

# 中国零排放汽车积分交易体系设计与实施方案研究



能源与交通创新中心

2014.10.17



1. *i*CET简介
2. 清洁交通项目简介
3. ZEV项目介绍 & Tesla Case Study
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# 目录

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# 1. Who we are

**Innovation Center for Energy and Transportation (iCET)** is a non-profit Beijing registered **Think Tank** aimed at reducing **GHG emissions**, **urban pollution**, and **oil dependency**, focused mainly on national government policy and regulatory guidance since 2006. We mainly focus on three areas: **clean transportation**, **carbon management**, **US-China clean technology transfer**.



**Clean Transportation Program**  
(since 2006)



**Carbon Management Program**  
(since 2008)



The **US-China Clean Tech Center (UCCTC)** is iCET's third program, which started in 2012, it is tailored for enhancing **bilateral clean-tech collaboration**, under the **US-DOC dedicated subsidy**. It is the only such connector and marketplace operating from China.



**UCCTC**  
(since 2012)

# Key Achievements 近年主要工作成果

- ❑ 帮助中国建立第一个机动车燃油经济性标准

**First world-class national fuel economy standards for cars and trucks**

- ❑ 帮助中国建立第一个能源效率与碳注册在线系统

**First Energy and Climate Registry online system in China for enterprises to report carbon footprint**

- ❑ 帮助中国建立第一个环境友好汽车绿色评估系统

**First China Green Car Online Ranking System**

- ❑ 帮助中国建立第一个可持续低碳燃油评估标准体系

**National sustainable and low carbon fuel evaluation standards and policies**

- ❑ 帮助中国引荐加州AB32气候法案

**First to introduce AB32 to China**

- ❑ 第一个引荐国际认证碳管理课程进入中国

**Introducing GHGMI Training to China**

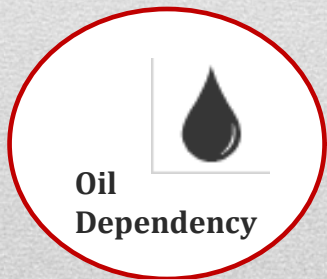
- ❑ 搭建第一个中美间清洁技术领域全方位合作平台

**Establishing US-China Clean Tech Center**



# The Problem

- China is projected to become the world's largest importer in 2014.
- The share of China's oil imports accounts for over 60% of the national consumption and is increasing steadily.
- The transport sector is responsible for over 70% of the increase in oil demand.



- About 24% of GHG are resulted from the transport sector.
- China's transport sector is projected to increase national CO2 emissions by over 50% between 2010 and 2020.
- As China's global oil consumption increases, so does its role in international Climate Change agreements.

- China's transport sector is responsible for about 50% of city air pollution.
- Beijing government, for example, states that the transport sector accounts for some 33% of city PM2.5.



- China's recent "Action Plan" for pollution prevention targets transportation and sets air quality improvement goals.

- China's urbanization rate is world's fastest, now and years to come.
- It accelerates air pollution at heavily populated urban areas.
- Over 60% of China's population is already exposed to severe day-to-day health risks.



# The Opportunity

Given China's global economic positioning and consumer's power, such approaches have the potential of steering global development, developing nations' urbanization and future markets.

## 2. 清洁交通项目简介

### 汽车燃料经济性since2002

Standards, Reports, Expert Panels, Media Interactions



**CATARC** 中国汽车技术研究中心  
China Automotive Technology & Research Center

### 中国绿车排行榜since 2006

Reports, Website, Workshops, Education



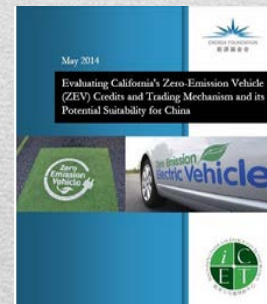
### 燃料可持续发展since2007:

Standards Drafts and Committees, Briefings, Intl' workshops



### 政策创新机制:

New initiatives at local city-level



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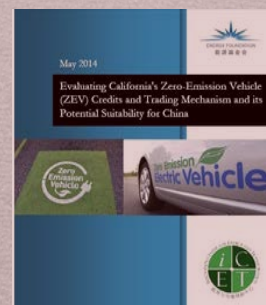
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# 加州ZEV实施背景与目标

