Monetized Health Benefits of Shandong Spring City Green Modern Trolley Bus Demonstration Project

Project Number TA 9208-PRC

FINAL REPORT

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Acronyms and Abbreviations

ΔC	Changes in ambient primary $PM_{2.5}$ concentrations for exposed populations
ΔQ	Projected changes in emissions
ADB	Asian Development Bank
BR	Breathing rate
C-R	Concentration-response
GHG	Greenhouse gas
iF	Intake fraction
P	Population projections
PM	Primary fine particulate matter
$PM_{2.5}$	Primary fine particulate matter less than 2.5 microns in diameter
ppm	Parts per million
RR	relative risk of death
USD	United States dollar
VSL	Value of a statistical life

1. Introduction

Rapid urbanization has occurred in many cities in China. Jinan, the capital of Shandong Province, has experienced dramatic increases in traffic, particularly in the use of private vehicles and electric bikes. Jinan is now the most congested city in China and has high levels of air pollution. While a public transportation system exists in the city, the use of private transportation continues to grow rapidly. Therefore, the Shandong Spring City Green Modern Trolley Bus Demonstration Project is intended to improve Jinan's public transportation system and reduce traffic congestion and air pollution. The project will install 880 trolley buses to run over 201.4 km of trolley bus priority lanes that will integrate into the city's existing bus rapid transit routes and overall public transport network.

The trolley buses will provide public transportation without direct air pollution emissions. As fewer people will use private vehicles, emissions will decrease, which will alleviate congestion. However, as electric power plants must generate electricity to power the trolley buses, it will somewhat temper the benefits of decreased air pollution emissions from private vehicles.

Reductions in air pollution emissions and associated reductions in ambient pollutant concentrations will lead to environmental and human health benefits. These benefits include avoided mortality and morbidity due to improved air quality, as well as reduced emissions of greenhouse gases (GHGs). In this report, Abt Associates quantifies and monetizes the avoided mortality benefit over the period of 2016 – 2050.

We note that the analysis considers only the avoided mortality impacts from primary fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) while recognizing reductions in $PM_{2.5}$ emissions and ambient concentrations would also have an avoided morbidity benefit (e.g., asthma-related incidents, hospitalizations, and non-fatal heart attacks).We focus on the avoided mortality as we lack the data to estimate morbidity impacts with any confidence, while recognizing the valuation of avoided mortality generally far outweighs the specific valuation of the benefits of emissions control scenarios (U.S. Environmental Protection Agency 2011).

The emissions reductions from the trolley bus demonstration project will also reduce the formation of ozone and secondary particulate matter, although there is considerable uncertainty in estimating health impacts from these pollutants in China without more specific air quality modeling.

Given these caveats, the results in the report are a lower bound on the benefits of the emissions reductions as a result of the trolley bus demonstration project.

This report is a companion to an Excel spreadsheet that has more detailed results. The spreadsheet can be edited to adjust analysis assumptions and run different scenarios.

The rest of this report is organized as follows: Section 2 discusses the methods used in the analysis, Section 3 provides the results and discussion, including uncertainty in the estimates, and Section 4 provides concluding remarks.

2. Methods

Quantifying and monetizing the avoided mortality benefits from the trolley bus demonstration project is a four-step process:

1. Estimate emissions reductions resulting from the trolley bus demonstration project.
2. Estimate changes in ambient pollution concentrations resulting from changes in emissions.
3. Estimate changes in health impacts resulting from changes in ambient pollution concentrations.
4. Estimate the monetary value of the health impacts.

The methods used in this analysis follow those proposed by Greco et al. (2016), which provides a framework for estimating monetized health benefits from reductions in primary PM emissions from transportation. Each step in the analysis is described in more detail in the following subsections.

2.1 Emissions Reductions

The Asian Development Bank (ADB) provided Abt Associates with projected emissions reductions resulting from the trolley bus demonstration project for the period of 2016 – 2043. These reductions account for the expected increase in vehicles in Jinan and the congestion alleviation due to the project along with increased emissions from the additional electric power generation needed for the trolleys. Figure 1 shows that emissions are expected to increase in Jinan with and without the trolley bus demonstration project; but, with the project, emissions would rise more slowly, resulting in cumulative emissions reductions of 338 metric tons of primary $PM_{2.5}$. However, Figure 2 shows that the trolley bus demonstration project also results in an increase in emissions from electric power generation, i.e., 97 metric tons of primary $PM_{2.5}$. As discussed in the next subsection, emissions from electricity generation have a smaller effect on local ambient pollution concentrations.

Because the projected emissions are for the period of 2016 – 2043, we hold the emissions constant for the period of 2044 – 2050 in the analysis.

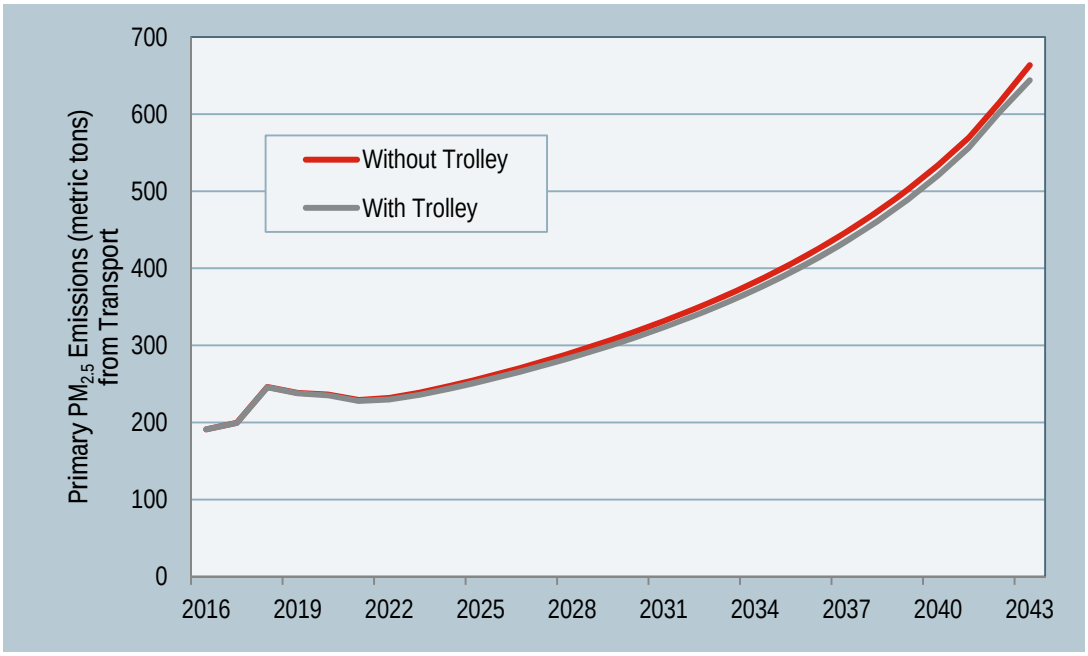

Figure 1. Primary $PM_{2.5}$ emissions (metric tons) from transport in Jinan, China

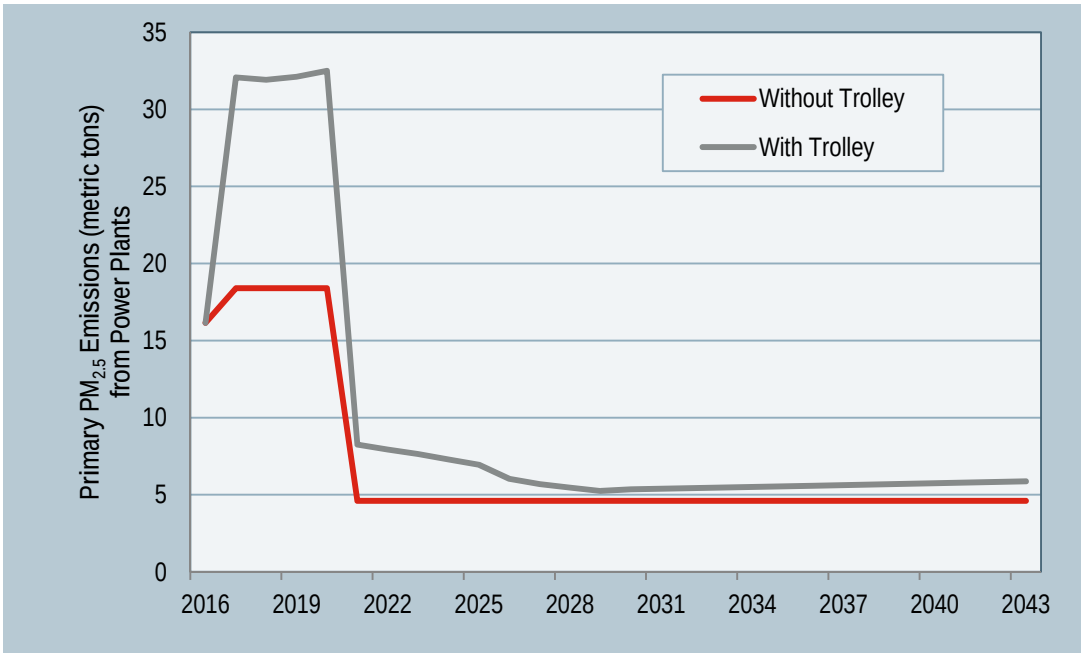

Figure 2. Primary $PM_{2.5}$ emissions (metric tons) from electricity required for trolley operations in Jinan, China

2.2 Changes in Ambient Pollution Concentrations

Changes in air pollution emissions drive changes in ambient air pollution concentrations. However, different emissions sources effect concentrations differently. Transportation sources are at the ground level and are generally concentrated around dense population centers. Therefore, emissions from these sources have a large direct impact on local ambient pollutant concentrations and populations. Electric power plants are often located away from dense urban areas, and they typically emit pollutants out of tall smokestacks, which distribute the emissions over a wider area, including to less population-dense areas and unpopulated areas, such as the ocean. Because of this, a ton of power plant emissions tends to have a less direct impact on public health than a ton of emissions from transportation.

In this analysis, the changes in ambient concentrations from changes in emissions are estimated using an intake fraction (iF), which is the fraction of emissions from a specific source (such as transportation) that are inhaled by an exposed population. Apte et al. (2012) estimated iF for transportation for 3,646 cities worldwide. The iF for Jinan is 48.5 ppm (parts per million), which means that 48.5 grams of primary $PM_{2.5}$ are inhaled for each ton of primary $PM_{2.5}$ emitted from transportation sources.

Zhou et al. (2006) estimated an iF for power plants throughout China. The results indicate an average iF of 6 ppm, with a range of 1.7 – 12 ppm. The estimates of iF for power plants in China are much lower than the iF for transportation, indicating that emissions from transportation are a more important driver of impacts to public health per ton of emissions.

The iF for transportation and power plants are used with population projections (P), projected changes in emissions (ΔQ), and estimated breathing rate (BR; m^3/day) to calculate the changes in ambient primary $PM_{2.5}$ concentrations for exposed populations (ΔC).

$$\Delta C = \frac{iF}{P \times BR} \Delta Q \quad (1)$$

Changes in air pollution concentrations are estimated separately for transportation and power plants, using the appropriate iF for each source. ABD provided the population projections to Abt Associates.

We use two values for the breathing rate. The lower value of 14.5 m^3/day is commonly found in literature (e.g., Apte et. al 2012; Greco et al. 2016). For sensitivity, we also estimate changes in the ambient $PM_{2.5}$ concentration using the higher breathing rate of 20 m^3/day (e.g., Greco et al. 2007; Hao et al. 2007).

2.3 Changes in Public Health Impacts

The changes in public health impacts due to changes in ambient air pollution concentrations are estimated using concentration-response (C-R) functions, which are estimated by environmental epidemiology studies. The first step is to estimate the relative risk of death (RR) based on ΔC.

$$RR = \exp(\beta \Delta C) \quad (2)$$

The value of β is the parameter linking changes in air pollution concentrations to the relative risk of death. For this analysis, we use two values for β to estimate a range of mortality risks. The lower value is 0.0001998, from Huang et al. (2012), which is a study of all-age, all-cause response to $PM_{2.5}$ concentrations in Xi'an. The higher value of β is 0.0003594, from Kan et al. (2007), which is a study of all-age, all-cause response to $PM_{2.5}$ concentrations in Shanghai. These studies, and the associated β values, are available options in the U.S. Environmental Agency's Environmental Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE; U.S. EPA, 2017a).

To estimate the change in the total relative risk of death attributable to the trolley bus demonstration project, we add the decrease in ambient primary $PM_{2.5}$ concentrations calculated for the reductions in transport emissions with the increase in ambient concentrations due to increases in power plant emissions.

The relative risk of death is used with the exposed population (P) and the baseline mortality risk (Y_0) to estimate the number of premature deaths avoided (ΔY) due to primary $PM_{2.5}$ emission reductions.

$$\Delta Y = \frac{RR - 1}{RR} \times P \times Y_0 \quad (3)$$

ADB provided the baseline mortality risk to Abt Associates.

Changes in ambient air pollution concentrations also result in changes in morbidity and mortality, including decreases in asthma-related incidents, hospitalizations, and non-fatal heart attacks, among other health outcomes. We lacked the data necessary to estimate the morbidity associated with changes in air pollution concentrations in Jinan. Specifically, appropriate CR functions from studies conducted in Chinese cities were not identified. Furthermore, as discussed in the next section, the monetized benefits to public health from decreased air pollution emissions are typically dominated by the avoided mortality impact. For this reason, this analysis focuses on the avoided mortality effects rather than those from avoided morbidity.

2.4 Valuation of Public Health Impacts

The monetized value of avoiding mortality from air pollution emissions is based on the concept of the value of a statistical life (VSL). The VSL concept is controversial, as it attempts to place a value on avoiding deaths. However, it should be noted that the VSL does not attempt to value any individual death, but rather it reflects the value of slightly reducing the individual risk of death over a broad population.

There are generally two ways to estimate a VSL. The first is a wage-risk study, which examines labor data to quantify the increase in wages received for jobs with higher risk of injury and death. These studies assume that individuals will require higher wages for participating in riskier jobs, and they use that relationship to determine a value of decreasing risk.

The second method of estimating VSL is a contingent valuation study, which is a survey that asks respondents their willingness to pay to reduce their risk of death or another health outcome, such as a non-fatal heart attack. Generally, a contingent valuation survey will ask a respondent whether they would be willing to pay a given amount of money to reduce their risk of death by a certain amount,

for example 1 in 10,000. If the respondent says yes, then the amount is increased until the respondent says no. This calculates bounds of willingness to pay to decrease risk of death from air pollution emissions. These contingent valuation studies have the advantage of being able to survey a broader sample of the population compared to the wage-risk studies. They also have the noted disadvantage that people often have poor judgment of risk and therefore may not fully know their willingness to pay for risk reductions.

There are relatively few studies estimating the VSL for China. Wang et al. (2001) and Hammitt and Zhou (2006) are both contingent valuation studies that estimate VSL for China. Hammitt and Zhou specifically note that their estimates of willingness to pay are not very sensitive to risk reduction, which is further evidence that people have poor judgment of risk and what they would be willing to pay to avoid it. As such, they state that their results should be used with caution.

For this reason, we used an established VSL from the U.S. Environmental Protection Agency (2017) for this analysis. The U.S. VSL is transferred to China following the methods of Hammitt and Robinson (2011), which provide a framework for transferring a previously estimated VSL to another population based on differences in income between the populations.

$$VSL_B = VSL_A \times \left(\frac{Income_B}{Income_A}\right)^i \quad (4)$$

In this equation, the previously estimated VSL for a population in country A (the U.S.) is transferred to country B (China) based on the ratio of income in country B to country A, adjusted by an elasticity (i). The elasticity accounts for differences in the relationship between VSL and income. If the VSL had no relationship to income (i.e., the elasticity is 0), then people all over the world would be willing to pay the same amount to avoid mortality risk, regardless of their income. Hammitt and Robinson (2011) suggest that the elasticity may be greater than 1 for some low-income countries. For this analysis we use an elasticity of 1 for the upper-bound VSL. This approach to transferring a VSL from a developed country for use in a developing country based on differences in income is suggested in ADB's cost-benefit analysis guidelines (Asian Development Bank 2013).

The U.S. VSL we use for this transfer is $7.4 million (2006 USD—United States dollar), which is an average of VSLs from 26 studies using both the wage-risk and contingent valuation methods. The U.S. VSL is adjusted for inflation to $8.7 million (2015 USD). The gross national incomes of China and the U.S. are from the World Bank, and are $14,320 and $57,540 per person (2015 USD), respectively. Incorporating these values into equation 4 results in an upper-bound transferred VSL for China of $2,170,470.

Hammitt and Robinson (2011) also recommend estimating a lower-bound VSL based on the present value of future consumption. This is the amount of consumption an individual would have if he or she had lived to his or her full life expectancy. This value is calculated by determining the life expectancy at birth in China (76.1 years, World Health Organization 2017) and dividing by two to determine a midpoint age of 38.05 years. The life expectancy at this midpoint age is an additional 41.3 years (World Health Organization 2017). The gross national income for China of $14,320 per person is used as a proxy for consumption. The sum of this value over 41.3 years, discounted to the present using a 3 percent discount rate, is $335,266, which represents a lower-bound VSL for China.

2.5 Scenarios

The methodology described above generally includes a range of calculation parameters for estimating health benefit values. Table 1 lists the parameters used in the low and high scenarios in the analysis.

Table 1. Calculation parameters for low and high scenarios

Parameter	Units	Low Scenario	High Scenario
Breathing rate	m^3 per person per day	14.5	20
β		0.0001998	0.0003594
Value of a Statistical Life	2015 USD	$335,266	$2,170,470

3. Results and Discussion

The results of this analysis indicate that the trolley bus demonstration project will reduce mortality over the period of 2016 - 2043, providing significant monetized public health benefits. However, these benefits are tempered somewhat by the emissions associated with electricity generation required to power the trolleys. The results are discussed in more detail below.

3.1 Mortality

The reduction in air pollution emissions due to the trolley bus demonstration project results in the avoidance of 41 to 54 total deaths between 2016 and 2050. Figure 3 shows the annual number of avoided deaths in the low and high scenarios. The slight decline in avoided deaths in 2041 and 2042 comes from ADB's modeled emission reduction results, which show a slight decrease in emissions reductions between 2040 and 2043. The emissions reductions are held constant between 2043 and 2050, resulting in a constant number of avoided deaths during those years.

