排放法规：欧洲发展

Emission Regulations: Driving

能源危机不是昨天才出现，电动汽车也不是一个全新的名词。虽然很长时间以来都有不少的人看好电动汽车前景，然而因为所涉及的巨大研发成本以及复杂的社会问题，始终让人望而却步。全世界很多车企尤其是欧洲的车企多年来始终迟疑观望，为什么偏偏在这两年终于迈出第一步，背后的动力是来自于对未来市场份额的担心吗，还是来自政府的压力，抑或是其他的什么？要问答这个问题，就不得不提及欧洲最新的二氧化碳排放法规。

在欧洲，12%的二氧化碳排放来自于汽车，为了进一步的减少污染以及改善欧洲市场上汽车燃油经济性，欧洲环境署在2014年4月24号宣布了针对欧洲汽车工业的最新的二氧化碳排放法规。目前，欧洲市场所有新车的二氧化碳的平均排放量限制是160g/km，到2015年，欧洲市场上所有新车的二氧化碳平均排放量不超过130g/km，从2012年开始逐步实施。到2021年，所有新车的二氧化碳平均排放量不超过95g/km，从2020年开始逐步实施。

2007年欧洲市场上新车二氧化碳平均排放量是

Energy crisis does not occur until yesterday, and electric car is not a new term. Although

for a long time there have been many people who have good prospects about electric cars,

they are involved the huge development costs and complex social problems, which leads to the prohibitive state. Many car companies around the world, especially European car companies have hesitate over the years. Are they concerned about the market share in the future or the pressure from the government? To answer this question, we have to mention Europe's newest regulations about carbon dioxide emissions.

In Europe, 12% of carbon dioxide emissions are from cars. In order to further reduce pollution and improve the automobile fuel economy in Europe, the European Environment Agency on April 24, 2014 announced the auto industry's latest carbon emissions regulations. At present, in the European market, the average carbon dioxide emissions from new cars are limited at 160 g/km, in 2015, less than 130 g/km. The regulations have been implemented step by step since 2012. By 2021, this figure will be less than 95 g/km.

In European market, the average carbon dioxide emissions in 2007 were 158.7 g/km, but in 2015 and 2021, this figure will be reduced

电动汽车的原动力

Development of Electric Vehicles in Europe

文/ 马翼 Text /Ma Yi

158.7g/km，2015以及2021年的目标相对于2007年分别要减少18%和40%。如果换算成油耗，2015年的二氧化碳排放限值相当于每百公里5.6升汽油或者4.9升柴油。2021年的二氧化碳排放限值相当于每百公里4.1升汽油或者3.6升柴油。作为对比，中国不是从二氧化碳而是从油耗的规定上来提高燃油经济性，按照中国的法规CAFC，2015应当达到的目标是每百公里6.9升燃油，计划在2020年达到每百公里5升燃油。

宝马i3电动汽车

各车企二氧化碳排放限值的具体算法

值得注意的是，130g/km是一个整体的目标，是欧盟对所有新车二氧化碳排放的平均值所设的限值，并不是针对所有汽车企业所设置的统一限值。每家汽车公司的二氧化碳排放量限值与该公司的产品组成以及所生产汽车的平均质量有关。具体计算方法如下：

该公司二氧化碳排放限值(g/km)=130g/km+0.0457x(该公司汽车平均重量kg-1372kg)

by 18% and 40%, respectively, compared to 2007. In other words, Co2 emissions in 2015 will be equal to 5.6L gasoline or 4.9L diesel per hundred kilometer; in 2021, 4.1L gasoline or 3.6L diesel. In contrast, according to the regulation CAFC of China, the goal of 2015 will be 6.9L gasoline per hundred kilometers, and in 2020 5L.

