

**CHANGAN FORD MAZDA AUTOMOBILE CO., LTD**  
**长安福特马自达汽车有限公司**  
**Nanjing Assembly Plant (CFMA – NJ)**  
**南京公司**



**2008 Greenhouse Gas Inventory**  
**2008 年度温室气体总量**

### **Executive Summary:**

Changan Ford Mazda Automobile Corporation Ltd. Nanjing Assembly Plant (CFMA - NJ) is taking an industry-leading move by becoming one of the first automakers globally to report its greenhouse gas emissions (GHG). CFMA - NJ believes that the starting point of a corporate GHG strategy is to better understand its emissions. CFMA - NJ is aware of the importance of Climate Change and it is committed to constantly improve its environmental performance and sharing results with others.

Ford is proud to participate in different greenhouse gas management initiatives worldwide including: The Chicago Climate Exchange (CCX), The Mexican GHG Program, The Philippine Greenhouse Gas Accounting and Reporting Program (PhilGARP), The Australian National Greenhouse Emissions Reporting System, The Climate Registry (TCR), The Brazilian GHG Program, The EU Emissions Trading Scheme (EU ETS), and The Canadian GHG Challenge Registry.

This GHG inventory commences reporting using 2008 data as it is the most representative year since the facility began vehicle production. CFMA – NJ will provide annual updates to this report and analyze data trends.

### **摘要:**

长安福特马自达汽车有限公司南京公司（以下简称 CFMA-NJ）正在进行一项行业领先的行动——成为全球首个公布其温室气体（以下简称 GHG）排放的汽车制造商之一。CFMA - NJ 认为只有充分了解自身 GHG 排放现状，才能制定出企业的 GHG 战略。CFMA - NJ 已经认识到气候变化的重要性，并且承诺将持续改进其环境方面的业绩并与其它企业分享我们的成果。

福特汽车公司非常荣幸地参与了各种世界 GHG 管理计划，包括芝加哥气候交易所（CCX）、墨西哥 GHG 计划、菲律宾 GHG 核算与报告计划（PhilGARP）、澳大利亚国内温室排放报告系统、气候登记（TCR）、巴西 GHG 计划、欧盟排放贸易计划（EU ETS）以及加拿大 GHG 挑战登记。

本 GHG 总量着手于报告 CFMA-NJ 2008 年的数据，因为 2008 年是 CFMA-NJ 自生产汽车以来的一个最有代表性的年份。CFMA - NJ 将会每年更新其数据，并将分析这些资料的趋势。

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### Introduction

Changan Ford Mazda Automobile Corporation Ltd. Nanjing Assembly Plant (CFMA - NJ) is located in Nanjing Jiangning Economical & Technological Zone (30 minutes drive east of Nanjing City). It is a three-party joint venture between Chongqing Changan Automobile Co., Ltd. (50%), Ford Motor Company (35%) and Mazda Motor Company (15%). The assembly plant was launched in 2007 with an initial annual capacity of 160,000 vehicles and plans to be expanded to 200,000 vehicles. In 2007, CFMA – NJ began production of the Mazda2 and the Ford Fiesta commenced manufacture in December of 2008.

The Nanjing Assembly site supports four manufacturing processes: stamping, body assembly, paint, and final assembly. CFMA - NJ utilizes world-class manufacturing processes and highly automated facilities to deliver top quality. The plant is equipped with the most advanced and effective automatic horizontal-bar conveyor system avoiding the use of body skids. It has more than 150 automated robots throughout the facility. It also utilizes eco-friendly paint technology (three wet paint formulation) which produces fewer volatile organic compounds and greenhouse gas (GHG) emissions than standard paint processes. Overall the facility utilizes the latest auto manufacturing technologies available to ensure quality, efficiency and environmental protection.

CFMA - NJ has a sister plant in Chongqing. Chongqing Changan Automobile Co., Ltd., Ford Motor Company and Mazda Motor Company also an engine plant (CFME) in Nanjing. These facilities are not included in this report as separate inventories have been developed for them.

