

**Guidelines for Accounting and Reporting
Greenhouse Gas Emissions
China Land Transportation Enterprises
(Trial)**

Instructions

I. Purposes and Significance of the Guidelines

The *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* (the Guidelines), formulated by the National Development and Reform Commission (NDRC), to achieve the aim of cutting carbon dioxide emissions per unit of GDP by 40% - 45% by 2020 from the 2005 level. The Guidelines were drafted according to demands of “establishing the statistical accounting system and building up carbon emission trading market” put forward in the *12th Five-Year Plan Outline*, and of “accelerating the establishment of national, local, enterprise three-level accounting system of greenhouse gas emission and system of requiring key enterprises to directly submit greenhouse gas emission data and energy consumption” put forward in the *12th Five-Year Plan Work Program to Control Greenhouse Gas Emission* (No. 41 Document in 2011 of the State Council). The Guidelines endeavor to help enterprises (i) scientifically calculate and report their own greenhouse gas emissions (GHGs), (ii) make plans to control greenhouse gas emissions, (iii) take an active part in carbon emission trading and, (iv) strengthen enterprises’ social responsibilities. Meanwhile, the Guidelines pave the way for competent departments to establish and implement the system of key enterprises reporting greenhouse gas emissions and accordingly make relevant policies.

II. Preparation Process

The Guidelines are drafted by Sino Carbon Innovation & Investment Co., Ltd, entrusted by the National Development and Reform Commission. The experts of the drafting team used the research findings and practical experiences of accounting reports on greenhouse gas emission both at home and abroad, referred to the *Guidelines of Provincial Greenhouse Gas Inventories* issued by the General Office of the NDRC,

conducted field researches, in-depth study and pilot tests, and finally finished drafting the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)*. The Guidelines taking into full consideration the status quo of China's land transportation enterprises and the statistical and accounting basis of such enterprises, strive to pursue a scientific, comprehensive, standardized and practical approach. In the course of the preparation, the drafting team has received strong support from relevant experts from the Academy of Sciences under the Ministry of Transportation, Research Institute of Highway under the Ministry of Transportation, Research Institute of Designing and Planning under the Ministry of Transportation, and China Railway Group Limited among many other institutes and enterprises.

III. Main Contents

The *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* have seven sections with eight appendices. The Guidelines elaborate respectively the application scope, references, technical terminology, accounting boundary, accounting methodology, quality guarantee, record-keeping requirements and reporting content and forms.

The greenhouse gases subject to accounting include carbon dioxide, methane and nitrous oxide. The emission sources include carbon dioxide, methane and nitrous oxide from the burning of fossil fuel, emissions from vehicle exhaust gas purifying agents such as urea, and net purchased electricity and heat. The Guidelines apply to land transportation enterprises with legal person status and independent accounting units regarded as legal persons.

IV. Issues that Need Clarification

Based on the Provincial Guidelines of Greenhouse Gas Inventories (Trial), China Energy Statistical Yearbook, Research on Chinese Greenhouse Gas Inventories 2005, 2006 IPCC Guidelines of National Greenhouse Gas Inventories and other related

domestic and overseas authoritative materials, the Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial) provide recommended values of some parameters and emission factors required for calculation. Where possible, enterprises may use actual measurement data.

Considering the fact that enterprise-based GHG emissions accounting and reporting are a completely new and complicated endeavor, some inadequacies may be found in practical application of the Guidelines, and it is hoped that those application units may provide their feedbacks in a timely manner, all aimed at making further revisions in the future.

The Guidelines are published by the National Development and Reform Commission, which is responsible for their interpretation and revision when appropriate.

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1. Application Scope

The Guidelines are applicable to greenhouse gas emission accounting and reporting from China land transportation enterprises. Enterprises dealing with road passenger transportation, road freight transportation, city passenger transportation, activities assisting road transportation (including road maintenance and highway operation and management) and railway transportation and those conducting businesses along coasts, inland rivers and ports can account and report their greenhouse gas emissions according to the methodology provided by the Guidelines. Apart from their main businesses, if the above enterprises deal with other businesses and produce greenhouse gas emissions, they should also account and report such emissions as requested in the GHG emissions accounting and reporting guidelines for the enterprises in the relevant sectors.

2. References

Documents cited in the Guidelines mainly include:

Provincial Guidelines of Greenhouse Gas Inventories (Trial);

China Energy Statistical Yearbook 2013;

Research on Chinese Greenhouse Gas Inventories 2005;

2006 IPCC Guidelines of National Greenhouse Gas Inventories;

Greenhouse Gas Protocol--Corporate Standard 2014;

GB/T 213 Determination of Calorific Value of Heat;

GB/T 384 Determination of Calorific Value of Petroleum Products;and

GB/T 22723 Energy Determination for Natural Gas.

3. Terminology and Definitions

The following terminology and definitions apply to the Guidelines.

3.1 Greenhouse gases (GHGs)

A greenhouse gas is natural or man-made atmospheric component in gaseous state that absorbs and emits radiation within the thermal infrared range. The six types of GHGs which are controlled under the Kyoto Protocol are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

3.2 Reporting entities

A reporting entity shall be an enterprise with a legal person status or an independently accounted unit that can be deemed a legal person, which has performed as a GHG emissions actor and therefore should calculate and report its GHG emissions.

3.3 Road transportation enterprises

Road transportation enterprises refer to enterprises which have registered in departments under the Ministry of Transportation, received *Road Transportation Permit* and deal with regular bus service, chartered bus transportation and freight transportation, including enterprises of road passenger transportation and freight transportation.

3.4 Road passenger transportation enterprises

Road passenger transportation enterprises refer to enterprises engaged in inter-city passenger transportation.

3.5 Road freight transportation enterprises

Road freight transportation enterprises refer to enterprises engaged in all road freight transportation

3.6 City passenger transportation enterprises

City passenger transportation enterprises refer to businesses engaged in passenger transportation within a city, including municipal public transportation enterprises (railway, express bus and regular bus transportation) and taxi enterprises.

3.7 Municipal public transportation enterprises

Municipal public transportation enterprises refer to enterprises providing basic service for the public at prescribed prices with buses, trams, railway vehicles and other related facilities according to prescribed routes and timetables. Municipal railway transportation refers to public transportation system adopting exclusive railways including metros, light railways, mono-railways, streetcars, maglev, automated guide-way transit and municipal rapid transit.

3.8 Railway transportation enterprises

Railway transportation enterprises refer to enterprises engaged in railway transportation and related coordination, signals, locomotives, vehicles, overhaul and projects, mainly including the national railway transportation enterprises, joint ventures and local railway transportation enterprises.

3.9 Freight turnover

Freight turnover refers to the product of a certain quantity of cargo (in tons) and the distance of its transportation (in km), unit: ton-km.

Freight turnover = \sum weight of cargo \times the distance of the transportation

3.10 Passenger turnover

Passenger turnover refers to the product of the number of passengers and the distance of their transportation, unit: person-km.

Passenger turnover = \sum number of passengers transported \times the distance of the transportation

3.11 Light cars

Light cars refer to cars M1, cars M2 and cars N1 with a maximum total mass (the maximum mass proposed by auto-makers including car's weight and loading capacity) not exceeding 3500kg.

3.12 Heavy trucks

Heavy trucks refer to trucks M and trucks N with a maximum total mass exceeding 3500kg.

3.13 National standards I, II, III, IV and V

National standards I, II, III, IV and V refer to the national standards for the discharge of pollutants set up in the first, second, third, fourth or fifth stages which are equivalent to the European Emission Standard IV and the national standard IV are emission limitations set up according to the *Limits and Measurement Methods for Exhaust Pollutants from Compression Ignition and Gas Fueled Positive Ignition Engines of Vehicles (III, IV and V) (GB17691-2005)*.

3.14 Bi-fuel vehicles

Bi-fuel vehicles refer to vehicles which have two separate fueling systems, one for gas or liquefied petroleum gas (LPG), the other for other kinds of fuel. The two systems can provide fuels for the vehicles separately but not at the same time. Such vehicles include gasoline-CNG (compressed natural gas) dual fuel cars and gasoline/LPG dual fuel cars.