BMW i3 electric car

Calculation of the upper limit value of carbon dioxide emissions

It is worth noting that the 130 g/km is the overall goal, which the average of the emissions of carbon dioxide for all new cars set by the EU but not for all car companies. For every auto company, the carbon dioxide emissions limits are related with the products and their average mass. The specific calculation method is as follows:

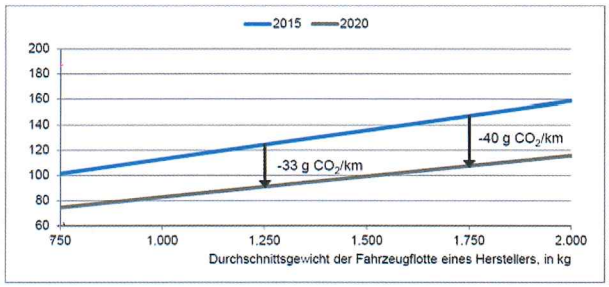
The company's carbon dioxide emission limit (g/km) = 130 g/km + 0.0457 x (the company's average vehicle weight kg – 1372 kg)

Note: From 2008 to 2010, in the European Union's 27 countries, new car average weight was 1372 kg.

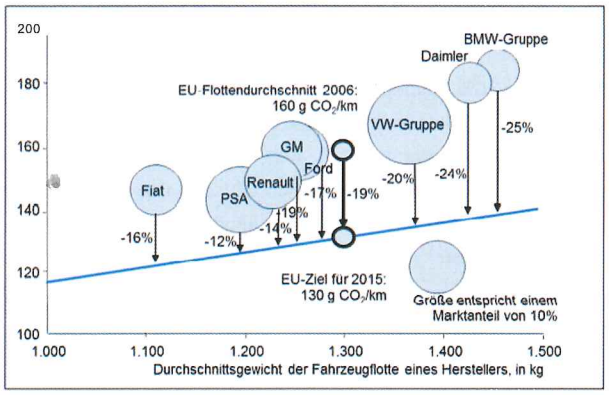
For 2020's limit value, the calculation method is the same, except that the concrete calculation parameters are adjusted. The general average limit value is from 130 g/km down to 95 g/km. For every increase of 100 kg, the additional emission limit is from 4.57 g/km

注：2008年到2010年欧盟27国所售新车的平均重量是1372kg

对于2020年的限值采用同样的计算方法，只是调整具体的计算参数。总的平均限制由130g/km下降到95g/km。每增加100kg车重所额外允许的排放由4.57g/km下降到3.33g/km。1372kg将由2017年到2019年欧盟所生产新车的平均重量取代。



上图表示2015年和2020年，车企各车型平均重量(横轴)与其二氧化碳排放限值(纵轴)之间的关系，假设2017年到2019年欧盟所有新车平均重量仍为1372kg。



上图表示2006年各车企的二氧化碳平均排放以及与2015年各自目标值之间的距离，横轴表示车企所有产品组合的平均重量(横轴)，纵轴表示二氧化碳平均排放量g/km，右下角圆圈是比例尺，这么大的面积表示10%的市场占有率。

因为法规针对的是二氧化碳的平均排放量，而不是每辆车的排放，所以汽车厂依然能够生产排量比较大的汽车，只要平均值达标即可。

逐步实施阶段

2015年设定的目标，将从2012年开始逐步生效，2012年

down to 3.33 g/km. 1372 kg is replaced by the average weight of new cars produced in the EU from 2017 to 2019.

Above Figure is the relationship of the average weight and the CO2 emission limit value. The Hypothesis is that the average weight for the new cars from 2017 to 2019 is still 1372 kg.

Above Figure shows the average emissions of 2006 and the gap to each target value in 2015 for car companies. The horizontal axis shows the average weight of the product mix, and vertical axis shows the average co2 emissions (g/km). The circle at the bottom right is the scale. Such area represents 10% of the market share.

Because the regulations are about the average carbon dioxide emissions rather than those for every car, the car company still can produce cars with large displacements, as long as the average value meets the requirement.

Step by step implementation stage

Targets set in 2015 will take effect since 2012 gradually. 65% of targets should be achieved in 2012, and 2013 75%, 2014 80%, 2015 100%. For the targets of 2021, 95% of them should be achieved in 2020.

Penalties

The following punishment started from 2012, if the carbon dioxide average emissions of new cars exceed the limit value, then the fine will be paid. If they exceed the limit value by 1g, then the fine of 5 euros will be paid; if by 2 g, then 25; afterwards, 95 per 1g. From 2019, if the emissions exceed the limit value by 1 g, then the fine of 95 euros will be paid.