One of the most important initiatives undertaken by CFMA - NJ is the implementation of the ISO 14001 environmental management standard, where all aspects of the facility are included: air emissions, waste, water, and energy. In order to remain certified, a facility must undergo a surveillance audit each year that ensures adherence to guidelines, and measures the plant's progress. A highlight of CFMA - NJ's performance is the use of detailed management systems for all resource use (energy, solid and liquid waste, solvent use and water). Energy targets are set for each operation and monitoring systems are in place in all areas. Performance against targets is taken very seriously, energy engineers report out to senior management on performance

## 介绍

长安福特马自达汽车有限公司南京公司（以下简称 CFMA—NJ）位于南京江宁经济技术开发区（从南京市区往东开车约 30 分钟）。CFMA—NJ 是由重庆长安汽车有限公司（占 50% 股份）、福特汽车公司（占 35% 股份）和马自达汽车公司（占 15% 股份）三方组成的合资公司。CFMA—NJ 于 2007 年成立，其初期的年产能为 16 万台汽车，同时计划将年产能扩大到 20 万台汽车。2007 年起，CFMA—NJ 开始马自达 2 车型的生产，随后在 2009 年开始生产马自达 2 涡轮增压车型和福特嘉年华车型。

CFMA—NJ 主要进行四种工艺：冲压、焊装、涂装和总装。CFMA - NJ 采用了世界领先的生产工艺和高度自动化设备制造出高质量的汽车。该工厂配备了最先进、最高效的自动化横杆传输系统，从而代替滑橇。工厂还配备了 150 多台自动化机械人，并采用环境友好的涂装技术（三喷一烘），从而比标准涂装工艺减少了挥发性有机化合物和 GHG 的排放。总之，工厂运用了最新的汽车制造工艺来保证其产品的质量、生产的效率和对环境的保护。

CFMA - NJ 在重庆有一个兄弟厂。此外，重庆长安汽车有限公司、福特汽车公司和马自达汽车公司在南京另外还有一个发动机厂。这些工厂将单独计算其排放总量，并不被包括在本报告里。

CFMA - NJ 的一个重要计划是实施 ISO 14001 环境管理标准，该标准涵盖了工厂环境管理的各个方面，例如：大气排放、废物、水和能源。为了维护该认证，工厂必须每年进行一次监督审核以确保工厂满足标准，同时衡量工厂的改进。CFMA - NJ 其中一个显著的成效是对资源利用（包括：能源、固体和液体废物、溶液和水）进行细致的体系化管理。厂内所有场所均有安装监测系统，并对每个工艺提出能源目标。工厂对目标能耗的达标要求十分严格，能源工程师每星期直接向高级管理层汇报成效。

against targets on a weekly basis. Other environmental initiatives include: energy efficiency projects and educational programs for employees.

Ford Motor Company, Changan Motors, and Mazda Motors recognize the importance of the climate change issue and will continue to work on reducing GHG emissions of our vehicles and facilities by way of introducing advanced technology vehicles and improving energy-efficiency in manufacturing operations.

### **CFMA – NJ in China**

**Product:** Mazda 2, Ford Fiesta

**Founded:** April, 2005

**Plant Capacity:** 180,000 units/year

**Operation:** Assembly & Stamping

**Employees (2008):** 1900 employees

**Area:** 190,000m<sup>2</sup>

**ISO 14001 Certified:** December 2008



**Figure 1: Mazda2**



其它环境计划包括：节能项目和员工教育计划。

福特汽车公司、长安汽车公司和马自达汽车公司认识到气候变化问题的重要性，并将通过引进含有先进技术的汽车和提高生产过程中的能效来继续减少其汽车和工厂的 GHG 排放。

### **CFMA – NJ 在中国**

**产品:**马自达 2, 福特嘉年华

**建立年份:** 2005 年 4 月

**产能:** 18 万辆每年

**工艺:** 装配和冲压

**员工人数 (2008):** 1900 人

**面积:** 190,000 平方米

**ISO 14001 认证时间:** 2008 年 12 月



图 1: 马自达 2



**Figure 2: Ford Fiesta**

### **Corporate Climate Change Initiatives**

CFMA - NJ is proud to be one of the first automobile companies to voluntarily report its GHG emissions in China. We believe that climate change is a serious environmental issue and recognize that it is not possible to wait for all the scientific uncertainties to be resolved. Ford Motor Company is actively participating in various programs around the world gaining considerable experience in GHG reporting. Some of the initiatives are listed below:

#### **CFMA Chongqing – China:**

CFMA CQ was the first automotive company in China to voluntarily report its GHG Emissions in April of 2008. We wish to share our GHG experiences with other companies and sectors around the world.