## 面临挑战

加州交通温室气体排放占总排放量的40%左右；交通成为了节能与减排的重点领域；

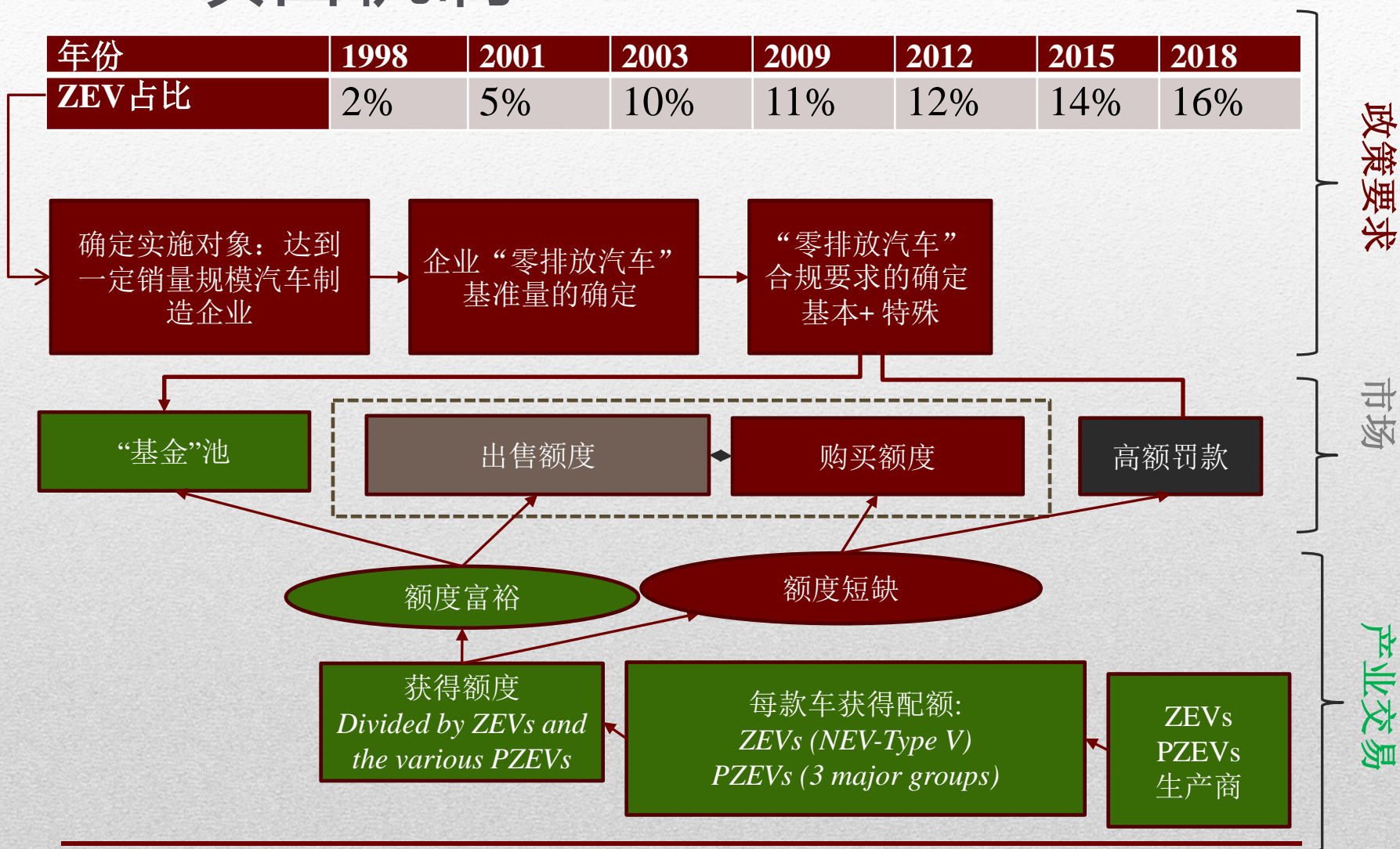
## 解决方案

不仅仅通过政策扶持手段，还需要通过市场机制来鼓励零排放与低排放汽车的生产与销售；

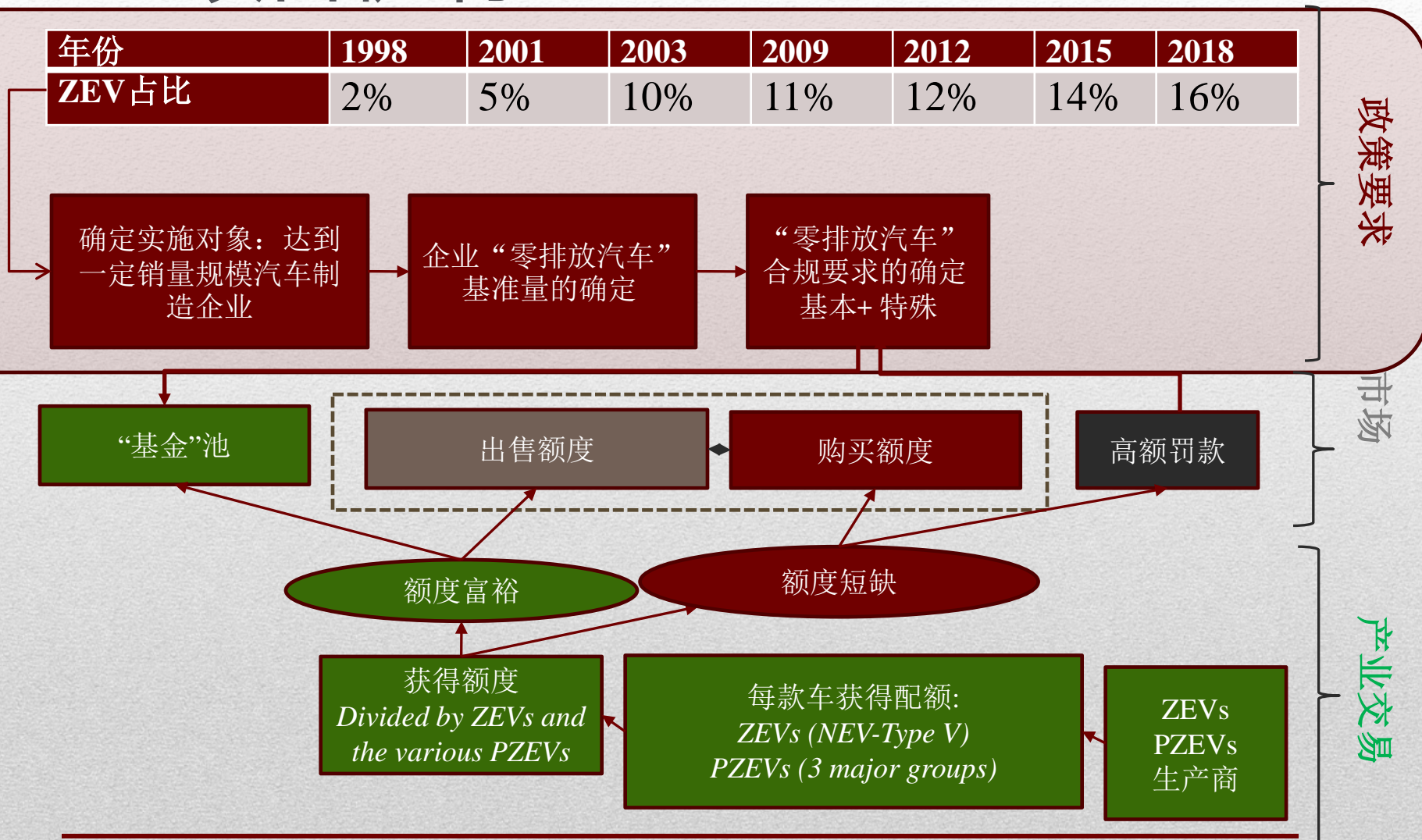
## 实施目标

- ✓ 到2025年，15.4% 的新售汽车为零排放或超低排放汽车，大幅提高汽车燃料经济性；
- ✓ 新车温室气体排放与污染物排放分别降低34% 和75%；
- ✓ 环境友好汽车广泛覆盖到各个汽车类型中，包括紧凑型、SUV、皮卡、面包车等，满足消费者的各类选择；
- ✓ 消费者平均可节省6000美元的燃油消费，远远高于汽车先进技术应用成本（约1900美元）