3.15 Dual fuel vehicles

Dual fuel vehicles refer to vehicles which have two fueling systems, one for gas or LPG, the other for other kinds of fuel. The two systems can provide fuels for the cylinder at a certain proportion. Such vehicles include diesel-CNG dual and diesel-LPG dual fuel cars.

3.16 Single fuel vehicles

Single fuel vehicles refer to vehicles which can only run on one kind of gas fuel (LPG or gas), while gasoline can only be used for emergency situations or engine start-up. Volume of the fuel tank cannot exceed 15L.

3.17 Hybrid electric vehicles

Hybrid electric vehicles refer to vehicles that can get power from at least the following two sources attached to the vehicles: consumable fuels and rechargeable or energy storage devices.

3.18 Plug-in hybrid vehicles

Plug-in hybrid vehicles refer to hybrid-electric vehicles that can get power from off-board devices.

3.19 Extended range electric vehicles (EREV)

Extended range electric vehicles refer to vehicles with ground charging function and on-board power supply function.

3.20 Emissions from fossil fuel burning

CO₂ emissions from fossil fuel burning refer to CO₂ emissions during the deliberate combustion of fossil fuel with oxygen for the purpose of releasing energy for heating or mechanical work.

3.21 Emissions from net purchased electricity and heat

GHG emissions generated from enterprises' consumption of electricity and heat corresponding to the net purchased quantities of electricity and heat (steam and hot water).

3.22 Activity level

Activity level refers to quantification of production or consumption activities causing greenhouse gas emissions, including consumption of various fuels, net purchased electricity, net purchased steam etc.

3.23 Emission factors

Emission factors refer to the quantified rate of greenhouse gas emissions per unit of activity.

3.24 Carbon oxygenation rate

Carbon oxidation rate is the percentage of total carbon in fuels containing carbon that is oxidized in the process of combustion.

4. Accounting Boundary

Reporting entities should account and report the greenhouse gas emissions from all their equipment and production:

(i) for enterprises of road passenger transportation, road freight transportation and municipal passenger transportation, the scope of their equipment and businesses includes the operation systems of their vehicles and accessory systems serving the operation of the vehicles;

(ii) for road maintenance enterprises, the scope of their equipment and businesses ranges from light repair, overhaul, and reconstruction to accessory systems providing service for the above projects;

(iii) for highway operation management enterprises, the scope of their equipment and businesses includes the maintenance of highway, auxiliary facilities and electromechanical devices, charging systems, inspection systems, troubleshooting systems and accessory systems serving the aforesaid systems;

(iv) for railway transportation enterprises, the scope of their equipment and businesses includes the operation systems of their diesel locomotives, electric locomotive and motor train unit (such as locomotive traction, vehicle repair, railway maintenance, train dispatching, traffic guidance, electricity supply) and accessory system providing service for locomotive operation; and

(v) for enterprises along coastal ports and inland harbors, the scope of their equipment and businesses includes stevedoring and production systems and accessory systems serving the aforementioned systems.

The above accessory systems include departments serving enterprises' main businesses (such as passenger and freight stations, mechanical repair shops, storehouses, office buildings, staff canteen, workshop bathrooms, health stations and enterprises' vehicles). If the vehicles are rented or contracted, the actual legal persons or enterprises with operation right should be responsible for accounting and reporting greenhouse gas emissions.

The greenhouse gas emissions of the main operation and accessory systems of the above enterprises should be included in the accounting and reporting range of the aforementioned road transportation enterprises of various kinds. The emission sources, main energy-consuming equipment, and emission equipment and types of gases of land transportation enterprises are shown below and also shown in Figure 1.

4.1 Emissions from fossil fuel burning

The greenhouse gas emissions from burning of fossil fuels include mobile source emissions of land transportation enterprises (such as vehicles, diesel locomotives, etc.), and stationary source emissions (such as boilers etc.). The greenhouse gas emissions from the burning of fossil fuel are mainly CO₂. The enterprises of road passenger transportation, road freight transportation, municipal public transportation, and taxi need to account CH₄ and N₂O emissions, which are subject to pollution control technologies that the vehicles adopt.

4.2 Emissions from exhaust purification

CO₂ emissions from exhaust gas purifying agent such as urea of vehicles in transportation.

4.3 Emissions from net purchased electricity

CO₂ emissions implicitly generated in enterprises' net purchased electricity. This part of emissions is actually caused by the enterprises which produce electricity; and

4.4 Emissions from net purchased heat

CO₂ emissions implicitly generated in enterprises' net purchased heat. This part of emissions is actually caused by the enterprises which provide heat.

5. Accounting Methodology

The complete work flow for reporting entities to account and report the greenhouse gas emissions includes:

- (1) Set the accounting boundary;
- (2) Identify emission sources and types of greenhouse gases;
- (3) Collect activity level data;
- (4) Select and obtain emission factor data;
- (5) Calculate the emissions of fuel burning and exhaust purification and the emissions from net purchased electricity and heat; and
- (6) Add up the total greenhouse gas emissions by enterprises.

Table 1 Greenhouse gas emission sources of land Transportation Enterprises

Enterprise Types	Emissions from fossil fuel burning			Emissions from exhaust purification		Emissions from net purchased electricity and heat	
	Main fossil fuel types	Main energy consuming facilities	Greenhouse Gas Types	Emission facilities	Greenhouse Gas Types	Main energy consuming facilities	Greenhouse Gas Types
Road Transportation Enterprises (including highway passenger Transportation Enterprises, highway freight Transportation Enterprises, urban bus and trolley Transportation Enterprises and taxi Transportation Enterprises)	Gasoline, diesel, natural gas and liquefied petroleum gas, etc.	Transportation vehicles (powered by fossil fuels, such as: gasoline vehicle, diesel vehicle, mono-fuel gas vehicle, bi-fuel vehicle, dual fuel vehicle, hybrid electric vehicle, etc.) and coal-fired, oil-burning and gas-fired facilities at passenger and freight stations, etc.	1.CO ₂ 2.CH ₄ (transportation vehicle) 3.N ₂ O (transportation vehicle)	Transportation vehicle	CO ₂	Transportation vehicle (vehicles powered by electricity, such as trolleys, pure electric vehicles, plug-in hybrid electric vehicle etc.) and electricity consuming facilities at passenger and freight stations etc.	CO ₂
Urban railway transit enterprises	Coal, natural gas, etc.	Fixed coal-fired and gas-fired facilities at stations	CO ₂	—		Subway, light railway, maglev and electricity	CO ₂

						consuming facilities at stations	
Highway maintenance enterprises, expressway operation and management enterprises	Diesel, natural gas, etc.	Maintenance equipment, such as road repair truck, conveyor, exchange machine and paver etc.	CO ₂	–		Facilities for roadway lighting, heat supplying and ventilation	CO ₂
Railway Transportation Enterprises	Diesel, coal and natural gas, etc.	Diesel locomotive and coal-fired, oil-burning and gas-fired facilities at stations	CO ₂	–		Electric locomotive, multiple unit train and electricity consuming facilities at stations	CO ₂
Port enterprises	Petrol, diesel, natural gas and coal, etc.	Handling facilities, crane, vehicle and transportation facilities, etc.	CO ₂	–		Handling facilities, crane, vehicle and transportation facilities, etc.	CO ₂

5.1 Overview

The greenhouse gas emissions of land transportation enterprises are equal to the sum of greenhouse gas emitted by fossil fuel within the enterprise boundary, emissions in the process of exhaust cleaning, and greenhouse gas emissions from enterprises' net purchase of electricity and heat. It can be calculated according to Equation (1).

$$E_{GHG} = E_{burning} + E_{process} + E_{electricity} + E_{heat} \quad (1)$$

where:

E_{GHG} is the total greenhouse gas emissions of enterprises. Its unit is ton CO₂ equivalent (tCO₂e);

$E_{burning}$ is the total greenhouse gas emitted in the process of enterprises' fossil fuel burning, the unit is ton CO₂ equivalent (tCO₂e);

$E_{process}$ is CO₂ emitted in the process of exhaust cleaning in which reducing agents are applied, such as urea, etc Its unit is ton CO₂ (tCO₂);

$E_{electricity}$ is CO₂ emissions from net purchase of electricity. Its unit is ton CO₂ (tCO₂); and

E_{heat} is CO₂ emissions from net purchase of heat. Its unit is ton CO₂ (tCO₂).

