BHUTAN TRANSPORT 2040
INTEGRATED STRATEGIC VISION
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Introduction

Bhutan is in a period of transition. The last 50 years have seen the country enter the modern era—from a closed pastoral society with no electricity and no roads into a rapidly emerging economy aspiring to holistic development. The next 30 years will see it hugely transformed in terms of socioeconomic progress and adoption of new technologies, with electricity exports driving its economy. In particular, investments in basic infrastructure and services will ensure that Bhutan emerges as a developed economy.

Transport 2040 Integrated Strategic Vision establishes the building blocks to enable Bhutan to achieve its vision for transport. The vision is ambitious and reflects the changing socioeconomic development of the country.

This pamphlet draws largely from a report prepared under Subproject 14: Bhutan Transport 2040 Integrated Strategic Vision under the Development Partnership Program for South Asia,1 financed by the Government of Australia through the Australian Agency for International Development. The transport vision incorporates all existing transport-related plans, policies, initiatives, and actions to create a long-term comprehensive strategy for the country. It builds on earlier studies to create one integrated and sustainable plan.

The overall vision covers both the implementation of transport infrastructure (e.g., roads and aviation) as well as the execution of institutional and management functions associated with the delivery of transport services (e.g., regulatory tasks, bus services, and institutional reform).

An integrated strategic vision can only be realized if it leads to a sustainable transport system. This requires an approach that involves moving people, goods, and information in ways that reduce the impact on the environment, develop the economy, and strengthen society. It should include using more energy-efficient transport modes, improving transport choices, using cleaner fuels and technologies, applying information technology, and adopting progressive urban and regional planning approaches to reduce or replace physical travel.

Bhutan in 2040 will be very different from the Bhutan of today, and the transport system needs to respond to the changing needs and demands.

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A number of fundamental factors will determine Bhutan’s future growth. The following major development trends will impact the future of the transport sector:

**Electricity production and hydropower projects.** Perhaps the single most significant impact over the coming decades will be the increase in gross domestic product (GDP) attributable largely to the generation of hydropower and the export of electricity. Overall GDP growth will be driven by electricity exports and is expected to result in a fivefold increase in real per capita income from current values of $2,000 to about $10,000 by 2040.

This fundamental change will significantly impact all aspects of life in Bhutan as it provides the government with adequate revenues to pursue its social and economic development strategies. Hence, substantial increase in personal income is expected.

**Industrial development.** Lying close to the Indian border, the southern part of Bhutan offers comparative advantages for the development of export-oriented industries because of its abundant power sources and cheap electricity, availability of raw materials, easier access to transport, and large low-cost labor force from neighboring countries.

The proposed growth and location of this industrial activity will dramatically alter the pattern of development and urban settlements with the creation of a series of growth centers in the south. The completion of the proposed southern East–West Highway will improve access and link these developments.

**Rural–urban migration.** The population of Bhutan is predominantly rural, with about 70% living in rural areas. By 2040, the total population will have increased from 700,000 in 2012 to almost 1 million, with three-quarters living in urban areas (Figure 1). Almost half could be in Thimphu.

This migration is a consequence of desires and aspirations of the younger, more mobile, and more educated generations for a more varied lifestyle, based on the greater employment, education, and social opportunities available in urban areas.

To temper the population growth and economic dominance of Thimphu, a series of policies and actions will be required to encourage development in regional centers throughout the country, including in border towns.

These changes in the population distribution will have a number of implications on the transport sector, such as (i) increased urban transport with resulting congestion and
environmental degradation, (ii) increased demand for inter-dzongkhag (district) travel, and (iii) difficulties in providing adequate transport services to a much reduced rural population.

**Tourism.** The government’s policy is to encourage growth in tourism, with a target of 100,000 arrivals per year in the near future, up from 40,873 in 2010. This will require a substantial expansion of hotels and other facilities, including additional flights and new air connections, both domestic and international.