# ZEV项目机制

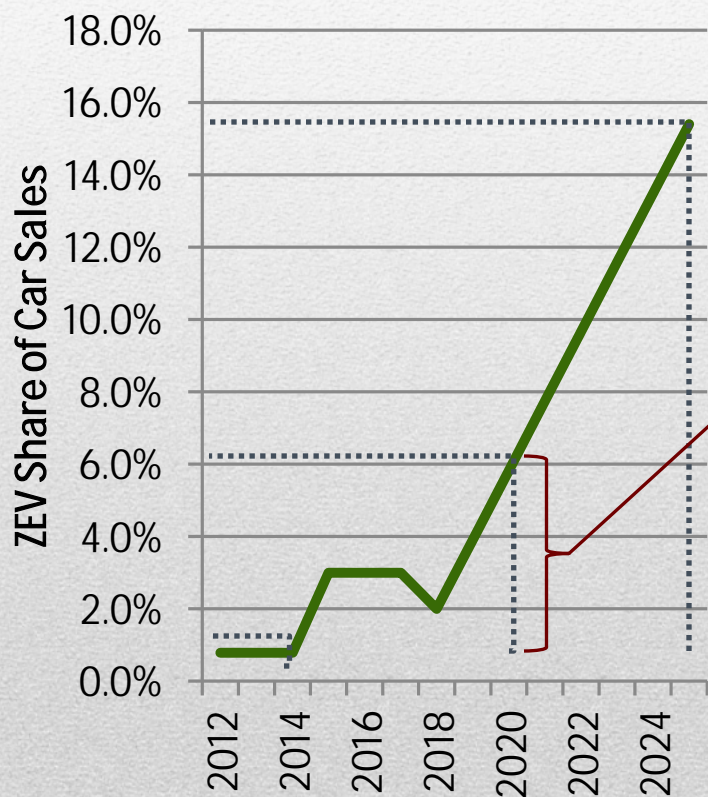


# ZEV项目机制

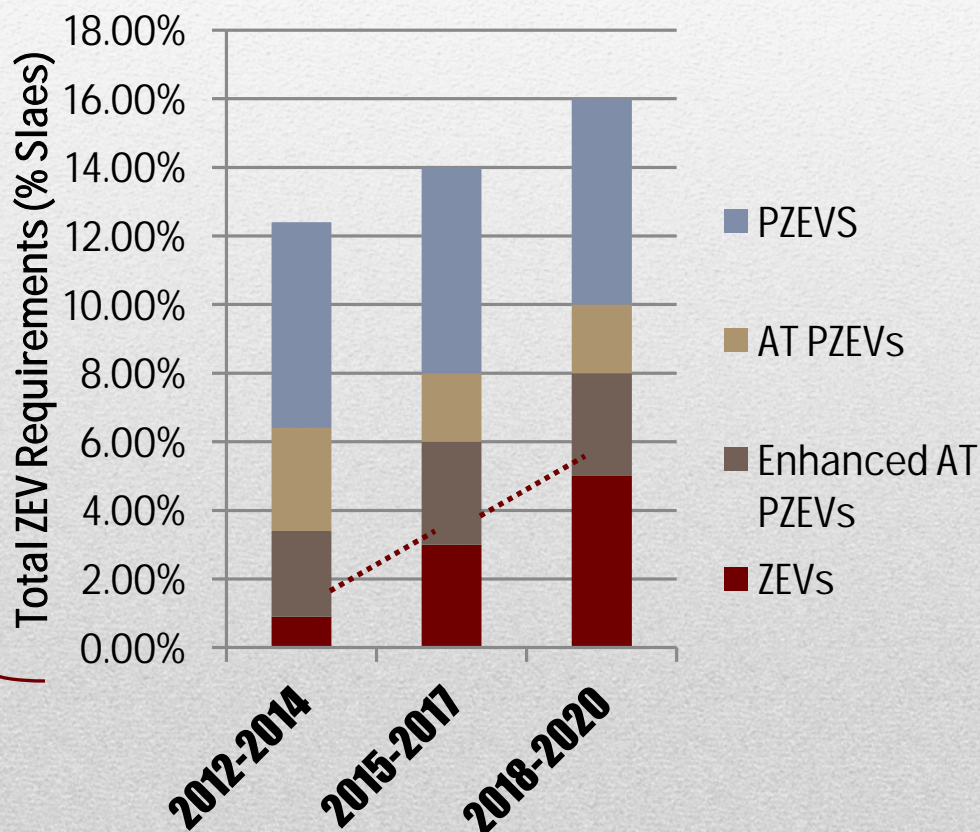


## 灵活要求

California ZEV program – minimum ZEV floor throughout the years



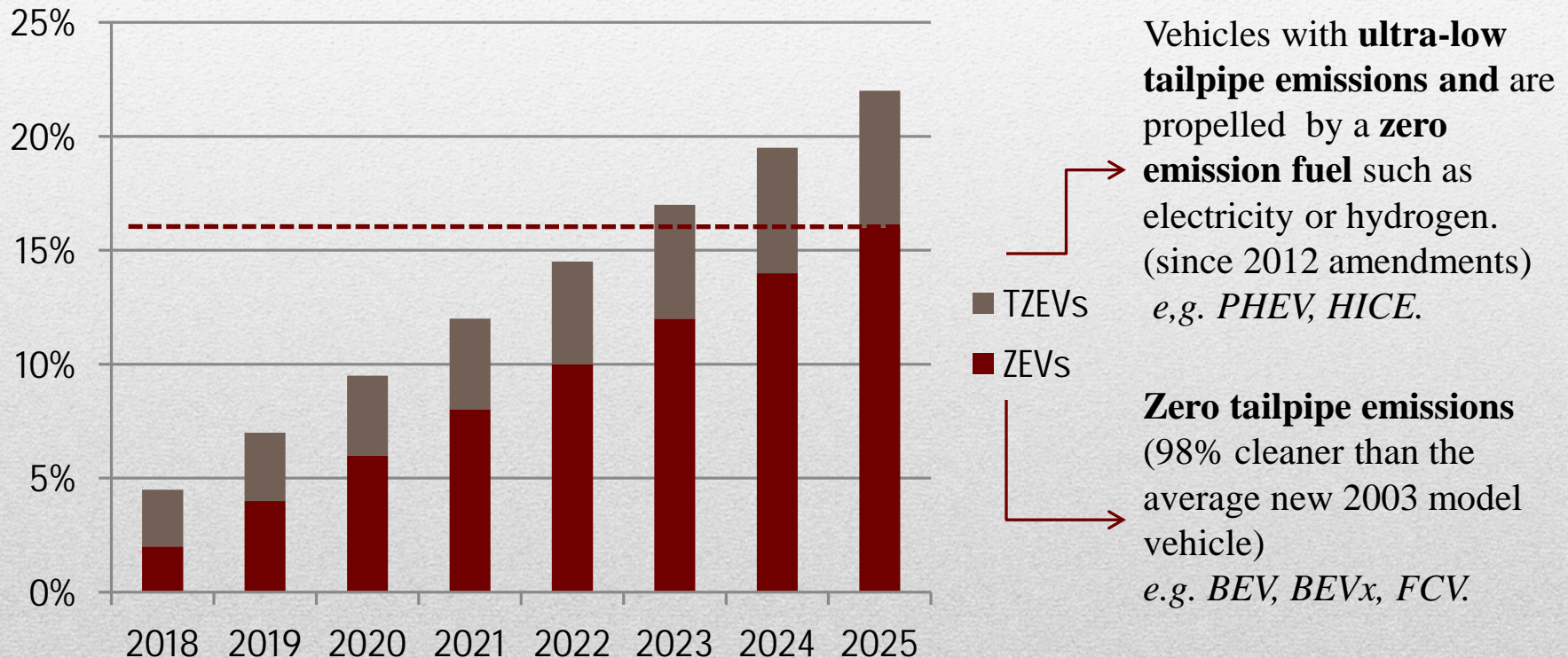
ZEV Requirements Broken Down by Vehicle Types (original regulation)



中国情况:不仅仅汽车可以参与,基础设施也可以参与,进入交易系统,积分可根据技术的先进性以及难以实现程度来确定

# 灵活要求: New Simplified Approach

Transitional ZEVs portion increase from 2.5% to just 6%, while pure ZEVs portion increases from 2% to 16% from 2018 to 2025



For California, ZEVs (cleanest vehicle technologies with zero tailpipe emissions) are targeted to be ready for commercialization by the end of this decade (composing 100% of vehicles by 2050). For China, this could also be the case should JVs and imported vehicles be included.