5.2 Emissions from fossil fuel burning

Greenhouse gas emissions in the process of fuel combustion are equal to the sum of that emitted by burning fossil fuel during enterprises' accounting and reporting period. It can be calculated according to Equation (2), and CO₂ emissions in Equation (2) can be calculated according to Equations (3) to (5). Methane and nitrous oxide emitted in the process of vehicles' fossil fuel burning in highway passenger transportation enterprises, highway freight transportation enterprises, urban bus

and trolley transportation enterprises and taxi transportation enterprises, the emissions can be calculated according to Equations (6) and (7).

$$E_{burning} = E_{burning-CO_2} + E_{burning-CH_4} + E_{burning-N_2O} \quad (2)$$

where:

$E_{burning}$ refers to greenhouse gas that emitted in the process of fossil fuel burning during enterprises' accounting and reporting period. Its unit is ton CO₂ equivalent (tCO₂e);

$E_{burning-CO_2}$ refers to CO₂ that emitted in the process of fossil fuel burning during enterprises' accounting and reporting period. Its unit is ton CO₂;

$E_{burning-CH_4}$ refers to CH₄ that emitted in the process of fossil fuel burning during enterprises' accounting and reporting period. Its unit is ton CO₂ equivalent (tCO₂e);

$E_{burning-N_2O}$ refers to N₂O that emitted in the process of fossil fuel burning during enterprises' accounting and reporting period, the unit is ton CO₂ equivalent (tCO₂e);

5.2.1 CO₂ emissions can be calculated by

$$E_{burning-CO_2} = \sum AD_i \times EF_i \quad (3)$$

where:

AD_i refers to activity level of No. i fossil fuel during accounting and reporting period, and the unit is GJ;

EF_i refers to CO₂ emission factors of No. i fossil fuel, and the unit is tCO₂/GJ; and

i refers to fossil fuel types.

AD_i , activity level of No. i fossil fuel during the accounting and reporting period, it can be calculated according to Equation (4).

$$AD_i = NCV_i \times FC_i \quad (4)$$

where:

NCV_i refers to average net calorific value of No. i fossil fuel during accounting and reporting period. For solid and liquid fuel, its unit is GJ/t; for gaseous fuel, its unit is GJ/ $\times 10^4 \text{Nm}^3$;

NCV_i refers to average net calorific value of No. i fossil fuel during the accounting and reporting period. For solid and liquid fuel, its unit is GJ/t; for gaseous fuel, its unit is GJ/ $\times 10^4 \text{Nm}^3$;

CO_2 emission factors of fossil fuel can be calculated according to Equation (5).

$$EF_i = CC_i \times OF_i \times \frac{44}{12} \quad (5)$$

where:

CC_i refers to carbon content in per-unit calorific value of No. i fossil fuel. Its unit is tC/GJ;

OF_i refers to carbon oxygenation efficiency of No. i fossil fuel. It has been valued by percentage, %; and

$\frac{44}{12}$ is the ratio of CO_2 to molecular mass of carbon.

5.2.2 Equations to calculate emissions of methane and nitrous oxide

$$E_{\text{burning-CH}_4} = \sum k_{a,b,c} \times EF_{\text{CH}_4} \times GWP_{\text{CH}_4} \times 10^{-9} \quad (6)$$

$$E_{\text{burning-N}_2\text{O}} = \sum k_{a,b,c} \times EF_{\text{N}_2\text{O}} \times GWP_{\text{N}_2\text{O}} \times 10^{-9} \quad (7)$$

where:

$K_{a,b,c}$ refers to the driving distance of transportation vehicles of different types, powered by different fuels, and with different emission standards. Its unit is km;

EF refers to emission factor of methane or nitrous oxide. The unit is $\text{mgCH}_4(\text{N}_2\text{O})/\text{km}$;

GWP_{CH_4} and $GWP_{\text{N}_2\text{O}}$ refer to global warming potential of CH_4 and

N₂O respectively. According to value, recommended in the second evaluation report of IPCC and based on variation in 100 years, the equivalent GWP value of CH₄ and N₂O with CO₂ as unit is 21 and 310 respectively;

a: fuel types, such as diesel, gasoline, natural gas, liquefied petroleum gas, etc.;

b: vehicle types, such as sedan, light or heavy vehicles;

c: emission standards, such as following national level I and lower levels, national levels II, III or IV and higher levels.

5.2.3 Collecting activity level data

To calculate CO₂ emissions, activity level data includes net consumption of various fossil fuels used by both mobile and fixed facilities during enterprises' accounting and reporting period, and average net calorific value. To calculate greenhouse gas emissions of methane and nitrous oxide, activity level data refer to driving distances of transportation vehicles of different types, powered by different fuels, and with different emission standards during enterprises' accounting and reporting period.

5.2.3.1 Net energy consumption of fossil fuel

Enterprises should use the energy consumption method as the basic method to calculate net energy consumption of fossil fuel. Enterprises less capable of collecting transportation vehicle energy consumption data should verify transportation vehicle energy consumption statistics (acquired by energy consumption statistics collecting method) by the following supplementary methods. If the discrepancy between the results calculated by the two methods is larger than $\pm 10\%$, enterprises should check their information of energy consumption statistics, and conduct the statistics and accountancy again. For highway freight transportation enterprises and highway passenger transportation enterprises, vehicles' energy consumption can be calculated and checked by energy consumption per unit transportation turnover

volume; for taxi enterprises, vehicles' energy consumption can be calculated and verified by energy consumption per unit mileage.

5.2.3.1.1 Basic method——energy consumption statistics collecting method

During the accounting and reporting period, net energy consumption of fossil fuel includes fossil fuel consumption of all mobile facilities (vehicles for transportation, diesel locomotive, vehicles for enterprises' inner affairs) and fixed facilities (boiler). Enterprises should acquire the activity level data by the energy consumption statistics collecting method, then calculate the emissions of greenhouse gas. As for fossil fuel consumption during the accounting and reporting period, enterprises should calculate their net consumption based on the amount of purchase, sales, and inventory variation during the period. Enterprises should use purchases and sales statistics of fossil fuel on vouchers of clearing, such as purchase order or sales order; statistics of inventory variation should be based on readings of metering outfits or be based on other reliable methods. Statistics can be calculated according to Equation (8).

$$\text{Net consumption} = \text{purchases} + (\text{inventory at the beginning} - \text{inventory at the end}) - \text{sales} \quad (8)$$

To collect statistics of transportation vehicles' energy consumption, enterprises should record license number, fuel type, total mass, verified payload capacity or largest tractive tonnage, working date, distance of single work, payload capacity of single work and refueling amount and other relevant information, and make monthly and annual summaries on transportation vehicle fuel consumption. To collect statistics of diesel locomotive fuel consumption, enterprises should keep an original record, model the format of "drivers service report" released by China Railway Corporation, and make monthly and annual summaries on diesel locomotive fuel consumption.

Energy consumption by transportation vehicles, diesel vehicles, and diesel-electric hybrid vehicles should be calculated by physical quantity of diesel; energy consumption by natural gas vehicles and gas-electric hybrid vehicles should be calculated by physical quantity of natural gas; energy consumption by pure electric vehicles and trolleys should be calculated by actual quantity of electricity; energy consumption by diesel-electric plug-in hybrid vehicles and diesel range-extended electric vehicles should be calculated by physical quantity of diesel and electricity; energy consumption by gas-electric plug-in hybrid vehicles and natural gas range-extended electric vehicles should be calculated by physical quantity of natural gas and electricity; the physical quantity of gasoline in vehicles fueled by methanol gasoline should be calculated by the percentage of gasoline.

5.2.3.1.2 Supplementary method 1 for energy consumption of transportation vehicles calculation methods for energy consumption per unit transportation turnover volume.