图 2: 2009 福特嘉年华

**集团气候变化管理计划:**

CFMA – NJ 是中国第一批自愿公布其 GHG 排放的汽车公司之一，为此我们感到非常骄傲。我们相信气候变化是一个严重的环境问题，并认为我们不能等待所有的科学不确定性明朗以后再来行动。福特汽车公司正积极地参与全世界各种 GHG 计划并获得了一定的 GHG 报告的经验。以下是我们参与过的部分 GHG 管理计划:

**CFMA 重庆-中国:**

CFMA 重庆于 2008 年 4 月成为中国第一家自愿公布其 GHG 排放的汽车制造公司。我们希望能和世界范围内的其它公司和行业分享我们的 GHG 经验。

**Chicago Climate Exchange (CCX):**

The Chicago Climate Exchange (CCX) is a greenhouse gas (GHG) emission reduction and trading program for emission sources and projects in North America. It is a self-regulated, rules based exchange designed and governed by CCX members. These members have made a voluntary, legally binding commitment to reduce their emissions of greenhouse gases by six percent below 2000 baseline year by 2010. Ford is the first and only auto manufacturing participant in this program.

**Mexico GHG Pilot Program:**

The Mexico GHG Program started as a two year partnership between La Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). It is a voluntary program established to help Mexican companies to quantify greenhouse gas emissions. Ford Motor Company was proud to be the only auto manufacturer to participate in the first phase of the program where we are committed to reporting emissions annually.

**EU Emissions Trading Scheme (EU ETS):**

Ford participates in the EU ETS which commenced in January 2005 and is one of the policies being introduced across Europe to reduce emissions of carbon dioxide and other greenhouse gases. The second phase of this program runs from 2008-2012 and coincides with the first Kyoto Commitment Period. Further 5-year periods are expected subsequently.

**Canadian Voluntary Challenge and Registry:**

Ford voluntarily reports GHG emissions to the Canadian Voluntary Challenge and Registry (VCR). It has been reporting annual emissions since 1999. Over the years, it has received the highest level of achievement in the reporting system, which includes two Leadership Awards in the Automotive Manufacturing Sector category as well as qualifying as a Silver Champion level Reporter in 1999 and Gold Champion Level Reporter from 2000 to 2003, 2005 & 2006.

**芝加哥气候交易所 (CCX):**

芝加哥气候交易所(CCX) 是北美地区的 GHG 减排与交易系统。CCX 由由会员设计和治理, 自愿形成的一套交易体系。这些成员自愿地通过法律约定的承诺在 2010 年前, 基于 2000 年的基准值消减 GHG 排放量 6%。福特公司是第一家, 也是唯一一家参与这个计划汽车制造公司。

**墨西哥 GHG 试验计划:**

墨西哥 GHG 试验计划是由 La Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT)、世界资源研究所(WRI) 和世界可持续发展工商理事会(WBCSD) 发起的为期两年的合作计划。作为一个自愿计划, 墨西哥 GHG 试验计划的成立旨在协助墨西哥企业计算其 GHG 排放量。福特公司是唯一一家参与该计划的第一阶段的汽车制造企业, 并承诺每年报告其排放量。

**欧盟排放权交易方案 (EU ETS):**

福特公司参与的 EU ETS 于 2005 年 1 月正式启动, 是欧洲减少二氧化碳和其它 GHG 排放的方针的其中之一。该方案的第二阶段于 2008 年到 2012 年实施, 这一时期也是《京都议定书》首次正式实施的时间。随后会又有一个五年方案。

**加拿大 GHG 挑战与登记:**

从 1999 年起, 福特公司自愿向加拿大 GHG 挑战与登记 (VCR) 报告其年度 GHG 排放量。时至今日, 福特公司已经在 VCR 的报告系统里取得最高级别的成绩, 包括两次获得汽车制造行业领导力奖, 此外还获得 1999 年度银牌报告者称号以及 2000—2003 年度、2005 年度和 2006 年度金牌报告者称号。

### **Philippines GHG Program**

The Philippine Greenhouse Gas Accounting and Reporting Program (PhilGARP) partnership between Klima Climate Change Center of the Manila Observatory, Philippine Business for the Environment, the Department of the Environment and Natural Resources, Department of Energy, WBCSD, and WRI – was launched in November 2006.

### **The Climate Registry (TCR)**

The Climate Registry in North America provides accurate and transparent measurement of GHG emissions and ensures consistency of measurement metrics across industry sectors and borders. The Climate Registry accounting infrastructure supports both voluntary and regulatory programs. Ford is a founding member and the first automaker to participate in the program.

### **Brazilian GHG Reporting Program**

The Brazil Greenhouse Gas program is a partnership of Brazil's Ministry of Environment, the Brazilian Business Council for Sustainable Development, the Fundação Getúlio Vargas, the World Business Council on Sustainable Development, and the World Resources Institute (WRI). Ford of Brazil is proud to be the first automobile company in Brazil to voluntarily report its Facility Greenhouse Gas (GHG) emissions.