# 灵活要求: Expanding

Section 177 States, choosing to follow CA (no need for EPA approval, [Section 177 of the Clean Air Act](#))

From 5 to 14 manufacturers required to comply with the ZEV mandate

Oregon

Vermont

Maine

New-York

Massachusetts

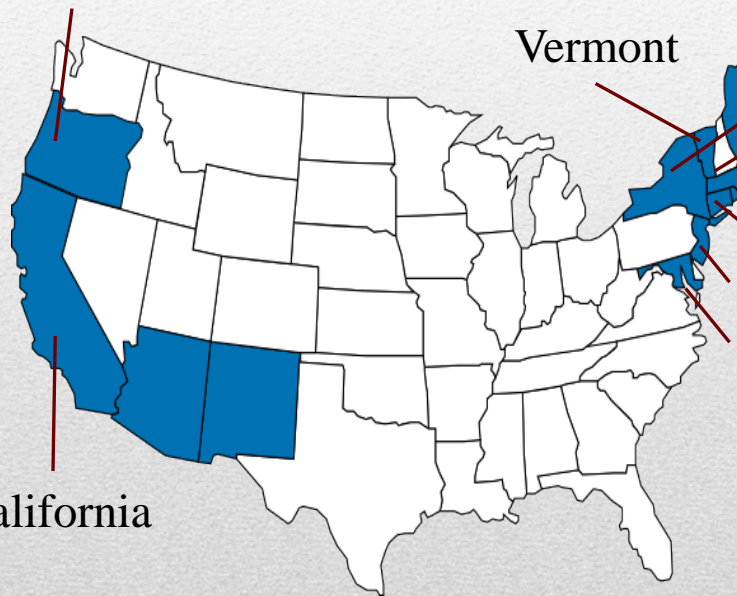
Rhode Islands

Connecticut

New-Jersey

Maryland

California

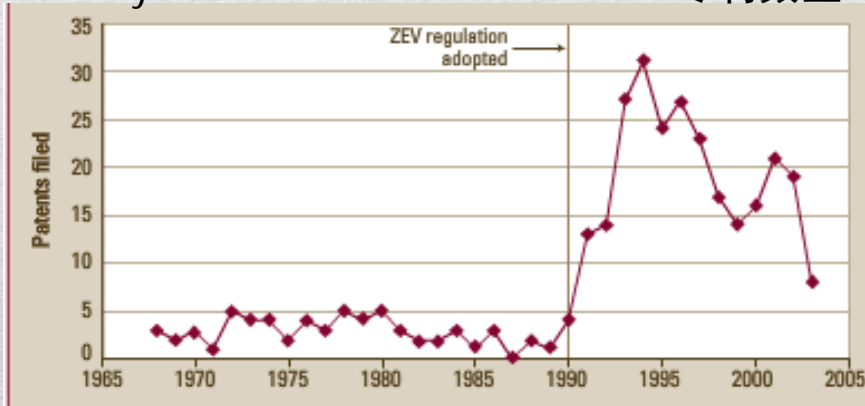


**The Multi-State ZEV Action Plan** signed in October 2013 by Connecticut, California, Maryland, Massachusetts, New-York, Oregon, Rhode Islands and Vermont, constituting 23.6% of US vehicle 2012 vehicle sales, sets a deployment target of 3.3 million ZEVs (approximately 15% of projected new car sales in 2025) and adequate fuelling infrastructure by 2025.

## 商业化结果

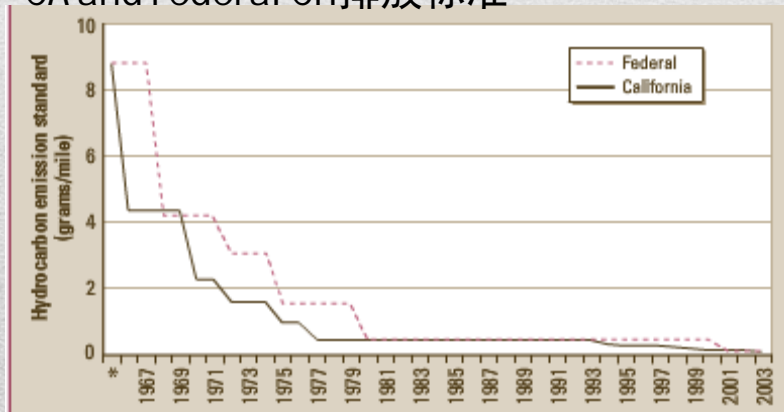
- ✓ 200万辆先进技术汽车（ PZEV and AT PZEV ）实现了零排放或者比2002年车型清洁80%以上
- ✓ 加州实现推广 近400,000 辆气电混合动力汽车;
- ✓ 成功实现节能减排车型的市场的推广 (Toyota Prius, Honda Insight);
- ✓ 先进节能技术被推广应用 (“MOA” Vehicles, FreedomCar);
- ✓ 汽车制造商的创新能力及积极性大幅提高 (Tesla Motors).

Battery Electric Vehicle Patents Filed 专利数量



Source: Public Policy Institute of California, Volume 3, number 4, Sep 2007.