Fossil fuel consumption by transportation vehicles can be calculated by energy consumption per unit transportation turnover volume and transportation turnover volume. Calculation methods of liquid fuel and gas fuel are shown in Equations (9) and (10).

$$FC_i = (\sum ET_{passenger\ transportation\ ij} \times RK_{passenger\ transportation\ ij} + \sum ET_{freight\ transportation\ ij} \times RK_{freight\ transportation\ ij}) \times 10^{-3} \quad (9)$$

$$FC_i = (\sum ET_{passenger\ transportation\ ij} \times RK_{passenger\ transportation\ ij} + \sum ET_{freight\ transportation\ ij} \times RK_{freight\ transportation\ ij}) \times 10^{-4} \quad (10)$$

where:

FC_i refers to consumption of No. i fossil fuel during accounting and reporting period. For liquid fuel, its unit is ton (t); for gaseous fuel, its unit is $\times 10^4 \text{Nm}^3$;

$ET_{passenger\ transportation\ ij}$ refers to passenger turnover of all passenger transportation vehicles of No. j vehicle type. Its unit is thousand passenger-kilometers;

$ET_{freight transportation ij}$ refers to freight turnover of all freight transportation vehicles in No. j vehicle type. Its unit is hundred ton-kilometers;

$RK_{passenger transportation ij}$ refers to No. i fuel consumption in unit passenger turnover finished by No. j passenger vehicles. Its unit is kg (cubic meter) per thousand passenger-kilometers;

$RK_{freight transportation ij}$ refers to No. i fuel consumption in unit freight turnover finished by No. j freight vehicles. Its unit is kg(cubic meter) per hundred ton-kilometers;

i refers to type of fossil fuel; and

j product models of transportation vehicles.

$ET_{passenger transportation ij}$ and $ET_{freight transportation ij}$ should be consistent with enterprises' statistics. Enterprises should provide relevant original statistics, relevant financial statements, transportation contracts and other materials. For $RK_{passenger transportation ij}$ and $RK_{freight transportation ij}$, enterprises can use sample statistics, respectively collected according to different vehicle types, fuel types and transportation conditions, to calculate energy consumption in unit transportation turnover volume, and can refer to the latest national or regional unit transportation turnover volume statistics released by national or regional transportation management departments.

5.2.3.1.3 Supplementary method 2 for energy consumption of transportation vehicles -- calculation methods of energy consumption in unit mileage.

Fossil fuel consumption by transportation vehicles can be calculated by energy consumption in unit mileage and corresponding distances. Calculation methods of liquid fuel and gas fuel are shown in Equations (11) and (12).

$$FC_i = \sum k_{ij} \times OC_{ij} \times Ci \times 10^{-5} \quad (11)$$

$$FC_i = \sum k_{ij} \times OC_{ij} \times 10^{-6} \quad (12)$$

where:

FC_i refers to consumption of No. i fossil fuel during accounting and reporting period. For liquid fuel, its unit is ton (t); for gaseous fuel, its unit is $\times 10^4 \text{Nm}^3$;

k_{ij} refers to distance run by all No. j type transportation vehicles. Its unit is km;

OC_{ij} refers to fuel (oil/gas) consumption in on hundred miles for No. j type transportation vehicles. Its unit is L/100km or $\text{m}^3/100\text{km}$;

C_i refers to density of No. i fossil fuel. Gasoline's density is $0.73\text{t}/\text{m}^3$; diesel's density is $0.84\text{t}/\text{m}^3$; liquefied natural gas's density is $0.45\text{t}/\text{m}^3$;

i refers to type of fossil fuel; and

j product models of transportation vehicles.

k_{ij} refers to enterprises' statistics, and OC_{ij} refers to monitor statistics of transportation vehicles' types classified by enterprises. Enterprises should refer to transportation vehicles' comprehensive fuel consumption released by governmental departments, such as the Ministry of Transportation, Ministry of Industry and Information Technology. Besides, enterprises should check energy consumption statistics in unit mileage of each transportation vehicle type. Comprehensive energy consumption of transportation vehicles can be acquired through the following resources:

(1) For transportation vehicles which are heavier than 3500kg, its comprehensive energy consumption can be found based on vehicle's product model at the website: *Inspection and Supervision of Fuel consumption for Road transportation Vehicles*, the Ministry of Transportation;

(2) For transportation vehicles which are lighter than 3500kg, their fuel consumption under comprehensive working conditions can be found at the website of *Automobile Fuel consumption*, the Ministry of Industry and Information Technology based on vehicles' product models; and

(3) If fuel consumption statistics per hundred kilometers cannot be found, default values provided at Table 1: Energy consumption statistics per hundred

kilometers of all kinds of vehicles, Appendix VIII can be referred to.

5.2.3.2 Average net calorific value of fossil fuels

Enterprises can use recommended values provided by the present Guidelines in Table 2 of Appendix VIII. Enterprises can conduct measurement in real conditions, purchase statistics from qualified professional agencies or use the statistics provided in the voucher of clearing in businesses with a relevant party. If enterprises conduct measurement in real conditions, net calorific value of fossil fuel should follow relevant standards in *GB/T 213 Determination of Calorific Value Coal*, *GB/T 384 Determination of calorific Value of Petroleum Products*, and *GB/T 22723 Energy Determination for Natural Gas*.

5.2.3.3 Mileage of transportation vehicles

Based on enterprises' statistics, enterprises should provide relevant odometer reading statistics or GPS vehicle data recorder, original working records and other auxiliary materials.

5.2.4 Acquiring data of emission factors

Enterprises can use statistics of carbon content in unit calorific value and default value of oxygenation of coal in the Guidelines, presented in Table 2 of Appendix VIII; enterprises can also use default value of emission factor of methane and nitrous oxide, which is shown in Table 3 of Appendix VIII.

5.3 Emissions from exhaust purification

5.3.1 Calculation Equation

Enterprises should confirm CO₂ emissions in exhaust cleansing process based on types of exhaust gas purifying agent and work principles. CO₂ emissions related to using urea selective catalyst reducer in transportation vehicles can be calculated according to Equation (13)

$$E_{process} = M \times 12 / 60 \times P \times 44 / 12 \times 10^{-3} \quad (13)$$

where:

$E_{process}$ refers to CO₂ emissions produced by using urea as exhaust gas purifying agent in transportation vehicles during the accounting and reporting period. Its unit is tCO₂;

M refers to consumed additive of urea of catalyst reducer during the accounting and reporting period. Its unit is kg; and

P refers to mass proportion of urea in the urea additive, %.

5.3.2. Collecting activity level data

Based on enterprises' statistics, enterprises should measure and collect statistics of transportation vehicles which have urea selective catalyst reducer (SCR).

5.4 Emissions from net purchased electricity

5.4.1 Calculation Equation

CO₂ emissions from net purchased electricity should be calculated according to Equation (14).

$$E_{electricity} = \sum AD_{electricityi} \times EF_{electricityi} \quad (14)$$

where:

$E_{electricity}$ is CO₂ emissions inherent in net purchase of enterprises' electricity, and the unit is ton CO₂;

$AD_{electricity}$ refers to net electricity purchased from No. i regional power grid. Its unit is MWh;

$EF_{electricity}$ refers to average CO₂ emission factor produced in power supply of No. i regional power grid. Its unit is tCO₂/MWh; and

i refers to regional power grid.

5.4.2 Collecting activity level data

Enterprises' consumption of net purchased electricity should be the same with ammeters readings provided by enterprises and power grid enterprises and with accounts or financial statement recording energy consumption. Their consumption of net purchased electricity equals to net different value between purchased electricity and consumed electricity. Enterprises whose transportation vehicles induce electricity consumption, such as taxi transportation should verify the transportation vehicle electricity consumption statistics (acquired by electricity consumption statistics) by energy consumption calculation method in unit mileage based on different vehicle types. If the discrepancy between the results calculated by the two methods is larger than $\pm 10\%$, enterprises should check their information of electricity consumption statistics, and collect statistics and do the accountancy again. Electricity consumption of transportation vehicles can be calculated by energy consumption in unit mileage based on different vehicle types and corresponding mileage.

To collect statistics of transportation vehicles' electricity consumption, enterprises should record each car's license number, working dates, mileage in each time, charging amount and other relevant information every day, and make monthly and annual summaries on transportation vehicle electricity consumption; To collect electricity consumption statistics of electric locomotive and multiple units, enterprises should keep an original record of electricity consumption, model the format of "drivers service report" released by China Railway Corporation, and make monthly and annual electricity consumption summaries of electric locomotive and multiple units.