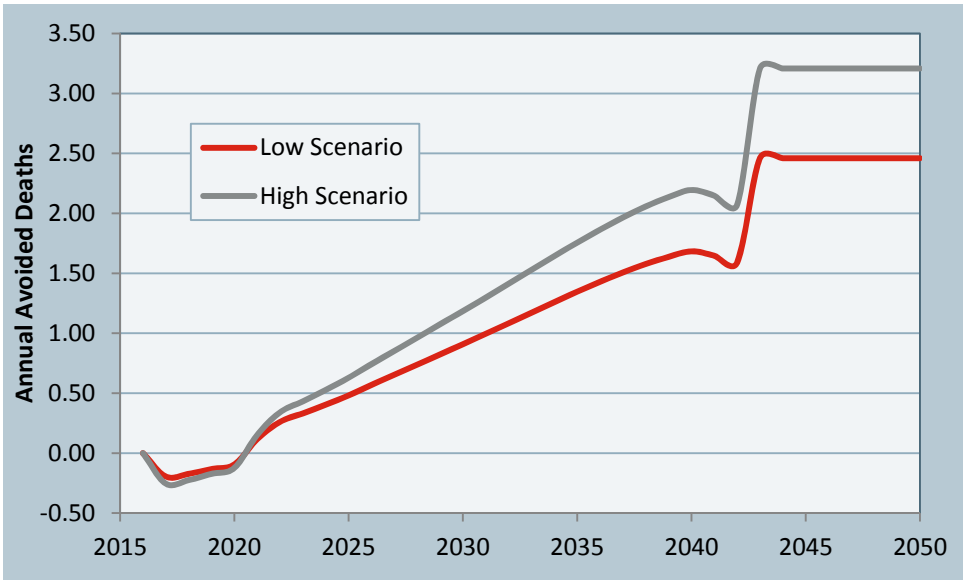

Figure 3. Annual avoided deaths due to the trolley bus demonstration project, 2016–2050

As power plants must generate electricity to power the trolleys, their emissions slightly reduce the overall benefits. In fact, during the period of 2017 – 2020, the increase in emissions from power plants outweighs the decrease in emissions from transportation, leading to a slight increase in mortality in those years. If the increase in emissions from power plants were not considered, the total decrease in mortality would be 43 to 56 avoided deaths over the period of 2016 – 2050. Therefore, the power plant emissions decrease the mortality benefit by approximately two avoided deaths.

3.2 Valuation

The monetized health benefits of the trolley bus demonstration project are estimated by multiplying the number of avoided deaths in a year by the VSL. Table 2 lists the results discounted to the present value using a 3 percent and 7 percent discount rate and a base year of 2016.

With a 3 percent discount rate, the valuation ranges from $6.8 million, using the low-end estimates of mortality avoided and VSL, to $57.3 million, using the high-end estimates.

Table 2. Present value of avoided mortality for the period 2016 – 2050 (2015 USD).

Parameter	Low Scenario	High Scenario
3% discount rate	$6,784,577	$57,273,189
7% discount rate	$2,803,910	$23,669,697

Power plant emissions reduced the total value of avoided mortality benefits. If the increase in emissions from power plants were not considered, the value would range between $7.2 million to $60.7 million. Therefore, the power plant emissions decrease the value of avoided mortality by $0.4 million to $4.4 million, or approximately 6 percent.

3.3 Caveats

There are two main caveats to the results of this analysis.

First, the analysis only considers reductions in mortality due to the trolley bus demonstration project, rather than a reduction in morbidity, such as asthma-related incidents, hospitalizations, and non-fatal heart attacks. We lack data and published studies on the CR functions necessary to estimate morbidity from changes in air pollution in Jinan. Nevertheless, because the value of avoiding mortality (the VSL) is significantly larger than that value of avoiding morbidity, other similar studies have found that the vast majority of monetized health benefits from air pollution reductions are from avoided mortality (e.g., U.S. Environmental Protection Agency 2011).

Second, this analysis considers only reductions in primary $PM_{2.5}$ emissions. The reduction in emissions of other pollutants, such as nitrogen oxides and sulfur dioxide, would likely also result in a decrease in the formation of ozone and secondary $PM_{2.5}$, which would generate additional positive health impacts. We lacked data to estimate changes in concentrations of ozone and secondary $PM_{2.5}$ without more sophisticated air quality modeling.

For these reasons, the results of this analysis represent a lower bound on the public health benefits of the trolley bus demonstration project.

4. Conclusions

The Shandong Spring City Green Modern Trolley Bus Demonstration Project provides tangible public health benefits, including the avoidance of 41 to 54 premature deaths over the period of 2016 – 2050. These benefits can be monetized at a value of between $6.8 million and $57.3 million, at a 3 percent discount rate, depending on the VSL used.

Nevertheless, accounting for the increase in emissions from electricity generation decreases the total monetized benefits by approximately 6 percent. Even though power plant emissions have a less direct impact on public health than transportation emissions, power plants still have a significant negative impact on the total benefits of the project.

As discussed above, these results should be considered a lower bound on the total public health benefits of the project because we lacked the data to estimate the project impacts on morbidity and the health impacts of other pollutants beyond $PM_{2.5}$, such as ozone and secondary PM.

In addition, the benefits are highly dependent on the VSL. We used a well-documented method to develop a range of VSLs, but more research may be necessary to refine these estimates.

5. Annex 1

This Annex contains the spreadsheets from the accompanying Excel workbook entitled, "Abt FINAL TA 9208-PRC Shandong Spring City-trolley-health-benefit-calcs-May 24_2017."

5.1 Overview

Monetized Health Impacts of Reduced Exposure to Primary Particulate Matter Emissions

Document Source			
Prepared by Abt Associates, Inc. (Abt) for Asian Development Bank			
Project #	TA 9208-PRC	**Project Name**	Shangong Spring City Green Modern Trolley Bus Demonstration Project
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Document Summary	
Date	05/19/2017
Version	1.2
Description	This workbook presents the calculations for estimating the monetized health benefits of reducing primary PM_{25} emissions from transportation due to a trolley system in Jinan, China.
Worksheet List	
Overview	Provides summary information about this workbook.
Summary	Includes a list of the parameters used in modeling the monetized health impacts of primary PM_{25} emissions reductions from the trolley system in Jinan. Parameters in yellow cells can be adjusted to change the assumptions used in the analysis. Also includes summary results of mortality avoided and monetized health benefits (US$) for the low and high scenarios.
Mortality - Low Scenario	Provides detailed results of the mortality calculations for the low scenario, including number of deaths avoided in each year.
Mortality - High Scenario	Provides detailed results of the mortality calculations for the high scenario, including number of deaths avoided in each year.
Valuation	Provides detailed results of the valuation of the mortality calculations for the low and high scenarios, using the low and high VSL values, at discount rates of 3%, and 7%.
Emissions Reductions Details	Assumptions used to determine the primary PM_{25} emission reductions from the trolley system. Emission reductions were provided by ADB.
Mortality Rate Details	Assumptions used to determine the all-cause, all-age mortality rate. Mortality rates were provided by ADB.
Intake Fraction Details	**Intake fractions from Apte et al. (2012), which are used to estimate the fraction of PM_{25} emissions from transportation in Jinan that is inhaled by people, and details from Zhou et al. (2006) which is used to estimate the fraction of PM_{25} emissions from power plants inhaled by people.**
Population Details	Details on the projected population in Jinan, China, for the period 2005-2050
VSL Details	Calculations and assumptions used to determine the lower and higher bound value for the Value of a Statistical Life (VSL)
References	References for assumptions and parameters used in the analysis.

Document Change History		
Version	**Delivery Date**	**Changes**
1.0	4/26/2017	Initial draft of document.
1.1	5/11/2017	Updated with new emissions projections considering ultra-low emissions.
1.2	05/19/2017	Corrected formula in Column G of the Low- and High-Mortality Scenario spreadsheets. The vlookup incorrectly searched through row 27 rather than 33.

5.2 Summary

Modeling Inputs			
Parameter	**Value**	**Notes**	**Source**
First Year of Emissions Reductions	2016		
Final Year for Calculating Impact of Emissions Reductions	2050		
Emissions reductions from project (metric tons)	edit here	Assumed annual reduction in primary $PM_{2.5}$ emissions realized in Jinan due to the trolley system.	Provided by ADB
Baseline Mortality Rate	edit here	Average of observed annual all-age mortality rates from 2004 through 2013	Provided by ADB
Project Location	Jinan	Target city for intake fraction	
	China	Country	
Transport Intake Fraction (ppm)	48.5	Fraction of pollutant emitted by transportation that is inhaled by the population of the selected city.	Apte et. al (2012)
Power Plant Intake Fraction (ppm)	6.0	Fraction of primary $PM_{2.5}$ emitted by power plants that is inhaled by the population.	Zhou et al. (2006)
Population	edit here		
Beta (low scenario)	0.0001998	Beta is coefficient used in the health impact equations to determine the impact of $PM_{2.5}$ emissions on mortality. It is derived in local epidemiological studies.	Huang et al (2012) study of all-age, all cause response to PM2.5 in Xi'an
Beta (high scenario)	0.0003594		Kan et al (2007) study of all-age, all cause response to PM2.5 in Shanghai
Breathing rate, low scenario (m^3/day/person)	14.5		Layton 1993
Breathing rate, high scenario (m^3/day/person)	20.0		Hao et al. 2007
Value of Statistical Life, low scenario (VSL, 2015 US$)	$335,266	edit here	Hammitt and Robinson 2011
Value of Statistical Life, high scenario (VSL, 2015 US$)	$2,170,470		
Discount Rate (%)	3%		Assumption
	7%		Assumption
			Note: Adjust modeling parameters in yellow cells.

Results		
Mortality Avoided	**Low**	**High**
Average Annual Deaths Avoided	1.2	1.5
Cumulative Deaths Avoided During Study Period	41	54
Monetized Benefits (2015 US$)	**Low**	**High**
3% discount rate	$6,784,577	$57,273,189
7% discount rate	$2,803,910	$23,669,697

5.3 Mortality – Low Scenario

Year	All Age Population	Breathing rate (m^3/day/person)	Transport Intake fraction (ppm)	Power Plant Intake fraction (ppm)	Annual Reduction of $PM_{2.5}$ Emissions from Transport (metric tons/year)	Annual Reduction of $PM_{2.5}$ Emissions from Power Plants (metric tons/year)	Daily Reduction of $PM_{2.5}$ Emissions from Transport (grams/day)	Daily Reduction of $PM_{2.5}$ Emissions from Power Plants (grams/day)	Assumed all age, all-cause annual mortality rate	Concentration-response function Coefficient (i.e., the Beta)	Baseline all-age, all-cause mortality	Change in exposure to ambient $PM_{2.5}$ concentration from Transport (ug/m^3) [a]	Change in exposure to ambient $PM_{2.5}$ concentration from Power Plants (ug/m^3) [a]	Relative risk for given change in ambient $PM_{2.5}$	Annual avoided mortality impact from emission reductions
2016	4,634,820	14.5	48.5	6	0.0	0.0	0	0	6.93%	0.0001998	321,054	0.000	0.000	1.0000000	0.00
2017	4,735,340	14.5	48.5	6	0.2	-13.7	419	-37,463	6.93%	0.0001998	328,017	0.000	-0.003	0.9999994	-0.20
2018	4,835,860	14.5	48.5	6	0.3	-13.5	857	-37,033	6.93%	0.0001998	334,980	0.001	-0.003	0.9999995	-0.17
2019	4,936,380	14.5	48.5	6	0.7	-13.7	1,794	-37,582	6.93%	0.0001998	341,943	0.001	-0.003	0.9999996	-0.13
2020	5,036,900	14.5	48.5	6	1.0	-14.1	2,739	-38,647	6.93%	0.0001998	348,906	0.002	-0.003	0.9999997	-0.09
2021	5,127,920	14.5	48.5	6	1.4	-3.6	3,762	-9,999	6.93%	0.0001998	355,211	0.002	-0.001	1.0000003	0.12
2022	5,218,940	14.5	48.5	6	2.5	-3.3	6,776	-9,123	6.93%	0.0001998	361,516	0.004	-0.001	1.0000007	0.26
2023	5,309,960	14.5	48.5	6	3.0	-3.0	8,184	-8,319	6.93%	0.0001998	367,821	0.005	-0.001	1.0000009	0.33
2024	5,400,980	14.5	48.5	6	3.5	-2.7	9,656	-7,367	6.93%	0.0001998	374,126	0.006	-0.001	1.0000011	0.40
2025	5,492,000	14.5	48.5	6	4.1	-2.3	11,198	-6,416	6.93%	0.0001998	380,431	0.007	0.000	1.0000013	0.48
2026	5,571,580	14.5	48.5	6	4.7	-1.4	12,809	-3,936	6.93%	0.0001998	385,943	0.008	0.000	1.0000015	0.57
2027	5,651,160	14.5	48.5	6	5.3	-1.1	14,489	-2,997	6.93%	0.0001998	391,456	0.009	0.000	1.0000017	0.65
2028	5,730,740	14.5	48.5	6	5.9	-0.9	16,230	-2,370	6.93%	0.0001998	396,968	0.009	0.000	1.0000019	0.74
2029	5,810,320	14.5	48.5	6	6.6	-0.6	18,031	-1,751	6.93%	0.0001998	402,481	0.010	0.000	1.0000020	0.82
2030	5,889,900	14.5	48.5	6	7.3	-0.7	19,882	-2,047	6.93%	0.0001998	407,993	0.011	0.000	1.0000022	0.91
2031	5,957,360	14.5	48.5	6	7.9	-0.8	21,769	-2,149	6.93%	0.0001998	412,666	0.012	0.000	1.0000024	1.00
2032	6,024,820	14.5	48.5	6	8.6	-0.8	23,684	-2,254	6.93%	0.0001998	417,339	0.013	0.000	1.0000026	1.08
2033	6,092,280	14.5	48.5	6	9.3	-0.9	25,611	-2,360	6.93%	0.0001998	422,012	0.014	0.000	1.0000028	1.17
2034	6,159,740	14.5	48.5	6	10.0	-0.9	27,527	-2,466	6.93%	0.0001998	426,685	0.015	0.000	1.0000030	1.26
2035	6,227,200	14.5	48.5	6	10.7	-0.9	29,405	-2,573	6.93%	0.0001998	431,358	0.016	0.000	1.0000031	1.35
2036	6,282,920	14.5	48.5	6	11.4	-1.0	31,213	-2,682	6.93%	0.0001998	435,218	0.017	0.000	1.0000033	1.43
2037	6,338,640	14.5	48.5	6	12.0	-1.0	32,909	-2,791	6.93%	0.0001998	439,078	0.017	0.000	1.0000034	1.51
2038	6,394,360	14.5	48.5	6	12.6	-1.1	34,441	-2,900	6.93%	0.0001998	442,937	0.018	0.000	1.0000036	1.58
2039	6,450,080	14.5	48.5	6	13.0	-1.1	35,746	-3,011	6.93%	0.0001998	446,797	0.019	0.000	1.0000037	1.64
2040	6,505,800	14.5	48.5	6	13.4	-1.1	36,747	-3,122	6.93%	0.0001998	450,657	0.019	0.000	1.0000037	1.68
2041	6,550,840	14.5	48.5	6	13.1	-1.2	35,974	-3,234	6.93%	0.0001998	453,777	0.018	0.000	1.0000036	1.65
2042	6,595,880	14.5	48.5	6	12.7	-1.2	34,735	-3,347	6.93%	0.0001998	456,897	0.018	0.000	1.0000035	1.59
2043	6,640,920	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	460,017	0.027	0.000	1.0000053	2.46
2044	6,685,960	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	463,136	0.027	0.000	1.0000053	2.46
2045	6,731,000	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	466,256	0.027	0.000	1.0000053	2.46
2046	6,766,740	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	468,732	0.026	0.000	1.0000052	2.46
2047	6,802,480	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	471,208	0.026	0.000	1.0000052	2.46
2048	6,838,220	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	473,683	0.026	0.000	1.0000052	2.46
2049	6,873,960	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	476,159	0.026	0.000	1.0000052	2.46
2050	6,909,700	14.5	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0001998	478,635	0.026	0.000	1.0000051	2.46

5.4 Mortality – High Scenario

Year	All Age Population	Breathing rate (m^3/day/person)	Transport Intake fraction (ppm)	Power Plant Intake fraction (ppm)	Annual Reduction of $PM_{2.5}$ Emissions from Transport (metric tons/year)	Annual Reduction of $PM_{2.5}$ Emissions from Power Plants (metric tons/year)	Daily Reduction of $PM_{2.5}$ Emissions from Transport (grams/day)	Daily Reduction of $PM_{2.5}$ Emissions from Power Plants (grams/day)	Assumed all age, all-cause annual mortality rate	Concentration-response function Coefficient (i.e., the Beta)	Baseline all-age, all-cause mortality	Change in exposure to ambient $PM_{2.5}$ concentration from Transport (ug/m^3) [a]	Change in exposure to ambient $PM_{2.5}$ concentration from Power Plants (ug/m^3) [a]	Relative risk for given change in ambient $PM_{2.5}$	Annual avoided mortality impact from emission reductions
2016	4,634,820	20.0	48.5	6	0.0	0.0	0	0	6.93%	0.0003594	321,054	0.000	0.000	1.0000000	0.00
2017	4,735,340	20.0	48.5	6	0.2	-13.7	419	-37,463	6.93%	0.0003594	328,017	0.000	-0.002	0.9999992	-0.25
2018	4,835,860	20.0	48.5	6	0.3	-13.5	857	-37,033	6.93%	0.0003594	334,980	0.000	-0.002	0.9999993	-0.22
2019	4,936,380	20.0	48.5	6	0.7	-13.7	1,794	-37,582	6.93%	0.0003594	341,943	0.001	-0.002	0.9999995	-0.17
2020	5,036,900	20.0	48.5	6	1.0	-14.1	2,739	-38,647	6.93%	0.0003594	348,906	0.001	-0.002	0.9999996	-0.12
2021	5,127,920	20.0	48.5	6	1.4	-3.6	3,762	-9,999	6.93%	0.0003594	355,211	0.002	-0.001	1.0000004	0.15
2022	5,218,940	20.0	48.5	6	2.5	-3.3	6,776	-9,123	6.93%	0.0003594	361,516	0.003	-0.001	1.0000009	0.34
2023	5,309,960	20.0	48.5	6	3.0	-3.0	8,184	-8,319	6.93%	0.0003594	367,821	0.004	0.000	1.0000012	0.43
2024	5,400,980	20.0	48.5	6	3.5	-2.7	9,656	-7,367	6.93%	0.0003594	374,126	0.004	0.000	1.0000014	0.53
2025	5,492,000	20.0	48.5	6	4.1	-2.3	11,198	-6,416	6.93%	0.0003594	380,431	0.005	0.000	1.0000017	0.63
2026	5,571,580	20.0	48.5	6	4.7	-1.4	12,809	-3,936	6.93%	0.0003594	385,943	0.006	0.000	1.0000019	0.74
2027	5,651,160	20.0	48.5	6	5.3	-1.1	14,489	-2,997	6.93%	0.0003594	391,456	0.006	0.000	1.0000022	0.85
2028	5,730,740	20.0	48.5	6	5.9	-0.9	16,230	-2,370	6.93%	0.0003594	396,968	0.007	0.000	1.0000024	0.96
2029	5,810,320	20.0	48.5	6	6.6	-0.6	18,031	-1,751	6.93%	0.0003594	402,481	0.008	0.000	1.0000027	1.08
2030	5,889,900	20.0	48.5	6	7.3	-0.7	19,882	-2,047	6.93%	0.0003594	407,993	0.008	0.000	1.0000029	1.18
2031	5,957,360	20.0	48.5	6	7.9	-0.8	21,769	-2,149	6.93%	0.0003594	412,666	0.009	0.000	1.0000031	1.30
2032	6,024,820	20.0	48.5	6	8.6	-0.8	23,684	-2,254	6.93%	0.0003594	417,339	0.010	0.000	1.0000034	1.41
2033	6,092,280	20.0	48.5	6	9.3	-0.9	25,611	-2,360	6.93%	0.0003594	422,012	0.010	0.000	1.0000036	1.53
2034	6,159,740	20.0	48.5	6	10.0	-0.9	27,527	-2,466	6.93%	0.0003594	426,685	0.011	0.000	1.0000039	1.64
2035	6,227,200	20.0	48.5	6	10.7	-0.9	29,405	-2,573	6.93%	0.0003594	431,358	0.011	0.000	1.0000041	1.76
2036	6,282,920	20.0	48.5	6	11.4	-1.0	31,213	-2,682	6.93%	0.0003594	435,218	0.012	0.000	1.0000043	1.86
2037	6,338,640	20.0	48.5	6	12.0	-1.0	32,909	-2,791	6.93%	0.0003594	439,078	0.013	0.000	1.0000045	1.97
2038	6,394,360	20.0	48.5	6	12.6	-1.1	34,441	-2,900	6.93%	0.0003594	442,937	0.013	0.000	1.0000046	2.06
2039	6,450,080	20.0	48.5	6	13.0	-1.1	35,746	-3,011	6.93%	0.0003594	446,797	0.013	0.000	1.0000048	2.14
2040	6,505,800	20.0	48.5	6	13.4	-1.1	36,747	-3,122	6.93%	0.0003594	450,657	0.014	0.000	1.0000049	2.19
2041	6,550,840	20.0	48.5	6	13.1	-1.2	35,974	-3,234	6.93%	0.0003594	453,777	0.013	0.000	1.0000047	2.15
2042	6,595,880	20.0	48.5	6	12.7	-1.2	34,735	-3,347	6.93%	0.0003594	456,897	0.013	0.000	1.0000045	2.07
2043	6,640,920	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	460,017	0.020	0.000	1.0000070	3.21
2044	6,685,960	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	463,136	0.019	0.000	1.0000069	3.21
2045	6,731,000	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	466,256	0.019	0.000	1.0000069	3.21
2046	6,766,740	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	468,732	0.019	0.000	1.0000068	3.21
2047	6,802,480	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	471,208	0.019	0.000	1.0000068	3.21
2048	6,838,220	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	473,683	0.019	0.000	1.0000068	3.21
2049	6,873,960	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	476,159	0.019	0.000	1.0000067	3.21
2050	6,909,700	20.0	48.5	6	19.6	-1.3	53,577	-3,467	6.93%	0.0003594	478,635	0.019	0.000	1.0000067	3.21