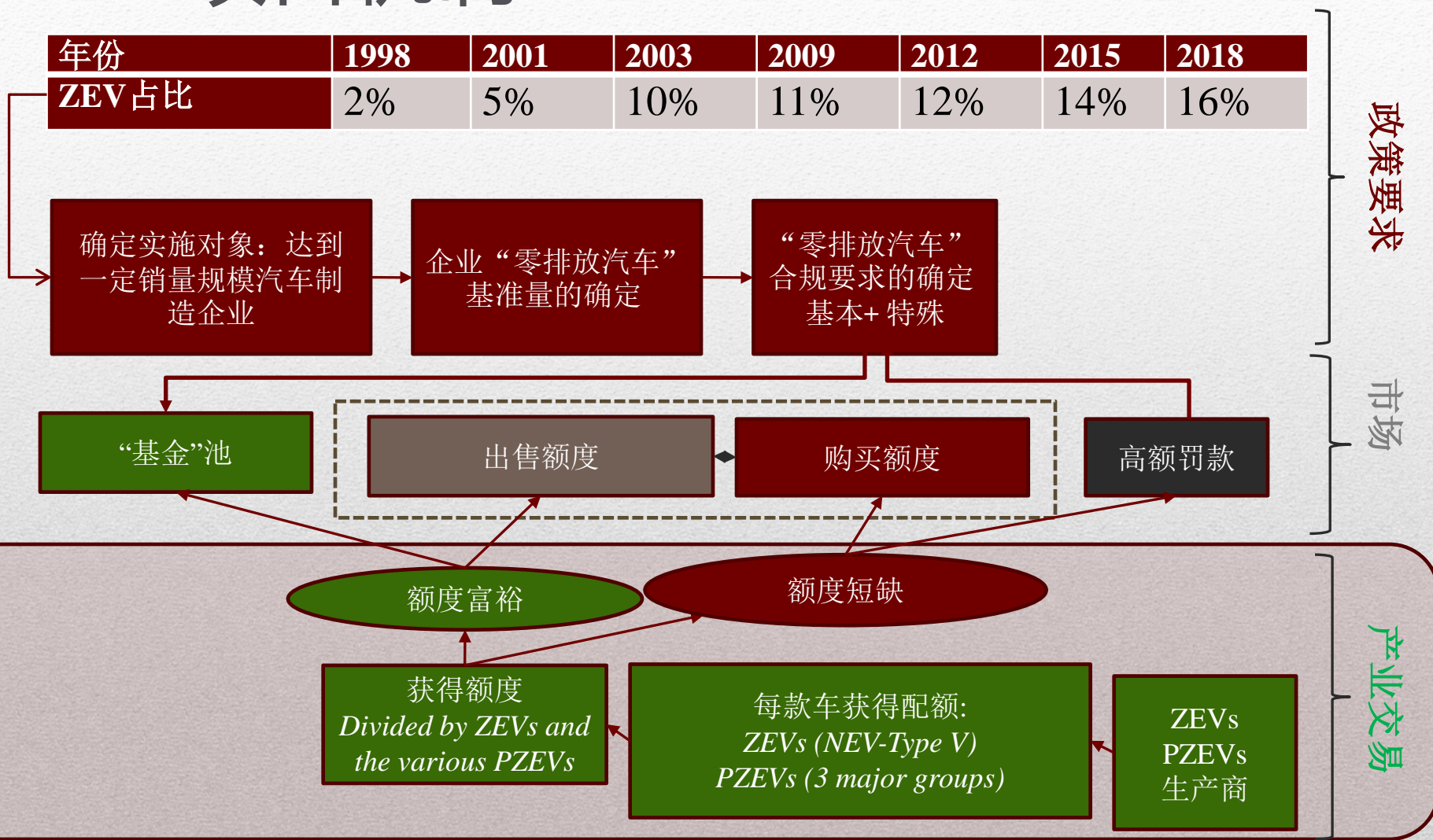
CA and Federal CH排放标准



Source: National Research Council, 2006.

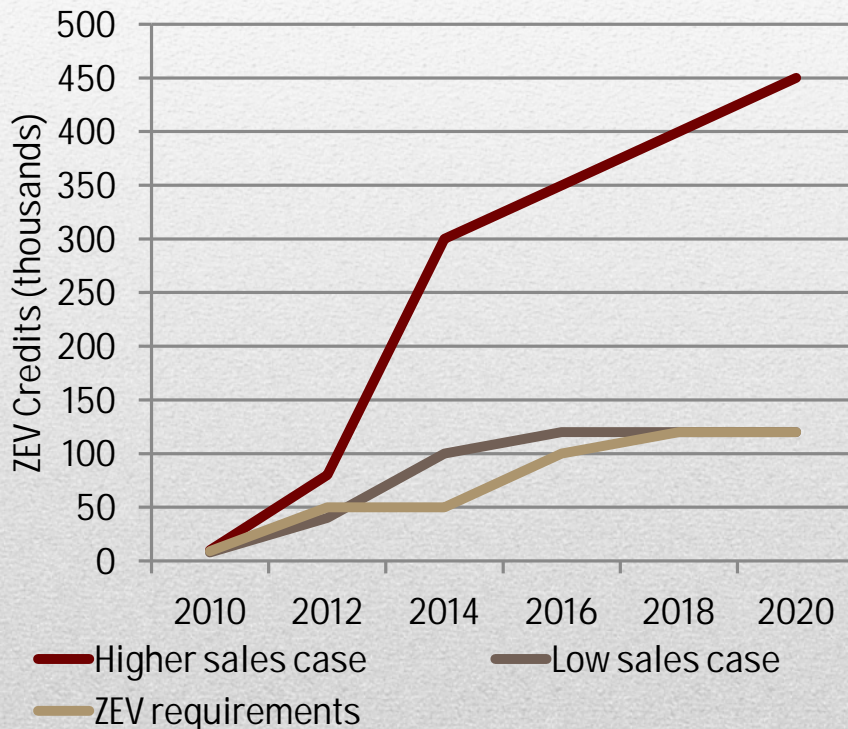
中国特色情景: 可根据未来的发展需求, 如六阶段排放标准、电动汽车及其他汽车技术等, 来设计要求

# ZEV项目机制



# EV sales projections

Annual ZEV credits generation predictions in California versus the requirements

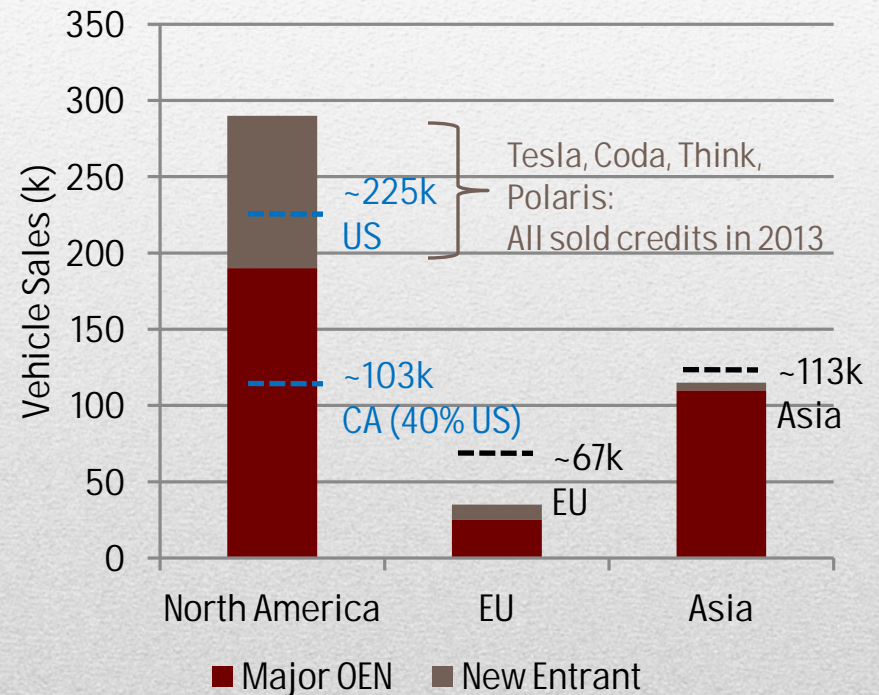


Source: Adapted from NRDC, 2010;

→ 2013 BALANCE was over 20k credits

(<http://www.arb.ca.gov/msprog/zevprog/zevcredits/2012zevcredits.htm>)