The growth in tourist numbers will require improved transport services; additional tour operators; and the introduction of domestic air services to open up new demand for high-end tourism, including helicopter access to remote areas. Surface transport should include scenic drives across the country.

**Gross national happiness, including poverty reduction.** The concept of gross national happiness (GNH) has been the guiding principle for the socioeconomic development of Bhutan over the last 2 decades, and will remain at the forefront of its agenda for economic development. The 10th Five-Year Plan envisages that all gewogs (groups of villages) will be connected by road by 2013 through a major program of rural road building. Such a program will immediately and directly reduce poverty, especially in remote parts of the country. The pursuit of GNH will continue to influence Bhutan’s economy in general, and the transport sector in particular. Social travel, including pilgrimage, will become increasingly important.
Regional transport connectivity. Trade accounts for 84% of Bhutan’s GDP. Almost all trade passes through the land borders with India. India is by far the largest trade partner, accounting for more than 80% of the trade value, with most exports and imports from third countries transiting through Kolkata. Currently no direct trade or transport links exist between Bhutan and the People’s Republic of China.

The potential for rail links to Indian railways has been investigated but construction of rail links has been delayed, although the potential exists for bulk haulage of minerals for export.

In addition to trade across land borders, the expansion of air services will enhance transport connectivity throughout South and Southeast Asia.

Brand Bhutan. “Brand Bhutan” offers a strong marketing tool covering many dimensions aimed at promoting the unique development philosophy of GNH. The emphasis on the promotion of green technologies and the enforcement of regulations on pollution control to maintain the image of an unspoiled country is of special interest in the transport sector.

This concept may be expanded to include the active promotion of alternative technologies for powering motor vehicles, leading to the potential abolition of all petrol or diesel-powered vehicles.
Transport Vision and Strategies

The transport strategies have been developed based on the impact of the above trends, the overall transport vision, and the range of transport issues identified.

Impact on Transport

The development trends discussed will have a major impact on the transport sector and will shape the overall transport vision in the coming decades. These changes will result in more travel, more vehicles operating on the roads, and a much greater proportion of the population living in cities. New cities will be developed and the population of Thimphu is likely to increase threefold over the next 30 years.

The larger volumes of intercity traffic (both passenger and freight) and more travel within Thimphu will increase congestion and environmental degradation. Greater international travel and trade will require improved regional road, rail, and air links. The likely effects of development trends on the transport sector may include the following:

- Hydropower—increased incomes leading to higher traffic and vehicle ownership
- Industrial development—increased heavy vehicle traffic
- Rural–urban migration—increased urbanization and need for traffic management
- Tourism—increased international air traffic and domestic air services
- Poverty reduction—100% electrification, need to construct and maintain rural roads
- Regional connectivity—improve international transport links across the border
- Bhutan brand—promote a high level of service, innovation, and green transport.

Growing wealth will result in a rapid increase in vehicle ownership. Figure 2 shows that the total number of vehicles could be 10 times the

Figure 2: Growth in Vehicle Ownership

Source: Road Safety and Transport Authority.
2010 level by 2040; and vehicle ownership, especially private cars, will increase to the levels of developed countries unless measures are taken to constrain growth.

**Transport Vision**

The overall transport vision can be summarized as follows:

- To provide the entire population with a safe, reliable, affordable, convenient, cost-effective, and environment-friendly transport system in support of strategies for socioeconomic development.

The goals of the transport vision are:

- accessibility to activities and supplies needed by people and enterprises,
- efficient use of economic resources,
- environmental sustainability, and
- transport safety especially on roads.

**Transport Strategies**

Nine transport strategies that constitute the overall Transport Vision 2040 have been developed. These are:

- road network,
- civil aviation,
- intercity passenger transport,
- freight transport,
- regional connectivity,
- urban transport,
- road safety,
- road transport regulation, and
- transport sector management.

The first eight strategies cover the main transport sectors, in terms of physical infrastructure, services, and regulation, while the final strategy concerns the coordination and management of the overall transport sector.