5.5 Valuation

Year	High Mortality, High Valuation			High Mortality, Low Valuation			Low Mortality, High Valuation			Low Mortality, Low Valuation		
	0%	3%	7%	0%	3%	7%	0%	3%	7%	0%	3%	7%
2016	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2017	-$552,268	-$535,946	-$514,931	-$85,307	-$82,786	-$79,540	-$423,532	-$411,015	-$394,899	-$65,422	-$63,488	-$60,999
2018	-$487,978	-$459,560	-$424,228	-$75,376	-$70,987	-$65,529	-$374,228	-$352,435	-$325,338	-$57,806	-$54,439	-$50,254
2019	-$374,152	-$341,949	-$303,282	-$57,794	-$52,820	-$46,847	-$286,935	-$262,239	-$232,585	-$44,322	-$40,507	-$35,927
2020	-$267,594	-$237,334	-$202,243	-$41,334	-$36,660	-$31,240	-$205,216	-$182,011	-$155,099	-$31,699	-$28,115	-$23,958
2021	$330,847	$284,763	$233,144	$51,105	$43,986	$36,013	$253,725	$218,383	$178,797	$39,192	$33,733	$27,618
2022	$739,956	$618,063	$486,186	$114,299	$95,470	$75,100	$567,469	$473,990	$372,854	$87,655	$73,216	$57,593
2023	$937,435	$759,870	$574,298	$144,803	$117,375	$88,710	$718,915	$582,741	$440,426	$111,048	$90,014	$68,031
2024	$1,145,740	$901,271	$654,457	$176,979	$139,216	$101,092	$878,663	$691,180	$501,900	$135,724	$106,764	$77,527
2025	$1,363,138	$1,040,592	$725,996	$210,560	$160,737	$112,142	$1,045,384	$798,025	$556,763	$161,477	$123,268	$86,001
2026	$1,614,446	$1,196,011	$801,710	$249,378	$184,744	$123,838	$1,238,111	$917,215	$614,828	$191,247	$141,679	$94,970
2027	$1,849,720	$1,329,808	$856,444	$285,720	$205,411	$132,292	$1,418,542	$1,019,824	$656,803	$219,118	$157,529	$101,454
2028	$2,088,060	$1,456,790	$901,437	$322,536	$225,026	$139,242	$1,601,324	$1,117,206	$691,308	$247,351	$172,571	$106,784
2029	$2,333,981	$1,580,238	$939,484	$360,523	$244,094	$145,119	$1,789,920	$1,211,878	$720,486	$276,483	$187,195	$111,291
2030	$2,571,716	$1,689,738	$965,194	$397,245	$261,008	$149,090	$1,972,238	$1,295,853	$740,203	$304,645	$200,166	$114,337
2031	$2,817,325	$1,796,406	$985,888	$435,183	$277,485	$152,287	$2,160,594	$1,377,656	$756,074	$333,740	$212,802	$116,788
2032	$3,066,541	$1,897,525	$1,000,550	$473,679	$293,105	$154,552	$2,351,717	$1,455,204	$767,318	$363,262	$224,781	$118,525
2033	$3,317,201	$1,991,965	$1,009,163	$512,397	$307,692	$155,882	$2,543,947	$1,527,629	$773,923	$392,955	$235,968	$119,545
2034	$3,566,504	$2,078,374	$1,011,653	$550,906	$321,040	$156,267	$2,735,136	$1,593,896	$775,832	$422,488	$246,204	$119,840
2035	$3,810,926	$2,155,175	$1,007,903	$588,661	$332,903	$155,688	$2,922,583	$1,652,795	$772,957	$451,442	$255,302	$119,396
2036	$4,046,069	$2,220,530	$997,748	$624,983	$342,998	$154,119	$3,102,913	$1,702,915	$765,169	$479,297	$263,044	$118,193
2037	$4,266,478	$2,272,291	$980,972	$659,029	$350,993	$151,528	$3,271,944	$1,742,611	$752,303	$505,407	$269,175	$116,206
2038	$4,465,421	$2,307,959	$957,302	$689,759	$356,503	$147,871	$3,424,513	$1,769,964	$734,151	$528,973	$273,401	$113,402
2039	$4,634,627	$2,324,618	$926,405	$715,896	$359,076	$143,099	$3,554,276	$1,782,740	$710,456	$549,018	$275,374	$109,742
2040	$4,763,969	$2,318,873	$887,880	$735,875	$358,189	$137,148	$3,653,468	$1,778,334	$680,911	$564,339	$274,693	$105,178
2041	$4,660,769	$2,201,592	$809,920	$719,934	$340,073	$125,106	$3,574,324	$1,688,391	$621,124	$552,114	$260,800	$95,943
2042	$4,496,704	$2,061,316	$728,582	$694,591	$318,405	$112,542	$3,448,503	$1,580,814	$558,746	$532,679	$244,183	$86,308
2043	$6,963,339	$3,097,698	$1,051,964	$1,075,605	$478,491	$162,494	$5,340,157	$2,375,612	$806,747	$824,877	$366,953	$124,616
2044	$6,963,339	$3,006,147	$980,845	$1,075,605	$464,350	$151,508	$5,340,157	$2,305,402	$752,206	$824,877	$356,108	$116,191
2045	$6,963,339	$2,917,302	$914,534	$1,075,605	$450,626	$141,265	$5,340,157	$2,237,267	$701,352	$824,877	$345,583	$108,336
2046	$6,963,340	$2,831,083	$852,706	$1,075,605	$437,308	$131,715	$5,340,157	$2,171,146	$653,937	$824,877	$335,370	$101,011
2047	$6,963,340	$2,747,412	$795,058	$1,075,605	$424,384	$122,810	$5,340,157	$2,106,979	$609,726	$824,877	$325,458	$94,182
2048	$6,963,340	$2,666,213	$741,307	$1,075,605	$411,841	$114,507	$5,340,157	$2,044,708	$568,505	$824,877	$315,839	$87,815
2049	$6,963,340	$2,587,415	$691,190	$1,075,605	$399,670	$106,766	$5,340,157	$1,984,278	$530,071	$824,877	$306,505	$81,878
2050	$6,963,340	$2,510,945	$644,461	$1,075,605	$387,858	$99,548	$5,340,157	$1,925,634	$494,235	$824,877	$297,446	$76,343
Total	$116,912,299	$57,273,189	$23,669,697	$18,059,065	$8,846,805	$3,656,182	$89,659,556	$43,922,569	$18,152,191	$13,849,422	$6,784,577	$2,803,910

5.6 Emissions Reductions

	Primary $PM_{2.5}$ Emissions (metric tons) from Transport			Primary $PM_{2.5}$ Emissions (metric tons) from Power Plants		
Year	Base Case (without trolley system)	Policy Case (with trolley system)	Difference	Base Case (without trolley system)	Policy Case (with trolley system)	Difference
2016	191.1	191.1	0.0	16.2	16.2	0.0
2017	199.5	199.3	0.2	18.4	32.1	-13.7
2018	246.0	245.7	0.3	18.4	31.9	-13.5
2019	238.5	237.8	0.7	18.4	32.1	-13.7
2020	236.1	235.1	1.0	18.4	32.5	-14.1
2021	229.2	227.8	1.4	4.6	8.2	-3.6
2022	232.0	229.6	2.5	4.6	7.9	-3.3
2023	238.8	235.8	3.0	4.6	7.6	-3.0
2024	247.4	243.9	3.5	4.6	7.3	-2.7
2025	257.1	253.0	4.1	4.6	6.9	-2.3
2026	267.5	262.8	4.7	4.6	6.0	-1.4
2027	278.5	273.3	5.3	4.6	5.7	-1.1
2028	290.5	284.6	5.9	4.6	5.5	-0.9
2029	303.3	296.7	6.6	4.6	5.2	-0.6
2030	316.9	309.7	7.3	4.6	5.3	-0.7
2031	331.5	323.6	7.9	4.6	5.4	-0.8
2032	347.2	338.5	8.6	4.6	5.4	-0.8
2033	364.0	354.7	9.3	4.6	5.5	-0.9
2034	382.3	372.2	10.0	4.6	5.5	-0.9
2035	402.1	391.3	10.7	4.6	5.5	-0.9
2036	423.7	412.3	11.4	4.6	5.6	-1.0
2037	447.3	435.3	12.0	4.6	5.6	-1.0
2038	473.4	460.8	12.6	4.6	5.7	-1.1
2039	502.1	489.1	13.0	4.6	5.7	-1.1
2040	534.0	520.6	13.4	4.6	5.7	-1.1
2041	569.6	556.4	13.1	4.6	5.8	-1.2
2042	614.9	602.2	12.7	4.6	5.8	-1.2
2043	663.4	643.9	19.6	4.6	5.9	-1.3

5.7 Mortality Rate Details

Mortality Rate Base Case (‰)		
Year	Rate (‰)	DM rate as actual %
2004	6.50	6.50%
2005	6.40	6.40%
2006	6.50	6.50%
2007	6.58	6.58%
2008	6.60	6.60%
2009	6.78	6.78%
2010	8.35	8.35%
2011	6.66	6.66%
2012	8.08	8.08%
2013	6.82	6.82%
2014	*6.93*	6.93%
2015	*6.93*	6.93%
2016	*6.93*	6.93%
2017	*6.93*	6.93%
2018	*6.93*	6.93%
2019	*6.93*	6.93%
2020	*6.93*	6.93%
2021	*6.93*	6.93%
2022	*6.93*	6.93%
2023	*6.93*	6.93%
2024	*6.93*	6.93%
2025	*6.93*	6.93%
2026	*6.93*	6.93%
2027	*6.93*	6.93%
2028	*6.93*	6.93%
2029	*6.93*	6.93%
2030	*6.93*	6.93%
2031	*6.93*	6.93%
2032	*6.93*	6.93%
2033	*6.93*	6.93%
2034	*6.93*	6.93%
2035	*6.93*	6.93%
2036	*6.93*	6.93%
2037	*6.93*	6.93%
2038	*6.93*	6.93%
2039	*6.93*	6.93%
2040	*6.93*	6.93%
2041	*6.93*	6.93%
2042	*6.93*	6.93%
2043	*6.93*	6.93%
2044	*6.93*	6.93%
2045	*6.93*	6.93%
2046	*6.93*	6.93%
2047	*6.93*	6.93%
2048	*6.93*	6.93%
2049	*6.93*	6.93%
2050	*6.93*	6.93%

5.8 Intake Fraction Details

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Akesu	China	EAP	26.3	502,500	41.6	78	285	41.18	80.27	371	26.3
CN	Aletay	China	EAP	18.9	251,600	17.4	60.3	443	47.8	124.47	372	18.9
CN	Alxa Zuoqi, Nei Monggol	China	EAP	6.85	101,100	17	24.5	427	38.84	105.69	373	6.85
CN	Anda	China	EAP	27.7	515,900	29.6	94.9	469	46.42	125.32	374	27.7
CN	Anguo, Hebei	China	EAP	7.93	122,000	22.6	25.7	377	38.42	115.34	375	7.93
CN	Anji, Zhejiang	China	EAP	9.52	138,200	21.6	29.7	413	30.64	119.68	376	9.52
CN	Ankang	China	EAP	15.5	142,200	14.2	37.8	279	32.71	109.02	377	15.5
CN	Anlu	China	EAP	53.7	557,700	11.9	161	371	31.27	113.69	378	53.7
CN	Anqing	China	EAP	27.8	566,100	38.6	91.1	418	30.54	117.05	379	27.8
CN	Anqiu	China	EAP	7.14	108,400	19.6	24.5	439	36.44	119.21	380	7.14
CN	Anshan	China	EAP	41	2,151,000	195	154	446	41.15	123.01	381	41
CN	Anshun	China	EAP	28	789,100	38.4	127	506	26.26	105.92	382	28
CN	Antu, Jilin	China	EAP	18.6	130,000	8.96	43.4	311	43.11	128.92	383	18.6
CN	Anxi, Fujian	China	EAP	19.5	213,800	14.2	56.7	380	25.07	118.18	384	19.5
CN	Anyang	China	EAP	18.6	718,200	111	68.3	416	36.11	114.34	385	18.6
CN	Anyue, sichuan	China	EAP	30.9	125,500	1.73	95.5	357	30.1	105.34	386	30.9
CN	Baicheng	China	EAP	23.4	471,300	30.5	85.4	488	45.63	122.84	387	23.4
CN	Baihua	China	EAP	22.4	488,300	41.2	76.1	397	27.56	109.98	388	22.4
CN	Baise	China	EAP	30	318,600	11.5	94	335	23.91	106.62	389	30
CN	Baiyin	China	EAP	18.7	445,200	36.9	73.3	383	36.56	104.18	390	18.7
CN	Bantou	China	EAP	11.4	120,100	23.5	24.8	274	25.36	118.69	391	11.4
CN	Baoding	China	EAP	10.7	701,500	316	39.5	369	38.87	115.46	392	10.7
CN	Baoji	China	EAP	23	554,000	53.8	75.5	362	34.38	107.15	393	23
CN	Baoqing, Heilongjiang	China	EAP	21.9	241,700	10.6	74.2	490	46.33	132.21	394	21.9
CN	Baoshan	China	EAP	13.9	256,900	28.2	48.4	477	46.52	124.87	395	13.9
CN	Baotou	China	EAP	20.8	1,319,000	216	89.7	460	40.64	109.88	396	20.8
CN	Baoying, jiangsu	China	EAP	14.9	230,100	15	59.5	536	33.25	119.32	397	14.9
CN	Bazhong, Sichuan	China	EAP	22.7	221,900	13	61.5	328	31.87	106.76	398	22.7
CN	Bazhou, Hebei	China	EAP	23.3	220,100	8.67	74.7	415	39.11	116.4	399	23.3
CN	Beian	China	EAP	13.5	211,400	25.7	41.7	432	48.25	126.51	400	13.5
CN	Beibei	China	EAP	13.6	111,800	9.27	36.7	313	29.84	106.44	401	13.6
CN	Beihai	China	EAP	13	497,000	43.7	75.2	721	21.47	109.13	402	13
CN	Beijing	China	EAP	73	10,800,000	1160	317	383	39.92	116.37	403	73
CN	Beiliu, Guangxi	China	EAP	8.76	258,100	62.8	32.6	440	22.71	110.34	404	8.76
CN	Beipiao	China	EAP	35.9	636,500	17.5	152	569	41.81	120.75	405	35.9
CN	Beizhen, Liaoning	China	EAP	22.6	156,400	4.41	74.5	463	41.6	121.8	406	22.6
CN	Bengbu	China	EAP	31.6	747,600	56.9	99.1	394	32.95	117.35	407	31.6
CN	Benxi	China	EAP	33.2	957,000	70.7	114	435	41.31	123.76	408	33.2
CN	Bijie, Guizhou	China	EAP	22.8	273,400	9.2	90.2	462	27.31	105.29	409	22.8
CN	Binhai, Jinagsu	China	EAP	22	241,900	9.98	76.6	456	34.01	119.84	410	22
CN	Binxian, Heilongjiang	China	EAP	11.7	114,000	9.03	37.9	449	45.76	127.49	411	11.7
CN	Binyang, Guangxi	China	EAP	12.7	208,900	16.7	51.2	463	23.24	108.81	412	12.7
CN	Bishan, Chongquing	China	EAP	13.3	115,200	8.81	38.8	326	29.6	106.23	413	13.3
CN	Bobai, guangxi	China	EAP	8.27	266,900	69.1	32.1	459	22.21	109.96	414	8.27
CN	Bodong	China	EAP	18.7	116,500	3.1	66.1	509	45.74	122.04	415	18.7
CN	Boluo guangdong	China	EAP	18.4	240,600	13	66.7	453	23.18	114.28	416	18.4
CN	Boshan	China	EAP	5.54	161,200	67.9	19.6	424	36.53	117.87	417	5.54
CN	Botou	China	EAP	48.1	554,800	12.7	155	427	38.08	116.58	418	48.1
CN	Boxing, shandong	China	EAP	9.58	101,400	9.99	32.1	435	37.15	118.14	419	9.58
CN	Bozhou	China	EAP	11.3	171,300	24.9	34.3	382	33.88	115.78	420	11.3
CN	Buizhou	China	EAP	22.5	563,100	51.2	78.7	439	37.4	118.02	421	22.5
CN	Cangnan, Zhejiang	China	EAP	24.9	522,400	8.38	180	1020	27.52	120.4	422	24.9
CN	Cangshan, shandong	China	EAP	15.1	170,300	13.6	46.2	398	34.87	118.04	423	15.1
CN	Cangwu, guangxi	China	EAP	11.6	122,300	9.15	40.4	431	23.44	111.25	424	11.6
CN	Cangxi, sichuan	China	EAP	28.2	105,100	2	74.3	323	31.74	105.93	425	28.2
CN	Cangzhou	China	EAP	19.2	440,400	44.1	66.3	436	38.32	116.87	426	19.2
CN	Caoxian, shandong	China	EAP	24.3	264,500	12.4	75.1	388	34.83	115.55	427	24.3
CN	Cenxi guangxi	China	EAP	19.6	196,200	8.86	65.9	425	22.93	110.99	428	19.6
CN	Changchun	China	EAP	52.4	3,093,000	242	199	449	43.9	125.32	429	52.4
CN	Changde	China	EAP	78.9	1,374,000	29.1	255	379	29.05	111.69	430	78.9
CN	Changge, henan	China	EAP	11.1	157,800	19.1	36.1	393	34.23	113.78	431	11.1
CN	Changji	China	EAP	36	406,500	16.1	101	306	44.02	87.3	432	36
CN	Changle, fujian	China	EAP	13.5	279,100	27.7	53	510	25.98	119.48	433	13.5
CN	Changle, shandong	China	EAP	13.6	124,400	7.74	44.7	429	36.71	118.84	434	13.6
CN	Changling, jilin	China	EAP	14.9	146,100	8.6	49.8	469	44.27	123.98	435	14.9
CN	Changning, Hunan	China	EAP	34	213,200	3.77	110	405	26.41	112.39	436	34
CN	Changsha	China	EAP	41.7	1,775,000	151	145	379	28.2	112.99	437	41.7
CN	Changshou, Chongqing	China	EAP	29.6	264,300	12.1	76	312	29.84	107.07	438	29.6
CN	Changting, fujian	China	EAP	24.8	121,200	7.13	45.4	240	25.84	116.36	439	24.8
CN	Changtu, Liaoning	China	EAP	17.9	207,100	12.8	57.9	437	42.79	124.13	440	17.9
CN	Changxing, Zhejiang	China	EAP	12.2	170,900	8.13	60	687	31.01	119.91	441	12.2
CN	Changyi, shandong	China	EAP	11.6	164,800	14	44.1	494	36.85	119.39	442	11.6
CN	Changzhou	China	EAP	23.2	886,000	105	86.6	462	31.78	119.97	443	23.2