5.4.3 Acquiring data of emission factors

In accordance with the location of an enterprise in relation to the current geographical divisions of electricity grids, i.e. those in the Northeast, North China, East China, Central China, Northwest, and Southern China, the enterprise should choose and calculate electricity emission factor by average CO₂ emission factor

statistics in relevant regional power grid released by national management department in the latest year.

5.5 Emissions from net purchased heat

5.5.1 Calculation Equation

CO₂ emissions from net purchased heat (e.g. steam) should be calculated according to Equation (15).

$$E_{heat} = AD_{heat} \times EF_{heat} \quad (15)$$

where:

$E_{electricity}$ is CO₂ emissions inherent in net purchase of heat, the unit is tCO₂;

AD_{heat} refers to net heat (e.g., steam) purchased during the accounting and reporting period. Its unit is GJ; and

EF_{heat} refers to heat-providing CO₂ emission factor. Its unit is tCO₂/GJ.

5.5.2 Collecting activity level data

Energy consumption statistics of net purchased heat is based on purchase or sales vouchers of clearing, accounts recording energy consumption or financial statement. Its consumption of net purchased heat equals to net different value between total heat of purchased vapor and hot water, and total heat of consumed steam and hot water.

Hot water counted by mass unit can be transferred into heat unit according to Equation (16),

$$AD_{heat} = M a_w \times (T_w - 20) \times 4.1868 \times 10^{-3} \quad (16)$$

where:

AD_{heat} refers to the heat of hot water. Its unit is GJ;

Ma_w refers to the mass of hot water. Its unit is t;

T_w refers to the temperature of hot water. Its unit is °C; and

4.1868 is water's specific heat capacity in normal temperature. Its unit is kg°C.

Steam counted by mass unit can be transferred into heat unit according to Equation (17),

$$AD_{steam} = Ma_{st} \times (En_{st} - 83.74) \times 10^{-3} \quad (17)$$

where:

AD_{heat} refers to the heat of steam. Its unit is GJ;

Ma_{st} is mass of steam. Its unit is t; and

En_{st} is enthalpy in each kilogram steam corresponding to different temperatures and pressures. Its unit is kJ/kg. Enthalpy of saturated steam and superheated steam can be inquired in Table 4 and 5 of Appendix VIII.

5.5.3 Acquiring data of emission factors

Emission factor of heat-providing CO₂ can be assumed to be 0.11 tCO₂/GJ for the time being. After the governmental management department releases official statistics, enterprises should update their data accordingly.

6. Quality Assurance and Documentation

Reporting entities should have a quality guarantee and filing system to report enterprises' greenhouse gas emission. The system shall include:

6.1 Designate special staff responsible for accounting and reporting GHG emissions;

6.2 Build a sound supervisory plan for enterprises' greenhouse gas emissions. Enterprises with better conditions should regularly supervise unit transportation

turnover volume of energy consumption, fossil fuel or electricity consumption in unit mileage and electricity consumption in unit transportation turnover volume of multiple units, based on different types of transportation vehicles.

6.3 Build sound accounts of greenhouse emissions and energy consumption. Enterprises should install energy consumption meter or other devices on fixed and movable facilities in accordance with relevant standards and requirements.

6.4 Establish a management mechanism for GHG data collection, documentation and filing; and

6.5 Establish an internal auditing for GHG emissions reports.

7. Content and Format of Report

Reporting entities should choose corresponding a report format template according to enterprises' types:

Report format template for highway passenger transportation enterprises and highway freight transportation enterprises, see Appendix I;

Report format template for urban bus and trolley transportation enterprises, see Appendix II;

Report format template for taxi transportation enterprises, see Appendix III;

Report format template for urban rail transit enterprises, see Appendix IV;

Report format template for road maintenance enterprises and expressway operation management enterprises, see Appendix V;

Report format template for seaport enterprises, see Appendix VI; and

Report format template for urban bus and trolley transportation enterprises, see Appendix VII.

Main contents in reports:

7.1 Basic information of reporting entity

Basic information of reporting entity should include enterprise's name, features, reporting years, industry classification, organization code, person in charge of reports and information of contact persons; besides, there should be information about overall construction conditions and features of transportation vehicles in services and their basic information including product type, amount, purchase date, fuel types, usage, passenger capacity (payload mass), etc.

7.2 Greenhouse gas emissions

Reporting entities should report overall greenhouse gas emissions during accounting and reporting period, and report emissions of fossil fuel, emissions in the process of exhaust gas purifying, emissions from net purchased electricity and heat respectively.

7.3 Activity level data and its sources

Reporting entities should state the method applied to acquire the activity level data. Net consumption of all kinds of fossil fuel and their corresponding lower heating value, transportation vehicles' mileage of different vehicle types, fuel types and emission standards, consumed urea and purity degree of transportation vehicles, and net purchased electricity and heat in different power grids. For enterprises using auxiliary methods to examine energy consumption of mobile transportation devices, they should report transport volume in the accounting and reporting period and energy consumption in unit transport volume of samples, or energy consumption in one hundred miles and corresponding mileage based on different vehicle types.

If enterprises produce other products, they should follow the relevant industry's accounting and reporting guidelines for enterprise greenhouse gas emissions reporting.

7.4 Emission factor and its sources

Reporting entities should report statistics of carbon content in unit calorific

value and carbon oxidation ratio, emission factor of methane and nitrous oxide, emission factor of electricity and heat.

If enterprises produce other products, they should follow other industry's accounting and reporting guidelines for enterprise greenhouse gas emission reporting.

7.5 Issues that need clarification

If enterprises wish to provide clarification for other issues or suggestions for revision to the Guidelines, they need to clearly list and explain the issues.

Appendix I: Report Format Template (Road Freight Transportation Enterprises and Road Passenger Transportation Enterprises)

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Source

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table 1-1: Greenhouse Gas Emission Report of Reporting Entities in the Year of

Emissions from fossil fuel (tCO ₂ e)		
Emissions from exhaust purification(tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total Greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂ e)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂ e)	

Table 1-2: Data of CO₂ Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm ³)	Net Calorific Value (GJ/t, GJ/10,000 Nm ³)	Carbon Content per Calorific Value (tC/GJ)	Carbon Oxygenation Rate of Fuels (%)	
Petroleum					
Diesel					
Liquefied natural gas					
Natural Gas					
Liquefied petroleum gas					
Blind coal					
Soft coal					

CO₂emissions from fossil fuel (tCO₂)	
---	--

* The company should add other types of energy actually consumed which are not listed in the Table.

Table1-3: Data of Methane and Nitrous Oxide Emissions from Fossil Fuel (to be continued)

Types of vehicles	Types of fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO2 Emissions (tCO ₂ e)
					Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	
Cars	Petrol eum	National Standard I			38			45			
		National Standard II			24			94			
		National Standard III			12			83			

		National Standard IV and beyond			6			57			
	Diesel	National Standard I			0			18			
		National Standard II			3			6			
		National Standard III			15			7			
		National Standard IV and			15			0			

		beyond									
	LPG	National Standard I			38			80			
		National Standard II			23						
		National Standard III and beyond			9						

Table1.3 Data of Methane and Nitrous Oxide Emissions from Fossil Fuel (continued)

Types of Vehicles	Types of Fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO2 Emission
					Emission Factors	Emissions (mg)	The Equivalent	Emission Factors	Emissions (mg)	The Equivalent	

					(mg/km)		CO2 Emissions* (mgCO ₂ e)	(mg/km)		CO2 Emissions* (mgCO ₂ e)	s (tCO ₂ e)
Other Types of Light Cars	Petrol eum	National Standard I			122			45			
		National Standard II			62			94			
		National Standard III			36			83			
		National Standard IV and beyond			16			57			
	Diesel	National			0			18			

		Standard I									
		National Standard II			3			6			
		National Standard III			15			7			
		National Standard IV and beyond			15			0			
Heavy Trucks	Petroleum	All			6			140			
	Diesel	All			30			175			
	Natural	National			–	–	–	900			

	al Gas	Standard IV and beyond									
		Others						5400			
CH₄ and N₂O emissions from fossil fuel (tCO₂e)											

According to the recommendation of the second assessment report of IPCC, the green-warming potentials of methane and nitrous oxide are 21 and 310 respectively.

