



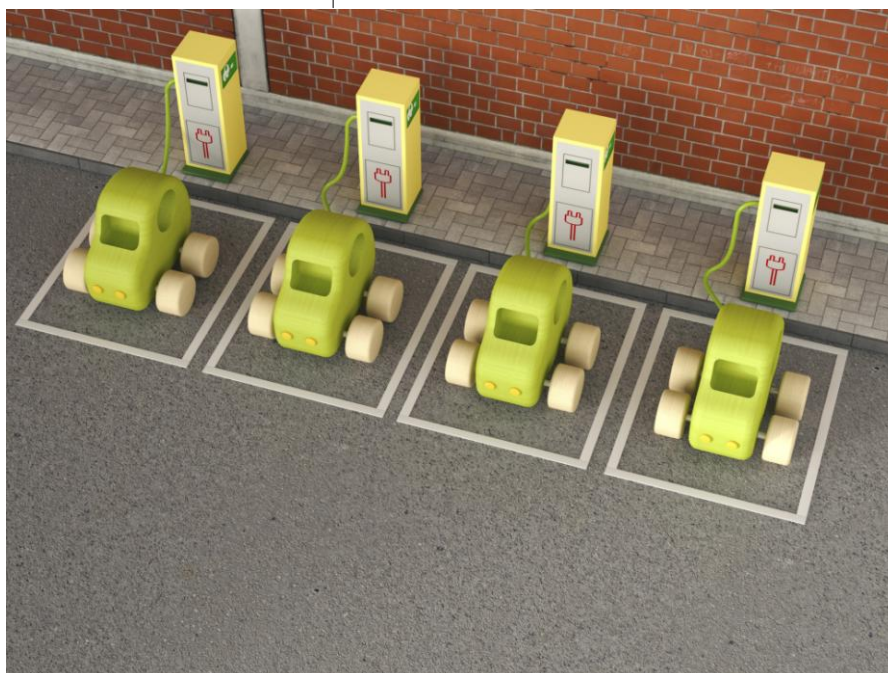
Fundamental, Incisive,
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Industry
China Autos

Date
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Asia
China
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Components

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F.I.T.T. for investors

What you should know about China's new energy vehicle (NEV) market

Many players, but only a few are making meaningful earnings contributions

One can question China's target to put 5m New Energy Vehicles on the road by 2020, or its ambition to prove itself a technology leader in the field, but the surge in demand with 171k vehicles sold in 4Q15 cannot be denied. Policy imperatives and government support could ensure three-fold volume growth by 2020, which would make China half of this developing global market. New entrants are proliferating, with few clear winners as yet, but we conclude that Yutong and BYD have the scale of NEV sales today to support Buy ratings.



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Clear intentions by the government and OEMs to drive up NEV ownership

At a national level, by promoting the NEV industry, China can 1) reduce air pollution, 2) import less oil, and 3) compete globally for the latest auto technologies. Long-term, China could go a long way to achieve self-sufficiency along the whole industry supply chain. For auto manufacturers, NEV adoption is also vital to achieve their mandated fuel economy targets by 2020.

Most barriers are being tackled by monetary and regulatory initiatives

A lack of infrastructure support and the price premium of NEVs are the most obvious barriers to stimulating real demand – their current premium is as much as 90-175%. Government policy and existing subsidy support are critical to stimulate demand currently but falling battery costs will narrow the price gap in the medium to long run. DB estimates powertrain costs could be cut 33% by 2020 (from the 2014 level). Nonetheless, we have concerns over the financial burden that subsidies place on local governments, and we think that an emission credit trading system could be a viable long-term solution beyond 2020.

China requires a 33% NEV volume CAGR to reach 2020 ownership target

Sales have surged, with a 4-year increase of 40x in 2011-15 and 4Q15 growth of 4.4x, before a slowdown recently as subsidy cuts took effect, and while a subsidy cheating investigation is taking place. We project a 5-year sales CAGR of 33%, with China accounting for half of global EV/PHEV demand by 2020E. In our opinion, the constraints surrounding infrastructure (charging stations and poles) and production capacity can be resolved to enable this growth.

An increasingly crowded sector with limited almost-pure plays

Among major auto manufacturers, BYD and Yutong have the largest NEV sales contributions in absolute and percentage terms vs. peers. The countless other traditional/non-traditional auto manufacturers/suppliers in the market are unlikely to record crucial NEV-related earnings contributions in the near future. In the upstream segment, strong China NEV sales should stimulate demand for lithium, and our Metals & Mining team rates Ganfeng a Buy (70.46 CNY).

Yutong is our top pick for NEV bus leadership and low valuation as NEV play

We initiate coverage on Yutong with a Buy rating, based on its leadership in the bus segment (26% share of NEV sales) and an undemanding valuation of 12x. We upgrade BYD-H to Buy on its enhanced earnings outlook as the scale of NEV sales begins to materially drive earnings. We also highlight SAIC Motor and BAIC Motor, which have been adding weight to their NEV business. We therefore envision higher sales with new products and favorable local government policies for these two names. Key sector upside risks are incremental policy support and falling NEV costs. Key sector downside risks are lower subsidies, technology replacement, and over-competition.

Key Changes

Company	Target Price	Rating
1211.HK	47.00 to 50.80(HKD)	Hold to Buy
600066.SS	- to 25.90(CNY)	NR to Buy
002594.SZ	39.50 to 42.60(CNY)	-

Source: Deutsche Bank

Top picks

Yutong Bus (600066.SS),CNY21.66	Buy
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Source: Deutsche Bank

Companies Featured

BYD (1211.HK),HKD42.15	Buy
	2015A 2016E 2017E
P/E (x)	28.7 25.4 18.4
EV/EBITDA (x)	12.1 9.7 8.0
Price/book (x)	2.7 2.5 2.2
BAIC Motor (1958.HK),HKD5.40	Buy
	2015A 2016E 2017E
P/E (x)	15.5 7.7 6.5
EV/EBITDA (x)	6.6 3.3 2.6
Price/book (x)	1.4 0.9 0.8
SAIC Motor (600104.SS),CNY19.81	Buy
	2015A 2016E 2017E
P/E (x)	8.6 6.7 6.1
EV/EBITDA (x)	5.2 3.2 2.5
Price/book (x)	1.3 1.1 1.0
Yutong Bus (600066.SS),CNY21.66	Buy
	2015A 2016E 2017E
P/E (x)	13.6 13.1 11.8
EV/EBITDA (x)	7.7 7.3 6.4
Price/book (x)	3.9 3.6 3.0
BYD-A (002594.SZ),CNY58.56	Sell
	2015A 2016E 2017E
P/E (x)	50.4 41.9 30.4
EV/EBITDA (x)	18.5 14.1 11.7
Price/book (x)	4.9 4.1 3.6

Source: Deutsche Bank

In this report we change ratings, target prices and estimates for several companies under coverage. Please refer to the company specific sections for further details.



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Executive summary

Stimulating NEV sales on all fronts in China

The development of China's new energy vehicle (NEV) market has been in the limelight since the early part of this decade, with obvious government initiatives to: 1) tighten emission standards to close the gap with developed regions; 2) contain overall fuel consumption to alleviate reliance on imported oils; and above all, 3) gain ownership of the latest vehicle drivetrain technologies, in particular those for electric vehicles (EV) and plug-in electric vehicles (PHEV), so as to be competitive with global peers in the long run.

With battery costs still high, a significant price gap exists between China's NEVs and its comparable internal combustion engine (ICE) vehicles. To address insufficient charging facilities, the central and local governments are now heavily subsidizing NEV purchases and the cost of setup of charging networks. Such efforts are augmented by local governments' favorable policies on NEV usage, like free license plates in Shanghai. That led to a surge in NEV sales volume in 2014-15, especially in Beijing and Shanghai, where about 70% of China's NEVs were sold in 2015, by our estimates.

Yet, with such a rapid increase in NEV sales, we are concerned about the implied financial burden on the government, especially at the local level. Already, there are plans to scale back subsidies over the next five years and we believe the government should follow up with a new NEV credit trading system.

The public transportation market will be equally as important as supporting demand from private car owners. In fact, the ability to quickly change emission levels by overhauling the public bus transport system is already recognized by government targets to have 200,000 public NEV buses by 2020. This has had an immediate effect on demand, with about 60% of all commercial NEV sales going to public bus companies, by our estimates.

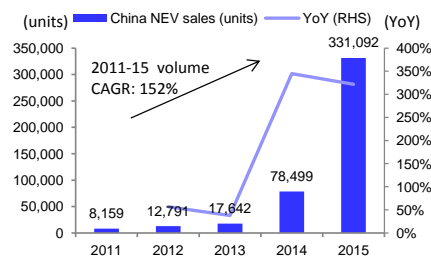
We envision 33% demand CAGR in 2016-20E

Considering the government's target of 5m units of NEVs on the road by 2020E, along with accompanying charging infrastructure, we expect China's NEV sales to have a 33% CAGR in 2015-20E. Our 2020 sales forecast of 1.36m units implies China's NEV sales will account for about 4.5% of the country's vehicle sales and 50% of global EV/PHEV sales.

The market will likely get crowded

With a rapid sales growth trajectory and the incentive of government support, the China NEV sector has attracted numerous participants along the supply chain, including even non-traditional entrants, e.g. internet companies. However, among the NEV manufacturers in Hong Kong/China, we think that Yutong and BYD (H-shares) make the best investments for their meaningful NEV contributions.

Figure 1: China NEV sales volume



Source: China Association of Automobile Manufacturers (CAAM), Deutsche Bank



Yutong is the leader in the new energy bus segment, with a comprehensive new energy bus model portfolio. We estimate the company will deliver a 35.4% new energy bus sales volume CAGR in 2015-18 and an 11.1% FY15-18E three-year earnings CAGR. We initiate coverage on Yutong with a Buy recommendation.

BYD's conventional auto sales figures have been weak, with total house-brand PV volume falling 12.6% YoY in 4M16, but demand for its house-brand passenger NEVs and commercial NEVs (sales up 121.3% and 34.4% YoY growth during the same period) has more than overshadowed ICE car sales weakness. The company is also showing a significant margin lift in these NEV products. We thus raise our earnings forecast for FY16-18E by 18.3-20.0%. With this increased earnings outlook, we upgrade its H-shares to Buy.

Our Metals & Mining team also has a Buy recommendation on Ganfeng Lithium (002460.SZ).

Figure 2: Zhengzhou Yutong Bus and BYD – valuation comparison as of 17 May 2016

Name	Ticker	Rating	TP (Local currency)	Price (Local currency)	Mkt cap (USDm)	P/E (x)		EPS growth (%)		P/BV (x)		EV/EBITDA (x)		ROE (%)	
						2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E
Zhengzhou Yutong Bus	600066.SS	Buy	25.9	21.58	7,324	13.1	11.8	12.5	11.1	3.57	3.02	7.3	6.4	29.3	29.9
BYD H-shares	1211.HK	Buy	50.8	42.80	13,651	25.8	18.7	22.4	37.8	2.49	2.20	9.8	8.1	10.2	12.5

Source: Company data, Reuters, Deutsche Bank estimates

Figure 3: Key operating and financial metrics of BYD and Yutong's NEV business

BYD		Yutong	
2015 house brand NEV sales	62,893 units (up 2.0x YoY)	2015 NEV sales	20,445 units (up 1.8x YoY)
2015 NEV sales volume as % of total sales volume	14.1%	2015 NEV sales volume as % of total sales volume	30.5%
2015 sales volume market share*	19.0%	2015 sales volume market share**	23.6%
2015 NEV sales revenue	RMB19.0bn (up 1.6x YoY)	2015 NEV sales revenue	RMB14.0bn (up 1.5x YoY)
2015 NEV revenue as % of total revenue	24.4%	2015 NEV revenue as % of total revenue	44.8%

* Amongst all NEV sales; ** Amongst commercial NEV sales
Source: Company data, CAAM, Deutsche Bank

Risks

Key sector upside risks are incremental policy support and falling NEV costs. Key sector downside risks are sliding subsidy levels, technology replacement, and over-competition.



The big picture

Key points

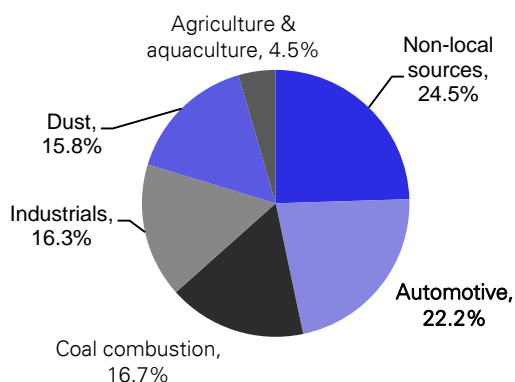
- We identify three key incentives for the Chinese government to promote the NEV market: 1) environmental concerns; 2) less oil import reliance; and 3) ownership of the latest auto technologies.
- Auto manufacturers are increasingly keen on NEV adoption, as it is a crucial means to achieve compliance with mandated 2020 fuel economy limits, while we also see opportunities in conventional hybrid technologies.
- Domestic Chinese auto manufacturers have a wide conventional engine technology gap vs. global peers; excelling in NEV technologies will help them close the gap for future auto drivetrain technology, in our view.

Why push for NEV consumption?

Air pollution reduction is an increasingly pressing task

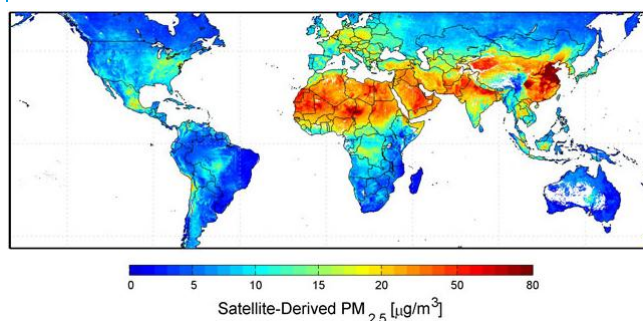
About two-thirds of Chinese cities exceed the air pollution limits specified by the Environmental Air Quality Standards, according to China's State Information Center. Rapid increase in internal combustion engine (ICE) vehicle ownership and the consequent traffic congestion, especially in large Chinese cities, are perceived to contribute significantly to carbon dioxide and other harmful gas emissions, and the level of inhalable particulate matter (PM). This makes China one of the most polluted countries in the world.

Figure 4: PM2.5 sources in Beijing



Source: State Information Center

Figure 5: Global PM2.5 Pollution Index*

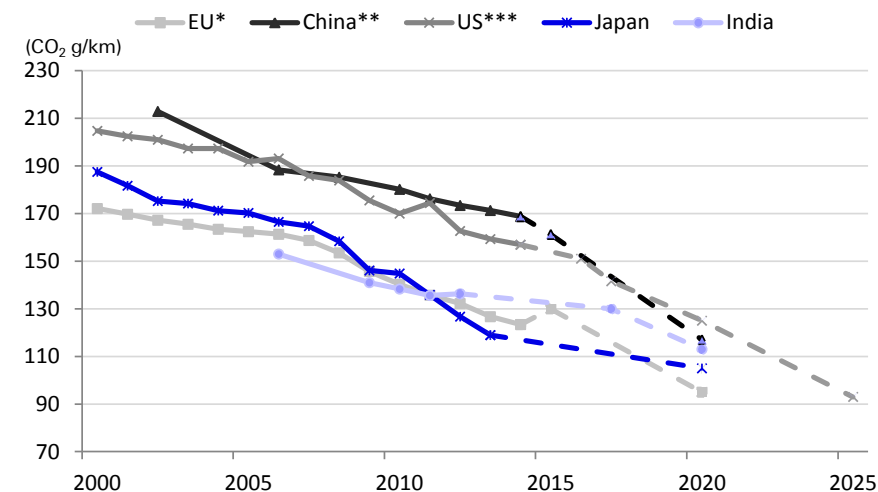


* Global satellite-derived map of PM2.5 averaged over 2001-2006.
Source: NASA, Dalhousie University

To curb environmental pollution and improve air quality, various countries have implemented or tightened policies to gradually reduce fuel consumption and/or harmful gas emission. China also has tightened requirements for emission and fuel consumption. Since the country had a slower start in emission controls (Figure 6), it should be one of the fastest to tighten emission controls to catch up with developed countries (e.g. the EU and Japan) (Figure 7).



Figure 6: Comparison of global auto emission regulations



* EU passenger car emission standards
** China's target reflects gasoline fleet only
*** For passenger cars only. US fuel economy standards set by NHTSA (National Highway Traffic Safety Administration) reflecting tailpipe GHG emission
Source: European Commission, International Council on Clean Transportation (ICCT), Deutsche Bank

Figure 7: Comparison of fuel economy regulations

Country/Region	Metric	2015 Target	2020E Target	2025E Target	MPG (CAFE equivalent)		
					2015 MPG Target	2020E MPG Target	2025E MPG Target
US	Fuel economy/GHG	32.6 mpg / 283g/mile	N/A	54.5 mpg / 157g/mile	32.6 mpg	38.3 mpg	54.5 mpg*
EU	CO2	130g/km	95g/km	N/A	54.2 mpg	58.0 mpg	71-81 mpg
China	Fuel consumption	6.9L/100km	5.0L/100km	N/A	34.1 mpg	47.0 mpg	N/A
Japan	Fuel economy	17km/L	20.3km/L	N/A	47.0 mpg	55.0 mpg	N/A
India	CO2	135g/km	N/A	N/A	46.5 mpg	N/A	N/A

* 54.5mpg combined 2025 EPA target is based on 163 g/mile CO2 emissions, partially achieved through reduced A/C system leakage
Source: IHS, Deutsche Bank

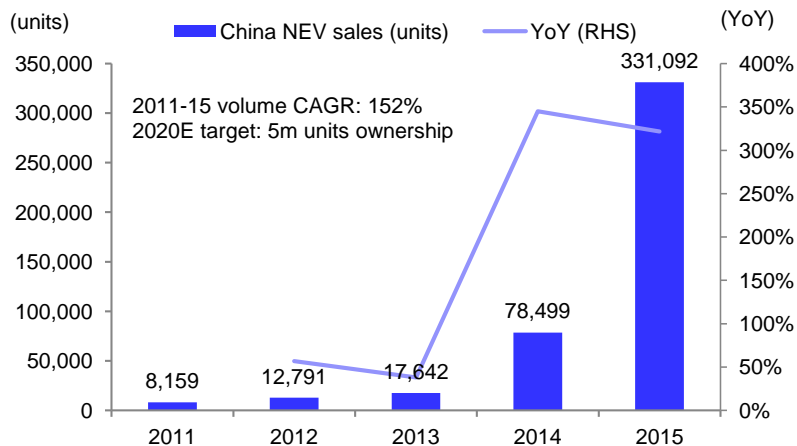
While countries have multiple means to lower auto emission, e.g. diesel adoption and using conventional hybrid engine technologies, China has placed a greater emphasis on using electric vehicle (EV) or plug-in electric vehicle (PHEV) technologies. To this effect, the State Council in 2012 issued a roadmap for China's NEV industry development, *The 2012-2020 Development Plan for Fuel-efficient and New Energy Vehicle Industry*.

The Chinese government targets 5m units of NEV ownership by 2020E

According to the plan, the government targets an accumulated NEV (including EVs and PHEVs) sales volume of 500k units by 2015 and 5m units by 2020E, with an annual NEV production capacity of 2m units by 2020E. Despite rapid growth in NEV sales volume in 2012-14, the absolute sales volume was meager in China, making up less than 0.2% of its vehicle sales during the period and falling way short of its 2015 target ownership level. However, NEV sales catapulted in 2015 at a 3.4x YoY growth rate and made up 1.3% of China vehicle sales (Figure 8). Aggregate NEV sales also approached closer the 2015 target NEV fleet size. In our view, soaring demand for NEVs in China is fueled by massive government subsidies and policy support (to be discussed in the next section).