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Chaohu	China	EAP	9.25	143,300	22.9	30	422	31.62	117.87	444	9.25
CN	Chaoyang	China	EAP	25.4	450,300	19.1	103	540	41.58	120.45	445	25.4
CN	Chengdu	China	EAP	46.6	3,294,000	365	173	301	30.67	104.05	446	46.6
CN	Chenggu, shaanxi	China	EAP	20	133,400	5.6	56.4	339	33.15	107.32	447	20
CN	Chengmai, hainan	China	EAP	11.7	114,000	6.55	44.5	459	19.74	110.01	448	11.7
CN	Chengwu, shandong	China	EAP	11.4	114,100	10.9	34.6	397	34.96	115.89	449	11.4
CN	Chenzhou	China	EAP	40.6	617,200	20	138	431	25.81	113.02	450	40.6
CN	Chifeng	China	EAP	30.8	1,087,000	47.5	158	661	42.28	118.95	452	30.8
CN	Chongqing	China	EAP	106	5,312,000	209	367	336	29.55	106.51	453	106
CN	Chongzhou, sichuan	China	EAP	17.3	147,500	8.25	51.3	301	30.64	103.67	454	17.3
CN	Chuncheng	China	EAP	8.39	114,100	13.3	31.3	458	22.18	111.78	455	8.39
CN	Chuxiong	China	EAP	15.4	464,900	37.4	76	517	25.06	101.54	456	15.4
CN	Chuzhou	China	EAP	28.8	468,600	27.4	89.6	403	32.31	118.32	457	28.8
CN	Cixi, zhejiang	China	EAP	14.3	675,700	135	58.2	509	30.18	121.26	458	14.3
CN	Conghua, guangdong	China	EAP	13.9	184,100	15	47.5	426	23.55	113.59	459	13.9
CN	Daan (Jilin)	China	EAP	11.3	114,900	8.33	39.8	501	45.51	124.29	460	11.3
CN	Dachang	China	EAP	13.9	149,000	11.4	44.2	429	32.23	118.76	461	13.9
CN	Dafeng, jiangsu	China	EAP	14.6	260,600	12.4	73.9	677	33.21	120.46	462	14.6
CN	Dali	China	EAP	77.8	499,300	9.61	161	212	25.7	100.17	463	77.8
CN	Dalian	China	EAP	26.8	2,854,000	283	170	776	38.99	121.63	464	26.8
CN	Dandong	China	EAP	28.5	700,200	57.5	92.4	415	40.12	124.38	465	28.5
CN	Danjiangkou	China	EAP	41.1	494,200	14.3	131	376	32.56	111.52	466	41.1
CN	Danzhou, hainan	China	EAP	41.2	374,200	13.9	100	302	19.53	109.57	468	41.2
CN	Daoxian, hunan	China	EAP	15.8	145,100	6.37	57.5	463	25.53	111.59	469	15.8
CN	Daqing	China	EAP	29.9	1,485,000	179	111	469	46.61	125.02	470	29.9
CN	Dashiqiao, Liaoning	China	EAP	17.3	313,300	26.1	61.3	467	40.64	122.51	471	17.3
CN	Datong	China	EAP	17.1	1,165,000	207	81	522	40.07	113.24	472	17.1
CN	Dawukou	China	EAP	8.64	124,000	16.1	30.9	431	39.03	106.38	473	8.64
CN	Daye, hubei	China	EAP	30.2	346,900	15.1	89.3	380	30.1	114.96	474	30.2
CN	Dayi, sichuan	China	EAP	21.2	115,400	5.99	47.1	237	30.59	103.52	475	21.2
CN	Dazhu, sichuan	China	EAP	19.1	120,000	7.99	42.5	276	30.75	107.2	476	19.1
CN	Dehua, fujian	China	EAP	22.2	130,000	11.3	38.7	222	25.5	118.24	477	22.2
CN	Dehui	China	EAP	8.9	110,900	14.6	29	445	44.54	125.71	478	8.9
CN	Dengfeng, Henan	China	EAP	15.8	154,400	9.35	50.5	389	34.46	113.03	479	15.8
CN	Dengzhou	China	EAP	113	1,391,000	16.7	340	355	32.69	112.08	480	113
CN	Deqing, zhejiang	China	EAP	18.1	146,800	7.14	55	413	30.55	119.96	481	18.1
CN	Dexing, Jiangxi	China	EAP	19.5	114,900	4.61	53.5	387	28.95	117.58	482	19.5
CN	Deyang	China	EAP	30.2	594,400	39.7	94.3	314	31.13	104.39	483	30.2
CN	Dezhou	China	EAP	20.3	510,000	51.9	70.8	434	37.46	116.29	484	20.3
CN	Dianbai, guangdong	China	EAP	23.5	327,200	10.9	98.9	540	21.52	111	485	23.5
CN	Dianjiang, Chongqing	China	EAP	33.7	139,100	3.63	73.1	276	30.33	107.35	486	33.7
CN	Diaobingshan, liaoning	China	EAP	18.5	204,100	11.5	60.2	445	42.46	123.56	487	18.5
CN	Dingtao, shandong	China	EAP	16.1	136,200	7.71	49.1	388	35.08	115.57	488	16.1
CN	Dingzhou	China	EAP	4.95	155,000	83.4	17	372	38.5	115	489	4.95
CN	Dongchang	China	EAP	24.7	253,200	27.1	48.6	253	41.74	125.95	490	24.7
CN	Dongfang, hainan	China	EAP	8.66	130,400	9.68	41.9	643	19.11	108.65	491	8.66
CN	Donggang, liaoning	China	EAP	21.8	226,700	8.85	76.2	467	39.89	124.14	492	21.8
CN	Donghai	China	EAP	6.33	140,100	33.2	24.3	485	22.96	115.64	493	6.33
CN	Dongkou, hunan	China	EAP	14.8	136,900	7.54	49.9	413	27.08	110.58	494	14.8
CN	Donglin	China	EAP	60.9	841,700	17.8	200	434	37.74	117.22	495	60.9
CN	Dongming, shandong	China	EAP	10.5	145,900	18	34.4	412	35.29	115.1	496	10.5
CN	Dongning, Heilongjiang	China	EAP	8.35	108,900	13.8	29.3	488	44.07	131.13	497	8.35
CN	Dongping, shandong	China	EAP	14.4	118,800	7.42	43.6	409	35.93	116.47	498	14.4
CN	Dongshan	China	EAP	46.8	1,413,000	42.1	218	576	22.53	113.36	499	46.8
CN	Dongsheng	China	EAP	16.7	173,300	7.4	63.7	482	39.82	110	500	16.7
CN	Dongtai	China	EAP	8.1	113,600	16	28.4	455	32.86	120.32	501	8.1
CN	Dongying	China	EAP	20.9	840,700	109	80.5	469	37.47	118.51	502	20.9
CN	Dujiangyan, sichuan	China	EAP	20.2	262,400	18.1	61.6	283	31	103.63	504	20.2
CN	Dunhua	China	EAP	47.1	473,800	21.8	102	280	43.37	128.24	505	47.1
CN	Dunhuang	China	EAP	15.7	134,800	6.8	51.7	378	40.15	94.67	506	15.7
CN	Duyun	China	EAP	30.7	454,500	12.8	127	493	26.27	107.51	507	30.7
CN	Emeishan, sichuan	China	EAP	10.2	128,900	19.5	29.2	294	29.6	103.48	508	10.2
CN	Enping, guangdong	China	EAP	12.8	151,600	10.1	47.7	458	22.2	112.31	509	12.8
CN	Enshi	China	EAP	80.1	712,600	11.8	208	313	30.29	109.48	510	80.1
CN	Ewenkizu, nei monggol	China	EAP	10.6	123,200	9.3	40.4	526	49.1	121.05	511	10.6
CN	Ezhou, Hubei	China	EAP	33.6	917,900	38.9	147	560	30.43	114.88	512	33.6
CN	Fangchenggang, guangxi	China	EAP	9.58	182,000	6.78	69.9	1020	21.63	108.36	513	9.58
CN	Feicheng, shandong	China	EAP	42.4	407,700	9.93	129	409	36.19	116.77	514	42.4
CN	Feidong, anhui	China	EAP	22.3	166,100	6.75	63.9	383	31.89	117.47	515	22.3
CN	Feixian, shandong	China	EAP	19.5	168,700	7.97	59.7	397	35.27	117.97	516	19.5
CN	Fengcheng	China	EAP	38.1	464,400	20.3	103	356	40.47	124.08	517	38.1
CN	Fengcheng, jiangxi	China	EAP	40.7	320,600	7.39	118	375	28.21	115.79	518	40.7
CN	Fengdu, Chongqing	China	EAP	17.6	111,800	5.54	47.5	339	29.87	107.72	519	17.6
CN	Fenghua, zhejiang	China	EAP	13.9	208,800	17.2	50.3	472	29.67	121.42	520	13.9
CN	Fengjie, Chongqing	China	EAP	28.4	114,100	3.09	64.9	284	31.02	109.46	521	28.4

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Fengshun, guangdong	China	EAP	9.46	144,900	30.5	26.2	341	23.77	116.18	522	9.46
CN	Fengxian, jiangsu	China	EAP	17.4	197,400	14.4	52	386	34.71	116.59	523	17.4
CN	Fengyang, anhui	China	EAP	14.6	118,300	7.57	43	394	32.88	117.56	524	14.6
CN	Fenyang, shanxi	China	EAP	8.61	118,700	14.2	31.5	453	37.28	111.78	525	8.61
CN	Fuding, fujian	China	EAP	46.8	235,800	7.68	85.1	230	27.33	120.22	526	46.8
CN	Fujin	China	EAP	37.9	465,600	15.5	118	442	47.26	132.04	527	37.9
CN	Fuling	China	EAP	19.5	166,200	9.38	54.3	340	29.72	107.38	528	19.5
CN	Funan, Anhui	China	EAP	24.1	145,300	4.49	68.6	378	32.64	115.58	529	24.1
CN	Fuping, shaanxi	China	EAP	13.5	114,300	9.79	36.5	341	34.76	109.17	530	13.5
CN	Fuqing, fujian	China	EAP	10.3	376,300	43.4	57.1	721	25.73	119.38	531	10.3
CN	Fuquan, Guizhou	China	EAP	12.4	115,200	5.25	50.3	493	26.66	107.52	532	12.4
CN	Fushun	China	EAP	28.9	1,411,000	189	103	423	41.86	123.9	533	28.9
CN	Fushun, sichuan	China	EAP	16.4	142,300	7.53	51.9	324	29.2	104.99	534	16.4
CN	Fusong, jilin	China	EAP	25.9	205,600	9.67	66.1	297	42.32	86.38	535	25.9
CN	Fuxin	China	EAP	23.9	785,000	73.2	91.8	488	42.02	121.67	536	23.9
CN	Fuyang	China	EAP	83.3	1,730,000	44.1	260	384	32.91	115.83	537	83.3
CN	Fuyang, zhejiang	China	EAP	31.8	267,400	7.83	95.6	406	30.06	119.95	538	31.8
CN	Fuyu	China	EAP	80	1,187,000	17	288	501	45.22	130.94	539	80
CN	Fuzhou	China	EAP	30.7	1,397,000	121	127	510	26.08	119.32	540	30.7
CN	Gaizhou, liaoning	China	EAP	10.4	167,800	20.8	36.8	467	40.42	122.35	541	10.4
CN	Ganyu, jiangsu	China	EAP	7.67	204,700	22.8	42.8	740	34.86	119.13	542	7.67
CN	Gaoan, jiangxi	China	EAP	24.4	186,500	7.05	70.3	371	28.42	115.38	543	24.4
CN	Gaobeidian, hebei	China	EAP	10.1	166,900	23.3	34.6	416	39.33	115.87	544	10.1
CN	Gaocheng	China	EAP	57.3	685,500	12.3	196	406	38.03	114.84	545	57.3
CN	Gaochun, Jiangsu	China	EAP	7.88	139,100	25.3	27.7	467	31.35	118.92	546	7.88
CN	Gaomi	China	EAP	7.58	154,700	34.3	26.4	437	36.39	119.76	547	7.58
CN	Gaoping, shanxi	China	EAP	12	119,100	7.76	42.8	436	35.8	112.93	548	12
CN	Gaoyou, jiangsu	China	EAP	14.7	225,200	14.7	58.7	536	32.79	119.45	549	14.7
CN	Gejiu	China	EAP	22.2	380,300	15.6	96.2	474	23.38	103.15	550	22.2
CN	Genge, Inner Mongolia	China	EAP	14.1	156,800	17.5	37.5	368	50.8	121.54	551	14.1
CN	Golmud, qinghai	China	EAP	4.84	114,300	37.3	18.7	415	36.42	94.9	552	4.84
CN	Gongxian, sichuan	China	EAP	26	113,300	2.37	73.6	310	28.45	104.71	553	26
CN	Guangan, sichuan	China	EAP	25	204,400	9.63	65.8	312	30.47	106.64	554	25
CN	Guangfeng, jiangxi	China	EAP	12.2	113,000	10.8	34.3	390	28.44	118.18	555	12.2
CN	Guanghan, sichuan	China	EAP	16.9	222,000	20.7	48.8	297	30.98	104.28	556	16.9
CN	Guangshui	China	EAP	16.6	154,100	9.68	49.5	371	31.63	114	557	16.6
CN	Guangyuan	China	EAP	64.7	867,100	22.2	184	323	32.44	105.83	558	64.7
CN	Guangzhou	China	EAP	26.6	8,356,000	3020	152	478	22.94	113.61	559	26.6
CN	Guanxian, shandong	China	EAP	9.93	105,000	10.3	32.6	424	36.49	115.45	560	9.93
CN	Guanyun, jiangsu	China	EAP	17.2	197,300	10.1	62	469	34.31	119.26	561	17.2
CN	Gucheng, Hubei	China	EAP	17.9	172,900	9.5	56.1	376	32.27	111.63	562	17.9
CN	Guichi (Chizhou)	China	EAP	53.5	571,100	11.4	169	418	30.67	117.48	563	53.5
CN	Guigang, guangxi	China	EAP	16.1	481,300	57.8	63.3	451	23.1	109.61	564	16.1
CN	Guilin	China	EAP	16.5	611,200	85.9	65.9	467	25.28	110.3	565	16.5
CN	Guiping, Guangxi	China	EAP	35.7	277,000	4.82	126	458	24.5	110.39	566	35.7
CN	Guixi, jiangxi	China	EAP	10.3	162,100	29.5	29.9	381	28.32	117.22	567	10.3
CN	Guiyang	China	EAP	61.2	2,533,000	79	285	516	26.58	106.72	568	61.2
CN	Guiyang, hunan	China	EAP	12.5	111,100	7.14	41.6	425	25.75	112.73	569	12.5
CN	Gushi, henan	China	EAP	20.6	150,900	6.94	57.3	358	32.19	115.68	570	20.6
CN	Haian, Jiangsu	China	EAP	12	221,300	23.3	45.9	498	32.55	120.47	571	12
CN	Haicheng	China	EAP	9.09	201,100	40	31.8	455	40.86	122.75	572	9.09
CN	Haifeng, guangdong	China	EAP	16.1	325,900	28.1	61.5	485	22.98	115.34	573	16.1
CN	Haikou	China	EAP	9.46	527,900	73.3	61.7	797	20.03	110.33	574	9.46
CN	Hailar	China	EAP	19.2	445,100	43.8	67.3	459	49.23	119.75	575	19.2
CN	Hailin, heilongjiang	China	EAP	24.2	282,700	10.7	86.3	482	44.58	129.39	576	24.2
CN	Hailun	China	EAP	10.5	114,700	12.2	32.9	440	47.47	126.97	577	10.5
CN	Haimen, jiangsu	China	EAP	21.6	303,500	9.84	96.8	603	31.9	121.17	578	21.6
CN	Haining, zhejiang	China	EAP	14.9	231,600	15.4	58.9	529	30.54	120.69	579	14.9
CN	Haiyan, zhejiang	China	EAP	8.91	119,400	11.7	34.9	529	30.53	120.94	580	8.91
CN	Haiyang, Shandong	China	EAP	10.9	180,200	29.3	33.3	385	36.77	121.18	581	10.9
CN	Hancheng	China	EAP	32.9	383,300	14.8	99.8	370	35.49	110.44	582	32.9
CN	Hanchuan, hubei	China	EAP	30.1	301,800	9.03	100	431	30.66	113.83	583	30.1
CN	Handan	China	EAP	44.9	1,996,000	141	168	413	36.63	114.49	584	44.9
CN	Hangu	China	EAP	3.6	122,500	23.9	25.1	874	39.25	117.8	585	3.6
CN	Hangzhou	China	EAP	41.9	1,780,000	156	143	413	30.31	120.17	586	41.9
CN	Hanshou, Hunan	China	EAP	13.5	109,900	6.93	41.7	379	28.91	111.96	587	13.5
CN	Harbin	China	EAP	52.1	2,928,000	238	190	445	45.74	126.67	588	52.1
CN	Hechi	China	EAP	22.2	309,200	10.6	94.8	495	24.71	108.07	589	22.2
CN	Hechuan, Chongqing	China	EAP	51.7	462,000	8.96	154	338	29.99	106.26	590	51.7
CN	Hefei	China	EAP	32	1,242,000	142	104	383	31.84	117.26	591	32
CN	Heishan, liaoning	China	EAP	15.4	184,200	12.4	52.4	463	41.69	122.13	592	15.4
CN	Hejian, hebei	China	EAP	11.5	128,400	11.8	37.4	411	38.44	116.1	593	11.5
CN	Hejiang, Sichuan	China	EAP	30.7	138,900	2.6	86.1	321	28.81	105.83	594	30.7
CN	Hejin, shanxi	China	EAP	12.3	104,900	8.22	36.6	370	35.6	110.71	595	12.3
CN	Hengnan, Hunan	China	EAP	4.76	127,200	60.3	16.4	399	26.9	112.61	596	4.76

