue source. During ownership, tonnage tax is assessed according to vehicle weight at each vehicle inspection, and automobile and mini-vehicle taxes of fixed amount are assessed each year. The tonnage tax is national tax where two thirds of which is for nationally and the rest for regionally earmarked road revenues sources. The automobile tax is prefectural tax and the mini-vehicle tax is municipal tax both for general revenue source. While in use, gasoline tax and regional road tax assessed on gasoline, diesel handling tax assessed on light oil, liquid petroleum tax assessed on liquid petroleum and consumption tax assessed on the purchase price of fuels are imposed. The gasoline tax and regional road tax are national taxes the former of which is for nationally and the latter is for regionally earmarked road revenue sources. The diesel handling tax is prefectural tax also for regionally earmarked road revenue source and the liquid petroleum tax is national tax, a half for national and the rest for regionally earmarked road revenue sources. The consumption tax on fuels is the same as the consumption tax on automobiles. In 2007, the automobile related tax revenue is about 9.0 trillion yen, or 9.4 percent of total national and local tax revenue. Out of the total automobile related tax revenue, the share of the taxes on automobiles is about 47 percent while the share of the taxes on fuels is about 53 percent. The share of national taxes is about 59 percent out of the total tax revenue, and the share of nationally and regionally earmarked tax revenues is about 62 percent. As of the expenditure in road projects in 2006, such as general and toll roads, the expenditure in general roads amounts to 681.7 billion yen out of which national expenditure is 66 percent while local expenditure is 34 percent. The expenditure in toll roads amounts to 142.3 billion yen. Table 1 summarizes the automobile related taxes imposed when one acquires, owns and uses an automobile.

Rail and public transport systems

The Rail Business Law in 1987 defines that the types of rails are classified into several categories, such as heavy rails including Shinkansens, inter/intra-city rails, regional rails and subways, monorails, new transport systems and guideway buses, trolley buses, linear rails and others while the Tram Law prescribes for light rails. Hereafter we will call heavy rails as rails, light rails as they are, and others as public transport systems. The Japan National Railways was established in 1949 and engaged in recovery and improvement of nation-wide trunk rail lines immediately after the Second World War. Because of the concentration of population and industry in the

Pacific belt zone due to the economic recovery during the 1950s, the capacity of trunk rail along the zone was expected to be exhausted in the near future. The Japan National Railways decided to construct a new inter-city high-speed rail in 1958 borrowing 80 million dollars from the World Bank, and opened the Tokaido Shinkansen connecting Tokyo, Nagoya and Osaka in 1964. Following the Law for Nation-wide Construction of New Trunk Railroads was legislated in 1970, the Sanyo, and Tohoku and Joetsu Shinkansens with the technological innovations against snow opened from 1973 to 1982. The national government drew the Nation-wide Construction of New Trunk Railroads Plan in 1973 and included the particular sections of the Hokuriku Shinkansen, the Kyushu Shinkansen, and the extension of the Tohoku Shinkansen in the Plan. Due to the inefficient management and accumulated deficit partly caused by the construction of the Shinkansens, the national government decided to privatize the Japan National Railways in 1987. Once the construction of the Shinkansens was stopped in 1984, it was resumed in 1987 and included in the Fourth Comprehensive National Development Plan. A section of the Hokuriku Shinkansen, called as the Nagano Shinkansen for meeting travel demand of the 1998 Winter Olympic Games, an extended section of the Tohoku Shinkansen, and a section of the Kyushu Shinkansen opened from 1997 to 2004. The improvements of the existing trunk rail by directly connecting the Shinkansen and the existing line were also conducted in the Yamagata and Akita areas.

As of intra-city rails, the Teito Rapid Transit Authority, established in 1941, opened the second subway connecting Ikebukuro and Ochanomizu in the city center of Tokyo in 1949. Mitigating increasing congestion in intra-city rails and light rails in the city center of major metropolitan areas, the National Council planned comprehensive intra-city rail network for the Tokyo area in 1956, and later for the Osaka and Nagoya areas. The construction of new intra-city rails, mostly urban subways, and the improvement of existing intra-city rails have been conducted based on the plans. The national government promoted the schemes of direct connections between suburban private rails and intra-city subways, and the construction of suburban rails that connected the city center and new towns of large-scale residential developments. The construction of subways also proceeded in other major cities such as Fukuoka and Sendai areas due to the increase in travel demand. The Law for the Promotion of Urban Monorail Construction was legislated in 1972 by which the construction of urban monorails, new transport systems and guideway buses was promoted for meeting travel demand less than for heavy rails in the City Planning Area of major metropolitan areas and major cities.