Transport Vision 2040 and the set of supporting transport strategies constitute an integrated approach to the three modes: road transport, urban transportation, and civil aviation, comprising broadly the following four activities:

- **infrastructure**—physical hardware,
- **services**—what runs on the infrastructure,
- **regulation**—control and legislation, and
- **management**—organization and direction of the sector.
Road Network Strategy

The development of the road network will be based on one integrated strategy covering all roads (except urban roads) from national highways, through feeder roads, to farm roads and access roads.

The Road Network Development Strategy covers:

- national highways (primary and secondary), which provide connections to border crossings and links to all dzongkhag centers;
- dzongkhag roads (previously feeder roads), which provide access within each dzongkhag to all gewogs and major villages;
- farm roads, which provide access to individual communities not otherwise served; and
- access roads, which provide access to hydro plants, schools, health facilities, forestry land, among others.

The responsibilities for planning, construction, administration, and maintenance of each class of road are discussed in Transport Sector Management (p. 18).

National Highways Strategy

The strategy involves the following six key activities:

- widening of the existing East–West Highway (and other key routes) to two lanes, with alignment improvements to reduce travel times and enhance safety;
- completion of the southern East–West Highway by upgrading existing routes and undertaking new construction to connect new industrial growth centers;
- construction of new alignments and diversions, including tunnels and viaducts on key routes to reduce distances and allow increased speeds and/or driver comfort;
- improvement of access routes between industrial centers and major border crossings, including the existing North–South Highway;
- introduction of improved engineering and construction technology to reduce overall life cycle costs and provide better pavement quality; and
- establishment of a maintenance regimen for all national highways and district roads to include pavement management systems and performance contracts.

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2 Thromde (urban) roads are included under the Urban Transport Strategy.
3 Secondary national highways were previously known as district roads.
Most of these activities already form part of the government’s strategy and are being implemented. However, new alignments and diversions, including tunnels and viaducts, can be significantly improved to create a modern high-capacity trunk road system. For example, the use of viaduct structures along steep hillsides with frequent re-entrant gullies can be very effective in allowing a significantly improved alignment while minimizing the environmental impact and extent of earthworks. Similarly, short tunnel sections can improve alignment, reduce road length, and minimize the adverse impact of road construction.

Rural Road Network

The rural road network strategy covers all non-urban roads of a lower classification than national highways. The critical activity at the planning stage is the creation of an agreed and coordinated dzongkhag transport master plan (DTMP) for each dzongkhag, which presents and prioritizes all transport investments, based on detailed inputs from the communities and local administrations.

Dzongkhag roads. The completion and subsequent upgrading of roads to all gewog centers is a priority. It is anticipated that an initial access road will be provided to about 200 of the 205 gewogs by the end of the 10th Five-Year Plan period in 2013. Following the completion of these roads, considerable pressure will remain to further expand the network to serve all significant population clusters. By 2040, it is anticipated that the dzongkhag road network will comprise about 3,500 kilometers (km), an increase of about 2,500 km from the present level of less than 1,000 km.

The dzongkhag road strategy entails:
- development of a DTMP in each dzongkhag to provide the basis for planning and prioritizing network development;
- construction of feeder roads to all gewog centers resulting in a dzongkhag road network of about 2,000 km, although most will be unsealed;
- identification and prioritization of additional dzongkhag roads based on demand, population served, and road length (>10 km), (possibly an additional 500 km);
- progressive upgrading of all dzongkhag roads to all-weather (sealed) standards to be prioritized based on traffic demand; and
- establishment of a program for routine and periodic maintenance activities.