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Hengshui	China	EAP	23	398,700	26.2	77.9	434	37.74	115.69	597	23
CN	Hengxian, guangxi	China	EAP	11.2	133,100	10.1	42	460	22.69	109.27	598	11.2
CN	Hengyang	China	EAP	84.5	784,300	8.36	271	399	26.98	112.37	599	84.5
CN	Hepu, guangxi	China	EAP	9.07	210,000	16.8	51.2	721	21.68	109.2	600	9.07
CN	Hexian, Anhui	China	EAP	13.4	100,200	4.96	45	467	31.72	118.36	601	13.4
CN	Heyuan	China	EAP	12.8	247,500	28.6	46.3	453	23.76	114.69	602	12.8
CN	Heze	China	EAP	62.1	1,600,000	60.9	205	388	35.25	115.47	603	62.1
CN	Hezhou, guangxi	China	EAP	12.2	225,700	26.1	44.2	449	24.43	111.54	604	12.2
CN	Hohhot	China	EAP	20.2	978,000	119	89.8	503	40.83	111.67	605	20.2
CN	Hong Kong Sar	China	EAP	114	6,927,000	112	655	722	22.35	114.18	606	114
CN	Hongaposan, hubei	China	EAP	14.6	132,100	9.4	43.1	374	31.29	114.61	607	14.6
CN	Honghu	China	EAP	15.3	154,800	9.51	50.2	419	29.83	113.47	608	15.3
CN	Hongtong, shanxi	China	EAP	8.13	123,200	18.5	28.6	423	36.26	111.68	609	8.13
CN	Hongze, jiangsu	China	EAP	14.8	143,000	5.66	60.1	573	33.3	118.87	610	14.8
CN	hotan, Xinjiang Uygur	China	EAP	8.21	101,800	15.8	25.6	313	37.13	79.91	611	8.21
CN	Houma	China	EAP	13.5	219,100	27	42.2	358	35.62	111.37	612	13.5
CN	Hua	China	EAP	53.4	339,400	6	139	312	30.39	106.78	613	53.4
CN	Huadian	China	EAP	30.8	435,200	22.1	92.7	399	42.98	126.76	614	30.8
CN	Huaibei	China	EAP	30.5	762,700	62.9	96.2	383	33.96	116.79	615	30.5
CN	Huainan	China	EAP	30.1	1,349,000	159	107	411	32.65	116.95	616	30.1
CN	Huairen, shanxi	China	EAP	8.12	140,600	16.7	34.4	522	39.83	113.09	617	8.12
CN	Huaiyang, henan	China	EAP	10.4	123,600	14.3	32.7	387	33.75	114.88	618	10.4
CN	Huaiyin	China	EAP	12.3	655,200	211	45.1	432	33.59	119.09	619	12.3
CN	Huaiyuan, anhui	China	EAP	11.4	138,800	16.4	34.3	394	32.98	117.21	620	11.4
CN	Huanan, heilongjiang	China	EAP	10.7	120,700	11.7	35.3	468	46.25	130.59	622	10.7
CN	Huangchuan, henan	China	EAP	12.8	122,800	11.2	36.6	363	32.15	115.05	623	12.8
CN	Huanggang	China	EAP	9.78	266,600	40.2	42.1	553	23.69	116.97	624	9.78
CN	Huangmei, hubei	China	EAP	14.2	157,200	8.3	54.6	521	30.09	115.94	625	14.2
CN	Huangshi	China	EAP	35.3	642,100	29.5	118	426	30.22	115.06	626	35.3
CN	Huangyan	China	EAP	6.99	139,900	20.5	30.9	601	28.66	121.26	627	6.99
CN	Huantai, shandong	China	EAP	11.9	124,800	9.79	39.9	435	36.96	118.1	628	11.9
CN	Huarong, Hunan	China	EAP	14.9	123,100	7.49	45	372	29.53	112.57	629	14.9
CN	Huazhou, guangdong	China	EAP	16.6	319,900	20.4	70.8	540	21.67	110.64	630	16.6
CN	Huidong, guangdong	China	EAP	18.1	289,000	20.7	63.5	439	23	114.71	631	18.1
CN	Huilai, guangdong	China	EAP	17.3	286,600	14.1	76.3	575	23.04	116.29	632	17.3
CN	Huinan, jilin	China	EAP	26	280,600	11.9	81.2	422	42.69	126.04	633	26
CN	Huixian, henan	China	EAP	14.5	188,700	16	47.2	403	35.46	113.8	634	14.5
CN	Huizhou	China	EAP	14.5	358,700	47.5	52.1	439	23.1	114.41	635	14.5
CN	Hulan	China	EAP	9.13	113,900	14.2	30.2	461	45.99	126.62	636	9.13
CN	Hulan Ergi	China	EAP	23.9	307,700	13.2	84.7	488	47.21	123.64	637	23.9
CN	Hulin, heilongjiang	China	EAP	19.3	270,900	17.7	64.4	468	45.76	130.57	638	19.3
CN	Hunjiang	China	EAP	65.4	771,700	26.4	150	300	41.94	126.43	639	65.4
CN	Huoqiu, anhui	China	EAP	27.3	226,200	8.12	79.4	378	32.34	116.28	640	27.3
CN	Huozhou	China	EAP	43.9	1,077,000	23.7	221	687	30.88	120.1	641	43.9
CN	Huozhou, shaanxi	China	EAP	7.41	132,500	25.3	26.4	423	36.58	111.72	642	7.41
CN	Hyesan	Korea, Dem. Rep.	EAP	20.2	206,000	21.8	44.1	288	41.41	128.19	2208	20.2
CN	Jiagedagi	China	EAP	7.4	134,900	31.7	24	442	50.42	124.12	643	7.4
CN	Jiamusi	China	EAP	28.3	874,000	85.1	94.8	443	46.81	130.38	644	28.3
CN	Jian (Jiangxi)	China	EAP	30	328,000	13.2	90.2	373	27.12	114.98	645	30
CN	Jiande, Zhejiang	China	EAP	21.5	166,700	7.23	62	392	29.48	119.29	646	21.5
CN	Jiangdu, jiangsu	China	EAP	23.8	384,000	22.6	80.7	444	32.44	119.58	647	23.8
CN	Jiangjin, Chongqing	China	EAP	58.9	479,900	7.82	172	326	29.28	106.26	648	58.9
CN	Jiangshan, zhejiang	China	EAP	16.3	193,900	17	47	394	28.73	118.62	649	16.3
CN	Jiangyan, jiangsu	China	EAP	16.4	258,200	20	57.8	458	32.52	120.15	650	16.4
CN	Jiangyin	China	EAP	7.12	110,400	19.6	24.9	462	31.91	120.27	651	7.12
CN	Jiangyou	China	EAP	8.78	132,200	28.1	24.9	310	31.79	104.76	652	8.78
CN	Jianhu, jiangsu	China	EAP	30.9	501,900	21.7	108	447	33.48	119.8	653	30.9
CN	Jianou, Fujian	China	EAP	35.4	155,100	9.22	51.1	187	27.05	118.32	654	35.4
CN	Jianping, liaoning	China	EAP	10.1	125,900	14.4	33.2	445	41.39	122.43	655	10.1
CN	Jianshui, Yunnan	China	EAP	7.13	133,200	21.9	28.4	419	23.63	102.84	656	7.13
CN	Jianyang, Fujian	China	EAP	39.2	156,400	7.48	57.2	195	27.34	118.12	657	39.2
CN	Jianyang, Sichuan	China	EAP	28.1	271,000	9.29	88.9	338	30.4	104.55	658	28.1
CN	Jiaohe	China	EAP	71	456,500	9.36	149	285	43.72	127.34	659	71
CN	Jiaojiang	China	EAP	22	445,100	20.9	97.5	601	28.67	121.43	660	22
CN	Jiaonan, shandong	China	EAP	14.1	252,200	15	65.1	601	35.88	120	661	14.1
CN	Jiaozhou	China	EAP	5.99	169,300	62.6	21.4	437	36.3	120.02	662	5.99
CN	Jiaozuo	China	EAP	29.3	717,100	48.8	103	390	35.25	113.23	663	29.3
CN	Jiashan, Zhejiang	China	EAP	8.17	137,100	14.7	35.7	598	30.86	120.92	664	8.17
CN	Jiaxiang, Shandong	China	EAP	12	114,900	9.9	36.5	407	35.41	116.34	665	12
CN	Jiaxing	China	EAP	29.4	791,000	36.2	132	598	30.78	120.75	666	29.4
CN	Jiayu, Hubei	China	EAP	15.6	138,600	6.8	53.2	446	29.98	113.92	667	15.6
CN	Jiayuguan	China	EAP	7.52	142,900	23.1	29.7	427	39.81	98.27	668	7.52
CN	Jieshi	China	EAP	6.41	102,100	13.1	28.2	575	22.83	115.83	669	6.41
CN	Jieshou	China	EAP	12.2	142,600	14.3	37.7	386	33.27	115.36	670	12.2
CN	Jiexi, Guangdong	China	EAP	8.67	116,400	15.9	29.1	430	23.44	115.83	671	8.67

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Jiexiu, shanxi	China	EAP	9.42	192,800	30.7	34.8	440	37.05	111.92	672	9.42
CN	Jilin	China	EAP	39.1	1,435,000	129	126	394	43.87	126.56	673	39.1
CN	Jinan	China	EAP	48.5	2,568,000	209	178	423	36.68	117.02	674	48.5
CN	Jincheng	China	EAP	5.31	230,600	134	20	396	35.56	112.87	675	5.31
CN	Jingdezhen	China	EAP	20.5	403,100	43.1	61.4	387	29.29	117.21	676	20.5
CN	Jinghong, Yunnan	China	EAP	22.9	139,000	14.9	36	164	22.02	100.79	677	22.9
CN	Jingjiang, Jiangsu	China	EAP	18.8	252,900	15.1	65.2	462	32.03	120.27	678	18.8
CN	Jingmen	China	EAP	97.6	1,153,000	30	211	249	31.04	112.21	679	97.6
CN	Jingzhou	China	EAP	39.8	1,065,000	73.7	124	344	30.33	112.23	680	39.8
CN	Jinhua	China	EAP	17.5	338,100	41.1	52.7	398	29.11	119.64	681	17.5
CN	Jining	China	EAP	44.4	1,019,000	50.6	143	407	35.42	116.59	682	44.4
CN	Jining (Inner Mongolia)	China	EAP	7.4	237,600	39.4	37.9	615	41.04	113.11	683	7.4
CN	Jinshi	China	EAP	82.1	2,771,000	41.4	431	665	40.75	120.85	684	82.1
CN	Jinshi, Hunan	China	EAP	10.7	127,400	15.3	32.6	369	29.63	111.88	685	10.7
CN	Jintan, Jiangsu	China	EAP	22.4	229,800	10.2	71.8	432	31.76	119.58	686	22.4
CN	Jintang, Sichuan	China	EAP	22.7	135,600	4.36	65	314	30.86	104.43	687	22.7
CN	Jinxian, jiangxi	China	EAP	11.6	137,300	12.5	38.8	438	28.37	116.25	688	11.6
CN	Jinxiang, shandong	China	EAP	11.2	106,400	9.96	33.7	397	35.08	116.31	689	11.2
CN	Jinzhou	China	EAP	19.1	834,000	79.7	93.4	604	41.13	121.12	690	19.1
CN	Jishou	China	EAP	24	271,000	15.9	68	342	28.3	109.72	691	24
CN	Jishu	China	EAP	15.3	106,000	6.71	40.9	308	44.31	86.22	692	15.3
CN	Jishui, Jiangxi	China	EAP	12.5	105,700	7.38	38.9	409	27.21	115.13	693	12.5
CN	Jiujiang	China	EAP	19.1	496,500	44.9	74.1	498	29.71	116.01	694	19.1
CN	Jiutai	China	EAP	12.3	178,500	19.4	40.5	444	44.16	125.88	695	12.3
CN	Jixi	China	EAP	42.9	1,056,000	59.8	137	420	45.32	130.98	696	42.9
CN	Jixian, Heilongjiang	China	EAP	10.1	103,200	17.3	24.8	334	46.72	131.15	697	10.1
CN	Jiyuan, Henan	China	EAP	7.27	191,500	58.1	25.1	374	35.12	112.58	698	7.27
CN	Junan, Shandong	China	EAP	18.7	201,900	12.4	57.2	402	35.19	118.84	699	18.7
CN	Jurong, Jiangsu	China	EAP	24.2	199,800	6.73	77	432	31.96	119.17	700	24.2
CN	Juxian, shandong	China	EAP	14.8	202,600	19.2	46.2	399	35.59	118.84	701	14.8
CN	Juye, shandong	China	EAP	10.4	109,300	11.6	32.1	402	35.4	116.09	702	10.4
CN	Kaiping, Guangdong	China	EAP	18.7	343,200	27.2	65.8	431	22.38	112.69	703	18.7
CN	Kaixian, chonqing	China	EAP	29.4	182,700	7.5	66.7	287	31.19	108.42	704	29.4
CN	Kaiyuan	China	EAP	11.4	258,300	26.6	50.1	474	23.73	103.26	705	11.4
CN	Kaiyuan, Liaoning	China	EAP	43.7	466,400	17.2	112	308	34.55	110.08	706	43.7
CN	Karamay	China	EAP	17	263,100	21.1	57.2	384	45.61	84.86	708	17
CN	Kashi	China	EAP	15.1	278,700	26.6	54.1	360	39.47	75.99	709	15.1
CN	Korla	China	EAP	8.53	170,200	43.3	25.9	301	41.76	86.16	710	8.53
CN	Kuandian, Liaoning	China	EAP	12.3	135,600	13.8	36.4	393	40.73	124.79	711	12.3
CN	Kunming	China	EAP	12.3	1,804,000	476	82.7	660	25.01	102.7	712	12.3
CN	Kunshan, Jiangsu	China	EAP	12.5	434,400	79.2	48.8	492	31.38	120.97	713	12.5
CN	Kuytun, Xinjiang Uygur	China	EAP	6.7	109,900	30.8	19.8	316	44.43	84.9	714	6.7
CN	Laibin, Guangxi	China	EAP	8.08	148,900	22.7	31.2	460	23.74	109.22	715	8.08
CN	Laiwu	China	EAP	70.1	1,219,000	27.9	231	416	36.22	117.67	716	70.1
CN	Laixi, shandong	China	EAP	15	235,300	20.5	52	437	36.84	120.52	717	15
CN	Laiyang	China	EAP	7.32	174,000	44.8	26	437	36.97	120.7	718	7.32
CN	Laizhou, shandong	China	EAP	23.6	366,600	19.4	83.1	451	37.18	119.93	719	23.6
CN	Langfang	China	EAP	28	683,300	50.4	96.2	410	39.52	116.71	720	28
CN	Langzhong, Sichuan	China	EAP	19.1	198,500	13.7	53.7	323	31.6	105.97	721	19.1
CN	Lanxi, Zhejiang	China	EAP	19.2	193,900	12.1	55.6	398	29.22	119.47	722	19.2
CN	Laohekou	China	EAP	52.4	530,400	11.5	156	355	32.4	111.68	723	52.4
CN	Lasa	China	EAP	3.61	134,000	28.5	25.1	680	29.67	91.12	724	3.61
CN	Lechang, guangdong	China	EAP	16.5	210,100	15.5	53.4	407	25.14	113.35	725	16.5
CN	Leiyang	China	EAP	10.8	138,900	14.7	36.2	405	26.42	112.84	726	10.8
CN	Leizhou, guangdong	China	EAP	30.6	463,800	12.1	133	545	20.92	110.09	727	30.6
CN	Lengshuijiang	China	EAP	27.1	356,800	17.6	85.1	375	27.7	111.44	728	27.1
CN	Lengshuitan	China	EAP	88.3	1,040,000	12.2	298	405	26.46	111.59	729	88.3
CN	Leping, Jiangxi	China	EAP	17	232,500	22.4	49.1	387	28.97	117.14	730	17
CN	Leshan	China	EAP	86.9	1,137,000	18.9	261	304	29.59	103.75	731	86.9
CN	Lezhi, Sichuan	China	EAP	21.7	103,800	2.34	67.8	364	30.28	105.03	732	21.7
CN	Liangping, chongqing	China	EAP	18.7	115,200	6.94	43.7	297	30.68	107.79	733	18.7
CN	Lianjiang, guangdong	China	EAP	22.2	369,400	16.8	90.1	502	21.62	110.28	734	22.2
CN	Lianshui, Jiangsu	China	EAP	11.2	150,300	16	37.6	438	33.79	119.27	735	11.2
CN	Lianyuan	China	EAP	78.5	1,007,000	16.7	247	375	27.71	111.66	736	78.5
CN	Lianyungang	China	EAP	27.3	604,500	35.5	101	469	34.6	119.16	737	27.3
CN	Lianzhou, Guangdong	China	EAP	10.8	159,900	18.5	37.2	430	24.79	112.38	738	10.8
CN	Liaocheng	China	EAP	10.9	220,300	36.7	36.4	422	36.46	115.98	739	10.9
CN	Liaoyuan	China	EAP	17.4	451,700	54.5	61.2	458	42.92	125.14	740	17.4
CN	Liaozhong, Liaoning	China	EAP	16.6	176,200	10.7	53.8	445	41.51	122.74	741	16.6
CN	Licheng	China	EAP	10.2	128,300	14.3	34	412	23.3	113.82	742	10.2
CN	Liling, Hunan	China	EAP	16.3	236,400	19.5	53.5	415	27.68	113.5	743	16.3
CN	Linchuan	China	EAP	11	133,300	17	32.3	384	28	116.36	744	11
CN	Linfen	China	EAP	33	692,400	45.5	103	351	36.09	111.53	745	33
CN	Lingbao, Henan	China	EAP	12.2	182,200	23.3	37.7	373	34.52	110.88	746	12.2
CN	Linghai, Liaoning	China	EAP	14.3	178,700	7.65	64.6	604	41.18	121.36	747	14.3