Table1-4: Data of CO2 Emissions from Exhaust Purification

Use of Urea(kg)	Purity of Urea (%)	Emissions(tCO ₂)

Table1-5: Data of Emissions from net purchased Electricity

Electricity(MWh)		Emission factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchased	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table1-6: Data of CO₂Emissions from net purchased heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat (tCO₂)	

**Table 1-7: Data of Computation of Fossil Fuel Consumption of Carrier Vehicles *
 (Energy consumption of transportation Turnover and Per-Unit transportation
 Turnover)**

Type of vehicles			transportation turnover (100 tons/kilometer, 1,000 people/ kilometer)	Energy consumption of per-unit transportation turnover kg(Nm ³)/100to ns kilometers, Kg(Nm ³)/1,000 people kilometers	Consumption (t, 10,000 Nm3)
Carrying passengers	Petroleum	Type 1			
		Type 2			
		..			
	Diesel	Type 1			
		Type 2			
		..			
	Natural Gas	Type 1			
		Type 2			
		..			

	LPG	Type 1			
		Type 2			
		..			
Carrying cargo	Petroleum	Type 1			
		Type 2			
		..			
	Diesel	Type 1			
		Type 2			
		..			
	Natural Gas	Type 1			
		Type 2			
		..			

	LPG	Type 1			
		Type 2			
		..			
Total consumption of various types of fossil fuels	Petroleum(t)				
	Diesel(t)				
	Natural gas(10,000 Nm3)				
	LPG(t)				

* The company should add other types of energy actually consumed which are not listed in the Table.

**Appendix II: Report Format Template (Municipal Public Transportation
Enterprises of Buses and Trams)**

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table2-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel burning		
Emissions from exhaust purification		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emission of net purchased electricity and heat(tCO ₂ e)	
	Including CO ₂ emissions of net purchased electricity and heat(tCO ₂ e)	

Table2-2: Data of CO2 Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission Factors		Emissions (tCO ₂)
	Net Consumption (t, 10,000 Nm3)	Net Calorific Value (GJ/t, GJ/10,000 Nm3)	Carbon Content per Calorific Value (tC/GJ)	Carbon Oxygenation Rate of Fuels (%)	
Diesel					
Natural Gas					
Petroleum					
Liquefied petroleum gas					

Soft coal					
Blind coal					
CO₂emissions from fossil fuel (tCO₂)					

* The company should add other types of energy actually consumed which are not listed in the Table.

Table2-3: Data of Methane and Nitrous Oxide Emissions from Fossil Fuel (to be continued)

Types of Vehicles	Types of Fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO2 Emissions (tCO ₂ e)
					Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	
Cars	Petroleum	National Standard I			38			45			
		National Standard II			24			94			
		National Standard III			12			83			

		National Standard IV and beyond			6			57			
	Diesel	National Standard I			0			18			
		National Standard II			3			6			
		National Standard III			15			7			
		National Standard IV and			15			0			

		beyond									
	LPG	National Standard I			38			80			
		National Standard II			23						
		National Standard III and beyond			9						

Table2-3: Data of Methane and Nitrous Oxide Emissions from Fossil Fuel

Types of Vehicles	Types of fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO2 Emissions (tCO ₂ e)
					Emission Factors(mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	
Other Types of Light Cars	Petroleum	National Standard I			122			45			
		National Standard II			62			94			
		National			36			83			

		Standard III									
		National Standard IV and beyond			16			57			
	Diesel	National Standard I			0			18			
		National Standard II			3			6			
		National Standard III			15			7			

		National Standard IV and beyond			15			0			
Heavy Trucks	Petroleum	All			6			140			
	Diesel	All			30			175			
	Natural Gas	National Standard IV and beyond			-	-	-	900			
		Others						5400			
CH₄ and N₂O emissions from fossil fuel (tCO₂e)											

According to the recommendation of the second assessment report of IPCC, the GWP of methane and nitrous oxide are 21 and 310 respectively.

Table2-4: Data of CO2 Emissions from Exhaust Purification

Use of Urea(kg)	Purity of Urea (%)	Emissions(tCO ₂)

Table2-5: Data of Emissions from net Purchased Electricity

Electricity(MWh)		Emission Factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchased	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table2-6: Data of CO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat(tCO₂)	

Appendix III: Report Format Template (Taxi Transportation Enterprises)

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table3-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel (tCO ₂ e)		
Emissions from exhaust purification (tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂ e)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂ e)	

Table 3-2: Data of CO₂ Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission Factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm ³)	Net Calorific Value (GJ/t, GJ/10,000 Nm ³)	Carbon Content per Calorific Value (tC/GJ)	Carbon oxygenation Rate of Fuels (%)	
Petroleum					
Diesel					
Natural Gas					
Liquefied petroleum gas					
Blind coal					
Soft coal					
CO₂emissions from fossil fuel (tCO₂)					

* The company should add other types of energy actually consumed which are not listed in the Table.

Table3-3: Data of Methane and Nitrous Oxide Emissions from Fossil Fuel (to be continued)

Types of Vehicles	Types of Fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO ₂ Emissions(tCO ₂ e)
					Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO ₂ Emissions* (mgCO ₂ e)	Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO ₂ Emissions* (mgCO ₂ e)	
Cars	Petroleum	National Standard I			38			45			
		National Standard II			24			94			
		National Standard III			12			83			
		National Standard IV and beyond			6			57			
	Diesel	National Standard I			0			18			

		National Standard II			3			6			
		National Standard III			15			7			
		National Standard IV and beyond			15			0			
	LPG	National Standard I			38			80			
		National Standard II			23						
		National Standard III and beyond			9						

Table3-3: Data of Methane and Nitrous Oxide Emissions from Fossil Fuel (continued)

Types of Vehicles	Types of Fuel	Emission Standards	Number of Vehicles	Mileage (km)	Nitrous Oxide			Methane			The Equivalent CO2 Emissions (tCO ₂ e)
					Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	Emission Factors (mg/km)	Emissions (mg)	The Equivalent CO2 Emissions* (mgCO ₂ e)	
Other Types of Light Cars	Petroleum	National Standard I			122			45			
		National Standard II			62			94			
		National Standard III			36			83			
		National Standard IV and beyond			16			57			
	Diesel	National Standard I			0			18			
		National Standard II			3			6			
		National			15			7			

		Standard III									
		National Standard IV and beyond			15			0			
Heavy Trucks	Petroleum	All			6			140			
	Diesel	All			30			175			
	Natural Gas	National Standard IV and beyond			–	–	–	900			
		Others							5400		
CH₄ and N₂O emissions from fossil fuel (tCO₂e)											

According to the recommendation of the second assessment report of IPCC, the GWP of methane and nitrous oxide are 21 and 310 respectively.

Table3-4: Data of CO2 Emissions from Exhaust Purification

Use of Urea(kg)	Purity of Urea (%)	Emissions(tCO ₂)

Table3-5: Data of Emissions from net Purchased Electricity

Electricity(MWh)		Emission factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchase d	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table3-6: Data of CO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat (tCO₂)	

Table 3-7: Data of Fossil Fuel and Electricity Consumption of Carrier Vehicles *

(Based On Consumption per Unit Mileage)

Types of Fuel	Types of Vehicles	Number of Vehicles	Total Mileage (km)	Petroleum (Gas, Electricity) consumption / 100 km (t/100km,Nm3/100km , kwh/100km)	Consumption (t, 10,000 Nm3, kwh)
Petroleum	1				
	2				
	...				
Natural Gas	1				
	2				
	...				

Diesel	1				
	2				
	...				
LPG	1				
	2				
	...				
Electricity	1				
	2				
	...				
Total consumption of various types of fossil fuel and electricity	Petroleum(t)				
	Natural gas(10,000 Nm3)				
	Diesel(t)				
	LPG(t)				
	Electricity(kWh)				

* The company should add other types of energy actually consumed which are not listed in the Table.