2015 Electric Vehicles Sales: Projection by manufacturer type



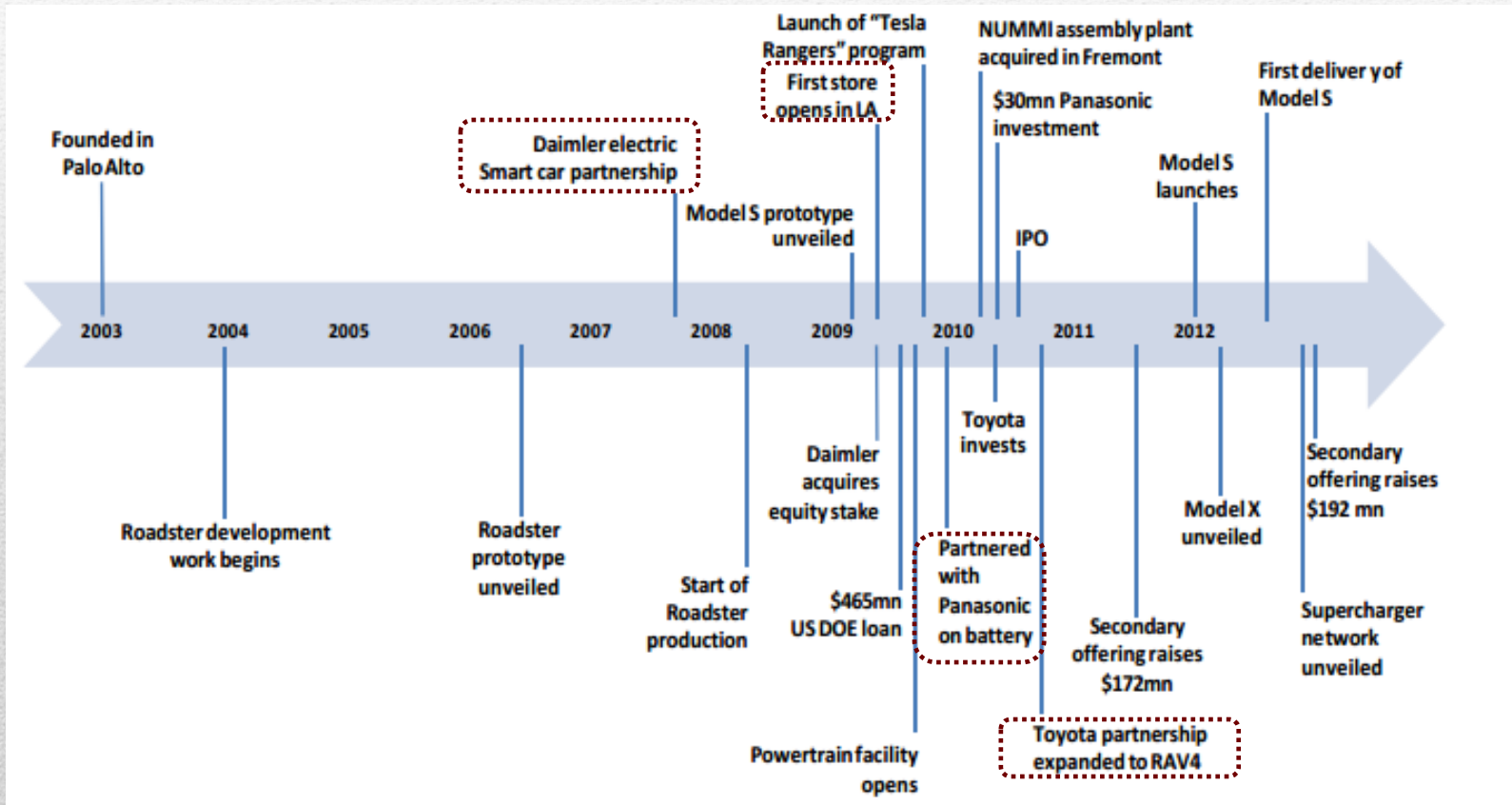
BLUE are actual PEVs sales from December 2010 through August 2014 [[Adapted CARB data](#)]

BLACK are actual PEVs sales by 2013 [[ZSW 2014 Report](#)]

中国特色情景: 可根据未来的发展需求, 如六阶段排放标准、电动汽车及其他汽车技术等, 来设计要求

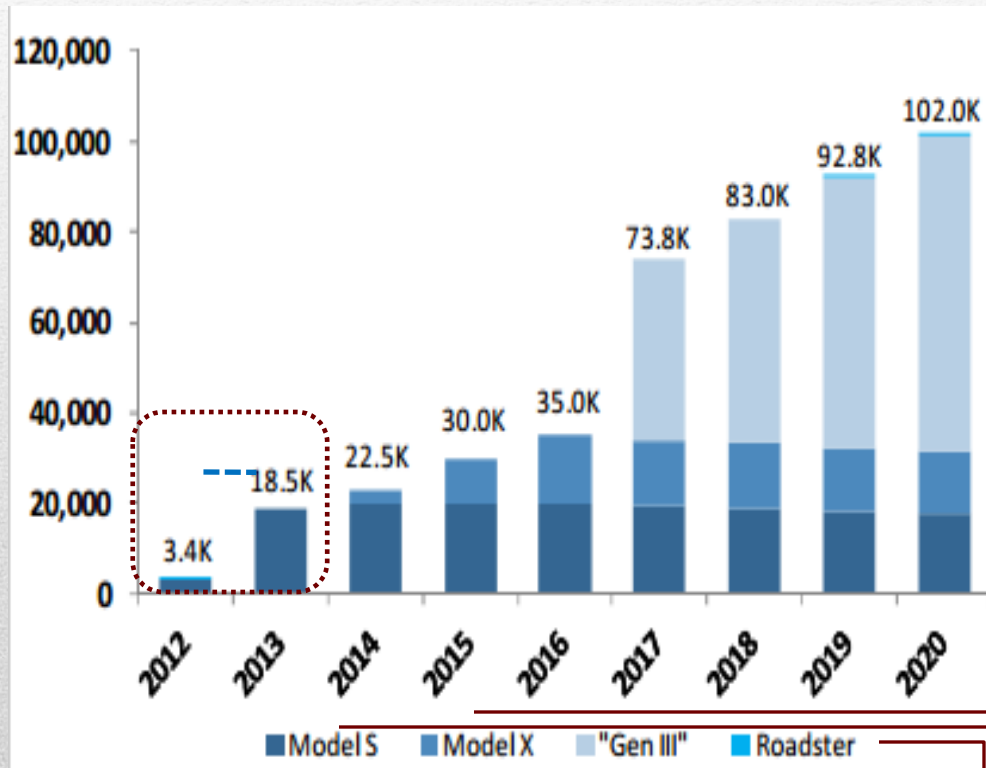
# Tesla Motors: ZEV contribution to growth

Tesla major developments timeline (2003-2012)



# Tesla Motors: ZEV contribution to growth

TSLA Vehicle Production Volume Forecast (2012E-2020E)