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Lingshan, Guangxi	China	EAP	9.22	143,700	16.9	35	460	22.41	109.3	748	9.22
CN	Lingyuan, Liaoning	China	EAP	13	201,000	12.5	56.8	590	41.26	119.41	749	13
CN	Linjiang, Jilin	China	EAP	27.7	139,600	5.37	60.2	300	41.81	126.91	750	27.7
CN	Linkou, Heilongjiang	China	EAP	13.9	115,900	12.9	32.3	312	45.29	130.27	751	13.9
CN	Linqing	China	EAP	70.4	891,000	15.1	230	432	36.85	115.71	752	70.4
CN	Linqu, shandong	China	EAP	14.6	188,200	14.8	49	429	36.52	118.55	753	14.6
CN	Linquan, Anhui	China	EAP	25.7	202,800	7	76.6	384	33.06	115.26	754	25.7
CN	Linshu, shandong	China	EAP	16.5	146,200	8.53	50.1	402	34.93	118.64	755	16.5
CN	Linshui	China	EAP	4.72	111,400	41.2	17.4	451	36.44	114.2	756	4.72
CN	Linxi	China	EAP	3.99	101,700	54.3	13.8	418	39.74	118.44	757	3.99
CN	Linxia	China	EAP	14	193,500	14.5	50.8	390	35.61	103.21	758	14
CN	Linxiang, Hunan	China	EAP	20.9	188,700	9.52	61.1	370	29.49	113.47	759	20.9
CN	Linyi	China	EAP	64.1	2,498,000	135	215	398	35.02	118.31	760	64.1
CN	Linying, henan	China	EAP	4.12	107,100	58.1	14.1	393	33.81	113.92	761	4.12
CN	Linzhou, henan	China	EAP	22	251,400	11.1	75.5	441	36.06	113.81	762	22
CN	Lishi, Shanxi	China	EAP	11.2	137,900	15.6	34.9	385	37.52	111.13	763	11.2
CN	Lishu, jilin	China	EAP	21.9	209,300	8.32	72.6	454	43.31	124.34	764	21.9
CN	Lishui	China	EAP	35.1	340,800	10.8	104	392	28.46	119.92	765	35.1
CN	Lishui, Jiangsu	China	EAP	20.5	173,800	7.53	63.3	423	31.67	119.03	766	20.5
CN	Liuhe, Jilin	China	EAP	11.1	107,000	9.64	34.4	422	42.28	125.74	767	11.1
CN	Liujiang, guangxi	China	EAP	2.96	146,600	137	12.5	478	24.33	109.4	768	2.96
CN	Liupanshui	China	EAP	125	2,023,000	13.8	545	483	26.61	104.84	769	125
CN	Liuyang, Hunan	China	EAP	24.7	286,500	13.9	76.8	396	28.16	113.62	770	24.7
CN	Lixian, Hunan	China	EAP	14.5	140,400	10.3	43.7	369	29.65	111.75	771	14.5
CN	Lixin, Anhui	China	EAP	32.5	258,600	7.25	96.1	384	33.15	116.2	772	32.5
CN	Liyang, Jiangsu	China	EAP	28	294,400	11.4	87.2	423	31.44	119.49	773	28
CN	Longchang, sichuan	China	EAP	19.3	141,600	5.06	63	354	29.34	105.29	774	19.3
CN	Longchuan, Guangdong	China	EAP	14.4	113,100	6.6	44	398	24.11	115.26	775	14.4
CN	Longhui, Hunan	China	EAP	11	106,500	8.82	35.9	392	27.13	111.03	776	11
CN	Longjiang	China	EAP	9.76	111,100	10.9	33.7	475	47.34	123.19	777	9.76
CN	Longjing	China	EAP	20.1	267,100	20	59.7	385	42.78	129.42	778	20.1
CN	Longkou, shandong	China	EAP	8.77	287,000	33.7	49.4	763	37.66	120.33	779	8.77
CN	Loudi	China	EAP	19.8	420,300	41	65.7	382	27.75	111.99	780	19.8
CN	Luan	China	EAP	10.9	176,700	30.7	31.9	365	31.77	116.51	781	10.9
CN	Luchuan, Guangxi	China	EAP	7.82	120,900	17.9	28.6	450	22.32	110.26	782	7.82
CN	Lufeng, Yunnan	China	EAP	24.3	106,400	1.17	98.6	514	25.15	102.08	783	24.3
CN	Luhe, Jiangsu	China	EAP	15.6	130,800	7.35	48.3	417	32.35	118.84	784	15.6
CN	Lujiang, Anhui	China	EAP	22.7	202,200	6.29	80.7	478	31.26	117.29	785	22.7
CN	Luliang, Yunnan	China	EAP	6.95	148,900	16.5	36.7	583	25.03	103.66	786	6.95
CN	Luobei, Heilongjiang	China	EAP	12	126,300	10.7	38.7	455	47.58	130.83	787	12
CN	Luoding, Guangdong	China	EAP	14.9	248,000	21.6	53.4	431	22.77	111.57	788	14.9
CN	Luohe	China	EAP	11.4	328,700	71.4	38.9	393	33.58	114.03	789	11.4
CN	Luoyang	China	EAP	33.3	1,451,000	141	122	390	34.67	112.45	790	33.3
CN	Luxi, Yunnan	China	EAP	63.2	233,100	9.54	75.5	123	24.45	98.58	791	63.2
CN	Luxian, Sichuan	China	EAP	24.4	118,800	2.46	75.7	335	29.15	105.37	792	24.4
CN	Maanshan	China	EAP	23.6	504,500	36.1	84	467	31.71	118.49	793	23.6
CN	Macheng	China	EAP	14.2	127,300	10	40.2	368	31.19	115.03	794	14.2
CN	Manzhouli	China	EAP	11.1	169,000	17.4	40.5	499	49.59	117.46	795	11.1
CN	Maoming	China	EAP	43.4	663,700	17.3	160	455	21.92	110.85	796	43.4
CN	Meihekou	China	EAP	7.85	101,300	16.7	24.8	422	42.54	125.68	797	7.85
CN	Meishan, sichuan	China	EAP	20.3	242,700	15.9	60.9	298	30.06	103.83	798	20.3
CN	Meizhou	China	EAP	24.7	326,500	38.1	52.9	250	24.32	116.11	799	24.7
CN	Mengcheng, Anhui	China	EAP	14.7	169,500	15.2	43.5	381	33.27	116.56	800	14.7
CN	Mengyin, shandong	China	EAP	15.7	158,900	10.8	48.3	397	35.72	117.94	801	15.7
CN	Mengzi, Yunnan	China	EAP	3.82	111,300	42.8	17	474	23.38	103.41	802	3.82
CN	Mianyang	China	EAP	52.1	1,065,000	45.6	158	309	31.48	104.74	803	52.1
CN	Mianzhu, sichuan	China	EAP	20.4	168,700	8.51	57.8	294	31.35	104.2	804	20.4
CN	Miluo, Hunan	China	EAP	14.2	112,800	7.43	41.4	380	28.81	113.08	805	14.2
CN	Mingguang, anhui	China	EAP	18.9	155,000	6.72	59.8	431	32.79	117.99	806	18.9
CN	Mingshui	China	EAP	10.2	117,900	13.1	32.6	423	36.72	117.53	807	10.2
CN	Minhou, fujian	China	EAP	11.4	142,600	10.7	43.7	510	26.15	119.14	808	11.4
CN	Mishan	China	EAP	39.3	623,100	23.6	128	445	45.55	126.99	809	39.3
CN	Miyun, beijing	China	EAP	9.93	129,000	15.8	32.4	390	40.39	116.85	810	9.93
CN	Mudanjiang	China	EAP	20.6	801,000	101	79.6	482	44.6	129.63	811	20.6
CN	Muling, Heilongjiang	China	EAP	10.1	121,000	11.4	35.9	501	44.93	130.54	812	10.1
CN	Nan'an, fujian	China	EAP	18.9	456,700	28.7	85.2	582	24.98	118.39	813	18.9
CN	Nanbu, Sichuan	China	EAP	30.3	217,400	6.85	83.1	323	31.35	106.06	814	30.3
CN	Nancha	China	EAP	19.2	125,600	9.24	41.3	286	47.14	129.27	815	19.2
CN	Nanchang	China	EAP	43.7	1,722,000	116	160	438	28.7	115.89	816	43.7
CN	Nanchuan, Chongqing	China	EAP	26.4	179,800	6.62	69.9	316	29.53	108.78	817	26.4
CN	Nandan, Guangxi	China	EAP	5.79	114,300	20.7	25.1	487	25.01	107.54	818	5.79
CN	Nangong	China	EAP	48.8	474,200	8.19	166	436	37.36	115.39	819	48.8
CN	Nanjing	China	EAP	68.9	2,740,000	129	241	429	32.07	118.79	820	68.9
CN	Nankang, jiangxi	China	EAP	16.8	132,500	7.67	47.8	359	25.67	114.76	821	16.8
CN	Nanning	China	EAP	26.8	1,311,000	118	121	469	22.83	108.31	822	26.8

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Nantong (Nanping?)	China	EAP	123	639,600	12.1	184	194	26.66	118.17	823	123
CN	Nanxi, sichuan	China	EAP	25.1	118,200	2.35	77	324	28.84	104.98	824	25.1
CN	Nanxiong, Guangdong	China	EAP	11.9	143,900	14.4	37.9	403	25.13	114.32	825	11.9
CN	Nanyang	China	EAP	83.1	1,614,000	35.8	270	375	33	112.53	826	83.1
CN	Nanzhang, Hubei	China	EAP	18.1	131,600	6.26	52.6	356	31.79	111.85	827	18.1
CN	Nanzhao, Henan	China	EAP	12	106,000	8.16	37.1	385	33.49	112.43	828	12
CN	Nehe	China	EAP	9.6	113,000	14.2	30	437	48.49	124.87	829	9.6
CN	Neijiang	China	EAP	88.6	1,365,000	20.7	300	354	29.59	105.06	830	88.6
CN	Neixiang, henan	China	EAP	13.9	125,000	9.82	39.9	344	33.06	111.85	831	13.9
CN	Nenjiang, Heilongjiang	China	EAP	12.9	147,600	15	38.1	417	49.18	125.24	832	12.9
CN	Ningaposan, Heilongjiang	China	EAP	10.9	129,700	11.2	38.8	482	44.35	129.47	833	10.9
CN	Ningbo	China	EAP	24	1,173,000	143	98.1	509	29.88	121.56	834	24
CN	Ningde	China	EAP	56.1	417,600	16	104	234	26.67	119.54	835	56.1
CN	Ningguo, Anhui	China	EAP	16.8	117,800	6	48.1	394	30.63	118.98	836	16.8
CN	Ninghai, zhejiang	China	EAP	13.6	208,700	18	49.2	472	29.32	121.43	837	13.6
CN	Ningyang, shandong	China	EAP	15.9	149,800	9.55	48.4	409	35.77	116.8	838	15.9
CN	Panjin	China	EAP	20	539,400	45	80.4	508	41.15	122.08	839	20
CN	Panshi, Jilin	China	EAP	18	212,500	14.3	56.2	425	42.94	126.07	840	18
CN	Panzhihua	China	EAP	27.6	635,500	24	130	456	26.59	101.71	841	27.6
CN	Peixian, Jiangsu	China	EAP	25	292,700	15.2	75.1	386	34.74	116.93	842	25
CN	Peng'an, Sichuan	China	EAP	28.6	130,500	3.08	74.4	326	31.03	106.41	843	28.6
CN	Penglai, shandong	China	EAP	9.64	189,800	16.6	46.5	766	37.81	120.77	844	9.64
CN	Pengxi, Sichuan	China	EAP	31.6	129,700	2.27	86.1	335	30.77	105.71	845	31.6
CN	Pengzhou, sichuan	China	EAP	24.4	245,900	12.6	69.2	297	30.99	103.94	846	24.4
CN	Pingdingshan	China	EAP	33.6	723,000	43.4	110	387	33.75	113.31	847	33.6
CN	Pingdu, shandong	China	EAP	27.1	345,900	13.5	94.1	451	36.79	119.97	848	27.1
CN	Pinghe, Fujian	China	EAP	16.7	122,400	6.4	48.4	381	24.37	117.31	849	16.7
CN	Pinghu, zhejiang	China	EAP	8.68	171,500	9.97	54.3	944	30.71	121.01	850	8.68
CN	Pingliang	China	EAP	27.8	444,200	19.1	102	445	35.55	106.67	851	27.8
CN	Pingnan, Guangxi	China	EAP	18.6	199,800	10.5	61.6	416	23.56	110.39	852	18.6
CN	Pingxiang (Guangxi)	China	EAP	111	1,502,000	20.4	333	379	27.64	113.85	853	111
CN	Pingyang, Zhejiang	China	EAP	18.1	371,300	8.05	131	1020	27.68	120.57	854	18.1
CN	Pingyi, shandong	China	EAP	18.6	219,200	14.2	58.2	408	35.52	117.64	855	18.6
CN	Pixian, Sichuan	China	EAP	27.8	247,300	9.92	78.5	297	30.82	103.89	856	27.8
CN	Pizhou, jiangsu	China	EAP	36	366,500	11	110	397	34.33	117.95	857	36
CN	Poyang, Jiangxi	China	EAP	10.8	130,000	7.63	47	604	29	116.68	858	10.8
CN	Pubei, Guangxi	China	EAP	18.1	120,800	3.38	65.7	460	22.27	109.55	859	18.1
CN	Pucheng, shaanxi	China	EAP	9.69	105,100	15.5	26.7	341	34.96	109.58	860	9.69
CN	Pujiang, zhejiang	China	EAP	13.5	117,000	8.34	40.5	408	29.46	119.9	861	13.5
CN	Pulandian	China	EAP	10.1	109,400	11.4	32.4	428	39.41	121.97	862	10.1
CN	Puqi	China	EAP	37.6	455,700	18.6	106	355	29.73	113.88	863	37.6
CN	Putian	China	EAP	4.85	350,200	153	28.3	721	25.42	119.08	864	4.85
CN	Puyang	China	EAP	17.5	464,900	59.7	60.2	414	35.76	115.04	865	17.5
CN	Qian&aposan, Hebei	China	EAP	15.4	171,600	12.5	48.5	400	40.01	118.71	866	15.4
CN	Qianguo	China	EAP	7.31	115,800	20.6	25.5	486	45.13	124.82	867	7.31
CN	Qianjiang	China	EAP	11.3	116,900	11.1	35	385	30.43	112.89	868	11.3
CN	Qichun, Hubei	China	EAP	20.3	204,600	9.71	65.7	426	30.25	115.43	869	20.3
CN	Qidong, hunan	China	EAP	14.8	145,400	8.72	49.2	404	26.8	112.11	870	14.8
CN	Qidong, jiangsu	China	EAP	23.1	393,000	14.2	104	603	31.82	121.66	871	23.1
CN	Qihe, shandong	China	EAP	13.7	140,500	10.2	44	431	36.81	116.77	872	13.7
CN	Qijiang, chongqing	China	EAP	25.3	219,700	8.42	75.7	353	29.04	106.65	873	25.3
CN	Qingdo	China	EAP	43.2	5,125,000	304	294	912	36.22	120.4	874	43.2
CN	Qinggang, heilongjiang	China	EAP	11.2	110,900	9.35	36.3	458	46.69	126.11	875	11.2
CN	Qingtian, Zhejiang	China	EAP	31	125,900	5.18	55.3	232	28.13	120.3	876	31
CN	Qingyang, Gansu	China	EAP	14.4	104,700	4.78	47.9	414	35.74	107.64	877	14.4
CN	Qingyuan	China	EAP	30.1	521,300	24.6	105	426	23.71	113.03	878	30.1
CN	Qingzhen, Guizhou	China	EAP	16.7	194,300	7.16	72.6	516	26.57	106.46	879	16.7
CN	Qinhuangdao	China	EAP	21.6	673,100	86.1	72.5	396	39.95	119.6	880	21.6
CN	Qinyang, henan	China	EAP	9.33	160,200	26.3	31.2	374	35.09	112.93	881	9.33
CN	Qinzhou	China	EAP	68	1,138,000	17.3	274	482	21.98	108.62	882	68
CN	Qionghai, Hainan	China	EAP	9.02	168,900	7.73	60.8	1020	19.25	110.46	883	9.02
CN	Qionglai, sichuan	China	EAP	39.5	239,300	7.33	88.4	237	30.42	103.46	884	39.5
CN	Qiqihar	China	EAP	65.1	1,435,000	82.8	158	298	47.32	130.29	885	65.1
CN	Qishan, Shaanxi	China	EAP	24.4	111,300	2.37	72.3	362	34.44	107.62	886	24.4
CN	Qitaihe	China	EAP	15.6	569,900	105	55.7	468	45.79	130.94	887	15.6
CN	Qixia, shandong	China	EAP	21.1	178,100	7.68	64.3	406	37.31	120.83	888	21.1
CN	Qiyang, hunan	China	EAP	18.9	209,000	10.2	65.5	416	26.6	111.86	889	18.9
CN	Quanzhou	China	EAP	3.79	640,000	927	21	582	24.8	118.58	890	3.79
CN	Qufu, shandong	China	EAP	17.4	247,700	20.8	54.3	407	35.6	116.99	891	17.4
CN	Qujing	China	EAP	17.2	590,700	38.4	95.3	592	25.53	103.8	892	17.2
CN	Quzhou	China	EAP	17.1	261,200	27.2	50.1	384	28.97	118.87	893	17.1
CN	Renhuai, Guizhou	China	EAP	21.1	114,300	2.68	69.8	396	27.81	106.41	894	21.1
CN	Renqiu, Hebei	China	EAP	15.6	285,100	30	52.1	411	38.71	116.11	895	15.6
CN	Renshou, sichuan	China	EAP	17.8	150,400	8.31	52.2	298	30	104.15	896	17.8
CN	Rizhao	China	EAP	44.9	1,136,000	45.9	168	466	35.41	119.5	897	44.9

