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Bicycles is the first industrial product that gets universal in China.

By end of 80s last century, China has 500 million units of bicycles.

It is bicycles that enhances China's speed for the first time.

But...


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By 2012, car ownership in China reaches 120 million,

with annual growth of 15.1 million;

There are more than 200 million registered drivers,

with annual growth of 26.47 million.

By end of May this year, the electric bicycles in China had exceeded 150 million.

In Jiangsu, every 100 households on average has 79.9 units of electric two wheelers, becomes No. 1 of the ownership.

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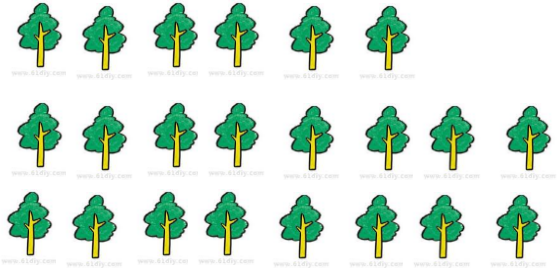

22 trees

The reduced CO_2 emssion in one year by riding on an electric bycicle, instead of an motorcycle, equals the amount of CO_2 absorbed by 22 trees.

150 m * 1 year

=

4 * 1 year

Qinshan Nuclear Power Plant

Wasted nighttime electricity reused by 150 million electric bicycles equals the total power generated by 4 Qinshan nuclear power plant in one year.

Electric two wheelers in China

- ✓ Introduction
- ✓ Market analysis
- ✓ Trends
- ✓ Issues
- ✓ Policy options

Ms FU Jia
Email: fujia316@163.com
Market Analyst, Beijing, China

an e-bycicle

an e-scooter

an e-motorcycle

Chinese electric two wheeler brands:

Table 2.2: List of selected electric two wheeler manufacturers and distributers in China

List & profiles of selected electric two wheeler manufacturers and distributers In China (In English)

Item	Brand	Comapny	Headquarter
1.	**AIMA**	AIMA Hi-tech	Tianjin
2.	**AUCMA**	Qingdao AUCMA Electric S&T Co.,Ltd.	Qingdao, Shandong
3.	**BYVIN**	Shandong Bidewen Power Technology Co., Ltd.	Weifang, Shandong
4.	**CRANES**	Shanghai CRANES Electric Vehicles Co., Ltd.	Shanghai
5.	**DALUGE**	Nanjing Daluge Hi-Tech Stock Co., Ltd.	Nanjing, Jiangsu
6.	**FOREVER**	Zhonglu Co., Ltd.	Shanghai
7.	**GEOBY**	GEOBY Electric Vehicle Co., Ltd.	Changzhou, Jiangsu
8.	**Giant**	Giant (China) Co., Ltd., Giant Electric Vehicle	Kunshan, Jiangsu
9.	**Lima**	Shanghai Lima Electric Vehicle Manufacturing Co., Ltd.	Shanghai
10.	**Luyuan**	Zhejiang Luyuan Electric Vehicle Co., Ltd.	Jinhua, Zhejiang
11.	**Lvneng**	Lvneng Electric Bicycle Technology Development CO., LTD	Changzhou, Jiangsu
12.	**PHOENIX**	Shanghai Phoenix E-bicycle Wuxi Co., Ltd.	Wuxi, Jiangsu
13.	**Schwinn, Diamondback, Specialized, Scott, MBK, Repco, Apollo, Hodaka and Deki**	Shenzhen China Bicycle Company (Holdings) Limited	Shenzhen
14.	**SUNRA**	Jiangsu Xinri E-Vehicle Co., Ltd.	Wuxi, Jiangsu
15.	**Yadea**	Jiangsu Yadea Technical Development Co., Ltd.	Wuxi, Jiangsu

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Table 1.1 E-bicycle definitions by region, World Markets

