



Ministry of Public Works and Transport
MPWT

National Implementation Plan on Environmental Improvement in Transport Sector of CAMBODIA (Draft)

*Workshop on Designing and Establishing Cambodian Low Carbon Development
Plan*

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Part 1. Current Status of Transport Sector

1. Current Status of Transport System

1.1 Land Transport

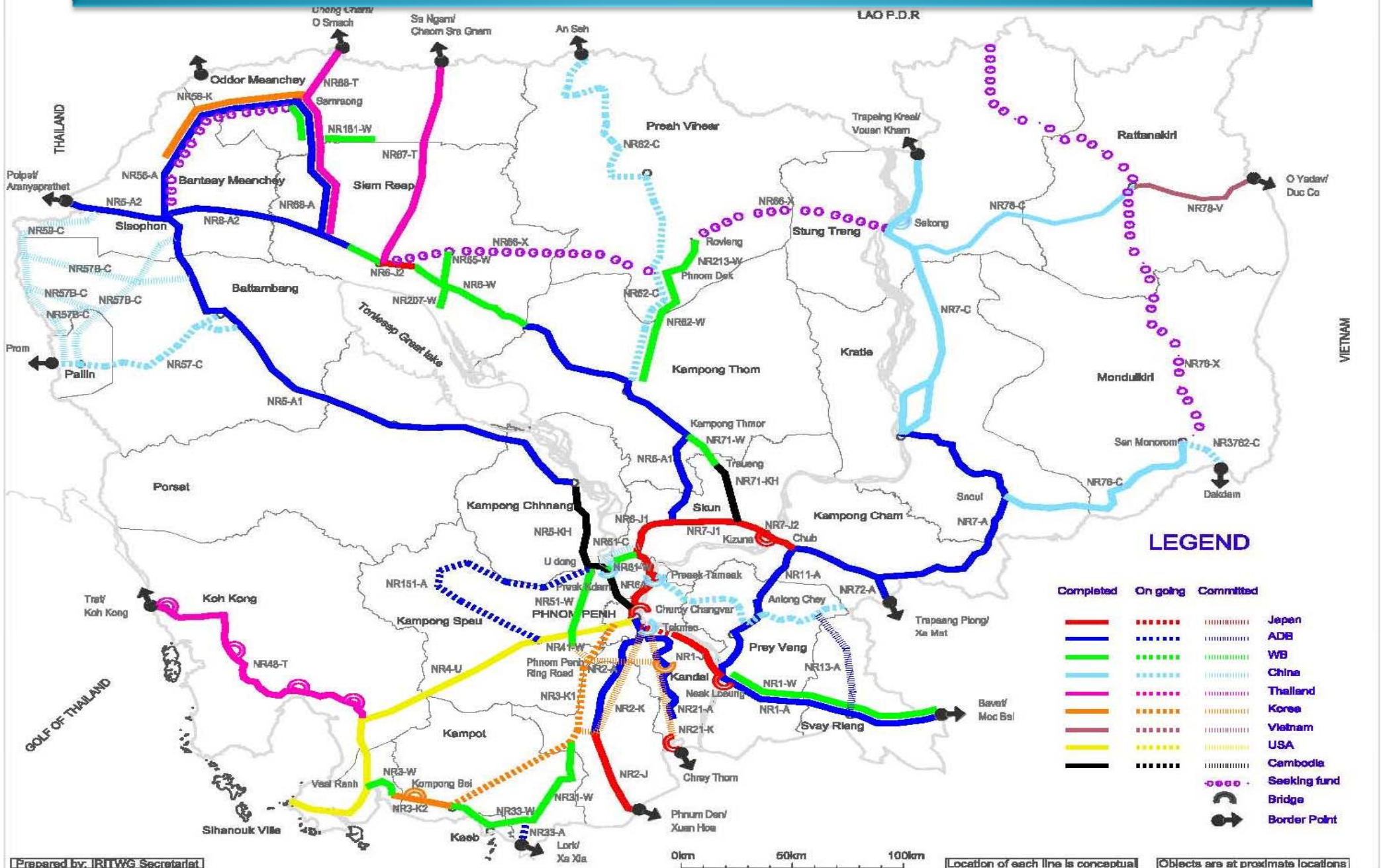
A. Road Network

The road network in Cambodia is composed of arterial roads that are managed by the Ministry of Public Works and Transport (MPWT) and rural roads managed by the Ministry of Rural Development (MRD). Pavement and bridge status are

as below.