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CN	Rongchang, chongqing	China	EAP	25.8	132,400	2.58	82.5	354	29.41	105.59	898	25.8
CN	Rongcheng	China	EAP	11.3	111,900	10.7	34.1	372	29.83	112.9	899	11.3
CN	Rongxian, sichuan	China	EAP	14.4	117,100	6.52	45.8	337	29.46	104.42	900	14.4
CN	Rudong, jiangsu	China	EAP	10.6	228,700	9.78	73.1	1000	32.32	121.18	901	10.6
CN	Rugao, jiangsu	China	EAP	24.5	340,800	13.5	92.8	498	32.4	120.56	902	24.5
CN	Ruichang, jiangxi	China	EAP	12.2	132,500	8.61	45.2	498	29.69	115.67	903	12.2
CN	Ruijin, jiangxi	China	EAP	14.6	110,900	11	33.5	296	25.89	116.03	904	14.6
CN	Ruili, Yunnan	China	EAP	25.2	100,400	16	25.1	101	24	97.88	905	25.2
CN	Rushan, shandong	China	EAP	28.8	208,800	6.16	84.1	385	36.92	121.53	906	28.8
CN	Ruzhou, henan	China	EAP	10.8	140,300	15.2	36	400	34.18	112.84	907	10.8
CN	Sanbu	China	EAP	8.97	104,300	11.4	31	431	22.46	112.77	908	8.97
CN	Sanhe, hebei	China	EAP	17.5	193,900	13.4	52.9	372	40	117.06	909	17.5
CN	Sanming	China	EAP	38.5	269,900	20.9	59	193	26.27	117.63	910	38.5
CN	Santai, sichuan	China	EAP	28.9	231,100	6.39	91.4	358	31.09	105.09	911	28.9
CN	Shanggao, jiangxi	China	EAP	15.1	104,100	6	42.5	365	28.25	114.92	912	15.1
CN	Shanghai	China	EAP	74.4	13,070,000	1250	370	534	31.25	121.44	913	74.4
CN	Shangqiu	China	EAP	53.5	1,435,000	70	172	384	34.43	115.65	914	53.5
CN	Shangrao	China	EAP	27.1	458,700	33.2	79.6	390	28.45	117.95	915	27.1
CN	Shangyu, zhejiang	China	EAP	11.1	297,100	49	42.4	493	30.03	120.86	916	11.1
CN	Shangzhi	China	EAP	55.3	534,200	13.7	144	346	45.22	127.97	917	55.3
CN	Shangzhou	China	EAP	66.9	511,300	6.39	202	383	33.88	109.94	918	66.9
CN	Shantou	China	EAP	13.3	2,609,000	1330	71.4	553	23.44	116.48	919	13.3
CN	Shanwei	China	EAP	30.6	409,100	12.7	115	485	22.79	115.36	920	30.6
CN	Shanxian, shandong	China	EAP	13.3	155,400	14.5	40.7	397	34.8	116.08	921	13.3
CN	Shaodong, hunan	China	EAP	11.9	200,100	26.8	38.7	382	27.28	111.74	922	11.9
CN	Shaoguan	China	EAP	14.6	494,600	92.4	51.5	407	24.78	113.59	923	14.6
CN	Shaoxing	China	EAP	11.4	324,300	55	43.7	493	30.01	120.57	924	11.4
CN	Shayang, hubei	China	EAP	21	191,700	8.69	65	385	30.71	112.58	925	21
CN	Shehong, sichuan	China	EAP	24.3	236,000	9.24	77.6	358	30.88	105.38	926	24.3
CN	Shengzhou, zhejiang	China	EAP	16.8	296,800	27.5	56.6	446	29.61	120.83	927	16.8
CN	Shenmu, shaanxi	China	EAP	10.7	127,300	12.5	36	416	38.84	110.5	928	10.7
CN	Shenqiu, henan	China	EAP	12.9	136,600	11.9	39.6	386	33.41	115.08	929	12.9
CN	Shenxian, shandong	China	EAP	12.2	133,300	11.4	39.5	426	36.25	115.67	930	12.2
CN	Shenyang	China	EAP	63.7	4,828,000	389	245	430	41.8	123.41	931	63.7
CN	Shenzhou, hebei	China	EAP	13.9	133,800	8.32	46.4	417	38.01	115.56	932	13.9
CN	Sheyang, jiangsu	China	EAP	43.2	632,400	17.3	152	456	33.78	120.25	933	43.2
CN	Shifang, Sichuan	China	EAP	18.2	163,100	10.1	51.3	297	31.13	104.17	934	18.2
CN	Shihezi	China	EAP	36.5	574,500	30.4	104	308	44.31	86.03	935	36.5
CN	Shijiazhuang	China	EAP	20.2	1,603,000	385	81.7	406	38.06	114.49	936	20.2
CN	Shiyan, Hubei	China	EAP	33.6	536,000	39.6	85.1	280	32.63	110.78	937	33.6
CN	Shou, anhui	China	EAP	22.8	240,300	11	72.4	411	32.6	116.79	938	22.8
CN	Shouguang, shandong	China	EAP	16.6	415,500	50	58.8	441	36.87	118.73	939	16.6
CN	Shouzhou	China	EAP	22.4	544,600	31.7	96.7	524	39.34	112.44	940	22.4
CN	Shuangcheng	China	EAP	10.5	136,400	15	35.3	469	45.38	126.31	941	10.5
CN	Shuangfeng, hunan	China	EAP	10.4	104,400	9.94	33.1	382	27.47	112.19	942	10.4
CN	Shuangliao, jilin	China	EAP	26.5	295,800	10.4	91.7	478	43.51	123.51	943	26.5
CN	Shucheng, anhui	China	EAP	20.3	141,900	6.16	57.2	363	31.47	116.95	944	20.3
CN	Shulan, jilin	China	EAP	25.5	257,100	10.4	79.5	429	44.41	126.95	945	25.5
CN	Shunyi	China	EAP	6.68	106,700	23.8	21.9	383	40.13	116.66	946	6.68
CN	Sihui, guangdong	China	EAP	16.2	209,300	14.4	55.2	414	23.36	112.7	947	16.2
CN	Simao, yunnan	China	EAP	20.5	154,400	17.1	37.3	184	22.8	100.97	948	20.5
CN	Siping	China	EAP	18.3	463,000	54.1	63	451	43.17	124.38	949	18.3
CN	Sishui, shandong	China	EAP	12.1	100,600	7.34	37.1	408	35.66	117.28	950	12.1
CN	Siyang, jiangsu	China	EAP	17.3	242,400	11.5	71.5	573	33.72	118.68	951	17.3
CN	Songjiang	China	EAP	23.7	502,100	27.6	95.7	534	31.03	121.24	952	23.7
CN	Songzi, hubei	China	EAP	28.9	220,600	6.1	89.3	377	30.19	111.78	953	28.9
CN	Suihua	China	EAP	14.9	252,100	26.6	48.9	451	46.65	127	954	14.9
CN	Suining, jiangsu	China	EAP	19.9	216,700	12.4	61.7	402	33.91	117.95	955	19.9
CN	Suixi, guangdong	China	EAP	15.8	208,500	10.7	63.6	502	21.39	110.25	956	15.8
CN	Suizhong, liaoning	China	EAP	4.38	101,600	20.4	22.5	665	40.33	120.35	957	4.38
CN	Suizhou	China	EAP	17.7	263,400	27.1	50.6	339	31.74	113.37	958	17.7
CN	Suqian (Sucheng)	China	EAP	87.9	1,189,000	18.6	276	402	33.97	118.3	959	87.9
CN	Suzhou (Jiangsu)	China	EAP	19.5	763,400	98.2	77.1	492	31.32	120.61	960	19.5
CN	Suzhou (suxian Diku)	China	EAP	62.3	1,183,000	38.5	191	381	33.64	116.98	961	62.3
CN	Taian	China	EAP	62	1,503,000	53	206	412	36.19	117.11	962	62
CN	Taicang, jiangsu	China	EAP	12.1	284,400	23.7	58.4	652	31.46	121.11	963	12.1
CN	Taicheng (Tacheng)	China	EAP	91.3	1,244,000	15.4	317	431	22.27	112.79	964	91.3
CN	Taihe, anhui	China	EAP	30.2	262,500	8.42	90.5	384	33.17	115.62	965	30.2
CN	Taihe, Jiangxi	China	EAP	17.8	133,100	6.42	52.5	373	26.79	114.89	966	17.8
CN	Taixing, jiangsu	China	EAP	33.8	404,300	12	117	462	32.18	120.03	970	33.8
CN	Taiyan	China	EAP	30.1	1,832,000	224	122	441	37.86	112.54	971	30.1
CN	Taizhou	China	EAP	22.8	588,000	50.5	82.8	458	32.5	119.93	972	22.8
CN	Taizhou(J+H)	China	EAP	80.3	1,408,000	23	294	477	28.87	121.14	973	80.3
CN	Tancheng, Shandong	China	EAP	16.4	191,300	14.2	50.8	407	34.62	118.34	974	16.4
CN	Tanchun	China	EAP	16.6	183,800	30.7	33.2	257	42.87	130.37	975	16.6

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Tanggu	China	EAP	6.45	407,400	76.9	46.5	874	39.02	117.69	976	6.45
CN	Tanghe, henan	China	EAP	18.5	171,000	8.73	57.9	385	32.7	112.83	977	18.5
CN	Tangshan, Hebei	China	EAP	31.6	1,703,000	212	117	412	39.65	118.19	978	31.6
CN	Taonan	China	EAP	32.5	529,900	20.6	117	488	45.34	122.79	979	32.5
CN	Taoyuan, hunan	China	EAP	15.6	136,500	10.2	42.7	331	28.92	111.48	980	15.6
CN	Tengxian, Guangxi	China	EAP	21.1	136,400	4.05	67.8	416	23.38	110.92	981	21.1
CN	Tengzhou	China	EAP	4.22	108,200	62.9	13.6	397	35.07	117.16	982	4.22
CN	Tianchang, anhui	China	EAP	16.8	180,100	10.4	55.8	444	32.69	119.01	983	16.8
CN	Tianjin	China	EAP	102	9,156,000	407	454	481	39.14	117.19	984	102
CN	Tianmen	China	EAP	156	1,779,000	14.2	473	379	30.66	113.17	985	156
CN	Tiantai, zhejiang	China	EAP	7.46	111,200	16.8	27.1	477	29.15	121.03	986	7.46
CN	Tieli	China	EAP	32	425,900	20.5	94	396	46.99	128.05	987	32
CN	Tieling	China	EAP	25.3	419,700	26.4	81.7	422	42.29	123.84	988	25.3
CN	Tongcheng, anhui	China	EAP	23.3	170,100	10.7	52	281	31.06	116.96	989	23.3
CN	Tongchuan	China	EAP	38.7	441,600	17	107	341	35.09	109.08	990	38.7
CN	Tonghua	China	EAP	117	428,700	4.01	214	253	41.68	125.75	991	117
CN	Tongliang, chongqing	China	EAP	18.2	103,100	3.78	53	338	29.84	106.05	992	18.2
CN	Tongliao	China	EAP	41.6	784,800	24.1	160	515	43.62	122.27	993	41.6
CN	Tongling	China	EAP	16.2	331,100	39.9	52.4	418	30.94	117.81	994	16.2
CN	Tonglu, Zhejiang	China	EAP	13.9	136,300	10.5	42	406	29.8	119.68	995	13.9
CN	Tongnan, Chongqing	China	EAP	17	106,900	4.6	49.9	338	30.19	105.83	996	17
CN	Tongxiang, zhejiang	China	EAP	18.7	249,700	11.6	73.2	529	30.64	120.55	997	18.7
CN	Tongyu, jilin	China	EAP	11	119,500	10.6	36.7	473	44.81	123.08	998	11
CN	Tongzhou, jiangsu	China	EAP	30.9	420,700	9.29	138	603	32.09	121.07	999	30.9
CN	Tongzi, Guizhou	China	EAP	22.7	120,700	2.6	74.9	396	28.14	106.82	1000	22.7
CN	Tumen	China	EAP	13	101,900	14.6	26.7	262	42.98	129.84	1001	13
CN	Turpan	China	EAP	20.2	349,000	26.1	68.3	395	42.96	89.18	1002	20.2
CN	UnJinghai, Tianjin	China	EAP	7.37	103,800	18.3	24.2	415	38.94	116.93	1003	7.37
CN	Wafangdian	China	EAP	16.5	267,700	24.6	54	428	39.63	122.01	1004	16.5
CN	Wangcheng, hunan	China	EAP	10.5	110,900	12.2	31.8	372	28.37	112.82	1005	10.5
CN	Wangqing, jilin	China	EAP	14.4	162,500	11.7	47.6	441	43.32	129.76	1006	14.4
CN	Wanning, Hainan	China	EAP	13.8	132,000	2.28	87.5	1020	18.8	110.38	1007	13.8
CN	Wanxian	China	EAP	114	1,759,000	39	282	287	30.8	108.39	1008	114
CN	Weifang	China	EAP	25.8	1,287,000	173	97.8	439	36.7	119.14	1009	25.8
CN	Weihai	China	EAP	16.5	496,400	31	89.1	713	37.52	122.09	1010	16.5
CN	Weihui	China	EAP	35.9	484,200	17.1	117	403	35.43	114.06	1011	35.9
CN	Weinan	China	EAP	49.9	861,000	35.6	144	329	34.51	109.49	1012	49.9
CN	Weishan, shandong	China	EAP	8.38	118,100	20.6	26	397	34.83	117.15	1013	8.38
CN	Weiyuan, sichuan	China	EAP	25.5	203,400	6.34	80.7	337	29.54	104.67	1014	25.5
CN	Wenaposan, Hebei	China	EAP	7.81	115,900	20.2	25.8	415	38.88	116.42	1015	7.81
CN	Wendeng	China	EAP	34.8	645,000	11.6	190	719	37.2	122.05	1016	34.8
CN	Wenling, Zhejiang	China	EAP	9.11	533,800	155	42.9	601	28.51	121.4	1017	9.11
CN	Wenshan, yunnan	China	EAP	8.34	170,800	19.8	38.4	503	23.38	104.24	1018	8.34
CN	Wenzhou	China	EAP	41	1,611,000	111	153	462	28.02	120.65	1019	41
CN	Wuchang, heilongjiang	China	EAP	29.9	262,600	9.57	84.9	389	44.92	127.16	1020	29.9
CN	Wuchuan, Guangdong	China	EAP	15.2	317,600	24	64.9	540	21.44	110.78	1021	15.2
CN	Wuchuang	China	EAP	36.7	461,700	13.3	127	420	38	106.2	1022	36.7
CN	Wugang, Henan	China	EAP	14.3	106,900	5.96	43.8	387	33.3	113.51	1023	14.3
CN	Wugang, Hunan	China	EAP	17.2	121,700	4.1	60.1	436	26.73	110.63	1024	17.2
CN	Wuhai	China	EAP	18.7	391,000	33.7	67.4	433	39.68	106.81	1025	18.7
CN	Wuhan	China	EAP	64.4	5,169,000	391	262	431	30.58	114.3	1026	64.4
CN	Wuhu	China	EAP	29.9	628,000	34.8	106	467	31.34	118.38	1027	29.9
CN	Wuhua, guangdong	China	EAP	15.5	136,700	10.9	41.4	341	23.94	115.77	1028	15.5
CN	Wujiang, jiangsu	China	EAP	36	410,700	7.01	155	598	31.18	120.64	1029	36
CN	Wulanhaote	China	EAP	32.5	558,600	20.9	122	500	46.08	122.07	1030	32.5
CN	Wulian, shandong	China	EAP	10.5	117,700	12.8	32.9	403	35.77	119.2	1031	10.5
CN	Wulumuqi (Urumqi)	China	EAP	25.6	1,415,000	265	86.8	306	43.86	87.58	1032	25.6
CN	Wuning	China	EAP	8.2	121,300	23.1	25.2	408	29.28	120.23	1033	8.2
CN	Wuwei, anhui	China	EAP	15.3	136,400	8.07	48	422	31.31	117.91	1034	15.3
CN	Wuxi	China	EAP	20.1	1,127,000	126	101	634	31.58	120.3	1035	20.1
CN	Wuxue	China	EAP	76	744,800	9.21	245	426	29.86	115.56	1036	76
CN	Wuzhou	China	EAP	19.2	328,400	22.9	68.7	431	23.5	111.3	1037	19.2
CN	Xiamen	China	EAP	32.8	1,266,000	87.2	136	511	24.5	118.12	1038	32.8
CN	Xian	China	EAP	58.7	3,123,000	256	195	325	34.28	108.93	1039	58.7
CN	Xiangcheng, henan	China	EAP	17.7	188,600	11	56.8	389	33.86	113.48	1040	17.7
CN	Xiangfan (Hubei)	China	EAP	36	706,400	40.4	111	356	32.05	112.14	1041	36
CN	Xiangshan, zhejiang	China	EAP	5.89	184,900	17.2	44.6	1080	29.48	121.88	1042	5.89
CN	Xiangshui, jiangsu	China	EAP	12.8	137,200	10.3	42.8	438	34.21	119.58	1043	12.8
CN	Xiangtan (Hunan)	China	EAP	28.7	653,700	49.1	93.3	379	27.86	112.91	1044	28.7
CN	Xiangxiang, hunan	China	EAP	18.7	156,100	7.11	58.5	390	27.75	112.52	1045	18.7
CN	Xianju, zhejiang	China	EAP	9.87	106,000	11.4	31.4	431	28.87	120.74	1046	9.87
CN	Xiantao	China	EAP	110	1,614,000	22.8	338	379	30.38	113.45	1047	110
CN	Xianyang	China	EAP	35.6	753,300	51.6	105	325	34.35	108.72	1048	35.6
CN	Xiaogan	China	EAP	60.4	858,900	22.1	183	370	30.94	113.92	1049	60.4
CN	Xiaoxian, anhui	China	EAP	12.8	144,000	14.3	38	383	34.19	116.95	1050	12.8