Fine calculation example

A car company in 2015 produced two models A and B. Model A's empty weight was 1200

kg, carbon dioxide emissions in the standard test were 120 g/km, and sales volume was

1.1 million units. Model B' empty weight was 1500 kg, carbon dioxide emissions were 150 g/km, and sales volume was 900000 units.

CO2 emission limit value = 130 + 0.0457 x 1100000 x 1200 x 900000−1372 = 1200 + 128.3 g/km

Actual CO2 emissions = 1100000 x 120 x 900000 = 120 + 133.5 g/km

The value in excess of the limit was 5.2 g/km.

Penalty amount =2000000 × 5.2−3 × 95+1 × 25+1 × 15+1 × 5=508 million euros

Another example. BMW sold 641964 vehicles in Europe in 2011. Assuming that in 2015 it still has the same sales volume, then BMW in 2015 has average CO2 emissions value that is more by g/km than the limit value. As result, the BMW will hand in 490 million euros as a fine. The total profit for the fiscal 2013 BMW was 5.3 billion euros 10% of which (nearly 500 million) would be as a fine.

Super credits

Extra subsidies for car companies from the bill are used to produce low emission vehicles (carbon dioxide emissions below 50 g/km). 1 car of low emissions in 2012 and 2013 is equal to 3.5 average cars in 2013, 2.5 in 2014, 1.5 in 2015, and 1 in 2016 to 2019. Subsidy policy for the second stage of the target also applies. 1 car in 2020 of low-emissions is equal to 2 average cars, 1.67 in 2021, 1.33 in

必须达到目标值的65%，2013年达到75%，2014年80%，2015年100%。对于2021年的目标，2020年必须达到95%。

处罚措施

从2012年开始，如果汽车厂的新车二氧化碳平均排放量超过限制，就要缴纳罚款。超过限制的第一克每辆车要缴纳罚金5欧元，超过的第二克每辆车要缴纳15 欧元，第三克25欧元，此后每克95欧元，从2019年开始，针对超过限制的每克二氧化碳，车厂都要为每辆新车都要缴纳罚金95欧元。

罚金计算举例

假设某车企2015年生产了两个车型A和B。A型车空车重量1200kg，在标准测试中二氧化碳排放120g/km，销售110万辆，B型车空车质量1500kg，二氧化碳排放150g/km，销售90万辆。

CO2排放限值=130+0.0457×1100000×1200+900000×15002000000−1372=128.3g/km

CO2实际排放量=1100000×120+900000×1502000000=133.5g/km

排量超标5.2g/km。

处罚金额5.08亿欧元

再举个实际的例子，宝马2011年在欧洲卖了641964辆车，假设在2015仍然是同样的产品同样的销量，那宝马2015年实际的CO2平均排放值将超过规定限值8g/km，届时，宝马将为此交上4.9亿欧元不菲的罚金。而2013财年宝马的总盈利为53亿欧元。如果花近5亿元用于缴纳罚款，盈利就得折掉近10%。

超级指标

法案给予汽车厂额外的补贴来生产低排放汽车(二氧化碳排放低于50g/km)。每辆低排放汽车在2012年和2013年折算成3.5辆普通汽车，2014 年折算成2.5辆，2015年1.5辆，2016年到2019年1辆。补贴政策对于第二阶段的减排目标也同样适用，2020年每辆低排放汽车可以折算成2 辆普通汽车，2021年1.67辆，2022年1.33辆，2023年以后1辆。

接着之前的例子，如果该车企额外生产10000辆电动车，加权计算后，平均CO2排放减少2.3 g/km。

CO2实际排放量=1100000×120+900000×1502000000+10000×3.5=131.2g/km

中国对电动车采用的系数是5，如果其他条件不变，按照中国的计算方法，CO2平均排放减少3.3 g/km。

CO2实际排放量=1100000×120+900000×1502000000+10000×5=130.2g/km

车企可结盟达到共同目标

2022, and 1 after 2023.

In the previous example, if the carmaker has the extra production of 10000 electric vehicles, then after weighted, the average CO2 emissions are reduced by 2.3 g/km.

Actual CO2 emissions = 1100000 x 120 x 900000 + 120 + 1100000 * 3.5 = 131.2 g/km

Coefficient used for EV in China is 5. If other conditions are unchanged, then according to the calculation method of China, the average CO2 emissions will be reduced by 3.3 g/km.