Road Classification	Length (percentage)	No. of bridges (length)	Management authority
1-digit national roads	2,117 km (5.3%)	589 (17,643 m)	MPWT
2-digit national roads	3,145.6 km (7.9%)	698 (15,710 m)	
Provincial roads	6,441 km (16.2%)	904 (16,309 m)	
Rural roads	28,000 km (70.5%)	N/A	MRD
Total length	39,703.6 km (100%)	2,121 (51,917 m)	

Road and Bridge in CAMBODIA



Future Road Development

To further strengthen the flow of the traffic and improve the economic development, the Royal Government of Cambodia has adopted 6 keys strategies dealing with road sector:

·Strategy I: Strengthen and improve the multi growth poles [1] development

○Completed projects:

- Enlarge NR 6 to 4 lanes: Phnom Penh–Th' Nal Kaeng
- Enlarge NR 5 to 4 lanes: Phnom Penh–Prek Phnau
- Enlarge NR 4 to 4 lanes: Phnom Penh–Sihanouk Ville

○Future projects:

- Upgrade road and try to enlarge them to 4 lanes to connect to potential development poles
- Improve the road network in development pole
- Detouring road and sky bridge to solve traffic congestion at development poles
- Construct express way Phnom Penh–Sihanouk Ville
- Construct high way Phnom Penh–Chrey Thom
- Construct express way Phnom Penh–Siem Reap–Poi Pet

○Detouring roads and ring roads at important cities:

- Construct detouring road, Siem Reap
- Construct detouring road, Battambang
- Construct ring road of Phnom Penh
- Construct detouring road, Kampong Chhnang

·Strategy II: Strengthen and improve road network to serve important social economic development region

- Enlarge NR 4 and NR 1 to 4 lanes
- Construct second Neak Loeung Bridge
- Prepare plan and develop road network connecting to NR 4 and NR 1
- Improve quality and traffic safety of economic development corridor road

·Strategy III: Push the development of tourism

- Enhance road in tourism region in order to offer convenient, good environment, create opportunity to public
- Establish administrative office at international gates to offer tourists convenient, enhance the connecting road
- Construct convenient airport, upgrade and enhance the connecting road
- Construct tourist port, upgrade and enhance the connecting road
- Construct sewage treatment station



Future Road Development (cont.)

·Strategy IV: National and regional integration

- Construct and upgrade national road 1 and 2 digit
- Construct and upgrade provincial road 3 digit (inter-provincial road) and in province road
- Construct and upgrade district road
- Construct and upgrade rural road

·Strategy V: Develop international corridor

- Develop international corridor (1) GMS International Highway
 - Strengthen the function of national road 1 digit and enhance national road 2 digits that defined to be GMS highway
 - Construct nation-wide road connecting to all international gates:
 - a. Vietnam: NR33, NR2, NR21, NR1, NR8, NR72, NR74, NR3762 and NR78
 - b. Lao P. D. R: NR7
 - c. Thailand: NR62, NR64, NR66, NR5, NR59, NR57, NR55 and NR58
 - d. Others: NR4 (through Sihanouk Ville seaport)

·Strategy VI: Praise the development of social economy at rural and along border in order to reduce poverty

- Strengthen national road 2 digits, provincial road 3 digits, road in province, district road connecting to rural area and road along border that have high agriculture, industry, and tourism potential
- Construct road at triangle development (Cambodia, Lao P. D. R, Vietnam)
- Construct road at emerald triangle development (Cambodia, Lao P. D. R , Thai)

Part 1. Current Status of Transport Sector

1. Current Status of Transport System

1.1 Land Transport

B. Transportation

- The major trend and development in the transport sector is the significant increase in traffic which is mainly due to an expanding economy and improving roads. Consequently the number of registered vehicles has been increasing, there are increasing vehicle emissions and traffic accidents which have an impact on the environment and health.
- In urban areas the incidence of private transport particularly cars is increasing rapidly and congestion and pollution is consequently worsening particularly as many of the cars are older second hand imports which are not fuel or emission friendly. In addition there is no mass transit public transport system operating within any urban areas.