Figure 8: China annual NEV sales volume and growth trend



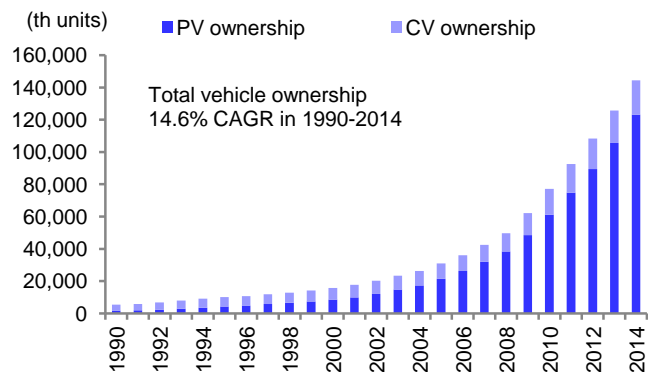
Source: CAAM, Deutsche Bank

China reduces reliance on crude oil imports

Together with the development of the Chinese economy, growth of automotive ownership in China has resulted in a rapid increase in oil consumption. To elaborate, vehicle ownership grew from 5.5m units in 1990 to 146.0m units in 2014 (representing a 24-year CAGR of 14.6%), while crude oil consumption increased from 117.6m tons in 1990 to 544.3m tons in 2015 (at a 25-year CAGR of 6.3%).

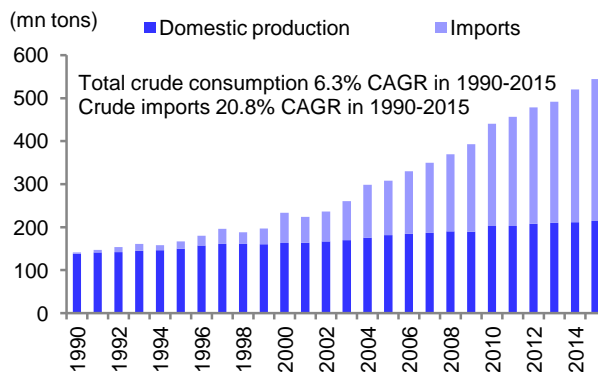
According to the National Bureau of Statistics, China imported about 330m tons of crude oil in 2015, accounting for about 61% of the country's total crude consumption. The nation is increasingly dependent on global crude supply to fuel its economic development and expanding vehicle fleet size. We think the Chinese government is uncomfortable about such high oil import reliance and hence would make efforts to lower that, i.e. by improving ICE fuel efficiency and to popularize NEV usage.

Figure 9: China vehicle ownership



Source: CEIC

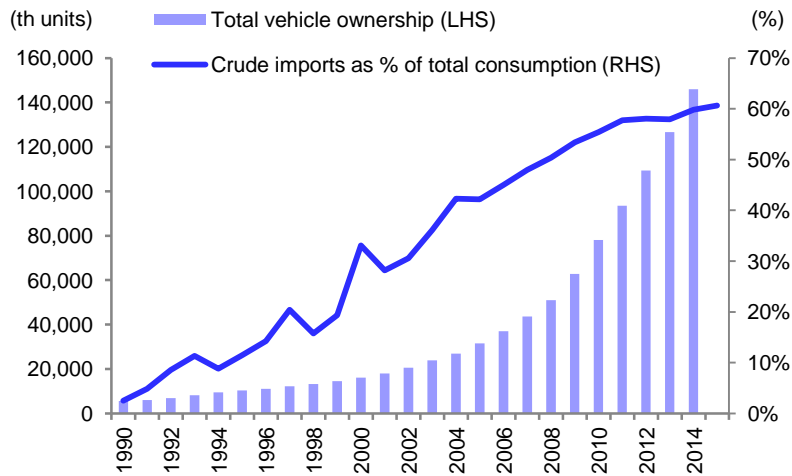
Figure 10: Crude oil output and import volume



Source: National Bureau of Statistics



Figure 11: Vehicle ownership growth vs. crude oil consumption



Source: CEIC, National Bureau of Statistics

A crucial means for OEMs to achieve fuel efficiency targets

As mentioned earlier, China's Ministry of Industry and Information Technology (MIIT) has asked the country's auto manufacturers to comply with the volume-based weighted-average fuel consumption limit of 6.9L/100km by 2015 and 5.0L/100km by 2020. For auto groups that fail to achieve the targets, MIIT will block their new model registrations and new capacity expansion plans, if any. Besides these, manufacturers could be subjected to heavy fines if they continue to breach the 5L/100km limit beyond 2020E.

*Fuel consumption target:
5.0L/100km by 2020E*

In June 2015, MIIT released an update on fuel consumption requirements for passenger cars and reiterated the consumption target for 2014. Among the 116 auto manufacturers that MIIT examined, 38 failed to comply with the respective targets set for 2014, according to the announcement (Figure 12).

We do not think the 2015 target is hard to achieve. Most manufacturers can probably comply by cutting old fuel-insufficient models, utilizing more compact turbo-charged engines, introducing newer fuel-saving technologies such as engine start-stop function, and launching NEVs. Yet, we foresee that OEMs, especially high-fuel-consuming SUV and/or premium-focused manufacturers, will be more incentivized to launch more NEVs to lower their average consumption level.

That being said, even if one assumes 2020E ICE vehicles could achieve average fuel efficiency of 5.5L/100km, a 10% EV sales penetration will still be required theoretically. This equation appears to be impossible (more discussion on this in the sections ahead), and hence we think a window of opportunity still exists for conventional hybrid vehicles, like those pioneered by Toyota (7203.T) to help lower fuel consumption.



Figure 12: China – a sample of major auto entities' average fuel consumption

Local auto production entity	2014 production (units)	Avg. fuel consumption (L/100km)		
		2014 target	2014 actual	Complied
BYD (partial)	210,269	7.29	6.24	Yes
Dongfeng Honda	320,293	8.16	7.75	Yes
Dongfeng Nissan	936,133	7.42	6.78	Yes
Dongfeng Yueda Kia	644,166	7.28	7.00	Yes
Guangqi Honda	511,191	7.67	6.89	Yes
GAC Toyota	379,923	8.10	7.89	Yes
Brilliance BMW	287,340	8.85	7.06	Yes
Chery	323,486	7.44	7.15	Yes
SAIC Roewe	170,165	7.50	7.22	Yes
Shanghai GM (Shenyang)	385,448	8.13	8.01	Yes
Shanghai GM Dongyue	636,884	7.34	6.82	Yes
Shanghai GM	658,844	8.13	7.86	Yes
Shanghai GM Wuling	1,545,177	7.14	7.08	Yes
Shanghai Volkswagen	1,718,438	7.53	6.86	Yes
Dongfeng PSA	716,032	7.61	7.32	Yes
Chang'an Ford	749,333	8.00	7.16	Yes
Great Wall Motor	579,628	7.93	7.11	Yes
Zhejiang Haoqing (part of Geely)	201,355	7.25	7.06	Yes
Zhejiang Geely	155,228	7.13	6.16	Yes
Chang'an own brand	927,955	7.13	6.66	Yes
Tianjin FAW Toyota	441,876	7.20	6.40	Yes
FAW Besturn/Mazda/Red Flag	296,366	8.05	8.18	No
GAC Trumpchi	136,546	8.33	8.55	No
BAIC Group Yinxiang	162,954	7.15	7.34	No
Imports				
Mercedes Benz	146,204	9.64	8.15	Yes
BMW	193,131	9.31	7.95	Yes
FAW Import (Audi)	84,197	9.75	8.59	Yes
Toyota	100,247	9.29	8.51	Yes
Jaguar Land Rover	127,210	10.35	9.38	Yes
Chrysler	128,052	9.37	9.43	No

Source: Ministry of Industry and Information (MIIT), Deutsche Bank

Why promote mainly EVs and PHEVs, not hybrids?

Diesel adoption and conventional hybrid technologies are mainstream routes by which to lower fuel consumption and emission. Thus, the market may wonder why the Chinese government is aggressively pushing the adoption of EVs and PHEVs to combat environment pollution, rather than using conventional hybrid cars and ICE efficiency improvement as a transitional measure first.

To begin with, we believe EV and PHEV are the most direct technology measures to achieve low fuel economy. We think improving the efficiency of ICEs will become more and more costly to do, despite their low combustion efficiency (i.e. power conversion ratio), and the marginal cost of improving a traditional ICE will keep increasing.

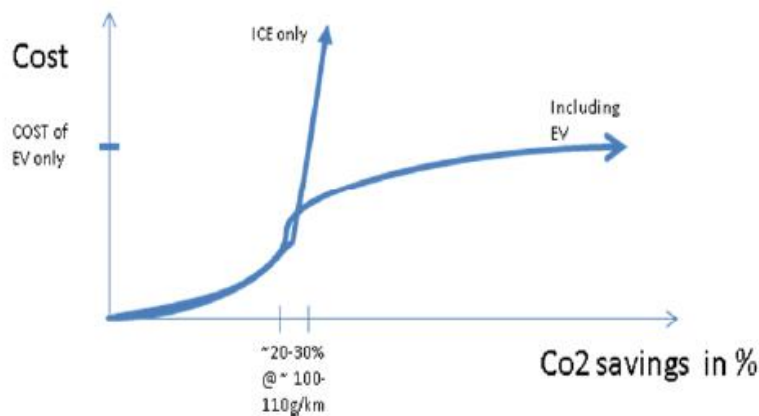
Costly to comply with China's 2020E emission target through the efficiency improvement of ICE vehicles



Here is a recap of the US case study by DB's US auto team: The new US regulations adopted in August 2012 will compel automakers to steadily improve fuel economy, with a series of annual increases that target 38 MPG by 2020E (real world fuel economy of 32 MPG), and ultimately reaching 54.5 MPG by 2025E (real world target is 45 MPG). Based on the team's proprietary analysis of fuel economy and vehicle safety mandates, it believes the average US vehicle will experience at least USD1,000 of cost inflation related to fuel economy mandates over the next 5 years and >USD2,000 over the next 10 years. This estimate is net of cost savings. Moreover, based on discussions with major suppliers, our US auto team has determined that US automakers are prioritizing technologies that improve fuel economy at a cost of USD50 per 1% improvement.

US automakers are currently prioritizing technologies that improve fuel economy at a cost of USD50 per 1% improvement

Figure 13: Schematic understanding of cost curves for US automakers



Source: Deutsche Bank estimate

To further trim carbon dioxide emission, the cost of improving ICE technologies could only become prohibitive; hence EV inclusion will be necessary

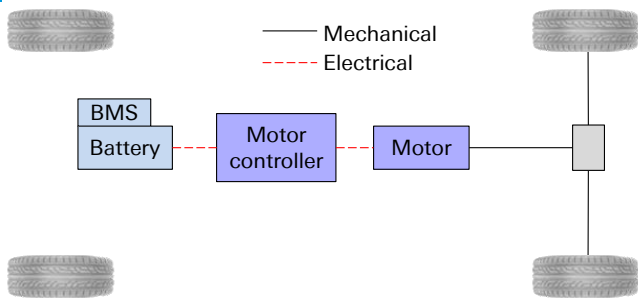
We think a similar trend is in store for Chinese manufacturers, not to mention that most of them are lagging behind their global peers' ICE technologies, and further investment into an aging product does not make sense, in our opinion. In addition, from a technology perspective, NEVs are simpler to assemble than conventional hybrid vehicles, especially those using powertrain and transmission systems.

In our China auto trip in April, we met with William Cai, Chief Technology Officer at Jing-Jin Electric Technologies, a Chinese auto part company making electric machines for hybrid-electric vehicles (HEVs), EVs, and other fuel-efficient vehicles. He thinks that from a strategic perspective, Chinese companies currently unable to possess all the technologies to make ICE cars, and still rely on overseas brand suppliers for fuel injection systems. By contrast, Chinese manufacturers can theoretically produce a whole EV, based on their technologies and part supplies. This incentivizes the government to promote EV adoption, not to mention that a surge in EV demand could also drive electricity demand, especially for renewable energy.

All in all, we think the adoption of EV/PHEV technologies as a mainstream measure will allow Chinese OEMs to narrow their technology gap with global peers in the future car segment.

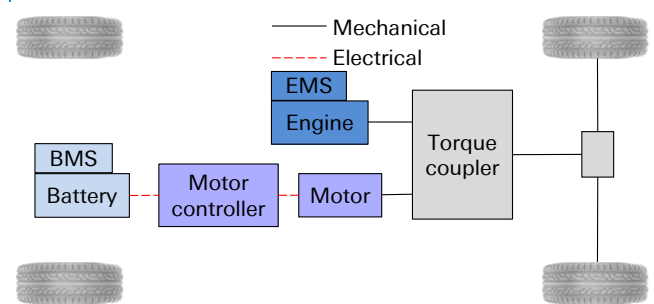


Figure 14: Basic EV architecture



BMS – Battery management system
Source: Deutsche Bank

Figure 15: Basic PHEV architecture (parallel system)



EMS – Engine management system
Source: Deutsche Bank



The challenges

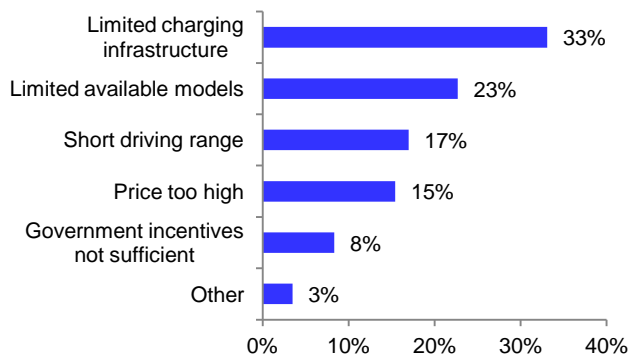
Key points

- We identify three key challenges for the current NEV market: 1) insufficient infrastructure support; 2) the NEV price premium; and 3) an increasing number of industry participants.
- On infrastructure and product pricing concerns, the government's policy push and subsidy support should help spur NEV demand while declining battery cost would help to narrow the price gap.
- Meanwhile, market expectation of a much bigger NEV fleet in the future has attracted non-traditional auto/part companies to enter the industry, raising the risk of more intensive future competition.

Infrastructure, a mental barrier to be removed gradually

One common concern that holds back individual NEV consumption is the limited availability of charging networks, in our view. In a proprietary survey of Chinese car owners conducted by Deutsche Bank in late 2014, we found that inadequate charging infrastructure build-out appeared to be the largest concern for potential buyers (Figure 16). For detailed survey results, please refer to our FITT report, "What do the upgraders say?" dated 18 Nov 2014.

Figure 16: Car owners' reasons for not considering NEVs



Source: China Auto Market, Deutsche Bank

In our view, the lack of existing infrastructure networks is due to 1) a lack of space, in particularly around older residential communities, to set up charging poles, and 2) limited potential financial return to make it worthwhile to establish charging networks, especially high-voltage fast-charging stations.



Figure 17: Construction cost estimate for charging poles and charging stations in China

	Charging time	Construction cost (RMB)
Slow charging pole	5-8 hours to full charge	~20,000
Fast charging pole	1 hour to full charge	100,000-200,000
Charging station*	NA	Several millions to 1bn+

* The construction cost of a charging station with 10+ charging poles, include the infrastructure, power distribution, and operation costs, but excludes land use fees

Source: Soku news, Sina news, Liao Wang Institution, Deutsche Bank

Nevertheless, we notice that the Chinese government has issued three major policies in the past three years to promote the construction and commercial operations of NEV charging infrastructure (Figure 18).

Figure 18: List of major NEV charging infrastructure policies

Date	Policy	Brief comments
July 2014	Guidelines to Promote the Adoption of New Energy Vehicles 国务院办公厅关于加快新能源汽车推广应用的指导意见	1) Encouraging private capital to invest in infrastructure construction; 2) Granting admission to the commercial operations of charging stations
September 2015	Guidelines to Promote the Construction of Charging Infrastructure for New Energy Vehicles 国务院办公厅关于加快电动汽车充电基础设施建设的指导意见	1) Targeting sufficient charging capacity installed to satisfy charging needs for at least 5m NEVs by 2020; 2) Continuing to encourage private capital investment and commercialized operations of charging stations; 3) Requiring newly-constructed residential properties to equip all parking lots with charging facilities or upgrade capacity to accommodate charging poles in future; 4) Requiring large-scale commercial buildings and public parking places to have at least 10% of their parking bays equipped with charging facilities; 5) Requiring local governments to build at least one public charging station for every 2,000 units of NEV ownership; 6) Applying preferential tariffs to commercial electric charging stations
January 2016	Notice of Incentive Policy on Charging Infrastructure for New Energy Vehicles in the 13th Five-Year Plan 关于“十三五”新能源汽车充电基础设施奖励政策及加强新能源汽车推广应用的通知	1) Central government to allocate dedicated fiscal funds to subsidize charging infrastructure construction and operations during 2016-20; 2) Local governments are required to establish detailed local NEV promotion plans and eliminate local protectionism in NEV subsidies and charging facility operations

Source: China's State Council, Ministry of Finance (MOF), Ministry of Science and Technology (MOST), MIIT, National Development and Reform Commission (NDRC), National Energy Administration (NEA), Deutsche Bank

In the State Council's July 2014 document, *Guidelines to Promote the Adoption of New Energy Vehicles*, the council called to accelerate the construction of charging facilities by:

- Formulating development plans for charging infrastructure and industry technology standards;
- Incorporating adequate capacity of charging facilities in city planning, including public parking lots and commodity buildings;
- Establishing relevant policies on price schemes for vehicle charging;
- **Encouraging private capital to invest in infrastructure construction;**
- **Granting admission to commercial operations of charging stations;**
- Promoting R&D on key charging technologies, etc.

In line with the government's push, China's State Grid announced in May 2014 that it would open up charging pole infrastructure construction for NEVs to private investment. NEV owners can also have charging poles built for their own use at their own designated parking bays.



Extra papers were issued in late 2015 and early 2016 to 1) provide charging facility targets (for at least 5m NEV units), 2) encourage private capital investment, and 3) provide monetary incentives for charging network expansion (Figure 19).

Figure 19: 2016-20E China NEV charging infrastructure subsidy standards

Year	Key provinces/cities** for air pollution control			Central China*** and Fujian province			Other provinces		
	Min. NEV* sales (units)	Subsidy (RMBm)	Additional subsidy (RMBm)	Min. NEV sales (units)	Subsidy (RMBm)	Additional subsidy (RMBm)	Min. NEV sales (units)	Subsidy (RMBm)	Additional subsidy (RMBm)
2016	30,000	90.0	RMB7.5m for every additional 2,500 units of sales. Max subsidy RMB120m.	18,000	54.0	RMB4.5m for every additional 1,500 units of sales. Max subsidy RMB120m.	10,000	30.0	RMB2.4m for every additional 800 units of sales. Max subsidy RMB120m.
2017	35,000	95.0	RMB8.0m for every additional 3,000 units of sales. Max subsidy RMB140m.	22,000	59.5	RMB5.5m for every additional 2,000 units of sales. Max subsidy RMB140m.	12,000	32.5	RMB2.8m for every additional 1,000 units of sales. Max subsidy RMB140m.
2018	43,000	104.0	RMB9.5m for every additional 4,000 units of sales. Max subsidy RMB160m.	28,000	67.0	RMB6.0m for every additional 2,500 units of sales. Max subsidy RMB160m.	15,000	36.0	RMB3.0m for every additional 1,200 units of sales. Max subsidy RMB160m.
2019	55,000	115.0	RMB10.0m for every additional 5,000 units of sales. Max subsidy RMB180m.	38,000	80.0	RMB7.0m for every additional 3,500 units of sales. Max subsidy RMB180m.	20,000	42.0	RMB3.2m for every additional 1,500 units of sales. Max subsidy RMB180m.
2020	70,000	126.0	RMB11.0m for every additional 6,000 units of sales. Max subsidy RMB200m.	50,000	90.0	RMB8.0m for every additional 4,500 units of sales. Max subsidy RMB200m.	30,000	54.0	RMB4.5m for every additional 2,500 units of sales. Max subsidy RMB200m.

* NEV sales refer to unit sales of standard NEVs (passenger EVs with driving range over 150km and passenger PHEVs). Sales amount of other types of NEVs will apply a discount/premium ratio to standard NEVs when calculating total NEV sales.

** Including Beijing, Shanghai, Tianjin, Hebei, Shanxi, Jiangsu, Zhejiang, Shandong, Guangdong, and Hainan

*** Including Anhui, Jiangxi, Henan, Hubei, and Hunan

Source: MOF, MOST, MIIT, NDRC, NEA

To qualify for the aforementioned subsidies, local governments will have to 1) establish detailed local NEV promotion plans and regulations on charging facilities construction/operations; and 2) implement a unified national NEV promotion directory for eligible car models to avoid local protectionism in NEV subsidies and charging facility operations. This would in turn promote wider NEV adoption, in our view.