Actual CO2 emissions = 1100000 x 120 x 900000 + 120 + 10000 * 5 = 130.2 g/km

Car companies can enter into alliance to achieve common goals

Car companies can enter into alliance. As such, EU can such auto enterprises alliance as an individual with a limit value given according to the product portfolio and sales volume. If such alliance reaches the standard, then so do members. In the process of alliance, the laws concerning the industry competition should be obeyed. The information exchanged among members is limited to the information about their CO2 emissions, their original limit value and the actual sales. For car companies mainly in the field of low emission vehicles, they can make full use of the advantage of its own emissions to get some additional economic benefits. For car companies mainly in the field of high emission vehicles, they can sacrifice a certain economic interests under the condition of retaining the original model as much as possible. It is worth mentioning that in the United States – California's emissions standards standard CAFE makes it clear that the surplus that is lower than the emission limit value can be sold, on the contrary, the company's that have the emissions higher than the emission limit value can buy such surplus to meet the standard requirements. This is also legally recognized.

Treatment to the sales volume

With annual sales in 1000 to 10000 cars, companies can come up with a target which is finally determined to be accepted or not by the committee. The basis of determination include a series of established standards, including the carmaker's emission reduction potential. For car companies with annual sales between 10000 and 300000 cars, compared with the carmaker average emissions in 2007, the reduction from 2012 to 2019 should be 25% and in 2020 45%. For

车企可以选择结盟，这样欧盟将这样的车企联盟视为一个独立的个体，根据总的产品组合以及销量给出一个限值，如果这样的联盟达标，其成员也都视为达标。在结成联盟的过程中必须要遵守行业竞争方面的相关法律，各成员所交换的信息也只限于各成员本身的CO2排放量，各自原本的限值以及实际的销量。对于主打低排放车型的车企来说，可以充分利用自身排放量的优势，额外获取一些经济利益，对于主打高排放车型的车企来收，可以在牺牲一定经济利益的情况下尽可能保留原有的车型。值得一提的是，在美国加州的排放标准CAFE中，明确规定，低于排放限值的盈余可以出售，反之，超标的车企业可以通过购买这样的盈余来达标，法律上也完全认可。

根据销量区别对待

年销量在1000到10000辆之间的车企可以自行提出一个减排目标，最后由委员会来决定是否采纳。决定的依据是一系列已制定的标准，包括该车企减排的潜力。对于年销量在10000到300000辆之间的车企，相比于该车企2007的平均排放量，2012年到2019年要求减少25%，2020年要求减少45%。年销量少于1000辆的车企因为对环境污染的影响太小将不受新的排放法规限制。

各国二氧化碳排放标准对比

全球主要的汽车市场都对污染提出要求，只是从不同的角度出发，有的是燃油的经济性，有的是二氧化碳排放，有的是温室气体Green house Gas(GHG)。而且有着不同的测试方法，目前最主要的有三种，欧洲的NEDC，日本的JC08以及美国的U.S.combined。中国采用的欧洲的测试方法。以下是国际清洁交通委员会(ICCT)统计的数据。

将各地区的法规全部换算成适用欧洲测试方法NEFC的二氧化碳排放数值，以便更好的进行比较，下图同样来自国际清洁交通委员会(ICCT)统计的数据。

新的测试方法WLTP(World Light Duty Test Procedure)

欧洲议会计划在2017年引入新的测试方法来测量新车的标准油耗，因为车企给出的标准油耗和实际油耗之间的误差平均能达到25%，新的测试方法将于实际更加接近，比如空调和座椅加热也将一起考虑进来，这也将进一步增加油耗和二氧化碳排放，与实际情况更加接近。新的测试方法减少了停车滞留的比例，将平均速度提高了38%，最高车速也从120km/h提高到131km/h，测试时间也更长。目前的测试方法在测试混合动力汽车油耗和二氧化碳排放

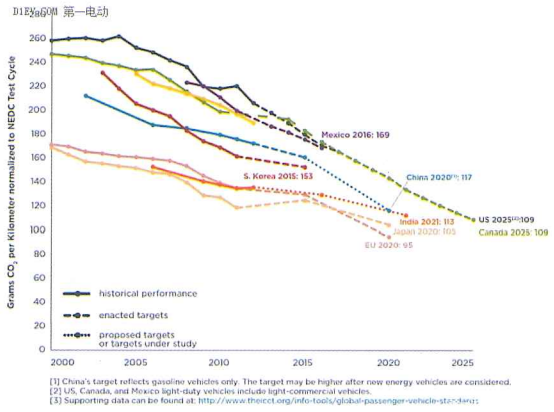
car companies with annual sales of less than 1000 cars, because of the effect on pollution to the environment being very small, they are not restricted by new emissions regulations.