Part 1. Current Status of Transport Sector

1. Current Status of Transport System

1.1 Land Transport

C. Road traffic

- The number of registered vehicles has been increasing from year to year at a rate of about 19% in 2010 (1,652,534 vehicles)

Vehicle/ Year	2006	2007	2008	2009	2010
2/3 wheeled motorcycles	541,146	671,252	860,167	1,135,638	1,372,252
cars	106,581	121,147	137,049	157,484	173,047
Buses + minibuses	15,912	18,597	21,166	24,004	26,738
Trucks	50,824	58,051	66,133	74,439	80,497
Total Vehicle Fleet	714,463	869,047	1,084,515	1,391,565	1,652,534
Annual growth rate %	24%	22%	25%	28%	19%

traffic accident / year	2006	2007	2008	2009	2010
Deaths (persons)	1,292	1,545	1,638	1,717	1,816
Serious Injuries (persons)	6,033	7,150	7,226	7,020	6,718
Slight injuries (persons)	18,821	18,708	16,932	12,782	9,753
Total persons killed +injured	26,146	27,403	25,796	21,519	18,287
Deaths Annual growth rate %	46%	20%	6%	5%	6%
Ser inj Annual growth rate %	139%	19%	1%	-3%	-4%
Slt Inj Annual growth rate %	260%	-1%	-9%	-25%	-24%
Total injury annual growth rate %	248%	4%	-7%	-18%	-17%

Part 1. Current Status of Transport Sector

1. Current Status of Transport System

1.1 Land Transport

D. Traffic Accidents (road safety)

- While the number of vehicles is increasing, the number of traffic accidents is also still highly concerning.
- The number of road accidents was 5007 cases in 2011, out of which 1890 persons were killed, 4910 severely injured and 3644 slightly injured.

The activities of transportation in land transport 80%, waterway 15%, Aviation 4% and Rail 1%.

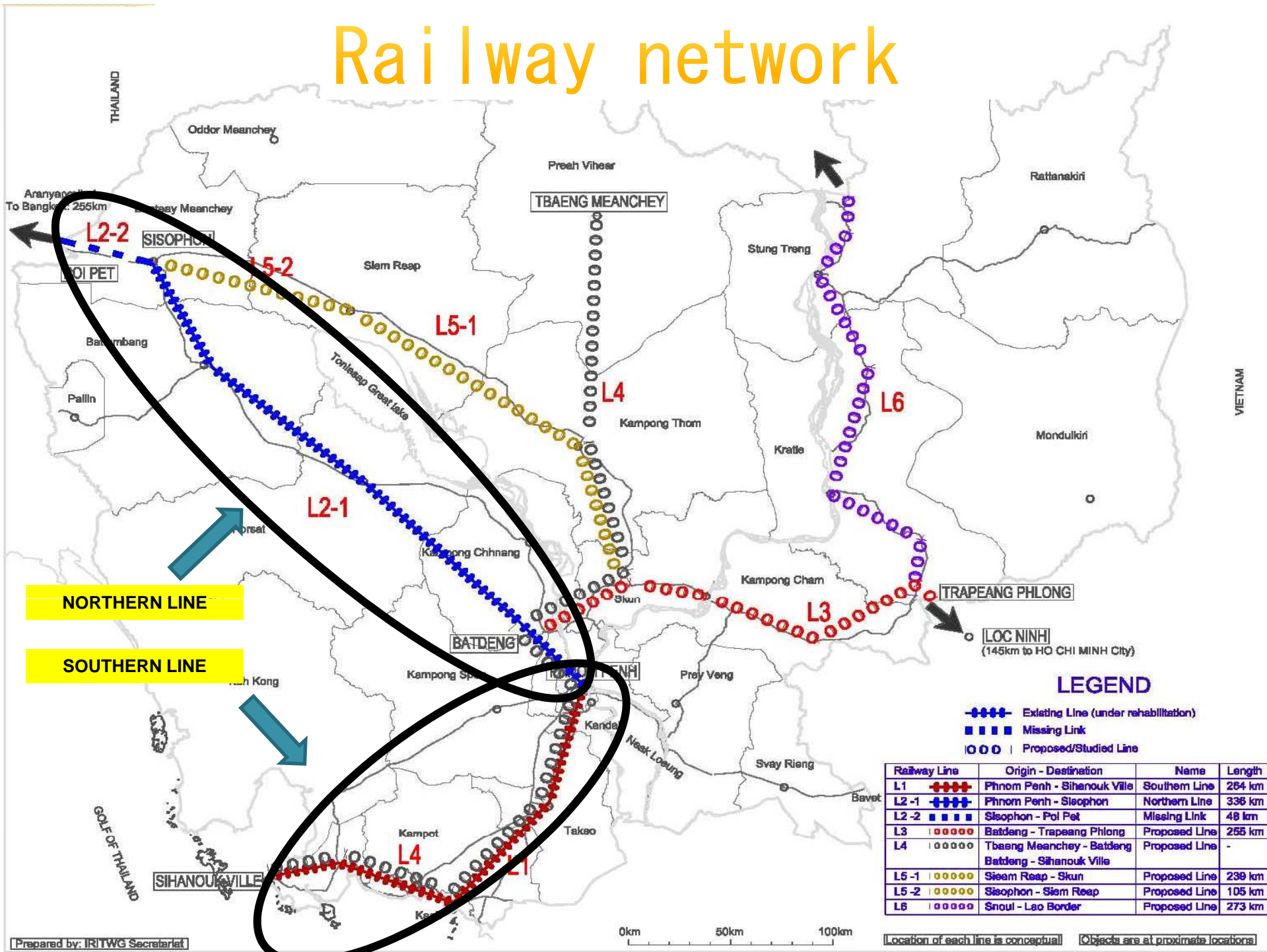
Part 1. Current Status of Transport Sector