Farm roads. The strategy aims to provide sustainable and equitable access in rural areas, including remote communities, in consideration of available funding and an appropriate balance between the construction of new roads and the maintenance of existing roads. The length of the farm road network is likely to stabilize at approximately 3,000 km.
The farm road network strategy involves:

- rationalization and prioritization of the network based on locally prepared DTMPs;
- establishment of criteria for farm road construction;
- extension and upgrading of the network based on local demand and DTMP priorities;
- review of construction standards and methods to ensure sustainability; and
- construction of motorable bridges to ensure all-weather accessibility.
Civil Aviation Strategy

There is a clear need for a major expansion in air services between Bhutan and key Asian hubs, particularly with neighboring cities in Bangladesh, India, and Nepal, to support the proposed growth in tourism and increased economic and commercial activities. The facilities at Paro International Airport and the domestic airports in other parts of the country will require expansion and upgrading.

The introduction of domestic aviation services is a key element of the government’s strategy to promote development and integrate the remote eastern and southern districts into the economic mainstream. Besides three domestic airports, additional short take-off and landing airstrips and/or helipads in other remote or unserved districts should also be considered.

The aviation sector strategy comprises seven main activities:

- expansion of international links with other Asian hubs and regional centers;
- provision of air carrier services and airport facilities sufficient for growth targets;
- availability of domestic scheduled services linking main population centers;
- construction of airstrips in remote areas for short take-off and landing and helicopter services;
- provision of helicopter services for search and rescue, emergencies, and charter services;
- private sector participation in services and facilities; and
- effective regulation and compliance with international safety and environmental standards.
Passenger Transport Strategy

The Passenger Transport Strategy aims to provide safe and affordable inter-dzongkhag public transport services to all significant population centers based on demand.

The role of government, through the Road Safety and Transport Authority, should be to provide an enabling environment within which the private sector can provide safe and effective services based on demand. The main functions of government involvement and regulation should be to ensure safety, maintain standards of comfort and convenience (service frequency), and regulate fares (at least for basic services).

The government should consider subsidies in locations where, or at times when, service levels provided by private sector operators are deemed inadequate. These subsidies should be directly related to the level of service provision required.

Specific policies and strategies will be required for the following services and facilities:

- **Inter-dzongkhag bus services**—size and condition of vehicles, including promotion of larger vehicles where and when road conditions permit; availability of luxury premium services; schedules and frequencies in coordination with operators; and regulation of fares for basic services.
- **Inter-dzongkhag taxi services**—regulation of fares, identification of appropriate vehicle types, determination of fares on a seat per kilometer basis, and regulation of loading.
- **Local (rural) services within dzongkhags**—introduction of minibus services in areas of low demand; identification of appropriate vehicle types; determination of fares on a per-passenger basis, based on road condition; and formation of local route associations.
- **Terminal facilities**—provision of appropriate terminal facilities in major centers for bus and taxi services in coordination with local authorities.

The activities required are:

- introduction of larger, more comfortable buses on major routes;
- alternative performance-based subsidy scheme for unprofitable routes;
- waiver of import duty and sales tax on new 8–12 seater vans used for public transport;
- introduction of incentive measures, including tax waivers for new environment-friendly and fuel-efficient buses and taxis; and
- construction of bus terminals and intercity taxi parking in all dzongkhag centers, including bus stops along the highways.
In the next 30 years, the freight transport sector will experience a major change, including the modernization of the vehicle fleet, an expansion of the logistics industry, closer matching of truck supply with demand, and the potential introduction of alternative modes of transport.

The Freight Transport Strategy aims to provide cost-effective and seamless freight services in response to demand. Most of the changes envisaged and recommended will be carried out by the private sector, although certain actions are required by the public sector. The government should (i) introduce tax incentives for new large trucks that are fuel efficient and comply with stringent emission standards; (ii) continue its efforts to improve the quality of the road network, and to build inter-modal transport facilities including warehouses, cold storage, and inland container depots and dry ports; (iii) support the establishment of management information system and global positioning system tracking; (iv) assist with the development of the logistics industry; and (v) investigate the potential for connections to the Indian rail network and the use of ropeways (aerial lifts) for specific commodity movements.
Regional Transport Connectivity Strategy

Bhutan has a small domestic market and is largely dependent on external trade to ensure its future economic growth. Its location dictates that this trade will be primarily with India and other South Asian countries, although opportunities exist to expand beyond this.