The funding framework for rail projects is based on the principle that rail projects are profitable and beneficiaries should pay the cost of rail projects. It is noted that the implementing body of rail projects is classified into three types such as public sector, private sector and the form of public-private partnership. As of the construction of the Shinkasens, a half of the construction cost is repaid to the Japan Railway Construction,

Transport and Technology Agency that owns the Shinkansen infrastructure, by the private Japan Railway Companies that collect the fare from the passengers after the opening, and the rest is subsidized by the national and local government general funds. As of the construction of intra-city rails, a part of the construction cost is subsidized by the national government for public urban subways and new town rails. The rest is covered by the fare from the passengers, and by the special assessment or other tax of local government. The land for the right of way is also generated during the process of the land adjustment project, a type of the Urban Development Project of the City Planning. Most private rail companies internalize the benefit of the construction and operation of rails by investing in residential and commercial developments along the lines. A part of the construction cost of urban monorails, new transport systems and guideway buses is funded from the road revenue source based on the law for the Promotion of Urban Monorail Construction.

PART II

At the beginning of 21st century, the Japanese national government faces a shrinking era in terms of population with the increase in the share of elderly people. The people are more concerned about the environment both at local and global levels, and are supportive for the movement of decentralization in general. The trend leads to the shift from public investment in social capital including Mega Urban Transport Projects to maintenance and improvement of existing infrastructure and to preserve the environment. In PART II, we discuss current issues on Mega Urban Transport Projects in Japan, especially in the context of the New National Spatial Planning Law and related issues, and disaster prevention and public investment in transport projects.

The New National Spatial Planning Law and Related Issues

The Fifth Comprehensive National Development Plan in 1998 included the discussion on the national development system and proposed the major amendments to the Comprehensive National Development Law in order to change the characteristics of land planning from public investment in social capital to guidelines on national development. Against the background of population decrease, environmental concern, decentralization and others, the Comprehensive National Land Development Law was completely revised into the new National Spatial Planning Law in 2005.

As basic ideas, the new National Spatial Planning Law indicates four points suggesting that national land should be used for

(1) the autonomous development of local society according to its characteristics
(2) the vital economic society realized by reinforcing international competitiveness and developing science and technology
(3) the public life whose safety is secured, and

(4) the good environment that also contributes to the preservation of global environment.

The new Law makes the new National Spatial Plan different from the old Comprehensive National Development Plans. Firstly, the new National Spatial Plan must cover the use and conservation of sea area, and the generation and conservation of good environment and landscape as well as the elements included in the old Comprehensive National Development Plans. Secondly, the new National Spatial Plan is composed of two plans - the National Plan and the Regional Local Pan. The former contains guidelines of measures for comprehensive national land formation, while the latter covers the necessary planning elements for each designated region under national-local government partnership and cooperation with appropriate role allocation. Thirdly, the new National Spatial Plan must be exposed to the public hearing process and subject to the policy review process sometime after the plan has been formulated. Fourthly, local government of prefecture or municipality can propose a part of the Plan and its amendments to the Ministry of Land, Infrastructure and Transport. In case the Ministry does not take account of the proposal, it needs to hear the National Council and notify the local government of the Ministry's response with reasons. Fifthly, the new National Spatial Plan is formulated simultaneously with the National Land Use Plan at the national level.

Under the new National Spatial Plan, Mega Urban Transport Projects previously formulated by the old Comprehensive National Development Plans based on the centralized national-local government relationship need to go through the hearings from local government and the general public. On one hand, some general public might not want more Mega Urban Transport Projects as over 50 percent of them live in the metropolitan areas where local environment is a matter of more concern. On the other hand, some local governments might strongly propose more Mega Urban Transport Projects such as expressways and Shinkansens because their transport infrastructure is lower than the national average and partly because their economy is dependent on public investment. Therefore, how will the first new National Spatial Plan be is still uncertain.