1. Current Status of Transport System (cont.)

1.2 Railway

- The railway route in Cambodia currently consists of two lines with a total length of 649 km. The North line (385 km) connects from the capital city, Phnom Penh to Poipet (Cambodia–Thailand border). The South line (264 km) connects from Phnom Penh to Sihanoukville.
- The two railway lines have badly been damaged during the war times. The stretch of the line from Sisophon to Poipet and Sihanoukville has been totally destroyed. It is now being revitalized under a series of reforms and investments and with a private partnership agreement for operations. The Royal Government celebrated a railway rehabilitation ceremony on February 18, 2008. The work is

Railway network



Part 1. Current Status of Transport Sector

1. Current Status of Transport System

(cont.)

1.3 Maritime and waterway

- Among the ports in Cambodia, only Sihanoukville Port, 400m-long and 11.50m-deep, and Phnom Penh Port, 300m-long, handle international containers. These two ports are controlled by the central government, but are financially independent, autonomously-managed ports.
- Sihanoukville Port has a cargo handling volume of approximately 1.6 million tons, and Phnom Penh Port, approximately 740,000 tons. The MPWT is right now under the process to consider the establishment of a kind of Port Administration, in order to regulate all ports.
- Of the 1,750 km length of the inland waterway in Cambodia, all year navigation is only possible 580 km of

Part 1. Current Status of Transport Sector

1. Current Status of Transport System

(cont.)

1.4 Aviation

- There are 11 airports in Cambodia, but regular flights are only available at 2 airports: Phnom Penh International Airport and Siem Reap International Airport. These are under BOT agreement between the RGC and SCA. All other airports are managed by the State Secretariat of Civil Aviation (SSCA) except for the Kampong Chhang Airport.
- The usage of international airports has been increasing yearly owing to the increase of tourist demand.
- At Phnom Penh International Airport, the number of international flight passengers has been increasing yearly and has marked 1.53 million in 2008.
- At Siem Reap International Airport, the number of

Part 1. Current Status of Transport Sector

2. Current Status of Energy and GHG (CO₂)

2.1 Fuel Consumption

- Cambodia consumes about 2.4 million liters of oils per day, according to the import statistic of oil in 2006.
- In Cambodia all petroleum products are imported. The current transportation means consume about 65% of the total gasoline and diesel while the energy sector uses the diesel fuel and fuel oil as the principle source of electricity generation. Recently, there have been initiatives from taxi operator and private car owners to convert their engines to run on gas. .