Comparison of carbon dioxide emissions standards

Major global auto markets have requirements about pollution from from a different perspective, for example, fuel economy, carbon dioxide emissions, and greenhouse gas (GHG). They have different test methods. At present there are three main test methods: European NEDC, Japanese JC08, and U.S.combined. China adopts the European test method. The followings are statistical data from International Committee of Clean Transportation.

Country or Region	Target Year	Standard Type	Unadjusted Fleet Target/Measure	Structure	Test Cycle
EU	2015 2021	CO_2	130 gCO_2/km 95 gCO_2/km	Weight-based corporate average	NEDC
China	2015 2020 (proposed)	Fuel consumption	6.9 L/100km 5 L/100km	Weight-class based per vehicle and corporate average	NEDC
U.S.	2016 2025	Fuel economy/ GHG	36.2 mpg[i] or 225 gCO_2/mi 56.2 mpg[i] or 143 gCO_2/mi	FP-based corporate avg.	U.S. combined
Canada	2016 2025 (proposed)	GHG	217 gCO_2/mi[ii] N/A[iv]	FP-based corporate avg.	U.S. combined
Japan	2015 2020	Fuel economy	16.8 km/L 20.3 km/L	Weight-class based corporate average	JC08
Brazil	2017	Fuel economy	1.82 MJ/km	Weight-based corporate average	U.S. combined
India	2016 2021	CO_2	130 g/km 113 g/km	Weight-based corporate average	NEDC for low-powered vehicle
South Korea	2015	Fuel economy/GHG	17 km/L or 140 gCO_2/km	Weight-based corporate average	U.S. combined
Mexico	2016	Fuel economy/GHG	39.3 mpg or 140 g/km	FP-based corporate avg.	U.S. combined

The requirements from other regions are converted into carbon dioxide emissions applicable for NEFC in Europe, in order to better compare. The following figure shows statistical data from International Committee of Clean Transportation.



[1] China's target reflects gasoline vehicles only. The target may be higher after new energy vehicles are considered.
[2] US, Canada, and Mexico light-duty vehicles include light-commercial vehicles.
[3] Supporting data can be found at: http://www.theicct.org/info-tools/global-passenger-vehicle-standards

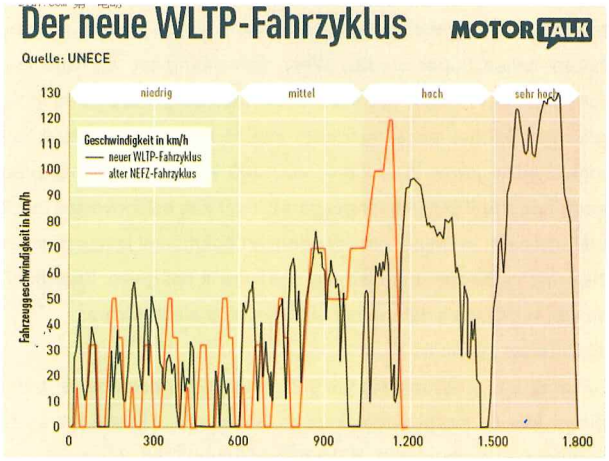
New test method WLTP (World Light Duty Test Procedure)

In 2017, new test method was introduced to measure the oil consumption for the new car in EU, because the average difference between the standard and actual fuels given by the company can reach 25%. The new test method will be more close to the actual condition. For example, the air conditioning and heating seat will also be taken into account together, which will further increase fuel consumption and CO2 emissions, thereby being more close to the actual situation. The new test reduces the parking retention ratio, increases the average speed by 38%. The highest speed also is