Figure 20: Examples of local governments' charging station targets

City/province	Target year	Number of charging poles (units)	Comments
China	2020	4,800,000	
Shanghai	2017	103,000	Number of charging poles as of end-2015: 21,700
	2020	211,000	
Beijing	2016	26,000	Number of charging poles as of end-2015: 21,000
Hebei province	2020	65,652	
Anhui province	2020	180,000	
Zhejiang province	2020	210,000	
Shenyang	2020	7,200	Additional 7,200 units of charging poles by 2020E vs. 2015
Zhongshan, Guangdong	2017	20,700	For new residential and commercial property projects, 10% ratio of charging poles to overall total car park area is required
Chongqing	2020	n.a.	For new property projects, 100% charging capability is required. For existing properties and public parking lots, a 10% ratio of charging poles to total car park area is required

Source: MIIT, Ministry of Transport (MoT), Sohu news, Anhui Government, Beijing Daily, Deutsche Bank

To conclude, as the infrastructure issue is already acknowledged and being actively addressed by the government with the help of various corporates, we expect concerns over limited charging facilities availability to be gradually removed and NEV demand to eventually improve.



Figure 21: Examples of corporate participation in setting up charging facilities in China

Company	Descriptions
BMW	In cooperation with China Potevio, BMW plans to build 1,000 charging poles in 12 cities by the end of 2016E
Tesla	Has built 3,644 charging poles and 616 charging stations around China
State Grid	Plans to build 10,000 charging stations around China in 2016-20E
Potevio	Plans to build 10,000 charging poles around Beijing by the end of 2018E
EV Power	Plans to build not less than 5,000 charging stations around China in 2016E
BAIC BJEV	Plans to build 10,000 charging poles by the end of 2016E

Source: Market news, Company press releases, Deutsche Bank

High price tags to be reduced in 10 years

Another factor that holds back NEV consumption, from consumers' viewpoint, is the price differential between an NEV and a conventional ICE vehicle of a comparable size (Figure 16). On our estimates, a manufacturer's suggested retail price (MSRP) of an NEV, even after government subsidy, is in general more than double the MSRP of its comparable ICE variant. The difference would be much less if we also included extra policy support, such as a purchase tax waiver (valued at 10% of ex-value-added-tax MSRP) and free license plates, as in the case of Shanghai (valued at about RMB80,000-90,000).

Figure 22: Price comparison of major Chinese NEV models and their counterparts in Shanghai

Company	NEV model	MSRP* (RMB)	Comparable ICE model	MSRP* (RMB)	NEV premium	Company	NEV model	MSRP* (RMB)	Comparable ICE model	MSRP* (RMB)	NEV premium
BYD	Qin PHEV	169,800	Surui	69,900	143%	BAIC	EV160 EV	102,800	Senova D20	48,800	111%
BYD	Qin EV	174,800	Surui	69,900	150%	BAIC	EV200 EV	133,900	Senova D20	48,800	174%
BYD	Tang PHEV	208,300	S7	106,900	95%	SAIC	Roewe e550 PHEV	185,800	Roewe 550	99,800	86%

*All MSRPs are for lowest-end trims and their options may vary. NEV MSRPs are based on ex-subsidy MSRP – 2016 central government subsidy – 2016 Shanghai government subsidy and exclude OEM incentives.
Source: Company data, Deutsche Bank

We believe the reason behind NEVs' higher selling prices is the still-high battery cost in electric powertrains, especially in EVs with longer driving distances. According to the FITT report, "Pricing The Car of Tomorrow", published by Deutsche Bank's global auto team in December 2014, a 47kWh battery pack (for a 200-mile driving range) cost USD10,575 in 2014, and it accounts for 91% of the total cost of an electric powertrain.



Figure 23: Cost trajectories of electric powertrains (USD)

	2014	2020	2025
Electric Powertrain	\$ 11,575	\$ 7,750	\$ 6,246
<i>\$/kWh</i>			
Cathode Materials	\$ 59	\$ 35	\$ 34
Anode Materials	\$ 19	\$ 15	\$ 14
Separator	\$ 14	\$ 10	\$ 6
Electrolyte	\$ 9	\$ 7	\$ 5
Other Materials	\$ 28	\$ 26	\$ 12
Total Materials	\$ 129	\$ 93	\$ 72
Cell Manufacturing	\$ 48	\$ 28	\$ 23
Cell Level Cost	\$ 177	\$ 121	\$ 95
Module & Pack Components	\$ 48	\$ 29	\$ 23
Pack Level Cost	\$ 225	\$ 150	\$ 118
<i>\$</i>			
47 kWh Battery Pack Cost, \$	\$ 10,575	\$ 7,050	\$ 5,546
Motor, Inverter, Other, \$	\$ 1,000	\$ 700	\$ 700

Source: Deutsche Bank, Argonne National Labs, Supplier Estimates, Industry Experts

However, with technical advancements in battery cell/pack technology, the cost of electrification is estimated to decline gradually over the next decade. Our global auto team believes battery pack cost targets in the USD150/kWh range are realistic over the next 5 years, and costs could decline to USD100/kWh in less than 10 years. They project the cost of a 47kWh battery pack will drop to USD7,050 in 2020E and USD5,546 in 2025E, resulting in a 46% decrease in the total cost of an electric powertrain by 2025E vs. 2014.

The reduction in battery cost will serve as a catalyst for significant expansion in volume, as it will enable electrified powertrains to reach cost parity with more advanced ICE powertrains, and in some cases lower cost (Figure 25). While significant opportunities still exist to improve the efficiency of conventional ICE, we expect the marginal cost of squeezing additional efficiency from internal combustion vehicles to increase significantly, making a more fuel-efficient ICE a less cost-effective measure.

We expect EV battery cost to lower by almost half in the next 10 years, making NEVs more affordable even without subsidies

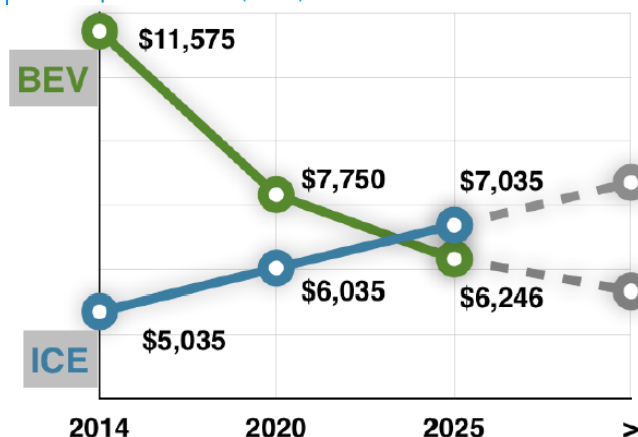


Figure 24: Average cost of ICE vehicle (USD)

2014	
Average IC Powertrain	\$ 5,035
Engine	\$ 2,555
Transmission	\$ 1,825
Fuel System	\$ 360
Exhaust	\$ 295
Other Components	\$ 9,455
Climate/engine cooling	\$ 715
Axles, Driveshafts, Braking, Steering & Other	\$ 1,640
Body & Structural	\$ 2,375
Suspension	\$ 480
Interior	\$ 1,285
Audio/telematics	\$ 335
Electronics & Electrical	\$ 1,825
Passenger restraints	\$ 350
Wheels/Tires	\$ 305
Body glass	\$ 145

Source: Deutsche Bank, Supplier Estimates

Figure 25: Comparison of cost trajectories of ICE and electric powertrains (USD)



Source: Deutsche Bank, Argonne National Labs, Supplier Estimates, Industry Experts

For more information about lithium ion battery evolution, please refer to the FITT report, "Lithium 101", published by Deutsche Bank's global metals and mining team in May 2016.

NEV sector getting crowding with more new entrants

Various types of non-auto companies jumping in

Given 1) the simple EV architecture, 2) government EV subsidies, and 3) the government's acceptance of non-traditional auto manufacturers making EVs, we have been seeing the increasing entry of more non-traditional auto companies to EV/EV component production in China. Examples include LeTV (300104.SZ), Tencent (0700.HK), Foxconn (2354.TW), and 3) Gree (000651.SZ).

Mr Cai sees tech and internet companies developing EVs because they envision opportunities in future EV/smart car adoption. These resourceful companies are able to attract traditional auto company talent to join them. In addition, he sees traditional industrial companies like motor manufacturer Broad Ocean (002249.SZ) participating in the EV supply chain with EV motor products. However, given the small initial EV sales quantity, Mr Cai thinks the segment's development could be overheated. While government subsidies help to sustain many weaker entities for now, some of them will eventually fall out after the subsidy period ends.



Figure 26: Examples of non-traditional auto/part companies' participation in NEV sector

公司名称	Company's full name	Ticker (Reuters)	Key business profile	NEV-related business highlights/products
Electric Motor				
中信国安	CITIC Guoan Information Industry	000839.SZ	The company operates cable TV and satellite telecommunication networks. It also develops real estate properties. In addition, CITIC designs network integrated systems and application software, and provides advertising services.	Manufactures lithium-ion battery and related products for NEVs through its subsidiary Citic Guoan Mengguli Power Science & Technology
中国宝安	China Baoan Group	000009.SZ	The company develops, leases, and manages residential and commercial real estate properties in Shenzhen, Wuhan, Hainan, and Shanghai areas. It also produces medical products and sells its products at retail chain stores.	Manufactures driving systems for various NEVs, including buses, sedans, special vehicles, low-speed EVs; and provides materials for power battery
金鹰股份	Zhejiang Golden Eagle	600232.SS	The company manufactures a variety of textile products, including spun silk and linen.	A private share placement is to support its EV battery project
卧龙电气	Wolong Electric Group	600580.SS	The company manufactures a variety of mini electric machinery.	Manufactures electric vehicle motors
江特电机	Jiangxi Special Electric Motor	002176.SZ	The company manufactures specialty motors including lifting, mining, and high-voltage motors.	Manufactures lithium battery cathode materials, electric automobile drive motors, control systems for NEVs, and produces low-speed electric vehicles
大洋电机	Zhongshan Broad Ocean Motor	002249.SZ	The company manufactures AC and DC electric motors.	Manufactures the electric vehicle motors and controllers
格力电器	Gree Electric Appliances	000651.SZ	The company manufactures a series of air conditioners and air purifiers.	The company announced it will acquire Zhuhai Yinlong New Energy recently and aims to enter the NEV market.
EV-related semiconductors				
株洲中车	Zhuzhou CRRC Times Electric	3898.HK	The company provides train-borne electrical systems for the China railway industry. It also manufactures train power converters, auxiliary power supply equipment, and control systems for trains for urban rail systems.	The IGBT (Insulated Gate Bipolar Transistor) that was developed by their semiconductor business unit can be applied to NEVs.
Autonomous driving				
百度	Baidu	BIDU.OQ	The company operates an Internet search engine.	R&D in autonomous driving vehicles and aims at mass production in 5 years
EV				
乐视网	Leshi Internet Information & Technology	300104.SZ	The company develops internet video and mobile networking video technology.	R&D on NEVs and cooperates with BAIC. The company aims to develop a complete new energy eco-system
	China Harmony New Energy Auto	3836.HK	The company is a dealership group that deals exclusively in luxury and ultra-luxury passenger vehicles in China.	In 2015, Harmony established an EV JV, Harmony Futeng, with Tencent and Foxconn. This JV has a controlling stake in Green Field Motor (GFMC), which is developing regular-speed EVs with a 150-250km driving range.
	Tencent	700.HK	The company provides internet and mobile value-added services (VAS), online advertising services, and e-commerce transactions services to users globally.	
	Foxconn Technology	2354.TW	The company manufactures and markets OEM desktop computers and color monitors.	

Source: Bloomberg Financial LP, Reuters, Company data, Jiefang Daily, Deutsche Bank



The solution...?

Key points

- For now, the Chinese government is still highly reliant on subsidies and other incentives to drive NEV sales.
- While more than half of Chinese provinces have not yet implemented any NEV stimulus policies, most of the major cities and provinces, already have detailed subsidy measures in place.
- Together with supportive policies such as purchase tax waiver and free license plate (in Shanghai), cost of owning an NEV could be highly comparable with that of a conventional car.
- Apart from passenger NEV supports, various local governments also have roadmap for replacing the public transportation fleet with EV buses or PHEV buses.
- All in all, the NEV supportive policies in China make the country amongst the most NEV-friendly globally.
- With the current NEV demand mainly driven by subsidy, in our view, any financial strain by the government on high subsidy expenditure and unexpected subsidy cuts/delays could risk the NEV sales.
- Meanwhile, we think that an emission credit trading system between auto manufacturers could be a viable long-term solution beyond 2020E to continually support OEMs' push for higher NEV adoption.

Government incentives are biggest driver of NEV sales

Amid a lack of charging infrastructure and NEV price premium, we think China's NEV demand is heavily driven by government support. We summarize the major policy announcements in the past few years in Figure 27. Broadly speaking, purchasers of NEVs in China enjoy three kinds of subsidies:

- Purchase tax waiver;
- Central government subsidy; and
- Various levels of local government subsidies.

Note that while purchase tax exemption applies to both locally produced and imported NEVs, central and local government subsidies apply only to locally produced NEVs, probably as a means to groom localized NEV technology, in our view.

On top of direct monetary support, the government also supports NEV purchases at the local government level, including free license plates in Shanghai, standalone new license quotas for cities with ownership restrictions, waivers of traffic restrictions on ICE cars, and minimum NEV public transportation fleet size requirements.



Figure 27: Summary of China's major NEV supportive policies

Date	Policy and summary of major implications
May 2010	<p>Notice of The Pilot Implementation of Private Purchases of New Energy Vehicles Subsidies</p> <ul style="list-style-type: none"> Officially initiated China's NEV subsidy program Started small-scale pilot testing in 6 cities in China
June 2012	<p>The 2012-2020 Development Plan for Fuel-efficient and New Energy Vehicle Industry</p> <ul style="list-style-type: none"> Roadmap for China's NEV industry development Accumulated NEV (EV and PHEV) sales volume target of 500k units by 2015 and 5m units by 2020E Annual NEV production capacity to reach 2m units by 2020E
September 2013	<p>Notice to Continue to Promote the Usage of New Energy Vehicles</p> <ul style="list-style-type: none"> NEV purchase subsidy standards for 2013-15 Set-up of required NEV ownership targets in pilot cities Priority given to NEVs in government procurement and public bus transit
July 2014	<p>Notice to Waive Purchase Tax for New Energy Vehicles</p> <ul style="list-style-type: none"> Waive purchase tax for electric vehicles, plug-in electric vehicles and fuel-cell vehicles regardless of production origin until 31 December 2017
April 2015	<p>Notice to Promote The Usage of New Energy Vehicles for 2016-20</p> <ul style="list-style-type: none"> NEV purchase subsidy standards announced for 2016-20E

Source: State Council, MOF, MOST, MIIT, NDRC, Deutsche Bank

The following are the key implications of the various types of policy support:

Purchase tax waiver for all NEVs, including imports

Since the auto purchase tax rate is equivalent to 10% of a car's price (excluding 17% value-added tax), this is practically a 10% discount on top of other incentives applicable to NEV consumption.

Central government subsidies

According to the latest 2016-20E NEV purchase subsidy scheme, the central government will provide various levels of subsidies (see Figure 28 and Figure 29), ranging within RMB25,000-55,000 for passenger NEVs and a maximum of RMB500,000 for NEV buses in 2016.

Figure 28: Central government subsidies for passenger NEVs in 2016

(RMB'000)	Battery driving range (R) (unit: km)			
	100<=R<150	150<=R<250	R>=250	R>=50
EV	25	45	55	n.a.
PHEV	n.a.	n.a.	n.a.	30

Source: MOF



Figure 29: Central government subsidies for NEV buses (10-12m) in 2016

(RMB'000)	Battery driving range (R) (unit: km)					
	6<=R<20	20<=R<50	50<=R<100	100<=R<150	150<=R<250	R>=250
EV Unit load energy consumption (E) (unit: Wh/km.kg)						
E<0.25	220	260	300	350	420	500
0.25<=E<0.35	200	240	280	320	380	460
0.35<=E<0.50	180	220	240	280	340	420
0.50<=E<0.60	160	180	200	250	300	360
0.60<=E<0.70	120	140	160	200	240	300
PHEV	n.a.	n.a.	200	230	250	250

Note: Electric buses of 6m and below in length qualify for 20% of the above standard bus subsidy (10-12m); electric buses of 6-8m length qualify for 50% of the standard bus subsidy; electric buses of 8-10m length qualify for 80% of the standard bus subsidy; electric buses of 12m and above in length qualify for 120% of the standard bus subsidy.

Source: MOF

Compared with previous years (2013-15), cash subsidies for passenger NEVs for 2016 is on average c.6% smaller than in 2015, and have stricter qualifying requirements (Figure 30). We also noticed a 0-2% cash subsidy increase for passenger EVs with a battery driving range above 150km, indicating clearly the central government's intention to promote higher-end EVs.

Similarly for NEV bus subsidies, China implements much more stringent qualification standards in 2016 and onwards, with detailed requirements for unit energy consumption and the battery driving range (Figure 29), unlike in previous years (Figure 31) when vehicle length was the only benchmark for subsidy qualification. We think this is a move to ensure product quality.

In addition, the central government subsidy level will progressively decline in 2016-20E, except in the case of fuel cell vehicles (FCVs), which are still at the infant development stage.

Figure 30: Comparison of central government subsidies for passenger NEVs in 2013-20E

(RMB'000)	Battery driving range (R) (unit: km)				YoY change			
	80<=R<150	150<=R<250	R>=250	R>=50	80<=R<150	150<=R<250	R>=250	R>=50
EV								
2013	35.0	50.0	60.0	-	-	-	-	-
2014	33.3	47.5	57.0	-	-5%	-5%	-5%	-
2015	31.5	45.0	54.0	-	-5%	-5%	-5%	-
2016E	25.0*	45.0	55.0	-	-21%	0%	2%	-
2017-18E	20.0*	36.0	44.0	-	-20%	-20%	-20%	-
2019-20E	15.0*	27.0	33.0	-	-25%	-25%	-25%	-
PHEV								
2013	-	-	-	35.0	-	-	-	-
2014	-	-	-	33.3	-	-	-	-5%
2015	-	-	-	31.5	-	-	-	-5%
2016E	-	-	-	30.0	-	-	-	-5%
2017-18E	-	-	-	24.0	-	-	-	-20%
2019-20E	-	-	-	18.0	-	-	-	-25%

* Minimum driving range for EVs to qualify for a subsidy was raised to 100km in 2016-20E from 80km previously.

Source: MOF, Deutsche Bank



Figure 31: Central government subsidies for NEV buses in 2013-15

(RMB'000)	Vehicle length (L) (unit: m)		
	6<=L<8	8<=L<10	L>=10
EV			
2013	300	400	500
2014	300	400	500
2015	300	400	500
PHEV			
2013	-	-	250
2014	-	-	250
2015	-	-	250

Source: MOF

Local governments to complement central support

In addition to the aforementioned central government financial incentives, local governments are encouraged to provide supportive policies to stimulate NEV consumption.

While more than half of the provinces in China have not implemented any stimulus policies to promote NEV usage, most of the major cities and provinces, where the majority of NEV sales come from, already have detailed subsidy measures in place. Such stimulus plans could be in the form of 1) monetary subsidies (on top of the subsidies given by MOF) for purchases of NEV models included in local eligibility lists and 2) free license plates in restricted cities such as Beijing and Shanghai. To elaborate:

- Beijing government will grant free EV-specific license plates (with an annual quota of 60,000 units) and provide monetary subsidies to EV purchases in amounts equivalent to central government subsidy. However, PHEV purchases will enjoy no such stimulus.

Figure 32: Beijing government passenger NEV subsidy program (2016)

Beijing	EV	EV	EV	PHEV
(RMB'000)	100<=R<150	150<=R<250	R>=250	R>=50
Central government subsidy	25	45	55	30
Local government subsidy*	25	45	55	n.a.
Free license plate**	Yes	Yes	Yes	No

* Total subsidy not exceeding 60% of NEV MSRP.

** Total free license plates to be issued for NEV not exceeding 60,000.

Source: Beijing Government, Deutsche Bank

- The Shanghai government released an update of the city's NEV subsidy policy for 2016-17E in early April. While the revised subsidy amount is a significant drop from the 2015 level, we believe the free NEV-specific license plates (with a market auction value of roughly RMB80,000-90,000) are the key NEV demand driver in Shanghai.