Part 1. Current Status of Transport Sector

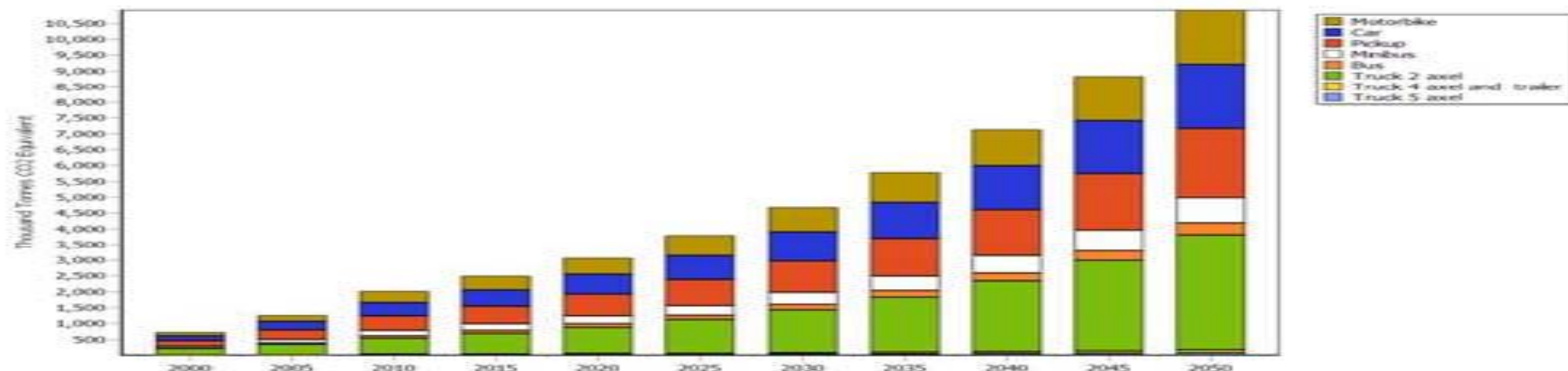
2. Current Status of Energy and GHG (CO2) (cont.)

2.2 CO2 Emission

- In particular the high growth of the transport relates CO₂ emissions compared to other economic sectors

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Motorbike	11	108	308	433	527	642	781	934	1119	1308	1510
Car	148	267	424	518	627	763	929	1130	1374	1672	2035
Pickup	173	308	455	554	674	819	997	1213	1476	1796	2185
Minibus	55	105	168	204	248	302	368	447	544	662	806
Bus	27	47	77	98	114	138	168	205	249	308	369
Truck 2 axel	183	314	506	648	829	1062	1359	1739	2226	2849	3646
Truck 4 axel and trailer	8	11	18	22	27	33	40	48	59	72	87
Truck 5 axel	11	12	16	19	23	28	34	42	51	62	75
Total	720	1262	2020	2489	3070	3787	4675	5773	7134	8821	10912

Environmental Results: Global Warming Potential
Scenario: Reference, Fuel: All Fuels, GHG: All GHGs



Part 1. Current Status of Transport Sector

3. Current Status of Environment in Transport Sector

3.1 Air pollution emission

- The mean value of CO concentration in ambient air (roadside) at and around the above three selected sampling locations is in a better condition (2005–2007) comparing to the National Ambient Air Quality Standard. As an observation, the CO concentration tends to increased between 4 ppm up to 6 ppm in 2007.
- The mean value of NO₂ concentration in ambient air between 2005 and the mid 2007 is in a better condition too. The graphic showed that the mean concentration of NO₂ in the three–observed years is increased a little bit between January to June, and it seemed to be stable (around 0.02 ppm) within the interval of July to December.
- Beside the two parameters above, SO₂ concentration was found in a lowest rank. The max. SO₂ concentration in 2005 was 0.083 ppm (in January) and min. concentration less than 0.0041 ppm. The mean