Region	Top Speed	Electric Motor Size	Other Requirements
United States	<20 mph (<32 kph)	Max 750W	Has operating pedals
Canada	<20 mph (<32 kph)	Max 500W	Vehicle weighs less than 120kg; has operating pedals
Western Europe	<15.5 mph (<25 kph)	Max 250W	Motor operates during pedaling only (Pedelecs)
Eastern Europe	<15.5 mph (<25 kph)	Max 250W	Has operating pedals; some markets require motors only operate during pedaling
China	≤12.4 mph (≤20 kph)	No limit	Has operating pedals; 40kg max weight
Rest of Asia Pacific	≤15.5 mph (≤25 kph)	Max 250W	Has operating pedals
Latin America	<15.5 mph (<25 kph)	Max 250W	Has operating pedals
Middle East	≤15.5 mph (≤25 kph)	No limit	Has operating pedals
Africa	≤15.5 mph (≤25 kph)	No limit	Has operating pedals

Table 1.2 E-scooters & e-motorcycle definitions by region

Region	E-scooters	E-motors
Nother America	20 mph (32 kph) <Top speed ≤ 30 mph (48 kph)	Top speed >30 mph motor size >3 kw
Western Europe	15.5 mph (25 kph) <Top speed ≤ 28 mph (45 kph)	Top speed >28 mph
Eastern Europe	15.5 mph (25 kph) <Top speed ≤ 28 mph (45 kph)	Top speed >28 mph
China	12.4 mph (20 kph) <Top speed ≤ 31 mph (50 kph)40 kg (max weight)<Top speed ≤ 31 mph (50 kph)	Top speed >31 mph
Rest of Asia Pacific	15.5 mph (25 kph) <Top speed ≤ 31 mph (50 kph)Vehicle weight over 40 kg	Top speed >31 mph
Middle East/Africa	15.5 mph (25 kph) <Top speed Vehicle weight over 50 kg	Top speed >31 mph

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Statistics - Global:

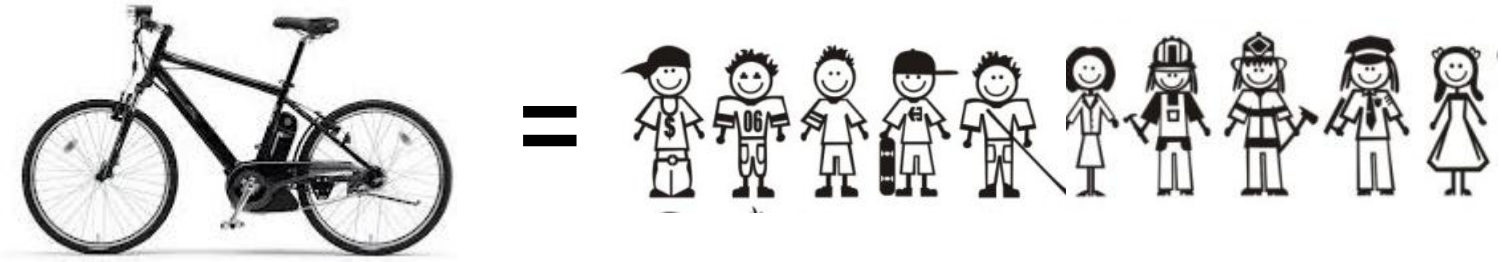
- In 2012
  Sales: 30 million units
  Revenue: $ 6.9 billion

- In 2018:
  Sales: more than 47 million
  Revenue: $ 11.9 billion

7.5% compound annual growth rate (CAGR)

(Pike Research, 2012)

10 Chinese



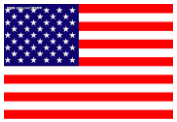
Approximately every ten Chinese owns an e-bicycle, or
an e-scooter, or
an e-motorcycle.