上有很大的缺陷，测试完全没有考虑到所使用的电能，新的测试程序将进行一定程度的修正。以后将不会出现像宝马i8这样，拥有354马力的动力，油耗却只有每百公里2.7升的误解。

因为目前欧盟所设定的二氧化碳排放限制都是基于现有的油耗测试方法，完成这个目标尚且是一项艰巨的任务，如果2017年就完全引入新的测试方法，对于各大车企来说，罚款几乎是无法避免，因而新的测试方法的引入也遭到各大车企的强烈反对，他们希望至少推迟到2021年再实施。

新旧测试方法NEDC和WLTP速度曲线的比较



与中国的乘用车企业平均燃料消耗量核算办法CAFC的一些比较：

(1) 限制的目标不同：

因为全世界每年销售的柴油车有将近四分之三的部分在欧洲，仅以2012年为例，德国销售的新车中，柴油车达到了48%，在法国，这个比重甚至达到了73%。所以考虑到汽油和柴油在燃油效率上的区别，欧盟并没有简单的以油耗作为考量，而是采用了CO2排放作为指标。而在中国，因为汽油车在乘用车市场上的强势，柴油车所占份额几乎可以忽略，所以中国以油耗做为指标，主要针对的是汽油车的油耗。

(2) 评价方式不同：

欧盟的目标是CO2在欧洲范围内达到130g/km，在此基础上，根据每个汽车企业的产品组合以及产品平均质量，分配单独的目标值，各家车企只需考虑各自的目标，奖惩与否只和是否达到自身的目标值有关。在中国，CAFC给出了两个目标值，国家统一的(与欧洲的130g/km类似)，以及各厂商自己的，在评价的时候要和两个目标值作比较，因此时常会出现，某些车企达到了国家给自己设定的目标值，却没有达到国家统一的目标值。这里会给人带来一些迷惑，因为在一个法定的国家标准中，

increased from 120 km/h to 131 km/h. The test time is longer too. The current testing method in the test of hybrid electric vehicle fuel consumption and Co2 emissions has a lot of defects, since this test is without considering the use of electricity. The new test method makes certain correction. In the future there will be no misunderstanding that the BMW i8 with 354 horse powers has fuel consumed of only 2.7 litres per hundred kilometers.

Because the carbon dioxide emissions limits set by the European Union are based on the

existing fuel consumption test method. Completing this goal still is a difficult task. If in

2017 a new test method was introduced, then, for each big car company, fines would be almost inevitable. Therefore, the introduction of the new test method was also strongly opposed by the auto enterprises. They hope to implement it at least until 2021.

Comparison of speed curves for old and new test methods NEDC and WLTP

Comparison with China's average fuel calculation method CAFC:

(1) Different goals:

Because the world each year sales of diesel are mainly in Europe (nearly three-quarters). Only in 2012, for example, in new cars sold in German, diesel cars reached 48%; in France, even reached 73%. So considering the differences between gasoline and diesel in the fuel efficiency, the EU is not just take the fuel consumption as a consideration, but uses the CO2 emissions as an indicator. In China, because the petrol car is dominant in the passenger car market, diesel car share almost can be ignored. The fuel consumption is taken as an indicator in China, which mainly aims at the petrol car's fuel consumption.

(2) Different methods of evaluation:

The goal of the EU is that CO2 within Europe will be 130 g/km. On this basis, according to the product portfolio, average product mass, distribution of single target, car companies only need to consider their own goals. Whether the rewards and punishments are paid or not is just related with whether or not they achieve their own goals. In China, the CAFC gives two target values: the national unified value (similar to Europe's 130 g/km) and the manufacturer's own value. In the evaluation, it is often found that, some car companies can reach their own value, but cannot reach the national unified value. This will bring people some confusion, because in a statutory national standard, it does not clearly confirm whether the requirement is met. In fact, the fuel consumption's uniform national standard is not much meaningful for car companies, for car companies have a different positioning, including the product varieties and customers. We cannot force all of car companies to produce cars with the low-emissions. On the other hand, the fuel consumption standard is aimed to improve fuel economy. If we do not improve technology, but only reduce