The overall goal of the Regional Transport Connectivity Strategy is to facilitate trade and vehicle movement between Bhutan and other countries in the region through measures to improve transit and customs procedures, together with parallel strategies to improve international road, rail, and air transport links.

The strategy aims to reduce transport costs and travel times between Bhutan and other countries in the region through improved infrastructure, easier transit and customs procedures, and implementable transport and transit agreements. The main activities required to implement the strategy and achieve these objectives include the continuing development of trade, transport, and transit agreements with neighboring countries; enhanced access to better road network; and improved facilities at border crossings.
Urban Transport Strategy

Bhutan’s cities require integrated transport plans to address the needs of their expanding populations and city areas. The growth in population and the increasing number of cars will result in serious traffic congestion unless action is taken. The cities should not continue to rely on personal car travel alone. Hence, public transport is urgently needed.

The urban transport strategy should focus on providing attractive public transport services and facilities for pedestrians, so that walking becomes the dominant mode in the central area and for short trips. The strategy must also seek to control the impact of private cars through careful management of vehicle numbers and use. The overall objective is to create vibrant, functional, and livable “green” cities, thus minimizing the adverse effects of traffic growth.

Starting with Thimphu, the responsibility for implementing and realizing the strategy lies principally with Thimphu Thromde (municipality) as coordinator and provider of urban services. While the existing Thimphu structure plan provides a solid basis to move forward, it requires updating to reflect current forecasts and trends, specifically population estimates and people’s aspirations for car ownership (Figure 3).

The strategy has identified a number of transport-related activities, involving both planning and implementation within the urban sector, which will require coordination by Thimphu Thromde. Thimphu Thromde will require strengthening to take on these additional responsibilities.

Figure 3: Concept Plan for Pedestrianization of Thimphu Central Area

Source: Thimphu Structure Plan.
The Urban Transport Strategy calls for six key activities:

- review and updating of the existing structure plan based on the revised population and vehicle ownership forecasts, including the preparation of an urban transport plan;
- improvement of the traffic engineering and management system, including better use of existing road space, provision of safety enhancements, and revision of traffic circulation;
- development of public transport, including identifying measures to boost ridership based on several options, both for the short- and long term;
- improvement of facilities for pedestrians, including a safe and secure network of routes and priorities within the central area;
- consideration of controls or restrictions on vehicle ownership and use in urban areas; and
- conduct of a study on parking demand, establishment of a parking policy, and development of a package of regulatory measures.
Road Safety Strategy

The Road Safety Strategy aims to improve road safety to a level achieved by countries with excellent road safety records. The specific objectives include (i) reduction of the number of road deaths to under 5 per 10,000 vehicles by 2020, (ii) reduction in the rate of serious injuries by 50%, and (iii) establishment of a road safety culture with zero tolerance of unsafe driving behavior.

The overall strategy will be implemented by:

- establishing a road safety board,
- developing a road safety action plan,
- improving road design standards,
- setting up a road safety audit process,
- improving driver training and vehicle safety standards and testing,
- strengthening the traffic police,
- implementing an accident reporting and analysis system,
- introducing school safety and public awareness programs,
- undertaking a safety retrofit program, and
- establishing a road safety fund.

The initial key activity is the establishment of a road safety board and the associated coordination unit to take overall responsibility for implementing the program.
The Road Transport Regulation Strategy aims to establish a safe and environment-friendly vehicle fleet, and adopt a high standard of driver training and behavior. Many of the proposed activities to implement the strategy overlap with other strategies related to inter-dzongkhag bus transport, taxis, and trucking and are described in their related strategies.