**Appendix IV: Report Format Template (Municipal railway
Transportation Enterprises)**

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table4-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel (tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	

Table4-2: Data of CO₂ Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm3)	Net Calorific Value (GJ/t, GJ/10,000 Nm3)	Carbon Content per Calorific Value (tC/GJ)	Carbon oxygenation Rate of Fuels (%)	
Blind coal					
Soft coal					
Natural Gas					
Petroleum					
Liquefied petroleum gas					
CO ₂ emissions from fossil fuel (tCO ₂)					

* The company should add other types of energy actually consumed which are not listed in the Table.

Table4-3: Data of CO₂Emissions from net Purchased Electricity

Electricity(MWh)		Emission Factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchase d	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table4-4: Data ofCO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat(tCO₂)	

**Appendix V: Report Format Template (Road Maintenance Enterprises
and Highway Operation Enterprises)**

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table5-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel (tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	

Table5-2: Data of CO2 Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm3)	Net Calorific Value (GJ/t, GJ/10,000 Nm3)	Carbon Content per Calorific Value (tC/GJ)	Carbon oxygenation Rate of Fuels (%)	
Diesel					
Petroleum					
Blind coal					
Soft coal					
Natural Gas					
Liquefied petroleum gas					

CO₂emissions from fossil fuel (tCO₂)	
---	--

* The company should add other types of energy actually consumed which are not listed in the Table.

Table5-3: Data of CO₂Emissions from net Purchased Electricity

Electricity(MWh)		Emission Factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchase d	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table5-4: Data of CO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat(tCO₂)	

Appendix VI: Report Format Template (Railway Transportation Enterprises)

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table6-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel (tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	

Table 6-2: Data of CO₂ Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm ³)	Net Calorific Value (GJ/t, GJ/10,000 Nm ³)	Carbon Content per Calorific Value (tC/GJ)	Carbon oxygenation Rate of Fuels (%)	
Diesel					
Natural Gas					
Liquefied petroleum gas					
Blind coal					
Soft coal					
CO₂emissions from fossil fuel (tCO₂)					

* The company should add other types of energy actually consumed which are not

listed in the Table.

Table6-3: Data ofCO2 Emissions from net Purchased Electricity

Electricity(MWh)		Emission Factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchased	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table6-4:Data of CO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat(tCO₂)	

Appendix VII: Report Format Template (Port Industry)

**Greenhouse Gas Emissions Report for
China Land Transportation Enterprises**

Reporting Entities (Seal):

Reporting Year:

Date: Day/Month/Year

Based on the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Land Transportation Enterprises (Trial)* by the National Development and Reform Commission, this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Activity Level Data and Sources

IV. Data of Emission Factors and Sources

V. Other Issues To Clarify

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise will bear the corresponding legal responsibility.

Legal Representative (Signature):

Day/Month/Year

Table7-1: Greenhouse Gas Emissions Report of Reporting Entity in the Year of

Emissions from fossil fuel (tCO ₂)		
Emissions from net purchased electricity(tCO ₂)		
Emissions from net purchased heat(tCO ₂)		
Total greenhouse gas emissions of enterprises	Not including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	
	Including CO ₂ emissions from net purchased electricity and heat(tCO ₂)	

Table 7-2: Data of CO₂ Emissions of Fossil Fuel

Types of Fossil Fuel *	Activity Level		Emission factors		Emissions (tCO ₂)
	Net consumption (t, 10,000 Nm ³)	Net Calorific Value (GJ/t, GJ/10,000 Nm ³)	Carbon Content per Calorific Value (tC/GJ)	Carbon oxygenation Rate of fuels (%)	
Petroleum					
Diesel					
Blind coal					
Soft coal					
Natural Gas					
Liquefied petroleum					

gas					
CO ₂ emission from fossil fuel (tCO ₂)					

* The company should add other types of energy actually consumed which are not listed in the Table.

Table7-3: Data of CO₂Emissions from net Purchased Electricity

Electricity(MWh)		Emission Factors (tCO ₂ /MWh)	Emissions (tCO ₂)
Purchase d	Electricity	Power grid	---
		1	
		2	
		...	
Outward sales	Electricity	Power grid	---
		1	
		2	
		...	
Emissions from net purchased electricity(tCO₂)			

Table7-4: Data of CO₂Emissions from net Purchased Heat

Net purchase (GJ)	
Emission factors (tCO₂/ GJ)	
CO₂emissions from net purchased heat(tCO₂)	

Appendix VIII: Relevant Default Values

Table8-1: Statistical Table of Energy consumption of Various Types of Vehicles per 100 km

Types of Vehicles	Petroleum consumption per 100 km	Source of Data
Passenger Car		
7 passenger vehicles (petroleum)	8.9	Notice of Energy consumption of Light Cars
7-15 passenger vehicles (diesel)	14.4	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
15-30 passenger vehicles (diesel)	18.4	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
30+ passenger vehicles (diesel)	25.5	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
Trucks		
2-ton trucks (petroleum)	13.0	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway

2-4 ton trucks (diesel)	20.2	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
4-8 ton trucks (diesel)	25.1	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
8-20 ton trucks (diesel)	30.7	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway
20+ ton trucks (diesel)	35	An Ad Hoc Survey of Traffic Volume on National Highway and Waterway

Table8-2: Recommended Value of Characteristic Parameters of Ordinary Fossil Fuels

Types of fuel		Net Calorific Value		Carbon Content per Unit Heat Value (tC/GJ)	Carbon oxygenation rate of fuels
		Recommended Value	Unit		
Solid fuels	Blind coal	24.515	GJ/t	27.49	94%
	Soft coal	23.204	GJ/t	26.18	93%
	Brown coal	14.449	GJ/t	28.00	96%

	Cleaned coal	26.344	GJ/t	25.40	93%
	Other washed coal	15.373	GJ/t	25.40	90%
	Briquette coal	17.460	GJ/t	33.60	90%
	Coke	28.446	GJ/t	29.40	93%
Liquid Fuel	Crude Oil	42.620	GJ/t	20.10	98%
	Fuel oil	40.190	GJ/t	21.10	98%
	Petroleum	44.800	GJ/t	18.90	98%
	Diesel	43.330	GJ/t	20.20	98%
	Ordinary kerosene	44.750	GJ/t	19.60	98%
	Petroleum coke	31.000	GJ/t	27.50	98%
	Other petroleum products	40.190	GJ/t	20.00	98%
	Tar	33.453	GJ/t	22.00	98%
	Crude benzene	41.816	GJ/t	22.70	98%
Gas Fuel	Refinery dry gas	46.050	GJ/t	18.20	99%
	Liquefied petroleum gas	47.310	GJ/t	17.20	99%
	Liquefied natural	41.868	GJ/t	15.30	99%

gas				
Natural gas	389.310	GJ/ 10,000 Nm ³	15.30	99%
Coke oven gas	173.854	GJ/ 10,000 Nm ³	13.60	99%
Blast furnace gas	37.690	GJ/ 10,000 Nm ³	70.80	99%
Converter gas	79.540	GJ/ 10,000 Nm ³	49.60	99%
Gas of the full-enclosed calcium carbide furnace	111.190	GJ/ 10,000 Nm ³	39.51	99%
Other coal gas	52.340	GJ/ 10,000 Nm ³	12.20	99%

Source of data: 1) *Net Calorific Value: Research on Chinese Greenhouse Gas Inventory 2005*;

2) Carbon content per unit heat value: *2006 IPCC Guidelines of National Greenhouse Gas Inventories; Provincial Guidelines of Greenhouse Gas Inventories (Trial)*;

3) Carbon oxygenation rate: *Provincial Guidelines of Greenhouse Gas Inventories*
(Trial)

Table8-3: Emission Factors of CH₄ and N₂O of Various Types of Vehicles (Road Traffic)

Types of Vehicles	Fuel	Emission Standard	Emission Factor of N ₂ O (mg/km)	Emission Factor of CH ₄ (mg/km)	
Cars	Petroleum	National Standard I	38	45	
		National Standard II	24	94	
		National Standard III	12	83	
		National Standard IV and beyond	6	57	
	Diesel	National Standard I	0	18	
		National Standard II	3	6	
		National Standard III	15	7	
		National Standard IV and beyond	15	0	
	LPG	National Standard I	38	80	
		National Standard II	23		
		National Standard III	9		
	Other types of light cars	Petroleum	National Standard I	122	45
			National Standard II	62	94
National Standard III			36	83	
National Standard IV			16	57	

		and beyond		
	Diesel	National Standard I	0	18
		National Standard II	3	6
		National Standard III	15	7
		National Standard IV and beyond	15	0
Heavy trucks	Petroleum	All	6	140
	Diesel	All	30	175
	Natural gas	National Standard IV and beyond	—	900
		Others		5400