Disaster Prevention and Public Investment in Transport Projects

Natural disasters such as earthquake, typhoon, heavy snow, volcanic eruption and others have seriously damaged human lives, buildings and transport facilities in Japan since the Second World War. When the national government discusses public investment in social capital including Mega Urban Transport Projects in Japan, higher priority is given to disaster prevention. Hereafter, we focus on disaster prevention and pubic investment in transport projects in relation to earthquake, which typically characterizes one of the current issues in transport planning and policies in Japan. Aside form the South Hyogo Prefecture Earthquake killing about six thousand people and devastating the structure of expressway and Shinkansen in the Kinki Region in

1995, the Fukui Earthquake killed about 4,000 people in 1948, while the Mid Niigata Prefecture Earthquake killed about 70 people in 2004. Furthermore, the Japanese national government expects several future earthquakes such as Tokai, Tonankai, and Nankai Earthquakes along the Pacific Ocean coast.

While Mega Urban Transport Projects should be constructed with sufficient materials and structures against possible earthquakes beforehand, immediately after earthquake, transport infrastructure should play a key role for carrying injured people and distributing necessary goods in the damaged area. Especially road network is important transport infrastructure for fast and flexible distribution of people and goods under emergent situation when traffic demand might often be more than normal period. The term 'redundancy' is a key for delivering the concept of invulnerable road network against earthquake where collapse of one road segment is easily substituted by alternative routes. One of the major reasons for public investment in ports soon after the Second World War was to secure redundant transport route when surface transport was damaged by earthquake or heavy snow. In fact, when the Mid Niigata Prefecture Earthquake happened and broke the Kanetsu Expressway and the Joetsu Shikansen, the alternative routes such as Joshinetsu and Banetu Expressways providing temporary bus services played an indispensable role for transporting people and goods to the affected area.

However, a redundant road project means that traffic volume on that road is often predicted to be low under normal situation. Simple cost benefit assessment might not support the road project with low traffic volume. On top of that, the probability of occurrence of incidence such as a devastating earthquake is extremely low and cost benefit ratio for the construction of the redundant road, possibly with higher cost of materials and structures against earthquake, is likely to be estimated as significantly low. It is especially true for the fault type earthquakes, for example the South Hyogo Prefecture Earthquake and the Mid Niigata Prefecture Earthquake, that are expected to occur once for every 1,000 year or more. Because the risk of devastating earthquake needs to be taken for well beyond the usual term of cost benefit assessment, it is argued that 'redundant' projects should be evaluated in a different framework of public investment than a simple cost benefit assessment.