Part 1. Current Status of Transport Sector

3. Current Status of Environment in Transport Sector (cont.)

3.2 Noise and Vibration

- Noise pollution has started to happen in PPM and large urban areas (Siem Reap and Sihanoukville) since the late 1990s while numbers of motor vehicles were remarkably increased. Noise pollution in PPM is occurred in parallel with the times of people go to work, to somewhere and back home. Furthermore, most motor vehicles in Cambodia are second-hand type which less control of noise. There is no attention to control the quality of imported motor vehicles at check-point too.
- Activities to control traffic noise along the road complying with the Sub-Decree on Air Pollution and Noise Disturbance, has not applied yet. However, MoE's officers merely monitored noise pollution at some stationary sources like: factories, handicrafts, business locations, to solve the communities' complaints.

Part 2. Envi' t Issues and Actions in the Transport Sector

1. Land Transport (1)

Envi't issues to climate change, air and noise pollution

Current Issues	Actions
1. Vehicle emission control and standards	<ul style="list-style-type: none">- Conduct the assessment of number and types of vehicle, and fuel quality and quantity- Establishment of Vehicle Inspection System Implement- Improvement of vehicle inspection and maintenance system- Regulation of secondhand vehicle- Introduction of new or revised emission standards
2. Vehicle Technology	<ul style="list-style-type: none">- Operation of fuel efficient vehicles- Operation of vehicles using alternative fuel- Operation of hybrid buses
3. Public Transportation	<ul style="list-style-type: none">- Operation of Bus in cities and connect to provinces- Operation of the low-cost and efficient city bus service- Conduct the study of travel demand management
4. Fuel and vehicle standard	<ul style="list-style-type: none">- Reinforcement of laws and policies related to inspection and maintenance- Public knowledge and awareness raising

Part 2. Envi' t Issues and Actions in the Transport Sector

1. Land Transport (2)

Envi't issues to climate change, air and noise pollution

Current Issues	Actions
5. Freight and logistics	- Improvement of freight transportation complex
6. Biofuel	- Alternative fuel introduction in the national plan
7. Behavioral changes	- Promotion of eco-driving
8. Environmental monitoring	- Introduction of environmental monitoring systems e.g. noise
9. Inventory	- Development of local data in estimating emissions, e.g. vehicle emission factors, registrations

Part 2. Envi' t Issues and Actions in the Transport Sector

2. Railway

Envi't issues to climate change, air and noise pollution

Current Issues	Actions
1. Rail infrastructure	- Expansion of railway network connected from city to province * Rehabilitation of north line (Phnom Penh-Poipet: 385 km) * Rehabilitation of south line (Phnom Penh-Sihanoukville:264 km)
2. Inventory	- Introduction of experiences and knowledge to estimate the emissions
3. Environmental Monitoring	- Introduction of environmental monitoring systems

Part 2. Envi' t Issues and Actions in the Transport Sector

3. Maritime and waterway

Envi't issues to climate change, air pollution and waste water

Current Issues	Actions
1. Emission control, standards and regulation	<ul style="list-style-type: none">- Introduction of emission standards- Promotion of fuel switch (low sulfur)- Regulation of secondhand vessel/ferry
2. Port infrastructure	<ul style="list-style-type: none">- Improvement of cargo handling system at port- Promotion of Onshore Power Supply- Improvement of port facilities
3. Inventory	<ul style="list-style-type: none">- Development of local data in estimating emissions, e.g. emission factors

Part 2. Envi't Issues and Actions in the Transport Sector

4. Aviation

Envi't issues to climate change, air and noise pollution

Current Issues	Actions
1. Airport Infrastructure	<ul style="list-style-type: none">- Improvement of air traffic control system- Promotion of eco-airport
2. Aircraft Technology	<ul style="list-style-type: none">- Introduction of noise reduction technologies
3. Environmental Monitoring	<ul style="list-style-type: none">- Introduction of air quality monitoring at airport
4. Inventory	<ul style="list-style-type: none">- Development of local data in estimating emissions, e.g. emission factors