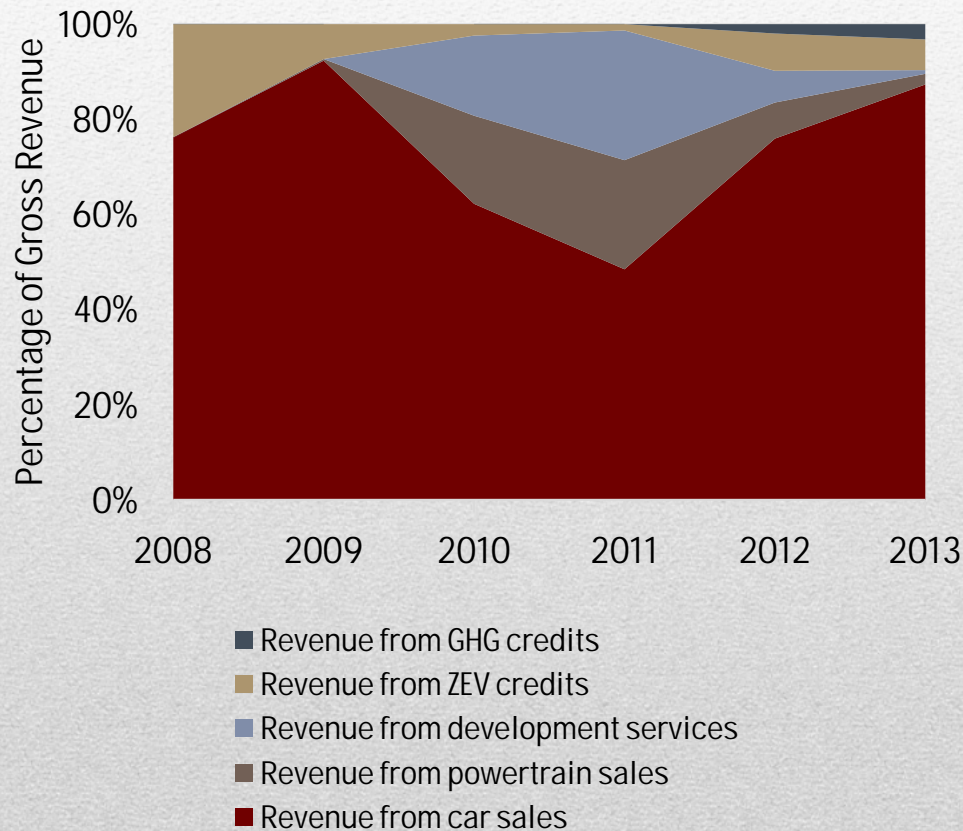


Tesla doesn't report production volumes, yet estimations (global sales breakdown) show **25k sales of Model S sales in 2013**.  
Range calculated based on urban driving conditions, avg. 90kmh

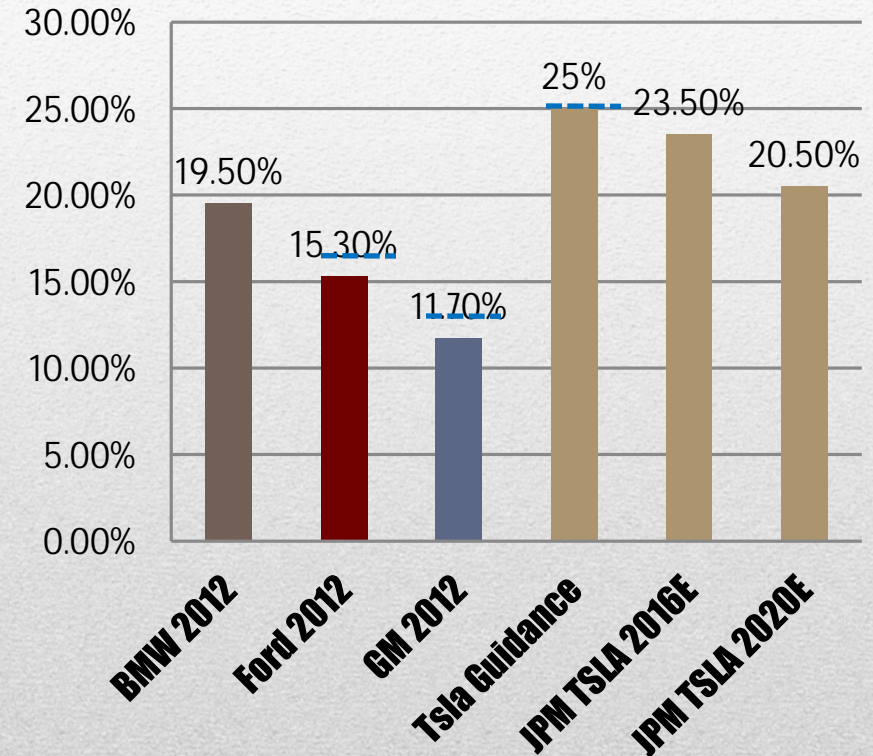


# Tesla Motors: ZEV contribution to revenue

## ZEV Credits Drove Tesla's Net Profitability



## TSLA Gross Margins vs. Automaker Peers



**2013 Q3 Actual:** 25% in the last quarter of 2013, overtaking Ford's 15.5% and General Motors' 12% gross profit margin.

### 3. ZEV项目介绍:

# ZEV项目机制

年份	1998	2001	2003	2009	2012	2015	2018
ZEV占比	2%	5%	10%	11%	12%	14%	16%

政策要求

确定实施对象：达到一定销量规模汽车制造企业

企业“零排放汽车”基准量的确定

“零排放汽车”合规要求的确定  
基本+ 特殊

“基金”池

出售额度

购买额度

高额罚款

市场

额度富裕

额度短缺

获得额度  
*Divided by ZEVs and the various PZEVs*

每款车获得配额：  
ZEVs (NEV-Type V)  
PZEVs (3 major groups)

ZEVs  
PZEVs  
生产商

产业交易

## ZEV-Credits 产出

The marketplace is discrete, credits prices are discussed between the buyer and seller (e.g. Honda and Tesla). To date, all car companies selling in CA have produced some credits and none have had to pay penalties.

市场是独立的，买方和卖方可单独商议价格（比如Honda and Tesla），到目前为止，加州市场上销售汽车的制造商还没有罚款。

### **Market potential**市场潜力:

- ✓ Can be linked to other trading markets 与其他交易市场连接;
- ✓ Can open to import brands for inspiring local innovation and increasing competition 开放进口品牌来刺激地方创新并增加竞争;
- ✓ Includes periodic and ad-hoc stakeholders meetings for ensuring sound implementation 周期性会议宣贯，确保实施;

中国情景: 可获得更大的市场，与碳排放交易联合起来

# ZEV-Credits 项目计划

- 2014
1. 综合性研究报告. evaluating the California leading ZEV and cap-and-trade scheme utilizing a quantitative case-study of a single manufacturer (Tesla Motors) and a qualitative study of major stakeholders.
  2. 利益相关方研讨会. supported by Shenzhen **(and potential other)** city government for introducing the study results to local relevant players and examining its potential local suitability and contribution.
- ↓
- 2015
3. 示范城市方案设计 in collaboration with local stakeholders and with the advice and consultation of Californian experts.
  4. 方案评估讨论会 (and experts review) supported by Shenzhen city government for assessing the feasibility of the suggested program design and providing comments to the design draft.
  5. 政策整合研究 **Integrating design** draft comments for providing a more solid **policy design recommendations**.
- ↓
- 2017
6. 其他相关城市推广应用 **Implementation and scaling up to other cities in China...**