却无法明确说明是否达标。其实，国家统一的油耗的标准对车企没有太大的意义，每家车企定位不同，产品种类不同，顾客群也不同，不能强制大家都只生产小排量的汽车，再者，油耗标准的提出旨在提高燃油经济性，如果不提高技术，仅仅减少排量而没有提高发动机效率的话，对环保并没有太多的改善。

(3) 对中小企业的要求不同：

考虑到中小企业对环境的负担比较小，欧盟适当的放宽对他们的限制，对于年销量低于1000辆，1000辆到10,000辆之间，以及10,000到300,000之间的车企都有不同的规定。中国的CAFC则是一视同仁。

(4) 电动汽车的折算系数不同：

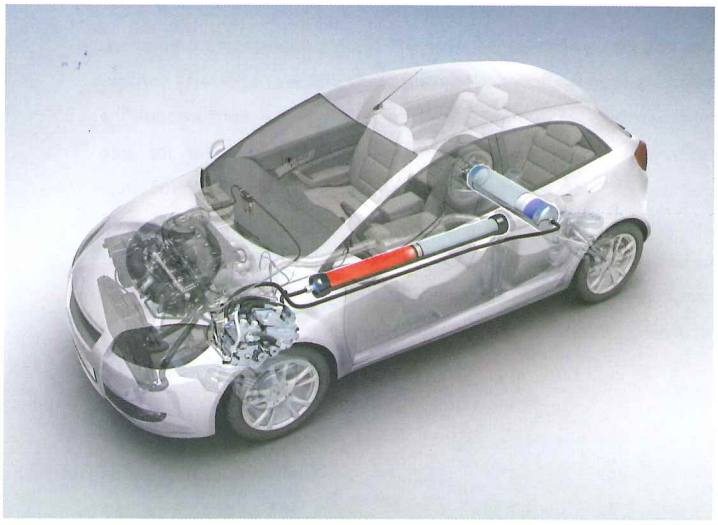
欧盟在计算平均排放时，低排放汽车(CO_2排放低于50g/km)在2014年折算成2.5辆普通车，2015年减为1.5辆，此后就与普通车一样。在第二阶段的实施过程中也会有三年享受所谓的Super credits的优惠，但最高也不过2辆的折算值。中国在计算平均油耗时，将纯电动车，燃料电池乘用车以及纯电动驱动模式综合工况续驶里程达到50公里及以上的插电式混合动力乘用车折算成5辆普通汽车，综合工况燃料消耗量实际值低于2.8升/100公里的车型(不含纯电动、燃料电池乘用车)折算成3辆。在中国，不仅折算系数比欧洲大很多，而且没有给出截止日期，中国对发展电动汽车的决心，可见一斑。

(5) 惩罚措施不同：

欧盟对不达标的车企将采取罚款措施，但是可以允许两家或者多家车企结盟，完成一个共同的目标，如果这样的联盟达标，他的成员也都认为是达标。中国的具体惩罚措施还没有制定，但是，基本不会采取简单的以罚代管，不排除对不达标的企业进行限制生产和限制销售等处罚办法。

(6) 达标盈余的处理方式不同：

欧盟允许车企自由结盟来利用某些车企低于限值的盈余，通过市场的供需给予可以给这些企业带来一些额外的经济利益。在中国，多实现的盈余只能在来年应用在自己身上，不允许交换。



emissions without improving engine efficiency, then environmental improvement will be not much.

(3) Different requirements for small and medium-sized enterprises

Considering the environmental burden of small and medium-sized enterprises are small, the EU appropriately relaxes restrictions on them. The EU has different provisions for the car companies with annual sales of less than 1000, between 1000 and 10000, and between 10000 and 300000 cars, but China in CAFC has the same provisions.

(4) Electric vehicle conversion coefficient that is different

In the EU, in calculating the average emissions, a car of low emissions (CO_2 emissions below 50 g/km) in 2014 is converted into 2.5 average cars; in 2015, 1.5; afterwards, 1. In the process of the implementation of the second phase, there will be 3 years to enjoy the so-called Super credits. When calculating the average fuel consumption in China, for the models including the pure electric vehicles, fuel cell passenger cars and so forth whose actual fuel consumed is lower than 2.8 litres / 100 km (not including pure electric and fuel cell passenger cars), 1 car can be converted into 3 average cars. In China, not only convert coefficient is much larger than that in Europe, but also the deadline is not given. Therefore, we can see China's determination to develop electric cars.