Part 3. Vision for Low-carbon and low-pollution

- Implementing city master-plan
- Motivate private sectors to handling the public transportation.
- Extending urban transportation infrastructure
- Strengthening inspection and control of air pollution (3M :Man-Material-Money).
- improvement of Ring Roads in the main cities

“High Efficiency Transportation, Low-carbon & Low-pollution”

Part 4. Current Policies related to the Environment in Transport Sector

- 1- Contribution principal (50% for gov't and 50% for resident) have been implemented successfully.
- 2- Reformed two-way as one-way road by installing the middle barring.
- 3- Annually checked vehicles (inspection).
- 4- Using the global positioning system device (GPS) supported by Handicap International.
- 5- Increase the traffic light and the road signal (line, plate..)
- 6- Green park.
- 7-Extent the road by cutting the pavements at both sides.

National Policy in Transport Sector (final draft),

Part 5. Implementation Plan

Action Plan		
Action	Concerned Institutions to Implement (by whom)	Period of Implementation (by when)
Land Transport		
1. Vehicle emission control and standards		2015
- Conduct the assessment of number and types of vehicle, and fuel quality and quantity	MPWT (land transport department)	2015
- Establishment of Vehicle Inspection System Implement Euro 4 by 2016		
- Improvement of vehicle inspection and maintenance system		
- Regulation of secondhand vehicle	MPWT, MEF	2015
- Introduction of new or revised emission standards	MoE, MPWT, PPM	
2. Vehicle Technology		
- Operation of fuel efficient vehicles	MPWT, MEF, MoE	N/A
- Operation of vehicles using alternative fuel		
- Operation of hybrid buses		
3. Public Transportation		2015
- Operation of Bus in cities and connect to each provinces	MPWT, PPM, MEF	2015
- Operation of the low-cost and efficient city bus service		
- Conduct the study of travel demand management	MPWT, PPM, MoE	2014
4. Fuel and vehicle standard		
- Reinforcement of laws and policies related to inspection and maintenance	MPWT, MoE	2014
- Public knowledge and awareness raising	MPWT, MoE, MEYS	
5. Freight and logistics		N/A
- Improvement of freight transportation complex	MPWT	N/A
6. Biofuel		
- Alternative fuel introduction in the national plan	MoE	N/A
7. Behavioral changes		
- Promotion of eco-driving	MPWT, MoE, MoT, PPM	2015
8. Environmental monitoring		
- Introduction of environmental monitoring systems	MoE, MPWT	2014
9. Inventory		
- Development of local data in estimating emissions	MPWT, MoE, PPM	

Part 5. Implementation Plan

Action Plan		
Action	Concerned Institutions to Implement (by whom)	Period of Implementation (by when)
Railway		
1. Rail infrastructure		
- Expansion of railway network connected from city to province * Rehabilitation of north line (Phnom Penh-Poipet: 385 km) * Rehabilitation of south line (Phnom Penh-Sihanoukville:264 km)	MPWT, MEF, MoE	N/A
3. Environmental Monitoring		
- Introduction of environmental monitoring systems	MoE, MPWT	N/A
2. Inventory		
- Introduction of experiences and knowledge to estimate the emissions	MPWT, MoE	N/A
Maritime and Waterway		
1. Emission control, standards and regulation		
- Introduction of emission standards	MPWT, MoE	2020
- Promotion of fuel switch (low sulfur)		
- Regulation of secondhand vessel/ferry		
2. Port infrastructure		
- Improvement of cargo handling system at port	MPWT	N/A
- Promotion of Onshore Power Supply		
- Improvement of port facilities		
3. Inventory		
- Development of local data in estimating emissions	MPWT, MoE	N/A
Aviation		
1. Airport Infrastructure		
- Improvement of air traffic control system	MPWT, SCA, SSCA	2020
- Promotion of eco-airport	MPWT, MoE, SCA, SSCA	
2. Aircraft Technology		
- Introduction of noise reduction technologies	MoE, SCA, SSCA	2020
3. Environmental Monitoring		
- Introduction of air quality monitoring at airport	MoE, MPWT	2015
4. Inventory		
- Development of local data in estimating emissions	MPWT, MoE	N/A



Thanks you for your attention