### **Methodology**

The data used to calculate the baseline and reporting year is based on actual electricity and natural gas invoices obtained directly from the utilities and gasoline invoices from the supplier.

CFMA - NJ uses a best in class energy monitoring system and an industry-leading Global Emissions Manager (GEM) database to ensure environmental metrics such as CO2 emissions are tracked consistently. All energy data contained in this report is available within GEM and it is tracked and revised by the facility. The emissions data



### 菲律宾 GHG 计划:

菲律宾 GHG 计算与报告计划(PhilGARP) 由马尼拉天文台的 Klima 气候变化中心、菲律宾环境商务部、环境与自然资源部、能源部、WBCSD 和 WRI 于 2006 年 11 月联合发起。

### 气候变化注册组织 (TCR)

北美的气候变化注册组织 (TCR) 提供精准和透明的 GHG 排放测量方法，并保证各行业和地区使用一致的度量法。气候变化注册组织的下属统计机构即支持自愿的，也支持法定的管理计划。福特公司是气候变化注册组织的创始成员，也是第一家加入该组织的汽车制造商。

### 巴西 GHG 报告计划

巴西 GHG 计划由巴西环境部、巴西可持续发展商业理事会、the Fundação Getúlio Vargas、WBCSD 和 WRI 共同发起。巴西的福特公司是巴西国内第一家自愿报告其 GHG 排放量的汽车制造商。

### 方法

用来计算基准值和报告年的数据是直接来自公用事业机构所出具的电费和天然气费发票。

CFMA – NJ 运用最高等级的能源监控系统 and 行业领先的全球排放管理 (GEM) 数据库，以确保环境因素例如二氧化碳排放量得到持续一致的跟踪。本报告的所有能源数据均包含在 GEM 里，并通过工厂进行跟踪和修正。本报告的排放数据

reported was generated following the GHG calculation tools developed by the World Resources Institute (WRI).

This report includes "direct" emissions characterized as scope 1 in the WRI/WBCSD protocol and "indirect" or scope 2 emissions from the same protocol. All CO<sub>2</sub> emissions are included and reported in units of metric tons of carbon dioxide (CO<sub>2</sub>). Other GHG applicable to combustion processes, CH<sub>4</sub> and N<sub>2</sub>O, are estimated to be less than 1% of the total emissions and hence considered negligible. Other emission sources such as HFCs from refrigerant leakages during the initial vehicle fill process for the air conditioning units are also considered minimal at less than 1.5% of total emissions. PFCs and SF<sub>6</sub> do not apply to the company's manufacturing facilities. Emission factors in Table 1 were used to calculate CO<sub>2</sub> emissions.

**Table 1: Emission Factors**

<b>Fuel</b>	<b>Factor</b>
Natural Gas	<i><b>0.001884tCO<sub>2</sub>/m<sup>3</sup></b></i>
Gasoline/Petroleum	<i><b>0.0023403tCO<sub>2</sub>/l</b></i>
Electricity	<i><b>0.000849tCO<sub>2</sub>/KWh</b></i>

\*From WRI/WBCSD

### **Base Years**

CFMA - NJ first began production in September of 2007 with the launch of the Mazda 2. The Ford Fiesta commenced manufacture in March of 2008 although program prototypes were built initially. Full production commenced fourth quarter of 2008. This inventory includes 2008 data only as other years are not representative of our operations due to the low production. Future inventories will include year to year comparisons for both absolute GHG emissions and emissions intensity (per unit). Table 2 shows CFMA – NJ energy consumption for 2008.



是通过世界能源研究所（WRI）建立的 GHG 计算工具计算得出。

本报告包括由 WRI 和 WBCSD 协议里定义为范围一的直接排放源和范围二的间接排放源。报告里所有的二氧化碳排放量单位均为公制**吨二氧化碳当量**。其它 GHG，例如甲烷和一氧化二氮的排放估量在总排放量的 1%以下，因此忽略。其它排放源，如在汽车空调初填充制冷剂时渗漏的含氟烃类，其排放量可视为总排放量 1.7%以下。本公司的制造工厂没有使用到全氟烃类和六氟化硫。表 1 里的排放指标是用作二氧化碳排放量的计算。

**表 1: 排放指标**

燃料	指标
天然气	<b>0.001884吨二氧化碳/米<sup>3</sup></b>
汽油/石油	<b>0.0023403吨二氧化碳/升</b>
电	<b>0.000849吨二氧化碳/千瓦</b>