Source of data: *Research on Chinese Greenhouse Gas Inventories 2005*

Table8-4: Table of Enthalpy of Saturated Steam

Pressure (MPa)	Temperature (°C)	Enthalpy(kJ / kg)	Pressure (MPa)	Temperature (°C)	Enthalpy (kJ / kg)
0.001	6.98	2513.8	1.00	179.88	2777.0
0.002	17.51	2533.2	1.10	184.06	2780.4
0.003	24.10	2545.2	1.20	187.96	2783.4
0.004	28.98	2554.1	1.30	191.6	2786.0
0.005	32.90	2561.2	1.40	195.04	2788.4
0.006	36.18	2567.1	1.50	198.28	2790.4
0.007	39.02	2572.2	1.60	201.37	2792.2
0.008	41.53	2576.7	1.40	204.3	2793.8
0.009	43.79	2580.8	1.50	207.1	2795.1
0.010	45.83	2584.4	1.90	209.79	2796.4
0.015	54.00	2598.9	2.00	212.37	2797.4
0.020	60.09	2609.6	2.20	217.24	2799.1
0.025	64.99	2618.1	2.40	221.78	2800.4
0.030	69.12	2625.3	2.60	226.03	2801.2
0.040	75.89	2636.8	2.80	230.04	2801.7
0.050	81.35	2645.0	3.00	233.84	2801.9
0.060	85.95	2653.6	3.50	242.54	2801.3
0.070	89.96	2660.2	4.00	250.33	2799.4
0.080	93.51	2666.0	5.00	263.92	2792.8
0.090	96.71	2671.1	6.00	275.56	2783.3

0.10	99.63	2675.7	7.00	285.8	2771.4
0.12	104.81	2683.8	8.00	294.98	2757.5
0.14	109.32	2690.8	9.00	303.31	2741.8
0.16	113.32	2696.8	10.0	310.96	2724.4
0.18	116.93	2702.1	11.0	318.04	2705.4
0.20	120.23	2706.9	12.0	324.64	2684.8
0.25	127.43	2717.2	13.0	330.81	2662.4
0.30	133.54	2725.5	14.0	336.63	2638.3
0.35	138.88	2732.5	15.0	342.12	2611.6
0.40	143.62	2738.5	16.0	347.32	2582.7
0.45	147.92	2743.8	17.0	352.26	2550.8
0.50	151.85	2748.5	18.0	356.96	2514.4
0.60	158.84	2756.4	19.0	361.44	2470.1
0.70	164.96	2762.9	20.0	365.71	2413.9
0.80	170.42	2768.4	21.0	369.79	2340.2
0.90	175.36	2773.0	22.0	373.68	2192.5

Table8-5: Table of Enthalpy of Superheated Steam (to be continued)

(Unit: kJ / kg)

Temperature	Pressure											
	0.01 MPa	0.1 MPa	0.5 MPa	1 MPa	3 MPa	5 MPa	7 MPa	10 MPa	14 MPa	20 MPa	25 MPa	30 MPa
0°C	0	0.1	0.5	1	3	5	7.1	10.1	14.1	20.1	25.1	30
10°C	42	42.1	42.5	43	44.9	46.9	48.8	51.7	55.6	61.3	66.1	70.8
20°C	83.9	84	84.3	84.8	86.7	88.6	90.4	93.2	97	102.5	107.1	111.7
40°C	167.4	167.5	167.9	168.3	170.1	171.9	173.6	176.3	179.8	185.1	189.4	193.8
60°C	2611.3	251.2	251.2	251.9	253.6	255.3	256.9	259.4	262.8	267.8	272	276.1
80°C	2649.3	335	335.3	335.7	337.3	338.8	340.4	342.8	346	350.8	354.8	358.7
100°C	2687.3	267.6.5	419.4	419.7	421.2	422.7	424.2	426.5	429.5	434	437.8	441.6
120°C	2725.4	271.6.8	503.9	504.3	505.7	507.1	508.5	510.6	513.5	517.7	521.3	524.9
140°C	2763.6	275.6.6	589.2	589.5	590.8	592.1	593.4	595.4	598	602	605.4	603.1
160°C	2802	279.6.2	276.7.3	675.7	676.9	678	679.2	681	683.4	687.1	690.2	693.3
180°C	2840.6	283.5.7	281.2.1	277.7.3	764.1	765.2	766.2	767.8	769.9	773.1	775.9	778.7
200°C	2879.3	287.5.2	285.5.5	282.7.5	853	853.8	854.6	855.9	857.7	860.4	862.8	856.2
220°C	2918.3	291.4.7	289.8	287.4.9	943.9	944.4	945.0	946	947.2	949.3	951.2	953.1
240°C	2957.4	295.4.3	293.9.9	292.0.5	282.3	103.7.8	103.8.0	103.8.4	103.9.1	104.0.3	104.1.5	102.4.8
260°C	2996.8	299.4.1	298.1.5	296.4.8	288.5.5	113.5	113.4.7	113.4.3	113.4.1	113.4	113.4.3	113.4.8
280°C	3036.5	303.4	302.2.9	300.8.3	294.1.8	285.7	123.6.7	123.5.2	123.3.5	123.1.6	123.0.5	122.9.9
300°C	3076.3	307.4.1	306.4.2	305.1.3	299.4.2	292.5.4	283.9.2	134.3.7	133.9.5	133.4.6	133.1.5	132.9
350°C	3177	317.5.3	316.7.6	315.7.7	311.5.7	306.9.2	301.7.0	292.4.2	275.3.5	164.8.4	162.6.4	161.1.3

Table8-5: Table of Enthalpy of Superheated Steam (continued)

(Unit: kJ / kg)

Temperature	Pressure											
	0.01 MPa	0.1 MPa	0.5 MPa	1 MPa	3 MPa	5 MPa	7 MPa	10 MPa	14 MPa	20 MPa	25 MPa	30 MPa
400°C	3279.4	3278	3217.8	3264	3231.6	3196.9	3159.7	3098.5	3004	2820.1	2583.2	2159.1
420°C	3320.96	3319.68	3313.8	3306.6	3276.9	3245.4	3211.0	3158	3072	2912	2730.7	2424.7
440°C	3362.52	3361.36	3355.9	3349.3	3321.9	3293.2	3262.3	3213.6	3144	3014	2873.9	2690.3
450°C	3383.3	3382.2	3377.1	3370.7	3344.4	3316.8	3288.0	3242.2	3175.8	3062.4	2952.1	2823.1
460°C	3404.42	3403.34	3398.3	3392.1	3366.8	3338.4	3312.4	3268.8	3204	3096	2994.6	2875.2
480°C	3446.66	3445.62	3440.9	3435.1	3411.6	3383.2	3361.3	3324	3262	3168	3079.8	2979.5
500°C	3488.9	3487.9	3483.7	3478.3	3456.4	3433.8	3410.2	3374.1	3323	3240.2	3165	3083.9
520°C	3531.82	3530.9	3526.9	3521.8	3501.2	3480.1	3458.6	3425.1	3377	3303.7	3237	3166.1
540°C	3574.74	3573.9	3570.1	3565.4	3546.1	3526.4	3506.4	3475.4	3432.5	3364.6	3304.7	3241.7
550°C	3593.2	3592.5	3589.1	3584.2	3566.6	3548.6	3530.2	3500.4	3459.2	3399.4	3337.3	3277.7
560°C	3618	3617.22	3613.64	3609.2	3593.1	3576.6	3559.1	3525.4	3485.8	3427.6	3366.9	3312.6
580°C	3661.6	3660.86	3657.52	3653.3	3638.4	3621.8	3604.6	3576.9	3538.2	3481.9	3431.2	3379.8

600°C	3705 .2	370 4.5	370 1.4	369 7.4	368 1.5	366 5.4	36 49. 0	362 4	358 9.8	353 6.9	349 1.2	344 4.2
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