The Road Transport Regulation Strategy includes:

- improving the road code and drivers’ training;
- establishing modern testing facilities for roadworthiness or privatize roadworthiness testing, emissions, and fuel standards;
- implementing enforcement programs for overloading, roadworthiness, and emissions;
- devolving enforcement of road rules to the traffic police, and the engineering aspects to the road agency;
- developing and implementing the Road Safety Action Plan (covered in the Road Safety Strategy);
- amending the Road Safety and Transport Act and regularly updating regulations;
- continuing the development of information and technology systems in the Road Safety and Transport Authority and the traffic police;
- establishing a national traffic police and provide technical resources and training; and
- introducing incentives for fuel-efficient and green vehicles in coordination with the Ministry of Finance and the Ministry of Economic Affairs.
Transport Sector Management Strategy

This strategy aims to develop efficient and effective management of the transport sector to achieve the overall transport vision. Specific objectives include (i) restructuring organizations responsible for transport to respond to the changing needs of the sector; (ii) developing technical capacity in the government and the private sector; and (iii) promoting the participation of the private sector in planning, engineering, construction, and maintenance services.

The key issues in managing the transport sector in Bhutan are summarized as follows:

- The rapid increase of demand for domestic and cross-border transport has created a need to improve transport services and infrastructure.
- The current transport program has significantly increased the workload and tested the technical resources of government agencies and the private sector.
- No single agency in the Government of Bhutan is responsible for overall transport sector policy, planning, coordination, setting of targets, and performance monitoring.
- Many government agencies are involved in the planning, operation, and regulation of the transport sector, resulting in overlaps and gaps in responsibility.

The review of the existing institutional framework and the activities of government agencies involved in transport has identified the following concerns and issues:

- No single agency leads the sector or is responsible for policy, strategic planning, coordination, and performance monitoring.
- There are overlaps and gaps in the responsibilities of the Department of Roads, Road Safety and Transport Authority, traffic police, Department of Urban Development and Engineering Services, Department of Agriculture, and city corporations.
- Limited technical expertise in the Government of Bhutan is dispersed over many agencies, making management of and implementation of policies in the sector inefficient and ineffective.
- Growth in the sector is creating a demand for additional technical and management resources, as well as new technical skills.
- Performance of the sector — measured by road condition, travel times, road deaths, air service availability, and transport costs — remains fairly low, and requires more efficient and effective management to improve.
The requirements for improving sector management include:

- better coordination of policy, planning, investment, enforcement, maintenance, and regulation;
- improving the utilization of available technical resources;
- upgrading technical skills in both the government and private sectors; and
- fostering and increasing the technical resources available in the private sector.

Organizational issues in the Bhutan transport sector are summarized as follows:

**Recommendation**

Based on the extent of the road network, population size, and the structure of government in Bhutan, only two levels of road authority are needed—one for the main road network (i.e., national highways) and another for local, rural, and urban roads. This is in keeping with the organizational setup in many countries.

**Options for reorganization**

Several options for the reorganization of existing transport agencies and the reallocation of management functions and responsibilities have been identified as follows:

- placing all the transport sector agencies and functions in a single ministry,
- creating a (new) separate Ministry of Transport by reorganizing relevant agencies, or
- creating one or more independent transport authorities.
Bhutan Transport 2040 Integrated Strategic Vision

Bhutan, in 2040, will be very different from what it is today. The transport system then needs to respond to the changing needs and demands. The Transport Integrated Strategic Vision 2040 incorporates all existing transport related plans, policies, initiatives, and actions to create a long-term comprehensive strategy for the country.

This publication draws largely from a report Bhutan Transport 2040 Integrated Strategic Vision, a subproject of a regional technical assistance on Development Partnership Program for South Asia, financed by the Government of Australia through the Australian Agency for International Development. This was the first study in Bhutan to integrate sustainable transport vision and strategies.

About the Asian Development Bank

ADB’s vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region’s many successes, it remains home to two-thirds of the world’s poor: 1.7 billion people who live on less than $2 a day, with 828 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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