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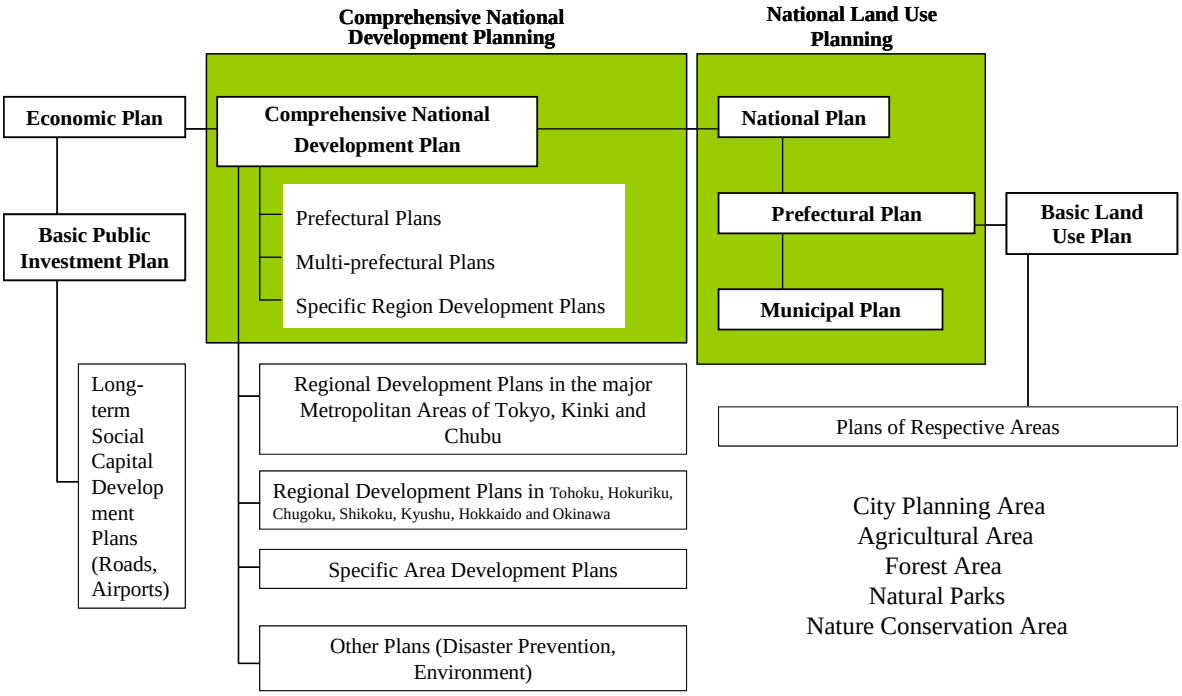
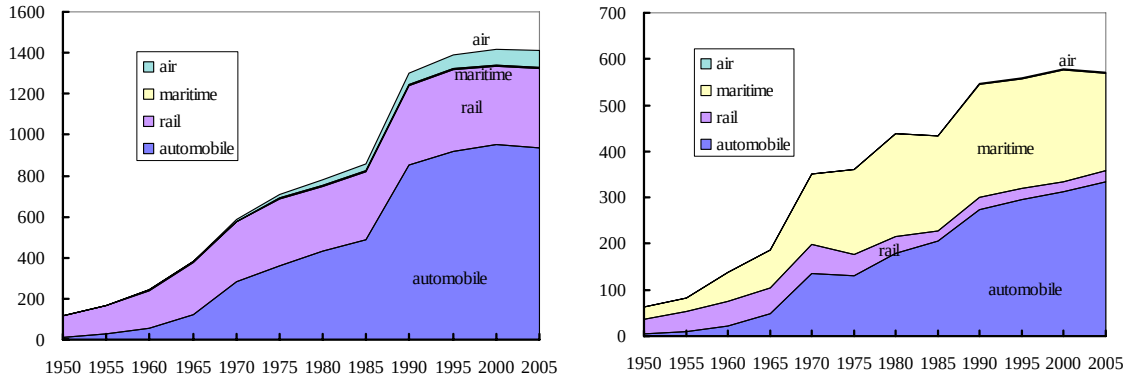


Figure 1 The diagram of the planning framework under the old Comprehensive National Land Development Law



Note: After 1990 the demand of mini-vehicles is included.

Figure 2 The trend of passenger (left: billion person kilometers) and freight (right: billion ton kilometers) transportation demand since the Second World War