Figure 33: Shanghai government passenger NEV subsidy program (2016-17E)

Shanghai	EV	EV	EV	PHEV
(RMB'000)	100<=R<150	150<=R<250	R>=250	R>=50
Central government subsidy	25	45	55	30
Local government subsidy	10	30	30	10
Additional local subsidy*	n.a.	n.a.	n.a.	14
Free license plate	Yes	Yes	Yes	Yes

* Prerequisites: engine size below 1.6L, fuel tank size below 40L, and fuel consumption below 5.9L/100km in hybrid mode.

Source: Shanghai Government, Deutsche Bank



Figure 34: Shanghai government passenger NEV subsidy program (2015)

Shanghai	EV	EV	EV	PHEV
(RMB'000)	80<=R<150	150<=R<250	R>=250	R>=50
Central government subsidy	31.5	45	54	31.5
Local government subsidy	40	40	40	30
Free license plate	Yes	Yes	Yes	Yes

Source: Shanghai Government, Deutsche Bank

Moreover, PHEV customers get an additional subsidy (Figure 33) if the model purchased meets certain extra criteria. We think such a policy initiative is aimed at ensuring that only authentically fuel-efficient PHEVs are eligible for subsidies. Currently, only SAIC Roewe e550 PHEV is eligible for the extra subsidy.

Figure 35: Comparison of major PHEV models (locally produced) available in Shanghai

Brand	Model	Wheel- base (mm)	Engine (L)	Fuel tank size (L)	Fuel consumption (hybrid mode) (L/100km)	Driving range (km)	Battery capacity (kWh)	MSRP (RMB)	Central subsidy (RMB)	Shanghai subsidy (RMB)	Total subsidy as % of MSRP (%)	After-subsidy ASP (RMB)
SAIC Roewe	e550	2,705	1.5L	31	1.6	60	12	239,800-259,800	30,000	24,000	20.8-22.5%	185,800-205,800
BYD	Qin	2,670	1.5T	50	1.6	70	13	209,800-219,800	30,000	10,000	18.2-19.1%	169,800-179,800
BYD	Tang	2,720	2.0T	53	2.4	60-80	13	248,300-518,800	30,000	10,000	7.7-16.1%	208,300-478,800
GAC Trumpchi	GA5 PHEV	2,710	1.0L	45	2.4	50	13	199,300-219,300	30,000	10,000	18.2-20.1%	159,300-179,300
Volvo	S60L T6	2,856	2.0T	68	2.1	53	8	505,900-559,900	30,000	10,000	7.1-7.9%	465,900-519,900
Brilliance BMW	530Le	3,108	2.0T	38	2.0	58	14	698,600	30,000	10,000	5.7%	658,600
Beijing Benz	C350eL*	2,920	2.0T	n.a.	2.8	31	6.2	599,900	0	0	0.0%	599,900

Newly launched/To-be-launched but not available for sale yet

SAIC Roewe	e950	2,837	1.4T	37	1.7	60	12	288,800-308,800	30,000	24,000	17.5-18.7%	234,800-254,800
BYD	Song	2,660	1.5T	52	2.0	70	15	280,000	30,000	10,000	14.3%	240,000
BYD	Yuan*	2,535	1.5L	39	2.0	85	n.a.	209,800-249,800	0	0	0.0%	209,800-249,800

* Beijing Benz C350eL and BYD Yuan not included in the government's new energy vehicle consumption tax waiver eligibility list yet.
Source: Autohome.com, Deutsche Bank estimates

In addition, Shanghai's local subsidy is under a progressive decline model based on the manufacturer's accumulated NEV sales volume in the region. We think this highlights local government needs to more effectively subsidize NEV market growth without over-stretching manufacturer budgets.

Figure 36: Shanghai local subsidy based on accumulative sales

	Passenger vehicle (units) *	Commercial vehicle (units) *	Special purpose vehicle (units) **
Standard subsidy amount	S<=40,000	S<=1,000	TS<=3,000
50% standard subsidy	40,000<S<=60,000	1,000<S<=2,000	3,000<TS<=5,000
No subsidy	S>60,000	S>2,000	TS>5,000

* Accumulative sales for NEV manufacturers in Shanghai since 1-January-2014.
** Accumulative sales for NEV manufacturers in Shanghai since 1 January 2016.
Source: Deutsche Bank

Different local governments use different eligibility lists to subsidize NEV purchases. These local lists are subsets of the national eligible NEV model list and appear to favor local OEMs. For example, the Beijing list includes only EV



models (e.g. BAIC EV160, BYD E6 and SAIC Roewe E50), excluding PHEV models (e.g. BYD Qin and BYD Tang), which BAIC currently does not make. Shanghai's list includes both eligible EV and PHEV models, but only the Roewe e550 is eligible for the extra PHEV subsidy for now. However, we notice that local governments were recently urged by the central government to eliminate local protectionism in their purchase subsidies and adhere to the national eligible list to ensure an efficient subsidy system nationwide.

Apart from laying out frameworks to popularize passenger NEVs, various local governments also have roadmaps to replace the public transportation fleet with EV buses or PHEV buses (Figure 37). We think this will be a crucial driver of commercial NEV demand, not to mention that the inner-city bus market is a sweet spot for the NEV segment with its predictable routes making logistics arrangements easier for charging networks.

Figure 37: Examples of public bus fleet electrification targets in China

City/Province	% of public bus targets to be upgraded to EV/PHEV				Target amount (units)
	2016E	2017E	2018E	2019E	2016E
Beijing	50%	60%	70%	80%	2,390
Shanghai					1,500
Tianjin					1,500
Hebei					1,471
Shanxi					
Linfen					200**
Taiyuan					1,000**
Jiangsu					4,614*
Changzhou					147
Zhejiang					1,000
Shandong					1,167
Jining					156**
Guangdong					
Hainan					
Anhui	35%	45%	55%	65%	
Bengbu					200**
Jiangxi					
Henan					
Hubei					
Hunan					
Changsha					647**
Fujian					
Other provinces/cities	15%	20%	25%	30%	

* Total incremental amount of new energy buses

** Pure electric buses only

Source: MOF, 21st Century Business Herald, Gasgoo.com, Xinhua Net, MOST, Jiangsu Government, Xnyauto.com

All in all, with a web of various direct subsidies and other supportive policies, China is among countries with the most supportive measures in NEV development, in our view, alongside Norway, as well as the Hong Kong region, both of which also have strong NEV sales. We also think China's support foundation will help the country attain its 2016-20E NEV penetration target.



Figure 38: Examples of various countries' NEV support policies

Country/Region	Policy	Summary	Description
Japan	Green Vehicle Purchasing Promotion Measure	Purchasing subsidies, tax deductions and exemptions	1) 1.6-2.7% vehicle acquisition tax reduction; 2) 50% reduction in annual automobile tax; 3) ~USD550-2,700 purchase subsidies for green passenger cars and ~USD2,100-19,000 for commercial vehicles.
France	Bonus-malus system	Bonus for purchase of new cars with CO2 emissions of 60 g/km or less	Subsidy of up to EUR6,300 for electric cars, capped at 30% of the vehicle price including VAT. Subsidy for fuel-efficient cars: 1) Up to EUR6,300 for emission level of 20g/km or less; 2) Up to EUR5,000 for 20-50g/km emission level; 3) Up to EUR3,700 for 50-60g/km.
Germany	Nationale Plattform Elektromobilität (NPE)	Targets 1m electric vehicles on German roads by 2020	No subsidies to the sales of electric cars but exempt from the annual circulation tax. Battery-powered cars are allowed onto bus lanes, and free parking and reserved parking spaces in locations with charging points. New electric and plug-in hybrid cars subsidy of up to EUR5,000 (USD5,500) still under discussion.
Norway	Annual budget by Norwegian Parliament	Targets 50,000 zero emission vehicles by 2018 (reached on 20 April 2015)	Exempt from 1) non-recurring vehicle fees, including purchase taxes that are extremely high for ICE cars, and 25% VAT; 2) annual road tax, public parking fees and toll payments; and 3) allowed to use bus lanes. Existing incentives will last through 2017, half of the yearly road license fee is required since 2018 and the full rate as of 2020. The value-added tax (VAT) exemption for electric cars will end in 2018.
UK	Plug-in Car Grant and other incentives	Purchase price discount at the point of purchase	1) 25% grant towards the cost of new plug-in cars capped at GBP5,000 (lowered to GBP4,500 in December 2015); 2) 20%, up to GBP8,000, for plug-in vans. The Plug-in Car Grant program was extended to March 2018 with additional funding of GBP400m.
US	Energy Improvement and Extension Act of 2008, American Clean Energy and Security Act	Federal tax credit	The federal tax credit worth of USD2,500, plus USD417 for each kWh of battery capacity over 4 kWh, capped at USD7,500. Total of 37 states established incentives and tax or fee exemptions.
California, US	Clean Vehicle Rebate Project (CVRP)	Federal tax credit and purchase rebate	1.5m zero-emission vehicles (ZEVs) in California by 2025. 1) Federal tax credit of up to USD7,500 depending on battery size; 2) rebates of up to USD2,500 per qualified light-duty vehicle.
Hong Kong	Guidelines for Importation & Registration of Pure Electric Vehicle (PEV) and Plug-in Hybrid Electric Vehicle (PHEV)	First registration tax exemption	First Registration Tax (40-115% progressive tax rate for private cars) for EVs is waived till end March 2017.

Source: Various countries' governments, Deutsche Bank

Potential problems and risks with reliance on subsidies

While we agree direct government subsidies provide an instant boost to NEV demand in China, as demonstrated by exponential sales growth in recent years, we also identify a few potential concerns of such policy support:

- Interestingly, policy support – central and local government subsidies, and extra incentives, such as purchase tax waivers and free license plates – is making it cheaper to own a PHEV than an ICE vehicle in Shanghai (see Figure 39). This could defeat the intention of promoting environmental friendliness, as consumers may not even charge their PHEVs and just use them as if they are conventional cars (i.e. not maximizing their fuel efficiency).



Figure 39: Ownership cost comparison of SAIC Roewe e550 PHEV and 550 ICE in Shanghai

Car model	MSRP	Subsidies	Purchase tax	Registration fee	Vehicle and vessel tax per year	Compulsory motor vehicle liability insurance per year	Commercial insurance* per year	Avg fuel (electric) cost per km	One-time cost	Cost per year assume 5,000 km per year	Total cost @1st year
Roewe 550	99,800-182,800	0	8,530 - 15,624	500	480	950	4,370 - 6,076	0.46	108,830 - 198,924	8,090 - 9,796	116,920 - 208,720
Roewe e550	239,800-259,800	54,000	0	500	0	950	7,248 - 7,659	0.09**	186,300 - 206,300	8,629 - 9,040	194,929 - 215,340

* Commercial insurance coverage includes RMB100,000 of third party liability, vehicle damage insurance, robbery and theft insurance, glass breakage, comprehensive insurance, non deductible insurance, not-at-fault liability insurance, passenger liability insurance and car body scratches loss insurance

** Assuming half of the mileage runs on electric and the other half runs on fuel. The residential electric unit tariff (without peak-trough) in Shanghai is RMB0.617/kWh. The unit fuel price for 92-octane fuel in Shanghai is RMB5.76/L as of 12 May 2016.

Source: Company data, Deutsche Bank estimate

- We estimate the combined local and central government subsidy per EV at the moment is probably close to, if not more than, the cost of an electric drivetrain. This could incentivize some auto manufacturers, especially lower quality ones, to launch EV products for the sake of getting government subsidies. There have been extreme cases of some manufacturers inflating EV bus sales, and these are currently under government investigation. In a nutshell, heavy government support could distort market development by keeping sub-par companies in the market.
- What is more, assuming each NEV sold gets RMB100k government incentive on average, a 5m-unit NEV fleet would imply an incentive commitment of RMB500bn, a big burden on both local and central governments under lukewarm macro conditions. Any inability to fully dispatch the subsidy could lead to NEV demand disruption and affect NEV manufacturers' financials.
- Last but not least, due to heavier local government support in Beijing and Shanghai, they account for about 70% of China's NEV sales, according to our channel checks. This implies a sales concentration risk (subject to local government policy changes) and a failure to promote NEV adoption on a nationwide basis.

Emission credit trade – a possibly better solution after 2020

According to a recent speech by Minister of MOF Lou Jiwei at an EV forum in January, the Chinese government will cease the NEV subsidy program after 2020E. In this section, we provide a case study of California's Zero Emission Vehicle (ZEV) regulation, which we believe could be a possible solution for China's NEV industry after 2020E, when the government ceases subsidy.

The ZEV regulation is designed by the California Air Resources Board (ARB) and targets to reduce the level of greenhouse gases (GHG) from passenger vehicles (PVs), light-duty trucks (LDTs) and medium-duty vehicles (MDVs). ARB aims to increase ZEVs to reach 15.4% of each manufacturer's sales by 2025. Besides California, 11 other states in the US have adopted the ZEV regulation.

According to California's ZEV regulation, all auto manufacturers with a certain annual production volume in California are required to comply with the rules (Figure 40). In addition, the regulation classifies vehicles into five categories according to emission levels, and OEMs are granted relevant credits for each qualifying vehicle they produce (Figure 41).



Figure 40: Zero Emission Vehicle (ZEV) compliance requirements

Average production volume in California (units)*	ZEV compliance requirement for model year (MY) 2009-2017E	ZEV compliance requirement for MY2018-2025E
> 60,000 units (decrease to 20,000 in 2018E and beyond)	Subject to regulation	Subject to regulation
4,501-60,000 units (20,000 from 2018E)	Subject to regulation; but can meet all requirements with PZEVs	Subject to regulation
< 4,500 units	Not subject to this regulation**	Not subject to this regulation***

* Based on the average number of vehicles (new PVs, LDTs, and MDVs) produced and delivered for sale for the previous three consecutive model years (MY)

** Not required to meet the ZEV requirements, but may earn credits for the ZEVs, TZEVs, AT PZEVs, or PZEVs it produces and delivers for sale in California

*** Not required to meet the ZEV requirements, but may earn, bank (save any credits that exceed ZEV requirements for future use), market, and trade credits for the ZEVs and TZEVs it produces and delivers for sale in California

Source: California Air Resources Board (ARB)

Figure 41: Vehicle classifications and ZEV credits

Classification name	Vehicle type	Credits MY2012-2017E	Credits MY2018-2025E	Example vehicle(s)
ZEV (Zero Emission Vehicle)	Battery electric vehicle (BEV), hydrogen fuel cell vehicle	1-9 depending on range	1-4 depending on range	Nissan LEAF, Honda Clarity
TZEV (Transitional Zero Emission Vehicle)	Plug-in hybrid (PHEV) or extended range electric vehicle (EREV), hydrogen internal combustion engine vehicle	1-3 depending on technology	0.4-1.3 depending on range	Chevrolet Volt
NEV (Neighborhood Electric Vehicle)	Short-range, low-speed battery electric vehicle	0.3	0.15 if it meets the specifications	
AT PZEV (Advanced Technology Partial Zero Emission Vehicle)	Natural gas vehicle, hybrid electric vehicle (HEV)	0.2-3 depending on technology	-	Honda Civic GX, Toyota Prius
PZEV (Partial Zero Emission Vehicle)	Extremely clean conventional vehicle*	0.2	-	Ford Focus

* Extremely clean conventional vehicle with a 15-year or 150,000-mile warranty on its emission-control components and zero evaporative emissions

Source: ARB, Center for Climate and Energy Solutions

In order to comply with the regulation, OEMs must fulfill 1) total ZEV credit requirements and 2) the minimum ZEV floor requirements (Figure 42). In other words, they may satisfy the total ZEV requirement with TZEVs, NEVs, AT PZEVs and AT PZEVs.

Under this regulation, excess ZEV credits may be traded and transferred between auto manufacturers. Meanwhile, a manufacturer has additional two years to make up for a ZEV deficit if it fails to meet the ZEV requirement. However, if it still fails to comply after the grace period, the manufacturer is subject to financial penalties of USD5,000 for each new vehicle that is sold but does not meet the applicable emission standards.



Figure 42: ZEV credit requirements* from 2012 to 2025

Model year (MY)	Total ZEV credit requirement	Minimum ZEV floor	TZEVs/NEVs	AT PZEVs	PZEVs
2012	12.0%	0.8%	2.2%	3.0%	6.0%
2013	12.0%	0.8%	2.2%	3.0%	6.0%
2014	12.0%	0.8%	2.2%	3.0%	6.0%
2015	14.0%	3.0%	3.0%	2.0%	6.0%
2016	14.0%	3.0%	3.0%	2.0%	6.0%
2017	14.0%	3.0%	3.0%	2.0%	6.0%
2018	4.5%	2.0%	2.5%	-	-
2019	7.0%	4.0%	3.0%	-	-
2020	9.5%	6.0%	3.5%	-	-
2021	12.0%	8.0%	4.0%	-	-
2022	14.5%	10.0%	4.5%	-	-
2023	17.0%	12.0%	5.0%	-	-
2024	19.5%	14.0%	5.5%	-	-
2025	22.0%	16.0%	6.0%	-	-

* ZEVs production volume as a percentage of total vehicle production volume.
Source: ARB, Center for Climate and Energy Solutions

Pure electric vehicle manufacturers, such as Tesla (TSLA.OQ), earn ZEV credits on every vehicle it produces and sells in California and other ZEV States. This allows Tesla to trade and transfer ZEV credits to other manufacturers under a confidential ZEV credit agreement, providing it with a source of additional revenue by selling ZEV credits. As shown in Figure 43, Tesla's annual credits' revenue (including ZEV and greenhouse gas (GHG) credits) accounted for 1.3-9.8% of total revenue in 2009-15.

Figure 43: Tesla's annual credits revenue

(USDm)	2009	2010	2011	2012	2013	2014	2015
Total revenue	111.9	116.7	204.2	413.3	2,013.5	3,198.4	4,046.0
Credits revenue	8.2	2.8	2.7	40.5	194.4	216.3	168.7
as a % of total revenue	7.3%	2.4%	1.3%	9.8%	9.7%	6.8%	4.2%
<i>ZEV and GHG (greenhouse gas) credits revenue</i>	<i>8.2</i>	<i>2.8</i>	<i>2.7</i>	<i>32.4</i>	<i>129.8</i>	<i>152.0</i>	<i>112.0</i>
<i>as a % of total revenue</i>	<i>7.3%</i>	<i>2.4%</i>	<i>1.3%</i>	<i>7.8%</i>	<i>6.4%</i>	<i>4.8%</i>	<i>2.8%</i>
<i>Other credit revenue</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>8.1</i>	<i>64.6</i>	<i>64.3</i>	<i>56.7</i>

Source: Company data, Deutsche Bank

We much prefer this type of incentive policy to the current subsidy program in China for the following merits:

- It incentivizes corporates to develop NEV technologies and promote NEV sales, as this leads to a realistic revenue stream.
- It provides an option for specific types of auto manufacturers, for example those with a focus on the premium and SUV segments, to comply with future emission/fuel economy limits.
- It frees up the government from subsidizing the industry with its precious monetary resources.



The growth outlook

Key points

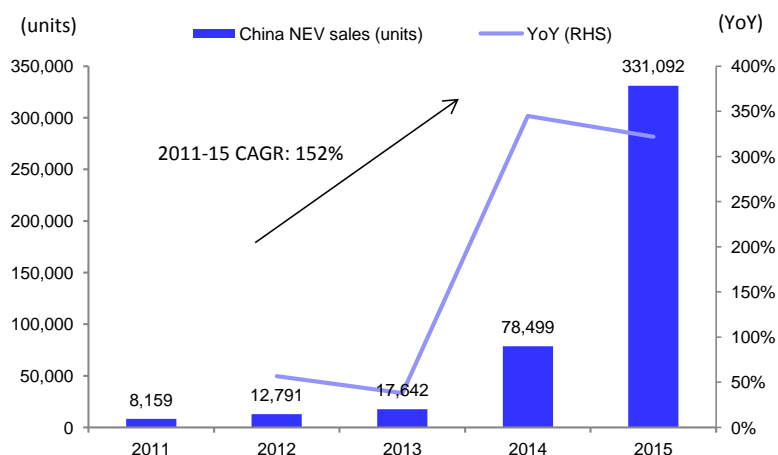
- China's NEV sales have been robust with 1.5x 2011-15 4-year CAGR and a 3.2x YoY sales surge in 2015, fuelled by government support. YTD growth has slowed due to a policy overhang.
- We think passenger NEV demand is driven by a combination of cash incentives and favorable policies for NEV users, while commercial NEV demand is driven by bus fleet upgrades.
- In 2015-20E, we estimate a 5-year NEV sales CAGR of 33%, with China accounting for half of global EV/PHEV demand by 2020E, when its growth would no longer be constrained by infrastructure and production capacities.