(5) Different penalties

EU takes fine measures for the substandard car companies, but it allows two or more automakers to enter into alliance so as to complete a common goal. If the alliance meets the standard, then its members are regarded as acceptable. Specific punishments of China have not yet be set, but basically, it will adopt the punishment and administration measures, and does not rule out the situation where the substandard enterprises are subject to the punishment measures such as restrictions of production and sales.

(6) Different handling methods for the surplus

The EU allows car enterprises to enter into alliance to give the additional economic profits by take advantage of the surplus in some car companies and market supply and demand. In China, the surplus in the coming year can only be self-applied and can not be exchanged. The recent news says that China is prepared to adopt a new measure, e.g. Points about electric cars and emissions.

Conclusion:

China and the European Union have launched their own standards for energy conservation and emissions reduction. In comparison, the European law gives priority to the punishment, while China priority to with reward. Currently, for the most car companies, the motivation for the development of the electric car is to avoid huge fines. In order to significantly reduce emissions, especially meet the standards of the second stage, the development of the electric car is the most effective way. The development of internal combustion engines has passed for so many years, thus the space of improvement for the fuel economy with new technologies is relatively limited. The electric car can reduce the emissions to a

总结：

中国和欧盟都推出了自己的节能减排标准，相比较而言，欧洲的法律以惩罚为主，中国的还是以奖赏为主。目前欧洲大部分车企发展电动汽车最根本的动力还是在避免巨额罚款，为了大幅度减少排放，特别是满足第二阶段的标准，发展电动汽车是最行之有效的办法。内燃机经过这么多年的发展，燃油经济性通过新技术来提升的空间相对有限，从计算方法上来说，远没有电动汽车带来的减幅大。虽然电动汽车特别是纯电动车目前因为基础设施，相关法规，技术现状等原因，市场接受度还不大，如若没有补贴，企业研发推广的风险极高，但是严格的节能减排法规决定了这是一条必经之路。

目前混合动力汽车在计算标准油耗以及标准排放上还存在很大的漏洞，这也可以视为鼓励发展混合动力汽车的一种机制，然而未来法规的走向，特别是法规细节的制定，新测试方法引入的时间，混合动力汽车的标准排放的计算方法是否需要修正，将对混合动力汽车的发展起着至关重要的影响。

如果未来罚款无法避免，车企必将提高传统汽车的价格，传统汽车和电动汽车的差价的得以减少。中国的油耗法规中在计算油耗上赋予电动汽车无限期的很高的折算系数，但是如果没有具体的惩罚制度，奖励机制如何运转不免让人生疑，中国发展电动汽车的动力更多的还是来自于国家的政策补助刺激，但这样的大幅度补助能持续多久还值得商榷。法规和市场之间需要建立一种平衡以及自行运转的机制，在新产品发展的初期必然需要一些人为的有目的的引导，但是如果长期依赖这样的外来影响，将无法实现健康持续的发展。

large extent. At present, the electric cars, especially pure electric cars still have a narrow market breath due to the infrastructure, related laws and regulations, and technology. If without subsidies, the risk of enterprises is very high in the research and development as well marketing. However, the strict regulations about energy conservation and emissions reduction have let the electric cars to play a more important role in the future.

Hybrid cars currently on the calculation of standard fuel consumption and emissions still have big loopholes, and this can also be seen as a mechanism to encourage the development of hybrid electric vehicles. However the future regulations, the time to introduce the new test method, and the whether the calculation method is revised or not, will have an important influence on the development of hybrid cars.

In the future, if the fine is inevitable, the car companies will raise the price of the conventional car. This can lead to the reduced the difference in the price between conventional cars and electric cars. In the calculation of the fuels consumed, the EV has high conversion coefficients. But if there is no specific punishment, then how the reward mechanism works will be suspected. The motivation for the development of electric cars in China is more from subsidies policy. It is not known how far these subsidies can go. The balanced and self-operation mechanism should be set up between the law and the market. In the beginning of the new product development, it is bound to need some guidance. But, if the long-term external influence is needed, then it cannot be able to achieve sustainable development.