目前

## 4. 支持与合作

- iCET从2002年开始就参与推动中国交通节能减排工作，包括标准与政策框架设计、政策效果评估等，中国及加州等的政府、研究机构具有良好的合作关系。
- iCET现阶段与加州空气资源署的专家以及中国合作伙伴（目前主要是深圳政府）合作来推动中国ZEV项目。
- iCET 正在寻找一个合适的示范城市在推动这项工作，包括积分交易机制设计、深层次合作推动方案的实施。
- 在中国ZEV项目对有效推动现有政策实施，通过市场机制来调动行业参与者的积极性，真正实现新能源汽车的商业化，促进更多能源汽车投资。
- Instrumental to the success of our project is collaboration from industry and EV infrastructure stakeholders, for better understating China's market conditions and projections.
- We welcome collaboration!

# 结论

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THANK YOU! [fengan@icet-usa.org](mailto:fengan@icet-usa.org)

[www.icet.org.cn](http://www.icet.org.cn)

[maya.bd@icet.org.cn](mailto:maya.bd@icet.org.cn)

**Beijing Office**

Fortune Plaza Tower A Suite 7H, No.7  
DongSanHuan Middle Rd., Chaoyang  
District, Beijing  
T: 8610 65857324 | F: 8610 65857394



[www.uschinacleantech.org.cn](http://www.uschinacleantech.org.cn)

[jeff@uschinacleantech.org](mailto:jeff@uschinacleantech.org)

**US Office**

601 West 5th St, Suite 650  
Los Angeles, CA 90014  
213-247-5703



	Vehicle group acronym	Definition
Original Terminology	<u>LEV(Low Emission Vehicle)</u>	The least stringent emission standard for all new cars sold in California beyond 2004.
	<u>ULEV(Ultra Low Emission Vehicle)</u>	50% cleaner than the average new 2003 model vehicle.
	<u>SULEV(Super Ultra Low Emission Vehicle)</u>	These vehicles emit substantially lower levels of hydrocarbons, carbon monoxide, oxides of nitrogen and particulate matter than conventional vehicles. They are 90% cleaner than the average new 2003 model vehicle.
	<u>PZEV (Partial Zero Emission Vehicle)</u>	Meets SULEV tailpipe standards, has a 15-year / 150,000 mile warranty, and zero evaporative emissions. These vehicles are 80% cleaner than the average 2002 model car.
	<u>AT PZEV (Advanced Technology PZEV)</u>	These are advanced technology vehicles that meet PZEV standards and include ZEV enabling technology. They are 80% cleaner than the average 2002 model car.
New Terminology	ZEV (Zero Emission Vehicle)	Zero tailpipe emissions, and 98% cleaner than the average new 2003 model vehicle. E.g. BEV, BEV <sub>x</sub> , FCV.
	TZEV (Transitional Zero Emissions Vehicles)	Vehicles with ultra-low tailpipe emissions and are propelled by a zero emission fuel such as electricity or hydrogen. e.g. PHEV, HICE.

# Our US-China Clean-tech work:

## Trade Missions:

Bring US sector-tailored delegations to city hosted events

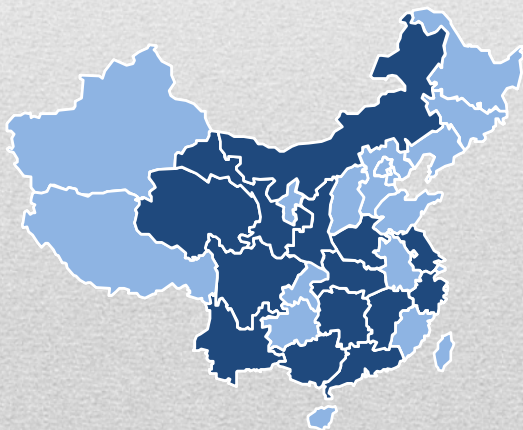


## eCommerce Platform:

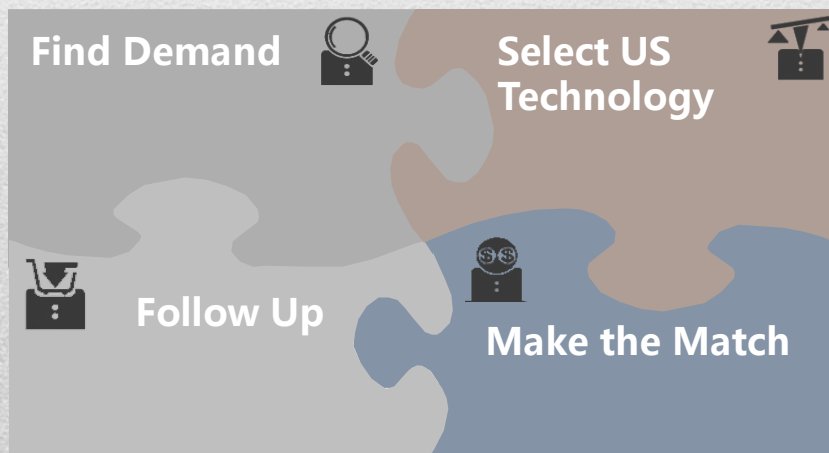
Online database of cutting-edge tech intro to meet Chinese city/industry needs



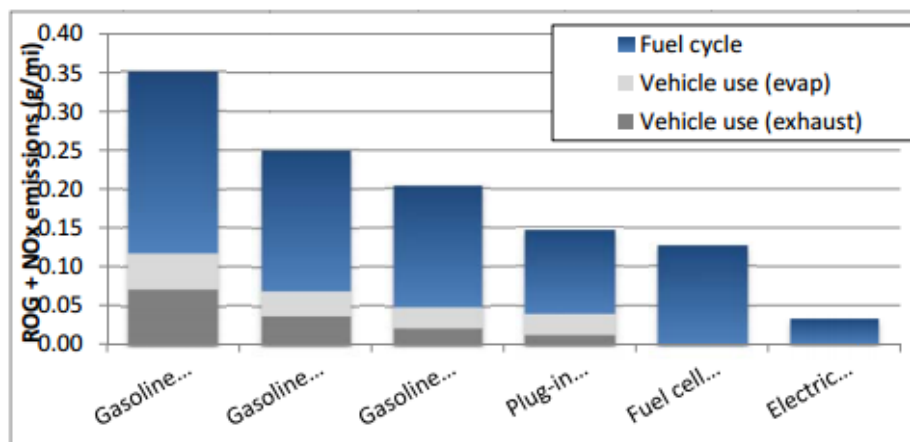
## Demonstration Parks:



## Match-making:



### Well to Wheel Smog-Forming Pollution Emissions Comparison [NOx + ROG]



### Well to Wheel Greenhouse Gas Emissions Comparison