Soaring sales with government policy support

2015 sales up 3-fold YoY and 2011-15 volume CAGR of 152%

According to the China Association of Automobile Manufacturers (CAAM), the country's total NEV sales reached 331,092 units in 2015 (up 3.4x YoY), representing a 2011-15 4-year sales volume CAGR of 152.4%. NEV production also recorded a historical high of 340,471 units in 2015, up 3.3x YoY. Despite rapid NEV sales volume growth in 2012-14, absolute sales volume was meager, making up less than 0.2% of China vehicle sales during the period and falling way short of the 2015E target ownership level. However, NEV sales catapulted in 2015 at a growth rate of 3.4x YoY and made up 1.3% of China vehicle sales. Aggregate NEV sales also approached closer the 2015E target NEV fleet size. In our view, the sudden surge in 2015 demand was fueled by massive government subsidy and policy support in order to meet the target, and also unfortunately by smaller companies inflating their EV bus sales to obtain more subsidies.

Figure 44: China annual NEV sales volume and growth trend



Source: CAAM, Deutsche Bank

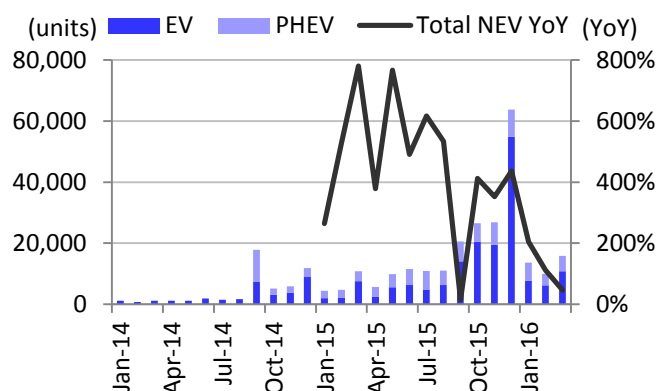


Year-to-date slowdown probably due to policy overhang

In terms of product segment, the 2015 NEV sales surge was more apparent in the commercial vehicle (CV) segment, which grew 4.0x YoY vs. PV's 3.0x YoY. Once again, we attribute commercial NEVs' outperformance mainly to massive government subsidy and policy support in order to meet the 2015E fleet target, and to smaller companies inflating EV bus sales to get more subsidies.

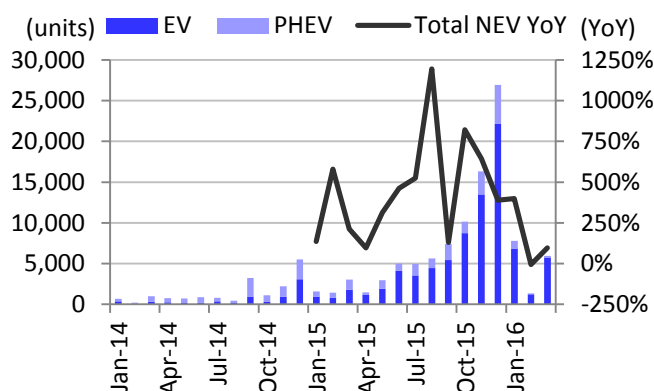
Going into 2016, there has been a market slowdown in NEV sales with 1Q16 passenger NEV and commercial NEV sales up 97.0% and 1.5x YoY respectively, but down 66.4% and 71.8% QoQ. We attribute the slowdown in passenger NEV sales momentum YTD to delay in local governments' rollouts of their 2016-20E NEV subsidy policies. Meanwhile, we think the slowdown in commercial NEV sales momentum YTD is due to the overhang of ongoing investigations into EV bus subsidy cheating.

Figure 45: Passenger NEV sales



Source: CAAM, Deutsche Bank

Figure 46: Commercial NEV sales



Source: CAAM, Deutsche Bank

EVs are still the mainstream vs. PHEVs

In 2015 and 4M16, about 70% of China's NEV sales were for EVs, despite EVs' generally higher prices than PHEVs and charging infrastructure constraints. In our view, this is because of simpler technological requirements for developing EV and hence the higher number of newly available EV products.

High subsidies and side benefits help to drive demand

In the passenger NEV segment, we think the major driver of robust demand in China in 2015 and beyond is strong support/monetary subsidies from the central and local governments. Based on our estimates, total monetary incentives (from both central and local governments) could account for as high as 35% of an EV's MSRP and 20% of a PHEV's MSRP.

After taking into consideration the subsidies and purchase tax waivers, we think a NEV ends up being sold within acceptable price level, e.g. at about RMB150,000-200,000 for a long-range EV or a PHEVs.

While buying an NEV is still more expensive at the beginning and charging it could be inconvenient, there are extra attractive government support schemes, such as free license plates offered to NEV buyers in Shanghai and Beijing, where governments have implemented strict purchase restrictions on conventional PVs. For example, Shanghai adopts an auction system for new



license plate issuance and a plate cost RMB80,000-90,000 at several auctions held recently with winning rates of low single-digits (i.e. below 5%). Furthermore, driving an NEV subjects one to fewer traffic restrictions, e.g. car usage controls on certain days of a month. In short, government support makes NEVs more competitive than ICE vehicles, especially in major cities with more traffic/ownership restrictions.

In the commercial NEV segment, the driver of growth has been and will still be local governments' vows to upgrade part of their public transportation fleets with NEVs.

Fuel usage target now tops OEMs' agenda

As discussed at the beginning of this report, the Chinese government has set emission targets to reduce fuel usage from 6.9L/100km in 2015 to 5.0L/100km by 2020E for all OEMs in China. As 1) it is costly to improve the efficiency of conventional ICE vehicles and 2) the fuel consumption target is measured on the volume-weighted average fuel consumption of all models on a group level basis (including NEVs, which are treated as emission free), we believe OEMs are increasingly pressured to launch more NEVs to comply with the 2020E emission requirements.

Figure 47: Major passenger NEV models to be launched in 2016E

Brand	Model	Type
BAIC	EU260	EV
BAIC	ES210	EV
BAIC	EX200	EV
BAIC	EX300L	EV
Beijing Hyundai	Shouwang	EV
Dongfeng	Fengshen A60 EV	EV
GAC Trumpchi	GS4 EV	EV
GAC Toyota	Leahead i1	EV
Geely	Englon C5 EV	EV
Great Wall Motor	C30 EV	EV
JAC	iEV6S	EV
BYD	Song	PHEV
BYD	Yuan	PHEV
BYD	Shang	PHEV
Chang'an	EADO plug-in	PHEV
Dongfeng Fengshen	AX7	PHEV
GAC Trumpchi	GA3S PHEV	PHEV
SAIC GM	Cadillac CT6	PHEV
SAIC Roewe	e950	PHEV
SAIC Roewe	RX5	PHEV

Source: Market news, Company data, Deutsche Bank

We see 33% volume CAGR in 2015-20E

China to account for about half of global EV/PHEV sales by 2020E

Given continuous government policy support, we believe Chinese consumers' NEV adoption and public transportation fleet electrification will maintain the strong momentum. As such, we expect China NEV sales to expand at a 33% 5-year CAGR in 2015-20, with accumulated 2011-20 NEV sales at about 4.9m



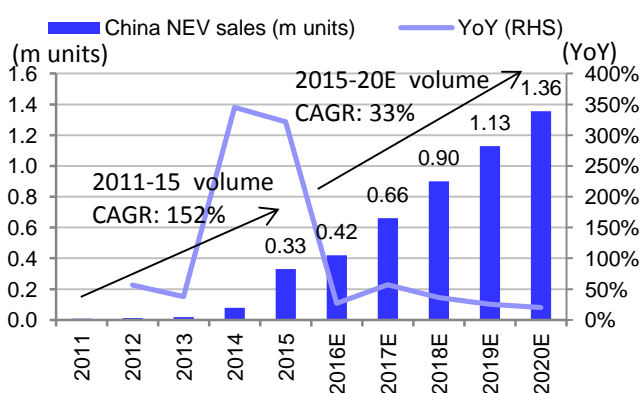
units, close to the government's target of 5m units. By 2020, we expect China's NEVs to account for about 4.5% of the country's vehicles sales and about half of global EV/PHEV sales. Considering the gradual decline in government subsidy before 2020E and the enlarging base effect, we expect a faster annual sales growth rate of 27-57% in 2016-18 than the 20-25% in 2019-20 (Figure 48).

In addition, with the increasing availability of charging infrastructure, we foresee slightly faster growth in passenger NEVs than commercial NEVs in 2017-20E and its proportion to ramp up in the coming years, in our view (Figure 49). Nevertheless, considering the government's agenda to upgrade the public transportation fleet to NEVs, we envision more predictable and consistently strong commercial NEV sales.

What is more, given the sudden surge in 4Q15 NEV sales, which we do not view as sustainable in the light of possible sales-inflation activities, we envision NEV sales growth rate will fall back to 27% in 2016E vs. 3.4x in 2015 and 57% in 2017E.

Last but not least, we also foresee an increasing adoption of passenger PHEVs since they offer better driving flexibility, e.g. for long-haul travel and in situations where charging facilities are not readily available. We think an increase in PHEV models offered by major auto companies like SAIC Motor, Dongfeng Motor (0489.HK) and Guangzhou Auto (GAC, 2238.HK) in the upcoming years will lift passenger PHEVs' sales contribution to about 40% of total passenger NEV sales by 2020E from the current 30% level. Apart from that, a decline in subsidies for shorter EV buses and improving PHEV technology possession could lift commercial PHEVs' sales contribution to about the 30% level of total commercial NEV sales by 2020E from the current 20% level, in our view.

Figure 48: China NEV sales forecast



Source: CAAM, Deutsche Bank estimates

Figure 49: China NEV sales forecast breakdown

(m units)	2016E	2017E	2018E	2019E	2020E
Passenger EV	0.20	0.32	0.42	0.51	0.60
YoY%		60.0%	31.3%	21.4%	17.6%
Passenger PHEV	0.10	0.16	0.24	0.32	0.40
YoY%		60.0%	50.0%	32.5%	24.5%
Total passenger NEV	0.30	0.48	0.66	0.83	1.00
YoY%		60.0%	37.5%	25.5%	20.3%
Commercial EV	0.09	0.14	0.18	0.22	0.25
YoY%		55.6%	28.6%	22.2%	13.6%
Commercial PHEV	0.03	0.04	0.06	0.08	0.11
YoY%		33.3%	50.0%	33.3%	37.5%
Total commercial NEV	0.12	0.18	0.24	0.30	0.36
YoY%		50.0%	33.3%	25.0%	20.0%
Grand total NEV	0.42	0.66	0.90	1.13	1.36
YoY%		57.1%	36.4%	25.3%	20.2%

Source: Deutsche Bank estimates

Attainable target on supply considerations

To recap, the Chinese government targets an accumulated NEV (EV and PHEV) sales volume of 500k units by 2015 and 5m units by 2020E, with annual NEV production capacity of 2m units by 2020E. Based on these targets, we think auto manufacturers' capacity and charging network will be adequate to meet our China NEV sales projections, not to mention that most manufacturers produce NEVs at the same production lines for ICE cars. Meanwhile, we do not expect 2020 NEV demand to get close to the target production capacity of 2m



units, since we think ICE vehicles and conventional hybrid vehicles will remain overwhelmingly mainstream products, due to their lower prices, longer driving range in general, and being free from charging infrastructure/charging time constraints.

From an EV/PHEV battery capacity perspective, we see no major bottleneck as our global metals and mining team forecast a global lithium ion battery capacity of about 260GWh by 2020. This considers the fact that a long range passenger EV, like a BYD E6, has battery capacity of about 60kWh and a large EV bus, like a BYD K9, has battery capacity of about 300kWh. This is not to mention that PHEVs use smaller battery packs. All in all, we estimate the China NEV sector will consume about 120 GWh of EV battery production.



The supply chain

Key points

- Among major auto manufacturers, BYD and Yutong have the largest NEV sales contributions in absolute and percentage terms vs. peers.
- While other traditional/non-traditional auto manufacturers are catching up in new launches, their NEV business is unlikely to become a crucial earnings contributor in the near future.
- In the midstream of the NEV supply chain is a plethora of companies, but NEV-related business contribution is still small for most of them and could stay small.
- In the upstream materials sector, strong NEV sales in China are expected to drive continuous demand for lithium. Our Metals & Mining team has a Buy rating on Ganfeng (002460.SZ) and a Hold rating on Tianqi (002466.SZ).

Downstream: more manufacturers than one can think of

BYD and Yutong have the most visible financial contributions from NEV sales

When investors look for China NEV sector thematic plays, the most obvious answers are BYD and Zhengzhou Yutong Bus. BYD's FY15 NEV sales volume equal 14% of its FY15 total auto sales volume with close to a 20% market share. FY15 NEV net revenue accounts for 49% of auto sales net revenue and 24% of total net revenue. According to BYD, its auto segment operating profit, which equals 66% of FY15 operating profit, is predominantly from the NEV business.

Yutong's FY15 NEV sales volume equals 31% of its FY15 total bus sales volume with close to a 25% market share. FY15 NEV gross revenue accounts for 45% of total gross revenue.

Obviously, both BYD and Yutong are major NEV manufacturers in China, and their NEV segment's contributions to total financial position, in both absolute and percentage terms, also place them among the leaders in China. Going forward, we envision both companies will be key NEV manufacturers in China, but with a declining market share as more manufacturers enter the NEV market with new products.

Figure 50: Key operating and financial metrics of BYD and Yutong's NEV business

BYD		Yutong	
2015 house brand NEV sales	62,893 units (up 2.0x YoY)	2015 NEV sales	20,445 units (up 1.8x YoY)
2015 NEV sales volume as % of total sales volume	14.1%	2015 NEV sales volume as % of total sales volume	30.5%
2015 sales volume market share*	19.0%	2015 sales volume market share**	23.6%
2015 NEV sales revenue	RMB19.0bn (up 1.6x YoY)	2015 NEV sales revenue	RMB14.0bn (up 1.5x YoY)
2015 NEV revenue as % of total revenue	24.4%	2015 NEV revenue as % of total revenue	44.8%

* Amongst all NEV sales; ** Amongst commercial NEV sales
Source: Company data, CAAM, Deutsche Bank



Other auto OEMs catching up, but with initial small earnings contribution

Given the long-term support commitment by the government and the need to lower their weighted average per-car fuel consumption, more mainstream OEMs are stepping up their NEV/smart car R&D efforts with some imminent new NEV launches. For instance, state-owned-enterprise SAIC Motor is undergoing an RMB15bn private placement plan to beef up its NEV R&D efforts in 2016-20E. Meanwhile, its Roewe local brand will launch the e950 PHEV sedan and PHEV version of its to-be-launched RX5 SUV in the foreseeable future. Apart from that, BAIC Motor will utilize its existing Senova sedan/SUV platforms (e.g. for D50 and D80 sedans as well as for X25 SUV) to roll out several extra EVs. These two companies will also benefit from specific supportive policies in Shanghai and Beijing, respectively, where about 70% of China's NEV sales are recorded, in our estimate.

For privately owned local Chinese enterprises, Geely (0175.HK) has launched the EV version of its popular Emgrand sedan, with more conventional hybrid and PHEV products on the way. The company has an ambitious target to have combined conventional hybrid, EV and PHEV sales make up 90% of its total sales volume by 2020E. For Great Wall (2333.HK), the company will develop and launch EV/PHEV SUVs in the coming years to help lower its weighted average per-car fuel consumption. There are also privately owned pure-play NEV manufacturers such as Kandi (KNDI.O) and FDG (0729.HK), but their scale is either tiny (e.g. FDG) or not mainstream (e.g. low range EVs for Kandi).

At the most recent Beijing Auto Show, almost every manufacturer was displaying at least one EV new model or prototype in its booth. What was new this time vs. the Guangzhou Auto Show in November 2015 was an increase in the number of PHEV models and EV/PHEV SUVs. We think this represents manufacturers' response to the market preference for SUVs and PHEVs (as well to insufficient charging facilities nationwide). Nevertheless, with the conventional car businesses for most of these OEMs remaining scalable and profitable, NEV initiatives are unlikely to become a meaningful earnings contributor.

Foreign brands/JVs have been slow to the market

Since imported NEVs, such as Tesla Model S and BMW i3, will not be eligible for government subsidies, global brands can only take advantage of main government support by producing NEVs at their Chinese JVs. However, there are currently only a handful of JVs' NEV models, e.g. Dongfeng Nissan Venucia Chenfeng EV (based on Nissan Leaf), Brilliance BMW 5 series PHEV and BYD Daimler Denza EV, none of which has significant sales volume.

In our view, the lack of models is due to 1) relatively higher price tags for JV NEVs and 2) a concern of global OEMs about sharing their NEV technology. However, with more JVs regarding NEVs as a volume driver besides SUVs, we expect more new launches, for instance from major JVs such as SAIC Volkswagen and from Tesla trying to localize its EV production. Most recently, Dongfeng Motor announced that it will co-develop an EV platform called e-CMP with PSA (PEUP/PA), to be available by 2019E for both companies' EV products.

Non-traditional auto manufacturers also at the party, but for the long term

As mentioned in the previous section, given the simple architecture of an EV vs. a conventional car and the intention to develop smart internet cars, various non-traditional auto companies have been pouring resources into the NEV



segment. Notable examples are LeTV's EV and smart car concepts, which were shown at a few China auto shows, and its investment in US-based Faraday Future.

Harmony Auto's partnership with Tencent and Foxconn to develop both entry-level and high-end EVs is another example, with the entry-level version to be available as soon as late 2016E. That being said, as these companies' EV development plans are for smart EV products that will be released a few years later, we are unlikely to see positive financial contribution from their NEV initiatives for now.

Midstream: myriad participants but limited pure plays

Many part suppliers of battery, drivetrain, and charging systems

Within the midstream space of the NEV supply chain are probably more than 40 listed companies involved in making various NEV parts, especially battery cells, battery packs, battery management systems (BMS) and electric motors. Meanwhile, China still mostly relies on overseas suppliers to provide industrial semiconductors for NEVs.

In terms of regulatory environment, the government has tighter control in the battery space, with a policy to subsidize only qualified and registered EV battery makers. Since November 2015, 25 EV battery makers have been qualified by the government. This includes EV battery companies under bigger listed groups (BYD, FDG, Corun, Wanfeng and Gree), directly listed EV battery companies (Do-Fluoride, Guoxuan and Tianneng), and other unlisted EV battery companies. In our view, the policy goal is to filter out small, inefficient and low-tech battery makers so as to ensure EV battery quality.

We identified at least 38 companies listed below with direct exposure or plans in this area, along with brief business descriptions. However, investors should note that this list is by no means comprehensive. What is more, most of these companies do not have scalable sales from NEV related business, and/or their NEV related business contribute only a small portion of overall sales.