\*来源：WRI和WCSB

## 基准年

CFMA – NJ 最先于 2007 年 9 月开始马自达 2 和马自达 2 涡轮增压车型的生产。福特嘉年华车型则投产于 2008 年 3 月。CFMA – NJ 于 2008 年第四季度才开始满负荷运行。由于 2007 年产量低下而不具有代表性，因此本总量报告只包括了 CFMA – NJ 2008 年的数据。将来的总量报告将包含工厂每年的 GHG 绝对排放和排放强度（每单位）的对比。表 2 显示了 CFMA – NJ 2008 年的能耗。

**Table 2: CFMA – NJ Energy Consumption**

<b>2008 CFMA - NJ Energy Consumption</b>	
Natural Gas (m3)	1,450,916
Gasoline/Petroleum (liters)	73,734
Electricity (KWh)	18,241,447
Production Units	14,258

**GHG Emissions Data**

Direct Emissions result from combusting fuels at the CFMA - NJ site including natural gas and gasoline. Indirect Emissions include all emissions generated outside the site's perimeter such as emissions from burning fossil fuel to generate electricity.

Table 3 shows absolute Direct and Indirect GHG emissions for 2008.

**Table 3: Total CFMA – NJ Absolute Emissions**

<b>2008 CFMA - NJ Absolute Emissions</b>	
Direct (tCO <sub>2</sub> )	2,906
Indirect (tCO <sub>2</sub> )	15,487
Total (tCO <sub>2</sub> )	18,393

Emission intensity is calculated by dividing absolute emissions by the number of production units (vehicles built). However, this value will not be representative at this time as the facility did not go into full production mode until the first quarter of 2009. Ford Fiesta prototypes were built during the third and fourth quarter of 2008. That means that CFMA – NJ was not operating near its full capacity (200,000 units) resulting in low production volumes (14,258 units). Production is expected to increase significantly over the next years with the launch of new products. A detailed analysis will be provided next year as more data becomes available.

表 2: CFMA – NJ 能耗

2008 年 CFMA - NJ 能耗	
天然气 (立方米)	1,450,916
汽油/石油 (公升)	73,734
电 (千瓦时)	18,241,447
生产单位	14,258

**GHG 排放数据**

CFMA – NJ 的直接排放来自燃烧天然气或者其它石油类燃料的排放，而间接排放则来自于厂外，例如用来发电的化石燃料。

表 3 显示了 CFMA – NJ 2008 年的 GHG 绝对直接排放和间接排放。

表 3: CFMA – NJ 总绝对排放

2008 年 CFMA - NJ 绝对排放	
直接排放 (tCO <sub>2</sub> )	2,906
间接 排放(tCO <sub>2</sub> )	15,487
总量 (tCO <sub>2</sub> )	18,393

排放强度的计算是基于绝对排放除以生产单位的个数（即汽车）。然而，由于 CFMA – NJ 于 2008 年第四季度才开始满负荷运行，因此这个数值目前并不具有代表性。福特嘉年华原型车于 2008 年第二和第三季度完成，这表明 CFMA – NJ 当时远没有达到其 20 万辆的年产能（实际只生产了 14258 辆）。下一年 CFMA – NJ 的产量由于新车型的投产而有望大幅增长。随之有了更多的数据，我们将提供更为详细的分析。

**Conclusions**

CFMA - NJ is proud to be one of the first automobile companies in China to voluntarily report its GHG emissions. This first report includes 2008 data and a more detailed report will be provided next year as more data become available. CFMA – NJ recognizes the importance of the climate change issue and supports emissions reporting at a national level. CFMA - NJ is committed to improving energy efficiency, reducing GHG emissions, and maintaining and exceeding its environmental standards. CFMA – NJ absolute emissions for 2008 reporting year are 18,393tCO<sub>2</sub>. Emissions Intensity has not been calculated this year as the number will be misleading due to the lower production volumes experienced in 2008. CFMA – NJ is committed to providing annual updates to the program.

### 结论

CFMA - NJ 作为中国第一批自愿公布其 GHG 排放的汽车制造公司之一，我们非常引以为豪。本报告包括了 CFMA – NJ 2008 年的数据，而下一年度在有了更多的数据之后，我们将提供更详细的报告。CFMA – NJ 明白气候变化问题的重要性，并在国家层面上支持 GHG 排放的公布。CFMA – NJ 承诺将努力提高能效，减少 GHG 排放，并致力于保持并超越其自身的环境标准。CFMA – NJ 2008 年的绝对排放量为 18393 吨二氧化碳。2008 年由于 CFMA – NJ 的低产量，本报告里并未计算 CFMA – NJ 的排放强度以避免造成误解。CFMA – NJ 承诺将每年更新其排放报告。