Statistics - China:

- **Ownership**: 150 million by now
- In 2012

  Output: 35 million units
- Export: 875,000, 2.5 % in the total output
- **Major export destination**s:



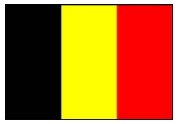


USD 60.5 m
14.2%

USD 46.2 m
10.85%

USD 41.7 m
9.80%



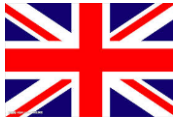



Table 2.1 Market comparison of electric bicycles among major markets

	Asia Pacific / China	West Europe	North America
General description	-The biggest & most concentrated area for manufacture, distribution & market; -Fragmented marketplace;-Low-cost products and batteries, sealed lead acid battery as the mainstream;	High-cost, high-quality;	UnderperformanceMergers and acquisitions;
Estimate sales in 2012/ global share	28 million / 92%	782,512	105,682
Anticipated sales in 2018/ global share	42.4 million / 89%	1.5 million	342,526
Average cost	$167	$1,546	$815
Lithium ion (Li-ion)battery penetration	4%	65%	56%

Features of China's market:

- **Affordability**

  Price in China: 1400 ~ 1800 RMB (≈228 ~ 294 USD)

  High end product: 4000 RMB (≈652 USD)

  A li-on battery costs 1000 RMB (≈160 USD) more than a SLA battery

  Pay back within 1 ~ 2 years of purchase;

- **Manufacturers & distributors**

- **Battery technology**: from 2012 to 2018

  Global li-on batteries: 6% to 12%

  China: 4% to 10% e-scooters and 15% e-motorcycles

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Market Analyst, Beijing, China

Market trend

1 Down-slowed growth, and demand for industry transformation

2 Domestic relocation

3 Acceleration of industry consolidation, with market fragmenta

4 Battery materials from SLA to Li-ion

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1. Ambiguity in regulations:

Contrasting the current & new national standard

	The current national standard	The new standard
Year of effect	**1999**	**2013 (provisional)**
Top speed	**20 kph**	**26 kph**
Speed limiter	**Have but dismountable;**	**Indismountable speed sensor to cut off the electricity if beyond the limit;**
Sub-categorization	**None, top speed ≤ 20 kph, max weight: 40kg**	**Into three types:Intelligent, pedelec and pure electoric type based on road condition and locations;**
Number of technical terms	**34**	**54** **Concepts of safety: mechanical safety, electricity safety, and driving safety.**

2. Hyper fast & safety issue & health risks

3. Lead poisoning, battery recycling

In Beijing, around 30,000 ~ 50,000 ton SLA batteries to be recycled & processed, but about 80 percent went to illegal channe in 2011.

Lead-acid battery
pollution prevention and
occupational health protection

By end of July in 2011, about 80 percent of the 1930 registered SLA production, assembling and recycling companies were closed.

Table 2.3 Contrast of Li-on batteries and SLA batteries

	Merits	Defects
Sealed lead acid batteries 	**Low cost;**	**Heavy, short durability (approx. 300 cycle times, long charging time (6~8 h), lead poisoning, poor performance in low temperature;**
Lithiom batteries 	**Light, larger capacity, long durability (Lithium iron as much as 2000 cycle times), fast charging (2~3 h), clean in production & use;**	**Low stability;**

4. Charging facilities to be developed

Table 1.4 Charging infrastructure developement in China

Year	City	Infrastructure
2006	Shenzhen	**BYD built up the first charging stations for electric cars;**
2008	Beijing	**Setting up the first domestic centralized charging station for the Olympics, which can provide charging for 50 pure electric buses;**
2009	Shanghai	**Shanghai Power Company invested the first commercial charging station in China.**
2009	Beijing	**The first demonstration charging station project which has the complete intelligent control system;**
2009	Shenzhen	**2 charging stations with 134 charging piles in operation;**
2010	Tangshan	**The State Grid sets up its first modelling charging station, which can charge 10 electric cars, in two models: fast charging and slow chargin.**

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1 More reality-sensible and meaningful regulation;

2 Effective management system;

3 Establishing effective monitor system for battery recycle and disposal;

4 Battery and motor improvement;

5 Electricity supplying infrastructure;

- 6 Electric two wheelers as public transporation

Electric two wheelers as public transporation

Wuhan: 100 e-bicycles

Chongqing,

Hangzhou,

...

Combination of e-bicycles and public renting system will further amplify the positive environmental effect of electric two wheelers and better solve the traffic congestion and pollution issues.

It is advised that li-ion battery e-bicycles are used in the public renting system, with the renting system jointed invested by local governments, electric two wheeler manufacturers, as well as private companies and individuals.

Paper available in July at UN DSD website