Figure 51: List of major A-share listed NEV part suppliers in China

公司名称	Company's full name	Ticker (Reuters)	Key business profile	NEV-related business highlights/products
万丰奥威	Zhejiang Wanfeng Auto Wheel	002085.SZ	The company mainly manufactures aluminum alloy auto wheels.	Manufactures lithium batteries through equity investment in CENAT
宜安科技	Dongguan Eontec	300328.SZ	The company manufactures aluminum and magnesium alloys, and other alloy precision die-castings.	Manufactures magnesium and aluminum alloy parts. Key client is BYD (1211.HK)
多氟多	Do-Fluoride Chemicals	002407.SZ	The company produces cryolite, aluminum fluoride, and inorganic fluoride compound products.	Manufactures lithium batteries for NEVs and currently also manufactures new energy minivan and logistics vehicles
成飞集成	Sichuan Chengfei Integration Technology	002190.SZ	The company manufactures car molds, aircraft molds, and frames.	Manufactures lithium batteries for NEVs
*ST 金瑞	Kingray New Materials Science & Technology	600390.SS	The company manufactures advanced electronic basic materials, alloy materials, and super-hard materials.	Manufactures materials for new energy batteries
西部资源	Sichuan Western Resources	600139.SS	The company operates in copper mining and trading of copper concentrations.	Manufactures materials for lithium batteries and produces new energy buses through its subsidiaries
南洋科技	Zhejiang Nanyang Technology	002389.SZ	The company manufactures capacitor film, wrapping film, and capacitors.	Manufactures lithium-ion battery separators
当升科技	Beijing Easpring Material Technology	300073.SZ	The company manufactures battery chemicals.	Manufactures cathode materials for lithium-ion batteries
永贵电器	Zhejiang Yonggui Electric Equipment	300351.SZ	The company manufactures rail transit connectors.	Manufactures electric vehicle connectors
中科三环	Beijing Zhong Ke San Huan High-Tech	000970.SZ	The company manufactures rare earth permanent magnetic materials and products.	Manufactures neodymium magnet materials applicable to NEVs
佳电股份	Harbin Electric Corp Jiamusi Electric Machine	000922.SZ	The company manufactures relays, relay protection devices, automation products, electrical mutual inductors, electric source products, and other electrical products.	Manufactures electric vehicle motors
松芝股份	Songz Automobile Air Conditioning	002454.SZ	The company manufactures car air-conditioning and related products.	Manufactures air conditioning systems for new energy buses
法拉电子	Xiamen Faratronic	600563.SS	The company manufactures thin film capacitors and metalized film materials.	Manufactures film capacitors for NEVs
京威股份	Beijing WKW Automotive Parts	002662.SZ	The company provides passenger cars with internal and external accessories systems, develops supporting products and provides related services.	Invested 20% stake in Changchun New Energy Limited and entered the NEV market
方正电机	Zhejiang Founder Motor	002196.SZ	The company manufactures household sewing machine motors, industrial sewing machine motors and computerized automatic thread trimming sewing machines.	Manufactures electric vehicle motors and electric vehicle controller
英威腾	Shenzhen Invt Electric	002334.SZ	The company manufactures electricity voltage transformers.	Manufactures electric vehicle control systems
合康变频	Hiconics Drive Technology	300048.SZ	The company manufactures high voltage transformers.	Manufactures electric vehicle controllers, core parts for new energy buses, and charging poles
振华科技	China Zhenhua Group Science & Technology	000733.SZ	The company manufactures electronic components, telecommunication equipment, and electric machines.	Manufactures cathode materials for lithium-ion batteries and integrated circuits
正海磁材	Yantai Zhenghai Magnetic Material	300224.SZ	The company manufactures high quality neodymium iron boron permanent magnets, and provides related services.	Manufactures electric vehicle control systems
欣旺达	Sunwoda Electronic	300207.SZ	The company produces li-ion battery module. The company also produces membrane switches and precision structures.	Manufactures lithium-ion battery modules
纳川股份	Fujian Newchoice Pipe Technology	300198.SZ	The company produces plastic pipes.	Manufactures powertrain systems for NEVs, and has an NEV operation platform
科力远	Hunan Corun New Energy	600478.SS	The company manufactures continuous nickel foam.	Manufactures nickel-metal hydride batteries for Toyota's hybrid models, and established a hybrid powertrain R&D project in 2016

Source: Bloomberg Financial LP, Reuters, Company data, Deutsche Bank



Figure 51: List of major A-share listed NEV part suppliers in China (Cont'd)

亿纬锂能	Eve Energy	300014.SZ	The company manufactures lithium battery, as well as provides portable power source solutions.	Manufactures lithium primary batteries, lithium-ion batteries, vehicle power battery driving systems, lithium-ion capacitors for NEVs
亚太股份	Zhejiang Asia-Pacific Mechanical & Electronic	002284.SZ	The company manufactures automobile parts, and produces brake drums, vacuum boosters, master and wheel cylinders, clutch operating and slave cylinders, and suspension parts.	Aims to enter in-wheel electric motors market through cooperation with Elaphe
康得新	Jiangsu Kangde Xin Composite Material	002450.SZ	The company produces laminating film and laminating equipment.	Aims to develop a complete carbon fiber chain
杉杉股份	Ningbo Shanshan	600884.SS	The company manufactures men's suits, casual wear, shirts, uniforms, and other apparel products. The company also produces lithium ion battery materials.	The upstream (material supplier) of lithium battery manufacturers, e.g. BYD, Samsung SDI (006400.KS), LG Chem Ltd (051910.KS), Guoxuan High-Tech (002074.SZ)
格林美	GEM	002340.SZ	The company collects and recycles cobalt and nickel scraps into ultra-fine cobalt and nickel powder and other products.	Manufactures materials (e.g. ultrafine cobalt and nickel powers, electro-deposit copper, cobalt cathode) for new energy battery power vehicles
万向钱潮	Wanxiang Qianchao	000559.SZ	The company manufactures a variety of auto parts, include universal joints, car vibration absorbers, transmission systems, bearings, and other related parts. Wanxiang also trades merchandise.	R&D in NEV auto parts for major OEMs
骆驼股份	Camel Group	601311.SS	The company manufactures and recycles batteries.	Manufactures electric vehicle motors and control systems; provides NEV leasing services. Currently R&D in lithium battery
康盛股份	Zhe Jiang Kangsheng	002418.SZ	The company produces cooling tubes and related products.	Manufactures electric motors, electric control and electric air conditioning for NEVs
阳光电源	Sungrow Power Supply	300274.SZ	The company produces and provides services for solar PV inverters, wind power converters, and other power supply products.	Manufactures electric control systems. Clients include King Long Bus (600686.SS) and Anka Bus (000868.SZ)
国轩高科	Guoxuan High-Tech	002074.SZ	The company manufactures switching equipment products, and mainly produces high and low voltage switches, switchgears and other related electronic components and equipment.	Manufactures power batteries (lithium) for NEVs
双环传动	Zhejiang Shuanghuan Driveline	002472.SZ	The company produces gears and shafts.	Manufactures gears for NEVs. Clients include BYD, Chery, and Guangzhou Auto (2238.HK)
德赛电池	Shenzhen Desay Battery Technology	000049.SZ	The company manufactures batteries, develops and manages office and commercial buildings. The company also operates in import and export trading.	Manufactures power batteries and battery management systems for NEVs
长园集团	Changyuan Group	600525.SS	The company manufactures radioactive materials and electric power netting facilities.	Manufactures EV-related materials, including heat-shrinkable tubing for EVs, electric vehicle power batteries, lithium-ion battery separators, lithium battery electrolyte additives.
海源机械	Fujian Haiyuan Automatic Equipments	002529.SZ	The company manufactures automatic hydraulic presses.	Manufactures carbon fiber for NEVs
圣阳股份	Shandong Sacred Sun Power Sources	002580.SZ	The company produces AGM, GEL and other new valve-regulated lead-acid batteries.	Manufactures lithium-ion batteries, new energy system integrated products, and various NEVs
天能動力	Tianneng Power International	0819.HK	The company manufactures motive battery products. Its batteries are used predominantly in electric bikes.	Also manufactures lithium-ion batteries for NEVs. Key clients include Kandi, Zotye, and Chery.

Source: Bloomberg Financial LP, Reuters, Company data, Deutsche Bank

The following is another list of manufacturers with exposure to the charging facility set-up. Once again, investors should note that this list is by no means comprehensive. What is more, most of these companies do not have scalable sales from NEV related business, and/or their NEV related businesses only contribute a small portion of overall sales.



Figure 52: List of major A-share listed NEV charging equipment manufacturers in China

公司名称	Company's full name	Ticker (Reuters)	Company profile	NEV-related business highlights/products
银河电子	Jiangsu Yinhe Electronics	002519.SZ	The company produces digital television receiver terminals, information and electronic equipment structure components, and electronic components.	Provides EV charging equipment (include charging poles and mobile charging equipment) and in-car AC systems for NEVs
德威新材	Jiangsu Dewei Advanced Materials	300325.SZ	The company sells polymer materials for cables.	Manufactures new energy and charging poles' electrical cables
中兴通讯	ZTE	000063.SZ	The company markets switches, access servers, videoconferencing systems, mobile communication systems, data communication devices, and optical communication devices.	Develops proprietary intellectual rights and applies high-power wireless charging series products in NEVs through its subsidiary ZTEV
中鼎股份	Anhui Zhongding Sealing Parts	000887.SZ	The company produces rubber sealing parts, special rubber products, and compounded rubber.	Manufactures EV charging equipment through its subsidiaries
特锐德	Qingdao TGOOD Electric	300001.SZ	The company manufactures electrical transformers and provides related technical services. The company also provides system solutions for electrical transformer substations.	Develops EV charging systems and provides construction and operation of charging station services
万马股份	Zhejiang Wanma	002276.SZ	The company produces mainly union insulating electric cables of polyethylene, insulating electric cables of polyvinyl chloride, and other kinds of electric wire cables.	Manufactures EV charging equipment, and operates charging networks
茂硕电源	Shenzhen Moso Power Supply Technology	002660.SZ	The company manufactures switching power supply products.	Subsidiaries are involved in manufacturing EV charging equipment
奥特迅	Shenzhen Auto Electric Power Plant	002227.SZ	The company manufactures electric automatic power supply equipment and intelligent units.	Manufactures, constructs and operates EV charging equipment
中恒电气	Hangzhou Zhongheng Electric	002364.SZ	The company supplies electrical products.	Manufactures EV charging poles
森源电气	Henan Senyuan Electric	002358.SZ	The company manufactures power distribution system and components.	R&D in intelligent EV charging poles and is preparing to enter the charging pole market in the next few years
通合科技	Shijiazhuang Tonhe Electronics Technologies	300491.SZ	The company specializes in power electronics and combines R&D, manufacture, sales services for high frequency switching power supply and related products.	Manufactures high frequency switching power supply and related products. Products include EV charging stations and on-board power
世纪星源	Shenzhen Fountain	000005.SZ	The company develops, leases, and manages real estate. It also provides information services.	Operates EV charging stations inside parking lots on their managed real estate
易事特	Guangdong East Power	300376.SZ	The company manufactures UPS power electronic devices.	Manufactures various EV charging equipment
科士达	Shenzhen Kstar Science And Technology	002518.SZ	The company engages in uninterruptible power supply and support services of valve-regulated lead-acid battery research and development, production, sales and support.	Manufactures various EV charging equipment, including DC/AC charging products
和顺电气	Suzhou Industrial Park Heshun Electric	300141.SZ	The company is an integrated service provider that utilizes applied power electronics in the public power supply, distribution and electricity systems for the provision of electricity.	Manufactures various EV charging equipment, constructs charging stations, and aims to develop more charging station operation platforms
科陆电子	Shenzhen Clou Electronics	002121.SZ	The company manufactures power automation equipment and public instruments.	Manufactures, constructs, and operates EV charging stations
南洋股份	Guangdong Nan Yang Cable Group	002212.SZ	The company manufactures power wires and cables, as well as PVC materials for wire and cable making. The company operates under the brand name of NAN cables.	Invests in and constructs EV charging poles at parking lots, and manufactures EV charging cables
上海普天	Shanghai Potevio Co Ltd	600680.SS	The company manufactures and trades telecommunication equipment and electronic products.	Through equity investment, manufactures EV charging accessory equipment
沃尔核材	Shenzhen Woer Heat-Shrinkable Material	002130.SZ	The company manufactures new application electronic & electric products and equipment, based on nuclear technology.	Through equity investment, manufactures EV charging poles and operates the charging network
中超控股	Jiangsu Zhongchao	002471.SZ	The company produces wires and cables.	Manufactures EV charging cables
彩虹精化	Shenzhen Rainbow Fine Chemical Industry	002256.SZ	The company manufactures aerosol products.	Prefers to equity invest in NEV business, include the operation of NEV service platform

Source: Bloomberg Financial LP, Reuters, Company data, Deutsche Bank



Figure 52: List of major A-share listed NEV charging equipment manufacturers in China (Cont'd)

智慧能源	Far East Smarter Energy	600869.SS	The company mainly engages in the system design, research and development, manufacturing, marketing and services of overhead wires, electric cables, wires and cables for electrical equipment, and special cables.	Develops the cable for EV AC/DC charging; and manufactures EV battery through its subsidiary
科华恒盛	Xiamen Kehua Hengsheng	002335.SZ	The company manufactures power supply equipment (Uninterruptible Power Supply systems).	Develops various EV charging equipments
爱康科技	Jiangsu Akcome Science & Technology	002610.SZ	The company produces solar accessories. Main products include solar frames, EVA film, and mounting brackets. Akcome also provides services to the solar industry.	Establishes EV operation platform through its subsidiary
九洲电气	Harbin Jiuzhou Electric	300040.SZ	The company manufactures power transmission and conversion equipment.	Aims to develop EV charging poles
泰坦能源	China Titan Energy Technology	2188.HK	The company manufactures power electronic products and equipment	The company also manufactures EV charging products comprising AC EV charging poles, binning chargers, charging modules, and battery maintenance and management systems.

Source: Bloomberg Financial LP, Reuters, Company data, Deutsche Bank

Foreign companies also making big bets for the Chinese NEV market

Apart from local part suppliers, we also observe that key global suppliers, especially in the battery arena, have plans to add capacities in China. For instance, both LG Chem (051910.KS) and Panasonic (6752.T) as amongst the EV battery market leaders, have plans to establish a battery factory in China.

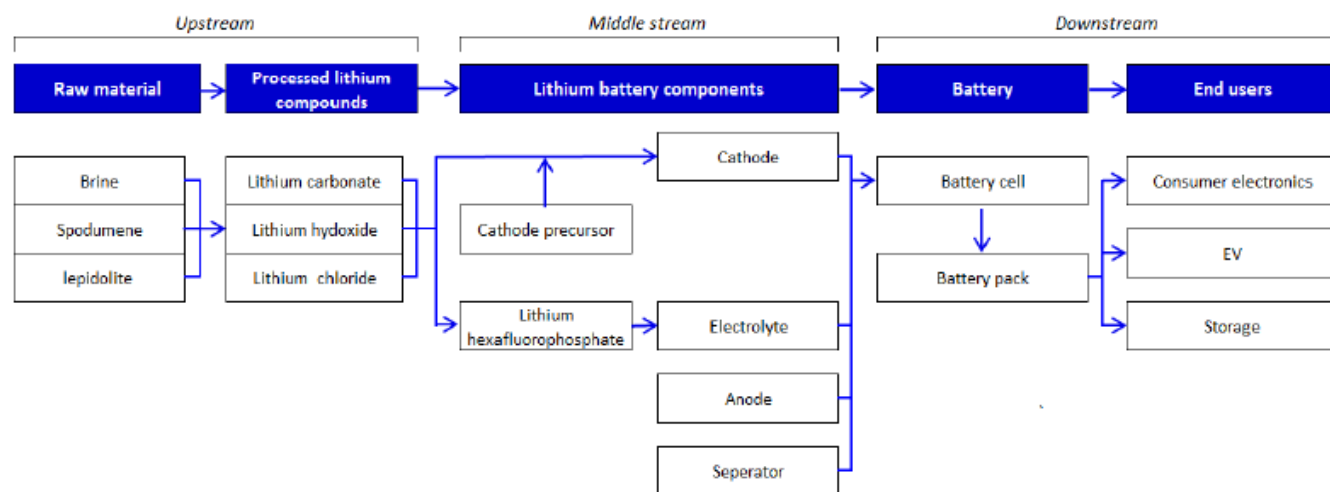
Upstream: unfading demand for lithium

Our global Metals & Mining team has looked in detail at the exposure of companies to these trends via the production of lithium and related products essential for EV batteries. As shown in Figure 53, lithium battery upstream players mainly provide lithium compounds used for cathode and electrolyte manufacturing. Middle-stream players produce components of lithium batteries, mainly including cathode, electrolyte, anode and separator, while downstream battery producers focus on assembly and packing. Despite having a simple industry supply chain structure, the whole industry chain could be considered long and fragmented, as many niche players focus only on one key activity. In the EV/battery supply chain, they believe lithium is in a sweet spot, enjoying a tight demand/supply balance and favorable industry structure.

According to the team's report, "*Lithium 101, Welcome to the Lithium-ion Age*", published in May 2016, the emergence of the EV and energy storage markets is being driven by a global desire to reduce carbon emissions and break away from traditional infrastructure networks. This shift in energy use is supported by the improving economics of lithium-ion batteries. Global battery consumption is set to increase 5x over the next 10 years, placing pressure on the battery supply chain and lithium market. The team expects global lithium demand will increase from 181kt Lithium Carbonate Equivalent (LCE) in 2015 to 535kt LCE by 2025.

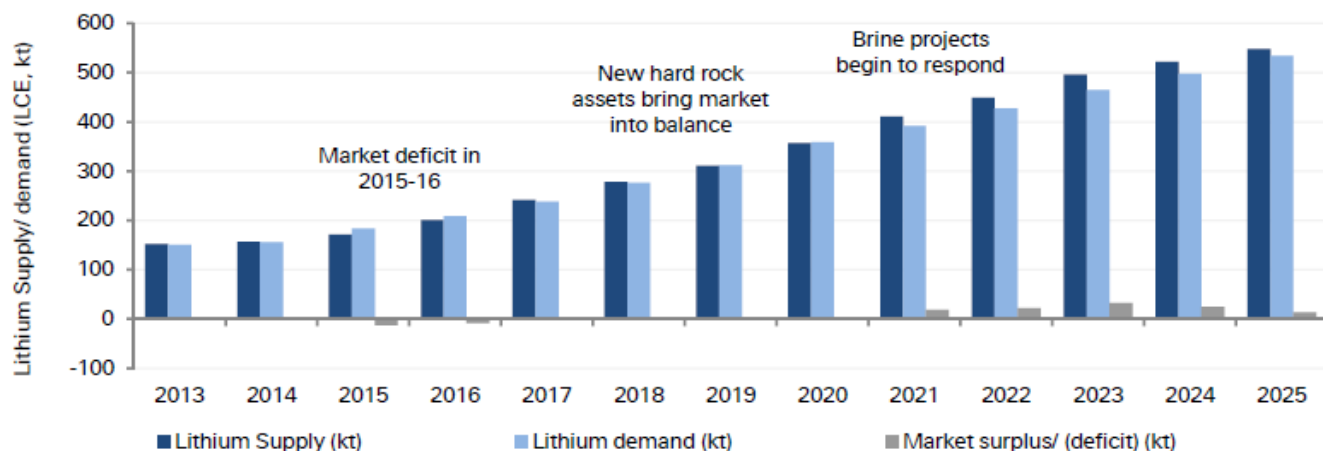


Figure 53: Lithium battery industry chain



Source: Deutsche Bank

Figure 54: Global lithium demand and supply balance



Source: Deutsche Bank, United States Geological Society, Company data

Figure 55: Lithium battery YoY capacity increases through the supply chain

YoY growth rate	2015E	2016E	2017E	2018E
Lithium battery demand (GWh)	45%	27%	25%	28%
Lithium compounds	9%	18%	20%	15%
Cathode	27%	38%	20%	15%
Hexafluorophosphate	24%	56%	33%	5%
Electrolyte	4%	15%	7%	0%
Battery capacity	62%	89%	25%	22%

Source: Deutsche Bank estimates, Avicenna energy, GIB, Chyx



Tianqi is the world's third-largest lithium supplier, controlling c.18% of global lithium output, and will likely be the major beneficiary of the favorable NEV sales trend. Tianqi not only owns the world-class Greenbushes mine, but also acquired a large, brand-new lithium carbonate processing factory in Zhangjiagang in 2015. Thus, Tianqi appears well positioned to benefit from this lithium up-cycle.