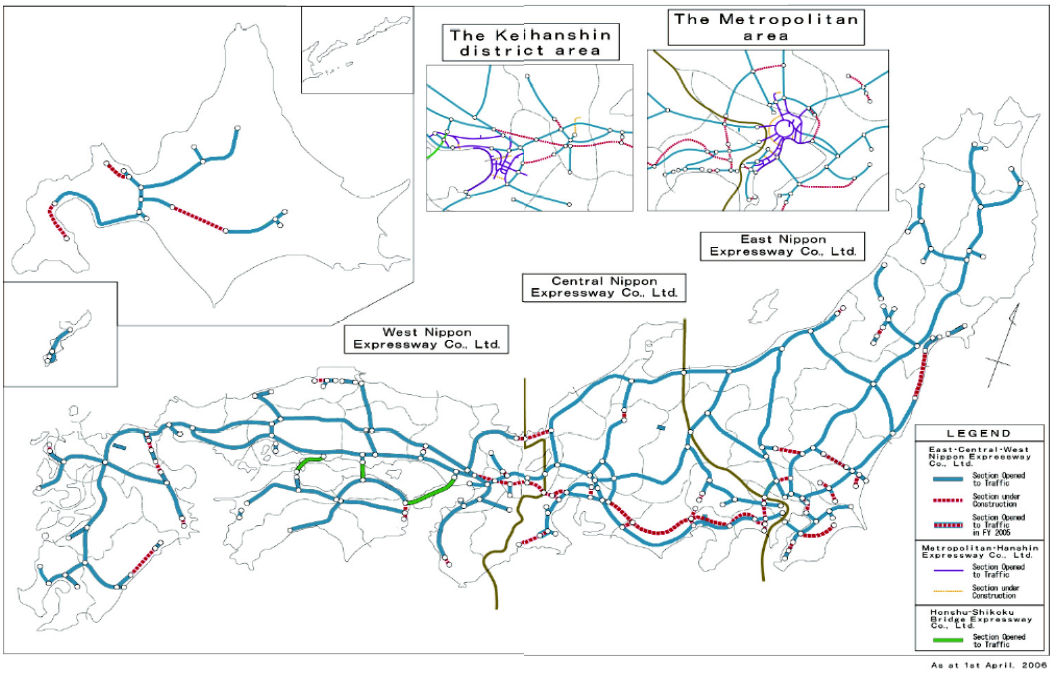


Figure 3 Inter-city expressway network

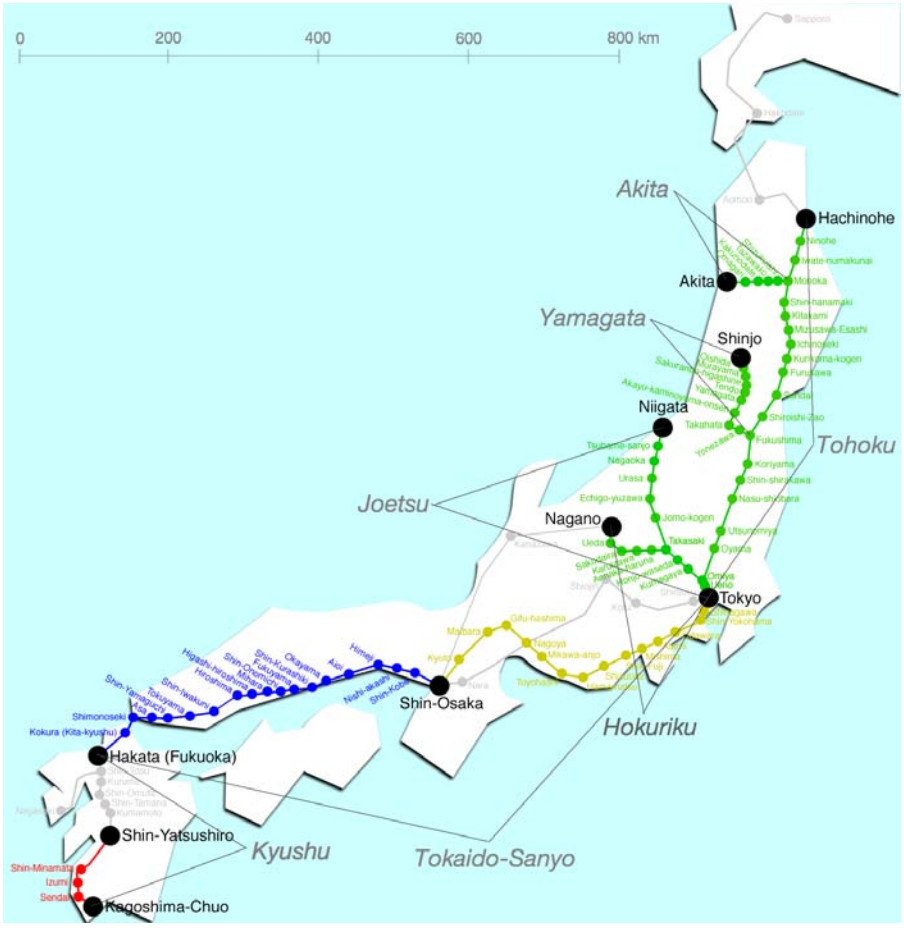


Figure 4 Inter-city high-speed rail (Shinkansen) Network

Table 1 The automobile related taxes imposed when one acquires, owns and uses an automobile

(Billion Yen in 2007)		Tax Revenue	Nationally Earmarked	Regionally Earmarked
On Acquisition	Acquisition Tax	485.5	0.0	485.5
	Consumption Tax	770.1	0.0	0.0
During Ownership	Tonnage Tax	1074.0	716.0	358.0
	Automobile Tax	1747.7	0.0	0.0
	Mini-Vehicle Tax	163.6	0.0	0.0
While In Use	Gasoline Tax	2844.9	2844.9	0.0
	Regional Road Tax	304.4	0.0	304.4
	Diesel Handling Tax	1036.0	0.0	1036.0
	Liquid Petroleum Gas Tax	28.0	14.0	14.0
	Consumption Tax	537.8	0.0	0.0
Total		8992.0	3574.9	2197.9