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon	DM orig order	China min/max
CN	Xiaoyi, Shanxi	China	EAP	6.44	141,600	35	24	440	37.14	111.78	1051	6.44
CN	Xiapu, Fujian	China	EAP	32.3	152,900	4.44	72.6	305	26.89	120	1052	32.3
CN	Xichuan, henan	China	EAP	11.9	105,200	9.83	33.6	333	33.14	111.49	1053	11.9
CN	Xilinhaote	China	EAP	7.8	159,600	22.8	33.4	538	43.96	116.09	1054	7.8
CN	Xinan	China	EAP	6.01	114,200	28.6	21.3	423	23.18	112.88	1055	6.01
CN	Xinchang, zhejiang	China	EAP	12.2	176,100	18.9	40.5	446	29.51	120.9	1056	12.2
CN	Xincheng	China	EAP	11.4	245,400	37.5	40.1	403	38.49	106.14	1057	11.4
CN	Xingcheng	China	EAP	4.42	103,900	20.9	22.7	665	40.63	120.72	1058	4.42
CN	Xingning, guangdong	China	EAP	36.2	381,700	15.2	97.8	341	24.16	115.72	1059	36.2
CN	Xingping, shaanxi	China	EAP	26.8	376,000	24.6	75.8	325	34.31	108.46	1060	26.8
CN	Xingtai	China	EAP	12.7	489,000	104	48.1	428	37.07	114.51	1061	12.7
CN	Xingyang, henan	China	EAP	12.3	180,200	18.6	41.8	390	34.79	113.38	1062	12.3
CN	Xingyi	China	EAP	39.3	686,900	18.8	158	429	25.1	104.9	1063	39.3
CN	Xinhua, hunan	China	EAP	15.3	156,000	10.8	47.6	375	27.75	111.3	1064	15.3
CN	Xining	China	EAP	15.1	822,700	163	64.4	370	36.64	101.74	1065	15.1
CN	Xinji	China	EAP	35.4	633,100	26.6	123	417	37.93	115.22	1066	35.4
CN	Xinle, hebei	China	EAP	11.9	152,400	16	38.1	372	38.36	114.7	1067	11.9
CN	Xinmi, Henan	China	EAP	12.6	219,400	28	41.4	389	34.53	113.37	1068	12.6
CN	Xinmin, liaoning	China	EAP	11.1	146,500	15.4	37.3	454	42	122.83	1069	11.1
CN	Xinshi	China	EAP	10.3	101,100	10.8	30.8	372	31.03	113.11	1070	10.3
CN	Xintai	China	EAP	131	1,325,000	10	419	416	35.91	117.76	1071	131
CN	Xinxiang	China	EAP	28.4	721,300	55.5	96.9	403	35.31	113.88	1072	28.4
CN	Xinxing, guangdong	China	EAP	14.7	141,200	7.84	50.4	423	22.71	112.23	1073	14.7
CN	Xinyang	China	EAP	14.7	318,800	46	47	381	32.13	114.08	1074	14.7
CN	Xinyi	China	EAP	74.9	973,400	17.3	234	407	34.38	118.34	1075	74.9
CN	Xinyi, guangdong	China	EAP	25.3	276,400	9.79	88.3	440	22.36	110.94	1076	25.3
CN	Xinyu	China	EAP	45.2	775,800	33.6	134	365	27.82	114.93	1077	45.2
CN	Xinzheng, henan	China	EAP	19.3	251,600	15.4	64.2	403	34.41	113.74	1078	19.3
CN	Xinzhou	China	EAP	10.1	150,900	15.6	38.3	468	38.42	112.73	1079	10.1
CN	Xishui, hubei	China	EAP	25.1	172,200	6.05	70	368	30.46	115.26	1080	25.1
CN	Xiushui, jiangxi	China	EAP	20.9	138,100	6.01	56.3	350	29.04	114.57	1081	20.9
CN	Xuanhua	China	EAP	6.94	188,100	46.6	27.6	476	40.6	115.07	1082	6.94
CN	Xuanwei, yunnan	China	EAP	8.24	218,000	24.8	43.8	571	26.24	104.1	1083	8.24
CN	Xuanzhou	China	EAP	77.3	823,000	12.6	232	408	30.96	118.75	1084	77.3
CN	Xuchang	China	EAP	13.4	350,200	58.4	45.8	393	34.04	113.83	1085	13.4
CN	Xupu, hunan	China	EAP	11.8	119,300	10.5	36.8	389	27.92	110.59	1086	11.8
CN	Xuwen, guangdong	China	EAP	8.97	145,800	9.62	47	664	20.34	110.17	1087	8.97
CN	Xuyi, jiangsu	China	EAP	16.7	215,200	11.1	64.5	530	33	118.51	1088	16.7
CN	Xuzhou (Jiangsu Sheng)	China	EAP	48.1	1,827,000	116	170	418	34.27	117.18	1089	48.1
CN	Yakeshi (Yakumshi?)	China	EAP	27.1	426,700	22.3	90.3	454	49.29	120.72	1090	27.1
CN	Yancheng	China	EAP	56.2	1,562,000	59.3	203	447	33.39	120.14	1091	56.2
CN	Yangcheng, shanxi	China	EAP	12	114,100	7.93	40.5	396	35.49	112.42	1092	12
CN	Yanggu, Shandong	China	EAP	11.7	136,500	12.9	38	426	36.12	115.79	1093	11.7
CN	Yangjiang	China	EAP	22.1	521,400	37.8	84.8	458	21.87	111.98	1094	22.1
CN	Yangquan	China	EAP	22.2	620,000	48.4	89.1	478	37.88	113.56	1095	22.2
CN	Yangxi, Guangdong	China	EAP	12.3	105,000	5.81	43.6	442	21.76	111.61	1096	12.3
CN	Yangxin, hubei	China	EAP	26.7	222,500	6.73	85.7	426	29.86	115.21	1097	26.7
CN	Yangzhong, Jiangsu	China	EAP	9.46	131,400	16	32.9	462	32.25	119.8	1098	9.46
CN	Yangzhou	China	EAP	16.5	513,500	76.7	58.6	444	32.4	119.44	1099	16.5
CN	Yanshi, Henan	China	EAP	11.3	174,000	21	38	390	34.74	112.77	1100	11.3
CN	Yantai	China	EAP	30.1	2,080,000	124	187	760	37.54	121.34	1101	30.1
CN	Yanzhou, shandong	China	EAP	23.9	315,200	18	74.3	407	35.56	116.83	1102	23.9
CN	Yichang	China	EAP	34	595,800	35.1	101	348	30.7	111.31	1103	34
CN	Yicheng, Hubei	China	EAP	29.2	210,100	8.57	71.8	301	31.72	112.26	1104	29.2
CN	Yichun (Jiangxi)	China	EAP	55.5	871,000	28.5	163	365	27.8	114.39	1105	55.5
CN	Yidu	China	EAP	6.34	120,100	30.6	21.7	429	36.71	118.49	1106	6.34
CN	Yidu, Hubei	China	EAP	23.1	142,500	4.85	64.7	348	30.39	111.45	1107	23.1
CN	Yima, Henan	China	EAP	14.5	136,500	7.84	48.8	406	34.73	111.9	1108	14.5
CN	Yinan, shandong	China	EAP	16.7	168,400	10.8	51.2	399	35.56	118.46	1109	16.7
CN	Yinchuan	China	EAP	36.3	586,000	22.1	125	403	38.47	106.28	1110	36.3
CN	Yingcheng	China	EAP	87.7	682,300	6.88	260	372	30.95	113.57	1111	87.7
CN	Yingde, guangdong	China	EAP	23.8	277,300	13.6	75.1	389	24.2	113.4	1112	23.8
CN	Yingkou	China	EAP	13	646,900	66.9	79.1	810	40.69	122.25	1113	13
CN	Yingshang, anhui	China	EAP	20.1	195,000	10.9	58.9	378	32.65	116.26	1114	20.1
CN	Yingtan	China	EAP	26.9	166,200	6.8	63.7	325	28.25	117.03	1115	26.9
CN	Yingzhong	China	EAP	10.6	111,800	13	31	350	31.18	112.59	1116	10.6
CN	Yining	China	EAP	19.6	341,600	33.2	59.3	317	43.92	81.31	1117	19.6
CN	Yishui, shandong	China	EAP	13.9	175,600	15	45.4	419	35.79	118.63	1118	13.9
CN	Yiwu, zhejiang	China	EAP	25.8	560,300	47.2	81.5	408	29.33	120.07	1119	25.8
CN	Yixing, jiangsu	China	EAP	35	534,600	11	161	634	31.38	119.82	1120	35
CN	Yiyang	China	EAP	66.4	1,343,000	41	210	372	28.59	112.36	1121	66.4
CN	Yiyuanm shandong	China	EAP	9.69	104,300	11.3	31.1	416	36.19	118.16	1122	9.69
CN	Yizheng	China	EAP	40.7	607,200	19.4	138	444	32.29	119.15	1123	40.7
CN	Yizhou, Guangxi	China	EAP	16.2	169,900	7.25	63.1	474	24.51	108.65	1124	16.2
CN	Yongan	China	EAP	67.5	304,100	8.69	103	205	25.98	117.37	1125	67.5

CountryCode	CityName	Country	RegionCode	iF_ppm	pop_2000	landarea_km2	LPD_pop_m	DR_m2_s	lat	lon		DM orig order	China min/max
CN	Yongcheng, henan	China	EAP	22.8	163,600	6.02	66.7	383	33.93	116.45		1126	22.8
CN	Yongchuan, chongqing	China	EAP	36.9	362,400	11.1	109	326	29.36	105.9		1127	36.9
CN	Yongchun, Fujian	China	EAP	32.1	186,600	11.2	55.8	222	25.33	118.29		1128	32.1
CN	Yongji, Jilin	China	EAP	20.3	117,300	6.38	46.5	315	43.67	126.5		1129	20.3
CN	Yongji, shanxi	China	EAP	9.77	115,600	17	28	343	34.88	110.45		1130	9.77
CN	Yongjia, Zhejiang	China	EAP	38	277,700	4.55	130	462	28.15	120.68		1131	38
CN	Yongkang, Zhejiang	China	EAP	21.7	265,400	15.6	67.3	416	28.92	120.04		1132	21.7
CN	Yongzhou	China	EAP	84.6	1,097,000	13.4	300	434	26.24	111.62		1133	84.6
CN	Youxian, Hunan	China	EAP	11.7	126,500	11.2	37.7	419	27.02	113.34		1134	11.7
CN	Yuanjiang	China	EAP	51.9	644,300	10.3	200	489	28.85	112.38		1135	51.9
CN	Yuaposnan, Guangdong	China	EAP	30.4	135,500	2.07	94.3	413	24.19	116.64		1137	30.4
CN	Yucheng, shandong	China	EAP	17.1	195,900	12.6	55.2	431	36.94	116.65		1138	17.1
CN	Yuci	China	EAP	24.2	502,600	33.5	86.8	422	37.7	112.74		1139	24.2
CN	Yuechi, Sichuan	China	EAP	26.9	128,400	3.5	68.6	312	30.53	106.44		1140	26.9
CN	Yueqing, zhejiang	China	EAP	46.3	489,000	9.25	161	462	28.12	120.96		1141	46.3
CN	Yueyang	China	EAP	60	1,213,000	42.7	186	370	29.39	113.14		1142	60
CN	Yuhuan, zhejiang	China	EAP	6.85	276,500	16.8	67.5	1520	28.13	121.25		1143	6.85
CN	Yulin	China	EAP	22.2	1,558,000	282	92.7	450	22.61	110.14		1144	22.2
CN	Yulin (Shaanxi)	China	EAP	21.2	409,500	31.9	72.5	414	38.29	109.75		1145	21.2
CN	Yuncheng	China	EAP	23.2	570,200	63.6	71.5	343	35.05	110.99		1146	23.2
CN	Yuncheng, shandong	China	EAP	11.6	141,000	15.3	36	402	35.6	115.95		1147	11.6
CN	Yunfu	China	EAP	13.9	275,000	31.3	49.2	419	22.95	112.04		1148	13.9
CN	Yunmeng, Hubei	China	EAP	15.9	148,400	10.1	46.8	370	31.03	113.75		1149	15.9
CN	Yunxian, Hubei	China	EAP	23.9	103,800	4.69	47.9	239	32.84	110.81		1150	23.9
CN	Yunxiao, Fujian	China	EAP	9.24	126,100	13.6	34.2	482	23.96	117.34		1151	9.24
CN	Yunyang	China	EAP	7.69	102,400	16.8	25	432	32.01	119.58		1152	7.69
CN	Yushan	China	EAP	7.67	143,300	24.8	28.8	492	31.66	120.75		1153	7.67
CN	Yushu	China	EAP	9.51	127,200	17.3	30.6	444	44.83	126.56		1154	9.51
CN	Yuxi	China	EAP	6.39	365,100	85.8	39.4	674	24.37	102.53		1155	6.39
CN	Yuyao	China	EAP	33.8	848,000	41.1	132	509	30.06	121.15		1156	33.8
CN	Yuzhou, Henan	China	EAP	14.8	206,800	18.5	48	389	34.17	113.48		1157	14.8
CN	Zalantun	China	EAP	36.8	428,700	20.6	94.4	320	48	122.75		1158	36.8
CN	Zaoyang	China	EAP	49	1,121,000	49.7	159	372	32.12	112.74		1159	49
CN	Zaozhuang	China	EAP	74.5	2,048,000	71.5	242	397	34.86	117.56		1160	74.5
CN	Zhalainuoer	China	EAP	6.5	107,100	23.8	22	459	49.47	117.71		1161	6.5
CN	Zhangjiagang, Jiangsu	China	EAP	33.9	432,400	10.4	134	523	31.88	120.55		1162	33.9
CN	Zhangjiajie	China	EAP	70.2	449,400	11.1	135	230	29.14	110.48		1163	70.2
CN	Zhangjiakou	China	EAP	25.7	880,000	55.3	118	552	40.8	114.89		1164	25.7
CN	Zhangpu, Fujian	China	EAP	13.9	213,800	17	51.8	482	24.13	117.61		1165	13.9
CN	Zhangshu	China	EAP	71.6	539,600	6.88	206	374	28.08	115.55		1166	71.6
CN	Zhangye	China	EAP	52.1	467,800	9.25	154	340	38.94	100.46		1167	52.1
CN	Zhangzhou	China	EAP	8.27	490,500	189	35.7	511	24.51	117.73		1168	8.27
CN	Zhanjiang	China	EAP	15.7	1,368,000	83.9	149	1300	21.25	110.37		1169	15.7
CN	Zhaocheng	China	EAP	9.58	103,400	12.3	29.5	406	37.37	120.4		1170	9.58
CN	Zhaodong (Beidong?)	China	EAP	54.1	851,000	22.4	180	458	46.08	126		1171	54.1
CN	Zhaoqing	China	EAP	19.3	459,100	43.5	69.6	423	23.07	112.46		1172	19.3
CN	Zhaotong	China	EAP	38.3	707,100	20.3	157	443	27.36	103.72		1173	38.3
CN	Zhaoyang	China	EAP	6.95	108,400	19.6	24.5	455	32.95	119.84		1174	6.95
CN	Zhengzhou	China	EAP	32.4	2,070,000	274	125	390	34.76	113.64		1175	32.4
CN	Zhenjiang	China	EAP	31.7	592,700	31.8	105	432	32.21	119.46		1176	31.7
CN	Zhenping, Henan	China	EAP	13.1	117,300	9.66	37.7	344	33.05	112.23		1177	13.1
CN	Zhenxiong, Yunnan	China	EAP	25.8	138,500	1.99	98.1	468	27.44	104.87		1178	25.8
CN	Zhijiang, Hubei	China	EAP	16.6	165,200	11.8	48.1	344	30.43	111.74		1179	16.6
CN	Zhijin, Guizhou	China	EAP	9.47	102,100	6.13	41.2	506	26.68	105.77		1180	9.47
CN	Zhongshan, Guangxi	China	EAP	13.3	119,900	6.77	46.1	449	24.54	111.3		1181	13.3
CN	Zhongxian, chongqing	China	EAP	22.5	145,000	7.59	52.6	297	30.31	108.04		1182	22.5
CN	Zhoucun	China	EAP	8.57	128,500	19.3	29.2	435	36.8	117.85		1183	8.57
CN	Zhoukou	China	EAP	17.1	352,100	39.9	55.7	387	33.63	114.66		1184	17.1
CN	Zhuanghe, Liaoning	China	EAP	11.3	195,100	11.6	57.3	690	39.71	122.97		1185	11.3
CN	Zhucheng	China	EAP	5.92	112,800	34.8	19.1	403	36.01	119.4		1186	5.92
CN	Zhuhai	China	EAP	9.85	407,000	75.7	46.8	576	22.26	113.54		1187	9.85
CN	Zhuji	China	EAP	7.66	103,000	19.3	23.5	408	29.73	120.24		1188	7.66
CN	Zhumadian	China	EAP	21.7	326,400	21.9	69.8	392	32.99	114.03		1189	21.7
CN	Zhuzhou	China	EAP	25.1	723,400	75.8	83.1	396	27.87	113.14		1190	25.1
CN	Zibo	China	EAP	66.4	2,654,000	118	244	435	36.79	118.07		1191	66.4
CN	Zigong	China	EAP	47.6	1,072,000	43.9	162	337	29.37	104.76		1192	47.6
CN	Zijin, Guangdong	China	EAP	12.1	110,700	9.47	36	382	23.63	115.18		1193	12.1
CN	Ziyang, sichuan	China	EAP	23	280,200	13.5	76.1	350	30.13	104.64		1194	23
CN	Zizhong, sichuan	China	EAP	17.4	148,000	6.86	56.5	350	29.79	104.85		1195	17.4
CN	Zouping, shandong	China	EAP	11.2	145,300	14.8	37.8	435	36.89	117.74		1196	11.2
CN	Zouxian	China	EAP	12.6	195,500	24.5	39.5	407	35.41	116.96		1197	12.6
CN	Zunhua, hebei	China	EAP	11.5	141,800	15.5	36	392	40.19	117.96		1198	11.5
CN	Zunyi	China	EAP	26.2	583,700	30.3	106	454	27.7	106.93		1199	26.2
CN	Zuozhou	China	EAP	22.4	486,600	38.9	78	416	39.49	115.99		1200	22.4
China average		count	822										
		sum if	20,359										
		average	24.77										
	Tianmen	max	156										
	Liujiang	min	2.96										

5.9 Population Details

Year	Observed	Estimated
2005	3,322,000	3,456,200
2010	3,839,000	4,000,400
2015	4,433,000	4,534,300
2016		4,634,820
2017		4,735,340
2018		4,835,860
2019		4,936,380
2020		5,036,900
2021		5,127,920
2022		5,218,940
2023		5,309,960
2024		5,400,980
2025		5,492,000
2026		5,571,580
2027		5,651,160
2028		5,730,740
2029		5,810,320
2030		5,889,900
2031		5,957,360
2032		6,024,820
2033		6,092,280
2034		6,159,740
2035		6,227,200
2036		6,282,920
2037		6,338,640
2038		6,394,360
2039		6,450,080
2040		6,505,800
2041		6,550,840
2042		6,595,880
2043		6,640,920
2044		6,685,960
2045		6,731,000
2046		6,766,740
2047		6,802,480
2048		6,838,220
2049		6,873,960
2050		6,909,700

5.10 VSL Details

Upper Bound VSL			
Parameter	**Units**	**Value**	**Reference**
US VSL	$2006	$7,400,000	U.S. Environmental Protection Agency, 2017
US VSL	$2015	$8,721,290	Adjusted for inflation, using U.S. Bureau of Labor Statistics, 2017.
China GNI	$2015	$14,320	World Bank, 2017
US GNI	$2015	$57,540	World Bank, 2017
Elasticity		1	Assumption
China VSL (upper bound)	$2015	$2,170,470	Calculated based on Hammitt and Robinson, 2011

Lower Bound VSL			
Parameter	**Units**	**Value**	**Reference**
China life expectancy at birth	years	76.1	World Health Organization, 2017
Midpoint age	years	38.05	Half of the life expectancy at birth
Life expectancy at midpoint age	years	41.3	World Health Organization, 2017
Discount rate		3%	Assumption
China VSL (lower bound)	$2015	$335,266	Calculated based on Hammitt and Robinson, 2011

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