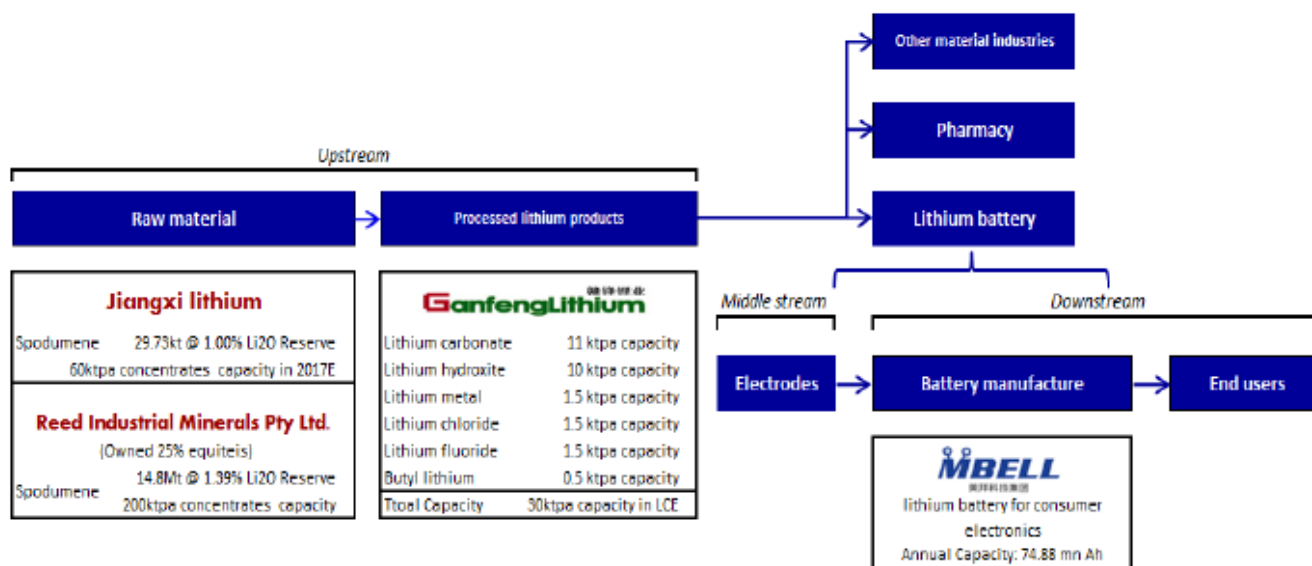
Figure 56: Tianqi's lithium compounds processing capacity in China (2016)

Battery/Industry grade	27.5ktpa
<i>Sheyang basement</i>	<i>10.5ktpa</i>
<i>Zhangjiagang basement (Original Galaxy lithium)</i>	<i>17ktpa</i>
Lithium hydroxide	5ktpa
Lithium chloride	1.5ktpa
High purity lithium carbonate	0.6ktpa
Lithium Metal	0.2ktpa
Total Capacity in LCE (lithium carbonate equivalents)	c.34.9ktpa

Source: Company data, Deutsche Bank estimates (Tianqi current price as of May 17 189.00 CNY)

Ganfeng Lithium is one of the largest lithium compound processors in China, with a total capacity of c.30ktpa LCE in 2016E. Ganfeng is directly benefiting from higher ASPs of lithium compounds, driven by booming EV sales and lead-acid battery replacement. Through purchasing shares in Process Minerals International, Ganfeng will become the largest shareholder (43.1%) of the Mt Marion project, which should solve the problems of uncertain raw material supply in the long term.

Figure 57: Ganfeng's major assets in operation along the industry chain



Source: Company data, Deutsche Bank



Stock implications

Key points

- Among Chinese auto manufacturers with material earnings contributions from NEV business, we view BYD and Yutong to be the more investible names.
- We initiate coverage of Yutong with a Buy rating, considering that its NEV bus leadership makes it the prime beneficiary of public bus fleet electrification.
- For BYD-H, we upgrade the stock to Buy on its enhanced earnings outlook. We maintain Sell on BYD-A on hefty valuation premium vs. BYD-H.
- We also highlight SAIC Motor and BAIC Motor, which have been adding efforts in its NEV business. We envision higher sales with new products and favorable local government policies.

Investment thesis for Yutong

Outlook: China's leading new energy bus manufacturer

Yutong is the largest manufacturer in the new energy bus segment, with a 26.1% market share in 2015 in terms of new energy bus sales volume. The company offers a comprehensive new energy bus model portfolio, including 1) pure-electric bus (EV bus) and 2) plug-in hybrid bus (PHEV bus), all eligible for the government's new energy vehicle (NEV) subsidy.

Demand growth is still at an early stage and we forecast a 28% CAGR in volume sales over the next five years. This is after factoring in the positives of long term demand stimulus from government policy, the improving operating efficiency of electric bus fleets and the negatives of changes in subsidies starting this year, as well as the high upfront cost of electric vehicles.

The economic case, as well as the environmental arguments for the sector is clear in our view – a new energy bus is now more cost-efficient to operate than a conventional product with similar pay-back period of around 3.7-3.8 years. By 2020E, we believe that as much 35% of the public bus fleet will have switched to NEV models.

Yutong Bus has shifted from its traditional product lines and developed a range of vehicles to supply this market which will enable the company to maintain a leading market share. By FY18E, half of sales and over 60% of gross profit will come from new technology products. Based on our forecasts, this will deliver annual NEV volume growth of 35% and a net income CAGR of 11%.

Valuation

Our target price of RMB25.9 for Zhengzhou Yutong Bus is set at a target 14.0x average FY16/17E P/E, about 30% above Yutong's mid-cycle P/E of 10.6x to reflect our optimism on Yutong's increasing profit contribution from the new energy bus segment. This is justified, in our view, since we expect the company to deliver an 11.1% three-year earnings CAGR in FY15-18E. In addition, while we think that the average FY16/17E P/BV implied by our target



price is 3.9x, at the higher end of the global peer group, we believe this is justified considering Yutong's relatively high FY17E ROE of 30%.

Risks

Key downside risks include 1) unexpected changes in the Chinese government's new energy bus subsidy policy, 2) weaker-than-expected new energy bus demand, 3) Yutong's market share loss in new energy buses, 4) an unexpected increase in raw material prices, and 5) an inability to adopt new technology and develop new bus models.

Investment thesis for BYD

Outlook: China's leading new energy bus manufacturer

In April, BYD reported 1Q16 results in PRC GAAP with gross revenue growing 32.7% YoY to RMB20.3bn. Gross profit margin improved by 1.9ppt YoY probably on higher NEV and SUV sales contribution, in our view. BYD's 1Q16 net profit jumped 6.0x YoY to RMB850.7m.

Latest guidance from BYD points to 1H16 earnings of RMB2.3-2.5bn – that is as much as 85% of our previous estimate for the full year. Its conventional auto sales figures have been weak with total house-brand PV volume falling 12.6% YoY in 4M16, according to CAAM, but demand for its house-brand passenger NEV sales and commercial NEV (sales up 121.3% and 34.4% YoY growth during the same period) have more than overshadowed ICE car sales weakness.

The company is also showing a significant margin lift in these NEV products and we raise our earnings forecast for FY16-18E by 18.3-20.0%. With this increased earnings outlook we now upgrade the share to Buy for the H-shares.

Nevertheless, our clear preference in the China NEV sector is for Yutong over BYD-H. The principal reason is that we envisage far less competition risk from new entrants in the bus segment than in passenger cars, where BYD will come under threat from peers like SAIC Motor and BAIC Motor. We also reiterate Sell on BYD-A, given its excessive valuation premium over BYD-H.

Figure 58: BYD – Deutsche Bank's major forecast assumptions

	2013	2014	2015	2016E	2017E	2018E
ICE vehicle sales (units)	503,499	419,418	384,437	358,624	370,347	392,114
YoY (%)	11.1%	-16.7%	-8.3%	-6.7%	3.3%	5.9%
Change from old forecast (%)				10.0%	11.3%	11.6%
New energy vehicle sales (units)	3,125	20,840	62,893	104,700	142,000	168,000
YoY (%)	-0.9%	566.9%	201.8%	66.5%	35.6%	18.3%
Change from old forecast (%)				7.4%	9.2%	9.4%
Net revenue (RMBm)	49,768	55,366	77,612	99,212	119,802	137,918
YoY (%)	12.1%	11.2%	40.2%	27.8%	20.8%	15.1%
Change from old forecast (%)				4.9%	5.6%	5.7%
Net profit (RMBm)	553	434	2,823	3,457	4,764	5,794
YoY (%)	579.6%	-21.6%	551.3%	22.4%	37.8%	21.6%
Change from old forecast (%)				20.0%	18.3%	20.0%

Source: Company data, Deutsche Bank estimates



Valuation

We base our SOTP-derived target price on: 1) 0.7x FY16E PEG to capture BYD's growth characteristics in the auto segment (87% of SOTP value); and 2) a peer average FY16E P/E of 14x and 14x for the handset business (10% of SOTP value) and battery business (3% of SOTP value), respectively. BYD's implied target FY16E P/E is at 30x, which is the highest target P/E benchmark among its local peers, and we think this is justified by a 61% FY15-18E three-year core earnings CAGR.

Risks

Key upside risks (BYD-A) are rapid auto sales and margin improvement, driven by successful new models, better-than-expected sales, and/or a margin recovery in the battery and handset component businesses. Key downside risks (BYD-H) are weaker-than-expected car sales, a slower-than-expected margin recovery in the battery and handset component businesses, and more capital fund raising in future years.



Model updated: 12 May 2016

Running the numbers

Asia
China
Automobiles & Components

BYD

Reuters: 1211.HK Bloomberg: 1211.HK

Buy

Price (18 May 16) HKD 42.15
Target Price HKD 50.80
52 Week range HKD 28.80 - 59.30
Market Cap (m) HKDm 104,363
USDm 13,445

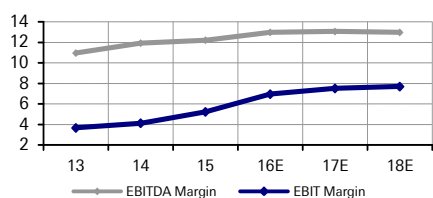
Company Profile

BYD Company Limited, through its subsidiaries, engages in three main businesses: 1) Li-ion and nickel rechargeable batteries; 2) handset components and assembly services; and 3) the production of autos, including hybrid and electric vehicles.

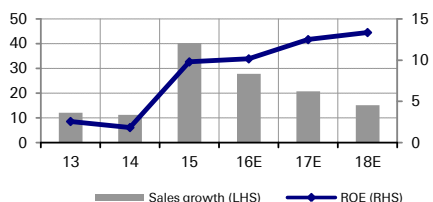
Price Performance



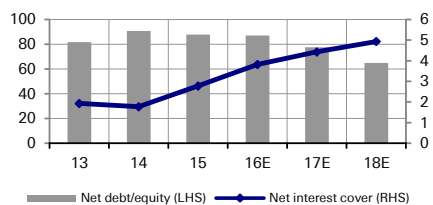
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 31-Dec

Financial Summary

	2013	2014	2015	2016E	2017E	2018E
DB EPS (CNY)	0.23	0.18	1.14	1.40	1.92	2.34
Reported EPS (CNY)	0.23	0.18	1.14	1.40	1.92	2.34
DPS (CNY)	0.05	0.00	0.00	0.00	0.00	0.00
BVPS (CNY)	9.2	10.2	13.0	14.4	16.4	18.7
Weighted average shares (m)	2,354	2,425	2,476	2,476	2,476	2,476
Average market cap (CNYm)	58,418	88,132	80,928	87,664	87,664	87,664
Enterprise value (CNYm)	80,795	116,448	114,406	124,694	125,524	124,472

Valuation Metrics

P/E (DB) (x)	105.6	203.3	28.7	25.4	18.4	15.1
P/E (Reported) (x)	105.6	203.3	28.7	25.4	18.4	15.1
P/BV (x)	3.27	2.35	2.65	2.45	2.16	1.89
FCF Yield (%)	nm	nm	nm	nm	2.2	4.6
Dividend Yield (%)	0.2	0.0	0.0	0.0	0.0	0.0
EV/Sales (x)	1.6	2.1	1.5	1.3	1.0	0.9
EV/EBITDA (x)	14.8	17.6	12.1	9.7	8.0	7.0
EV/EBIT (x)	44.2	50.9	28.2	18.1	13.9	11.7

Income Statement (CNYm)

Sales revenue	49,768	55,366	77,612	99,212	119,802	137,918
Gross profit	6,516	7,623	11,859	16,455	20,578	23,908
EBITDA	5,455	6,603	9,480	12,874	15,642	17,889
Depreciation	3,209	3,704	4,486	4,865	5,364	5,829
Amortisation	418	611	931	1,104	1,274	1,444
EBIT	1,828	2,288	4,063	6,904	9,004	10,616
Net interest income/(expense)	-947	-1,292	-1,464	-1,809	-2,035	-2,151
Associates/affiliates	-48	-122	-243	-220	-200	-180
Exceptionals/extraordinary	0	0	1,438	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	832	874	3,795	4,876	6,769	8,284
Income tax expense	56	134	657	1,073	1,625	2,071
Minorities	223	306	315	346	381	419
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	553	434	2,823	3,457	4,764	5,794
DB adjustments (including dilution)	0	0	0	0	0	0
DB Net profit	553	434	2,823	3,457	4,764	5,794

Cash Flow (CNYm)

Cash flow from operations	2,436	38	3,842	9,210	12,214	14,289
Net Capex	-5,492	-7,781	-10,482	-10,300	-10,300	-10,300
Free cash flow	-3,056	-7,743	-6,640	-1,090	1,914	3,989
Equity raised/(bought back)	0	3,395	0	0	0	0
Dividends paid	0	-146	-37	0	0	0
Net inc/(dec) in borrowings	6,232	5,314	5,774	4,612	2,226	239
Other investing/financing cash flows	-2,152	-1,381	2,963	-1,895	-2,164	-2,337
Net cash flow	1,024	-561	2,061	1,627	1,976	1,891
Change in working capital	-2,913	-6,106	-5,705	-3,548	-2,489	-2,166

Balance Sheet (CNYm)

Cash and other liquid assets	4,511	3,950	6,011	7,638	9,614	11,505
Tangible fixed assets	34,147	36,379	38,126	41,461	44,298	46,669
Goodwill/intangible assets	9,623	10,821	11,824	12,818	13,639	14,291
Associates/investments	1,084	1,414	1,889	1,669	1,469	1,289
Other assets	28,650	41,445	57,635	69,153	80,607	90,410
Total assets	78,015	94,009	115,486	132,739	149,626	164,163
Interest bearing debt	24,824	30,152	37,643	42,255	44,481	44,720
Other liabilities	28,334	34,962	41,814	50,652	60,169	68,253
Total liabilities	53,158	65,114	79,457	92,906	104,650	112,973
Shareholders' equity	21,710	25,366	32,294	35,751	40,515	46,309
Minorities	3,147	3,529	3,735	4,081	4,462	4,881
Total shareholders' equity	24,856	28,894	36,029	39,832	44,977	51,190
Net debt	20,313	26,202	31,632	34,617	34,867	33,215

Key Company Metrics

Sales growth (%)	12.1	11.2	40.2	27.8	20.8	15.1
DB EPS growth (%)	579.6	-23.9	537.9	22.4	37.8	21.6
EBITDA Margin (%)	11.0	11.9	12.2	13.0	13.1	13.0
EBIT Margin (%)	3.7	4.1	5.2	7.0	7.5	7.7
Payout ratio (%)	21.3	0.0	0.0	0.0	0.0	0.0
ROE (%)	2.6	1.8	9.8	10.2	12.5	13.3
Capex/sales (%)	11.6	15.5	15.8	10.7	8.8	7.7
Capex/depreciation (x)	1.6	2.0	2.3	1.8	1.6	1.5
Net debt/equity (%)	81.7	90.7	87.8	86.9	77.5	64.9
Net interest cover (x)	1.9	1.8	2.8	3.8	4.4	4.9

Source: Company data, Deutsche Bank estimates



SAIC and BAIC could become viable NEV players

In prior years, bigger Chinese auto manufacturers did not appear to be keen on developing NEV products due to a lack of scale and consequent losses from a high battery cost. However, substantial government subsidies, which are payable to manufacturers, have since helped to cover the incremental cost of making NEVs (mainly battery cost), putting paid to such concerns. Moreover, with an imminent agenda to lower average PV fuel consumption level by 2020E, manufacturers are more incentivized to develop NEVs now. Accordingly, we identify SAIC Motor and BAIC Motor among the pioneers in major auto SOEs' participation in the NEV sector.

SAIC Motor now has about 1,000 R&D personnel dedicated to NEV research on various platforms, including conventional hybrids, PHEVs, EVs, and FCVs. In 2015, it announced a RMB15bn private placement plan to boost NEV/smart car R&D in 2016-20E. In products, SAIC Motor has an e50 EV, China's first EV available to the private market in 2012. The company also launched e550 PHEV in 2014 and will launch two extra PHEVs, namely e950 sedan and RX5 PHEV SUV, in the foreseeable future. Apart from that, NEVs will come out from its JVs like SAIC Volkswagen. In 2015, SAIC Motor sold 11,123 passenger NEVs, according to CAAM, accounting for merely 0.2% of its total PV sales. However, we think that number will increase.

For BAIC Motor, its local brand currently produces EVs, with the drivetrain system provided by its affiliate BAIC BJEV. In FY15, it sold 20,131 EVs, accounting for 1.2% of BAIC Motor's total PV sales. According to management, even though BAIC BJEV has obtained its own license to make and sell NEVs directly, that affiliate is likely to focus on the development of low-end and high-end NEVs with distinct platforms. Meanwhile, BAIC Motor will continue to produce NEVs that share platforms with existing ICE products. For instant, its key EV model, EV160/EV200, is based on the Senova D20 sedan. Going forward, BAIC Motor is launching EU260 EV, ES210 EV and EX200 EV based on Senova D50 sedan, D80 sedan and X25 SUV, respectively.

Apart from products, another key point is that SAIC Motor and BAIC Motor are based in Shanghai and Beijing, respectively, cities that account for about 70% of national NEV sales, in our estimates. With the Shanghai/Beijing governments' relentless push for NEV adoption using subsidies and a favorable policy for NEV users, we think SAIC Motor and BAIC Motor will benefit the most vs. peers in those two markets.



Sector risks

Changes in government NEV subsidy scheme

It seems obvious to us that the China NEV market, whether viewed in terms of demand or supply, is mainly driven by government subsidies and other supportive policies. As such, any unexpected dwindling in subsidy level, for example much lower local government subsidies amid weakened local governments' financial strength, could negatively affect NEV demand. One good proof of the impact is the 1Q16 QoQ decline in NEV sales when local governments reformulated their new subsidy scheme and with the central government's investigations into subsidy cheating.

On the positive side, if the government wanted to ensure NEV take-ups in the upcoming years and beef up its policy support, NEV demand could be further front-loaded and provide upside in the near to medium term.

Developments in new technologies to replace NEVs

We think that while NEVs are more environmentally friendly than ICE cars, they do have shortcomings, including 1) pollution at the electricity generation level (especially at coal-fired power plants), 2) battery disposal, 3) long charging times, which make EV less ideal for long-haul travel. Therefore, the auto industry has been conducting other fuel-efficient R&D, alongside NEV R&D. This includes improving ICE efficiency efforts and FCV R&D. While these options currently appear costly with unsolved environmental concerns (e.g. carbon emission during hydrogen generation), any technological or cost breakthrough could post a threat to EV/PHEV demand.

Indeed, since we think EV sales are technically unlikely to have a high contribution to total sales before 2020E (e.g. >5%), we still see opportunities for conventional hybrid products to thrive while OEMs need to comply with stricter fuel efficiency and emission limits. Apart from that, electric motors appear to be a more sustainable segment because hybrid vehicles, PHEVs, EVs, and FCVs all need motors, while EV battery manufacturers are also subject to technology change risks.

Over-competition could erode margins

As mentioned in the previous section, both traditional and non-traditional auto companies are involved in the development of EVs, with even more new products to come out from non-traditional players. As such, crowding in the products space could lead to margin pressure before production costs are able to come down.



Rating
Buy

Asia
China

Automobiles &
Components

Company
Yutong Bus

Reuters
600066.SS

Bloomberg
600066 CH

Price at 18 May 2016 (CNY)	21.66
Price target - 12mth (CNY)	25.90
52-week range (CNY)	24.50 - 16.73
HANG SENG INDEX	20,119

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Riding on the new energy drive; initiating coverage with a Buy

China's largest bus manufacturer leading the new energy drive

Persuading five million prospective car buyers to choose a new technology will be a major challenge for the Chinese government. However, getting hundreds of fleet bus operators to switch to New Energy Vehicles (NEV) is already proving to be a much quicker process, via regulations and intensive subsidy programs. NEV bus sales of 78,409 units accounted for a quarter of the whole industry last year, and we expect this to grow 28% annually over the next five years. Yutong is the clear leader in this field, with a 26% market share and on our estimates by 2018 will make over 60% of profit from NEV products. We initiate coverage with a Buy, TP RMB25.9, 14x forward PER.

Subsidy-stimulated demand to continue; subsidy reduction risk well contained

New energy bus sales grew 3.5x in 2015, and China is committed to accelerating adoption by both public and private operators. Changes to the subsidy regime from this year and the high up-front purchase price are legitimate obstacles but we expect greater cost efficiencies and policy support to generate a 28% five-year CAGR as we expect 36% of the public bus fleet to be replaced and updated to NEVs. On our estimates, Yutong has the breadth of product range and leading position to maintain a 27% share of this expanding market.

Solid earnings growth supported by increasing new energy bus contribution

We expect sales in H1 2016 to be weak as the subsidy regime should be changed after alleged abuse of the system last year (and 4Q15 sales were exceptional), but thereafter we forecast 35% volume growth annually to 2018. Pricing will be adjusted lower as subsidies are cut, but production costs will fall as battery costs decline rapidly. Product mix will also improve. Our earnings forecasts are for an undemanding 11.1% FY15-18E CAGR.

Initiating coverage with a Buy; target price set at 14x avg. FY16/17E P/E; risks

Target price of RMB25.9 is set based on 14.0x average FY16/17E P/E, c.30% above Yutong's mid-cycle P/E of 10.6x. We believe this is justified, given an 11.1% three-year earnings CAGR in FY15-18E. Key downside risks: unexpected changes in government's subsidy policy and weaker-than-expected demand.

Forecasts and ratios

Year End Dec 31	2014A	2015A	2016E	2017E	2018E
Sales (CNYm)	25,573.7	31,059.1	34,235.9	37,746.2	41,647.6
EBITDA (CNYm)	3,791.1	4,644.1	5,335.0	5,985.1	6,722.7
Reported NPAT (CNYm)	2,612.6	3,535.2	3,842.6	4,363.7	4,846.0
Reported EPS FD (CNY)	1.18	1.60	1.74	1.97	2.19
DB EPS FD (CNY)	0.85	1.47	1.65	1.83	2.04
DB EPS growth (%)	19.1	72.1	12.5	11.1	11.5
PER (x)	13.4	13.6	13.1	11.8	10.6
EV/EBITDA (x)	5.0	7.7	7.3	6.4	5.6
DPS (net) (CNY)	0.67	1.50	0.87	0.99	1.09
Yield (net) (%)	5.9	7.5	4.0	4.5	5.1

Source: Deutsche Bank estimates, company data

¹ DB EPS is fully diluted and excludes non-recurring items

² Multiples and yields calculations use average historical prices for past years and spot prices for current and future years, except P/B which uses the year end close

Price/price relative



Performance (%)	1m	3m	12m
Absolute	8.4	11.1	5.9
HANG SENG INDEX	-4.9	3.9	-27.1

Source: Deutsche Bank



Model updated: 18 May 2016

Running the numbers

Asia
China
Automobiles & Components
Yutong Bus
Reuters: 600066.SS
Bloomberg: 600066 CH

Buy

Price (18 May 16)	CNY 21.66
Target Price	CNY 25.90
52 Week range	CNY 16.73 - 24.50
Market Cap (m)	CNYm 47,954
	USDm 7,355

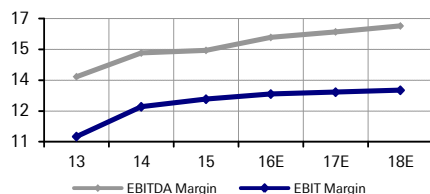
Company Profile

Zhengzhou Yutong Bus Co., Ltd. is a large-scale modern manufacturing company specialized in the R&D, manufacturing and sales of bus products. Its main plant is located in Zhengzhou Yutong Industrial Park, Zhengzhou, Henan province, which covers an area of 1.12 million square meters.

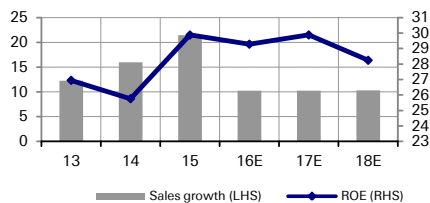
Price Performance



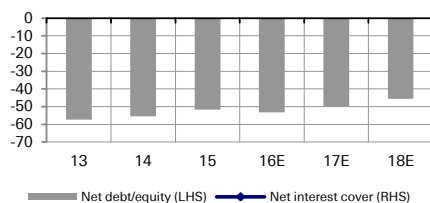
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 31-Dec

Financial Summary

	2013	2014	2015	2016E	2017E	2018E
DB EPS (CNY)	0.71	0.85	1.47	1.65	1.83	2.04
Reported EPS (CNY)	1.02	1.18	1.60	1.74	1.97	2.19
DPS (CNY)	0.29	0.67	1.50	0.87	0.99	1.09
BVPS (CNY)	4.3	4.9	5.8	6.0	7.1	8.4
Weighted average shares (m)	2,221	2,216	2,215	2,214	2,214	2,214
Average market cap (CNYm)	23,374	25,245	44,069	47,954	47,954	47,954
Enterprise value (CNYm)	17,810	19,115	35,762	39,191	38,456	37,940

Valuation Metrics

P/E (DB) (x)	14.7	13.4	13.6	13.1	11.8	10.6
P/E (Reported) (x)	10.3	9.7	12.5	12.5	11.0	9.9
P/BV (x)	2.57	2.96	3.87	3.58	3.03	2.59
FCF Yield (%)	7.1	5.1	10.7	7.9	5.6	5.7
Dividend Yield (%)	2.7	5.9	7.5	4.0	4.5	5.1
EV/Sales (x)	0.8	0.7	1.2	1.1	1.0	0.9
EV/EBITDA (x)	5.9	5.0	7.7	7.3	6.4	5.6
EV/EBIT (x)	7.5	6.1	9.2	8.9	7.9	7.0

Income Statement (CNYm)

Sales revenue	22,056	25,574	31,059	34,236	37,746	41,648
Gross profit	4,980	6,092	7,753	8,482	9,255	10,104
EBITDA	3,016	3,791	4,644	5,335	5,985	6,723
Depreciation	623	637	691	879	1,031	1,211
Amortisation	20	32	47	65	78	93
EBIT	2,372	3,122	3,906	4,391	4,876	5,419
Net interest income/(expense)	3	25	142	11	13	11
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	243	-96	56	55	172	191
Profit before tax	2,618	3,051	4,104	4,457	5,061	5,620
Income tax expense	328	398	517	557	633	703
Minorities	28	40	52	57	65	72
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	2,263	2,613	3,535	3,843	4,364	4,846
DB adjustments (including dilution)	-675	-725	-288	-190	-304	-320
DB Net profit	1,588	1,888	3,247	3,653	4,059	4,526

Cash Flow (CNYm)

Cash flow from operations	2,802	3,205	6,010	5,445	4,624	5,017
Net Capex	-1,146	-1,914	-1,294	-1,642	-1,935	-2,282
Free cash flow	1,656	1,291	4,715	3,802	2,689	2,735
Equity raised/(bought back)	47	34	0	0	0	0
Dividends paid	-932	-922	-1,608	-3,321	-1,921	-2,182
Net inc/(dec) in borrowings	-285	-195	-4	0	0	0
Other investing/financing cash flows	976	125	-2,293	12	13	14
Net cash flow	1,463	333	810	494	781	566
Change in working capital	-113	-410	1,427	566	-940	-1,217

Balance Sheet (CNYm)

Cash and other liquid assets	5,613	6,016	6,699	7,193	7,974	8,540
Tangible fixed assets	3,874	4,586	4,657	5,125	5,672	6,310
Goodwill/intangible assets	704	940	1,464	1,723	2,034	2,406
Associates/investments	149	170	1,687	1,705	1,725	1,746
Other assets	8,276	12,111	15,633	16,945	18,328	19,889
Total assets	18,616	23,823	30,139	32,692	35,733	38,891
Interest bearing debt	165	0	0	0	0	0
Other liabilities	8,940	12,963	17,200	19,174	19,707	20,130
Total liabilities	9,104	12,963	17,200	19,174	19,707	20,130
Shareholders' equity	9,478	10,804	12,861	13,382	15,825	18,489
Minorities	33	56	79	136	200	272
Total shareholders' equity	9,511	10,861	12,939	13,518	16,025	18,761
Net debt	-5,448	-6,016	-6,699	-7,193	-7,974	-8,540

Key Company Metrics

Sales growth (%)	12.3	15.9	21.4	10.2	10.3	10.3
DB EPS growth (%)	-5.3	19.1	72.1	12.5	11.1	11.5
EBITDA Margin (%)	13.7	14.8	15.0	15.6	15.9	16.1
EBIT Margin (%)	10.8	12.2	12.6	12.8	12.9	13.0
Payout ratio (%)	28.2	56.5	94.0	50.0	50.0	50.0
ROE (%)	27.0	25.8	29.9	29.3	29.9	28.2
Capex/sales (%)	5.3	7.5	4.2	4.8	5.1	5.5
Capex/depreciation (x)	1.8	2.9	1.8	1.7	1.7	1.8
Net debt/equity (%)	-57.3	-55.4	-51.8	-53.2	-49.8	-45.5
Net interest cover (x)	nm	nm	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

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Investment thesis

China's leading new energy bus manufacturer

Yutong is the largest manufacturer in the new energy bus segment, with a 26.1% market share in 2015 in terms of new energy bus sales volume. The company offers a comprehensive new energy bus model portfolio, including 1) pure-electric bus (EV bus) and 2) plug-in hybrid bus (PHEV bus), all eligible for the government's new energy vehicle (NEV) subsidy.

According to the China Association of Automobile Manufacturers (CAAM), sales of new energy bus reached 78,409 units in 2015, up 3.5x YoY, accounting for 90% of total new energy commercial vehicle sales and 24% of total new energy vehicle sales.

Demand growth is still at an early stage and we forecast a 28% CAGR in volume sales over the next five years. This is after factoring in the positives of long term demand stimulus from government policy, the improving operating efficiency of electric bus fleets and the negatives of changes in subsidies starting this year, as well as the high upfront cost of electric vehicles.

The economic case, as well as the environmental arguments for the sector is clear in our view – a new energy bus is now more cost-efficient to operate than a conventional product with similar pay-back period of around 3.7-3.8 years. By 2020, we believe that as much 35% of the public bus fleet will have switched to NEV models.

Yutong Bus has shifted from its traditional product lines and developed a range of vehicles to supply this market which will enable the company to maintain a leading market share. By FY18E, half of sales and over 60% of gross profit will come from new technology products. Based on our forecasts, this will deliver annual NEV volume growth of 35% and a net income CAGR of 11%.

Valuation

Our target price of RMB25.9 for Zhengzhou Yutong Bus is set at a target 14.0x average FY16/17E P/E, about 30% above Yutong's mid-cycle P/E of 10.6x to reflect our optimism on Yutong's increasing profit contribution from the new energy bus segment. This is justified, in our view, since we expect the company to deliver an 11.1% three-year earnings CAGR in FY15-18E. In addition, while we think that the average FY16/17E P/BV implied by our target price is 3.9x, at the higher end of the global peer group, we believe this is justified considering Yutong's relatively high FY17E ROE of 30%.

Risks

Key downside risks include (1) unexpected changes in the Chinese government's new energy bus subsidy policy; (2) weaker-than-expected new energy bus demand; (3) market share loss in new energy bus at Yutong; (4) an unexpected increase in raw material prices; and (5) any inability to adopt new technology and develop new bus models.



Valuation

Key points

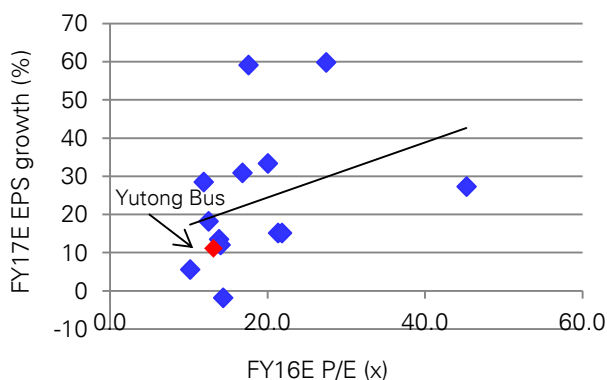
- Our target price of RMB25.9/share is based on an average FY16/17E target P/E of 14.0x. This is near the low end of global peers' trading average, and should be well supported, in our view, by the 13.6% FY17E EPS growth we forecast.
- The average FY16/17E P/BV implied by our target price is 3.9x, at the higher end of the global peer group; we believe this is justified considering Yutong's FY17E ROE of 30%.

Target price of RMB25.9 based on 14x avg. FY16/17E P/E

Global commercial vehicle (CV) manufacturer stocks are trading in a wide valuation range of 10-45x FY16E P/E. While the range is skewed by companies that are in an earnings trough, we find a positive correlation between P/E and forward earnings growth in general.

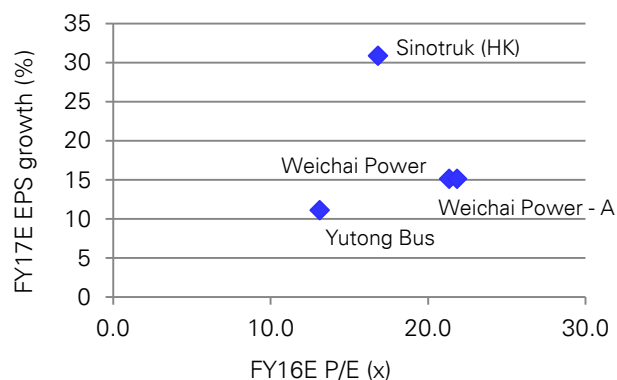
The average FY16E P/E for global peers in each major region ranges 18-21x, with FY17E earnings growth ranging 13-60%. The upper end of this growth range is the US, which is inflated by an outlier. Stripping the outliers out, the range would be -2-27%.

Figure 59: Global CV manufacturers – FY16E P/E vs. FY17E EPS growth



Remark: Excluding outlier
Source: Bloomberg Finance LP, Deutsche Bank estimates

Figure 60: China CV manufacturers under DB's coverage – FY16E P/E vs. FY17E EPS growth

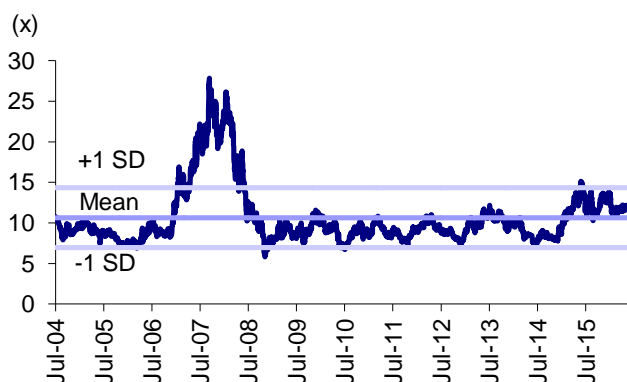


Source: Bloomberg Finance LP, Deutsche Bank estimates

Our target price of RMB25.9 for Zhengzhou Yutong Bus is set at a target 14.0x average FY16/17E P/E, about 30% above Yutong's mid-cycle P/E of 10.6x to reflect our optimistic view on Yutong's increasing profit contribution from the new energy bus segment. This is justified, in our view, since we expect the company to deliver an 11.1% three-year earnings CAGR in FY15-18E.

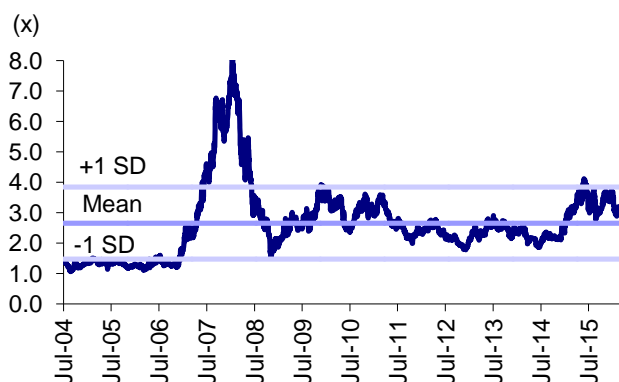


Figure 61: Yutong Bus – rolling forward P/E band



Source: Company data, Bloomberg Finance LP, Deutsche Bank estimates

Figure 62: Yutong Bus – rolling forward P/BV band



Source: Company data, Bloomberg Finance LP, Deutsche Bank estimates

Figure 63: Valuation comparison of global commercial vehicle manufacturers (as of 17 May 2016)

Ticker	Company	Rec	Cur	Price	TP	Mkt cap	PE (x)		EPS gwth (%)		P/BV (x)		ROAE (%)		Yield (%)		
							2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E	
Europe																	
VOLVb.ST	Volvo	Not rated	SEK	93.30	NA	23,984	13.8	12.2	-18.8	13.5	2.05	1.86	16.1	16.2	3.4	3.8	
MANG.DE	MAN	Hold	EUR	94.84	82.00	15,803	22.9	NA	265.1	NA	2.71	NA	12.0	NA	3.2	NA	
FI.MI	CNH Industrial	Buy	EUR	9.75	12.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Un-weighted average							18.3	12.2	123.1	13.5	2.38	1.86	16.4	16.2	3.3	3.8	
US																	
PCAR.OQ	Paccar Inc.	Not rated	USD	57.01	NA	19,766	14.4	14.6	-12.9	-1.9	2.83	2.40	18.9	23.1	3.7	3.3	
NAV.N	Navistar	Not rated	USD	11.55	NA	949	21.6	9.7	138.4	122.5	NA	NA	-1.8	-3.6	0.0	0.0	
Un-weighted average							18.0	12.2	62.8	60.3	2.83	2.40	8.5	9.8	1.8	1.7	
Asia excluding China A-shares																	
7202.T	Isuzu Motors*	Buy	JPY	1,211.0	1,400.0	9,704	10.2	8.3	-0.7	5.5	1.28	1.06	15.2	14.0	2.3	3.3	
7205.T	Hino Motors*	Buy	JPY	1,067.0	1,400.0	6,780	12.5	8.0	-12.6	18.2	1.63	1.20	15.4	16.4	2.7	4.2	
ASOK.BO	Ashok Leyland*	Buy	INR	102.80	125.00	4,385	27.4	17.2	429.9	59.8	4.93	4.06	19.3	25.9	0.7	1.2	
2338.HK	Weichai Power	Sell	HKD	9.00	4.70	4,636	21.3	18.5	39.0	15.1	0.87	0.84	4.2	4.6	0.5	0.5	
3808.HK	Sinotruk (HK)	Hold	HKD	3.57	3.30	1,270	16.8	12.8	59.7	30.9	0.42	0.41	2.5	3.2	2.4	3.1	
Un-weighted average							17.6	13.0	103.1	25.9	1.83	1.51	11.3	12.8	1.7	2.5	
China A-shares																	
600066.SS	Yutong Bus	Buy	CNY	21.58	25.90	7,328	13.1	11.8	12.5	11.1	3.57	3.02	29.3	29.9	4.0	4.6	
000957.SZ	Zhongtong Bus	Not rated	CNY	28.66	NA	1,248	17.6	11.0	-0.9	59.1	NA	NA	30.2	28.1	0.7	0.7	
600686.SS	Xiamen King Long	Not rated	CNY	13.03	NA	1,179	11.9	9.2	10.1	28.5	2.03	2.16	17.2	19.8	1.3	2.0	
600006.SS	DFMC Limited	Not rated	CNY	6.29	NA	1,840	20.0	15.0	74.4	33.3	NA	NA	NA	NA	NA	NA	
600166.SS	Beiqi Foton	Not rated	CNY	5.08	NA	2,547	45.3	35.6	-15.4	27.3	0.88	0.87	1.8	2.4	0.6	0.8	
000338.SZ	Weichai Power-A	Sell	CNY	7.74	3.90	4,745	21.8	19.0	39.0	15.1	0.89	0.86	4.2	4.6	0.5	0.5	
600303.SS	SG Automotive	Not rated	CNY	11.05	NA	999	14.0	12.5	341.2	12.0	NA	NA	17.5	17.1	NA	NA	
Un-weighted average							20.5	16.3	65.8	26.6	1.84	1.73	16.7	17.0	1.4	1.7	

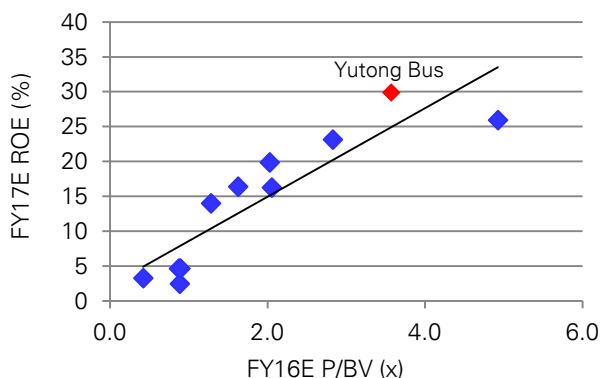
* Fiscal years ended March 2017 and 2018 are referenced instead
Source: Company data, Deutsche Bank estimates, Bloomberg Finance LP estimates for NR stocks



Cross check: P/BV vs. ROE

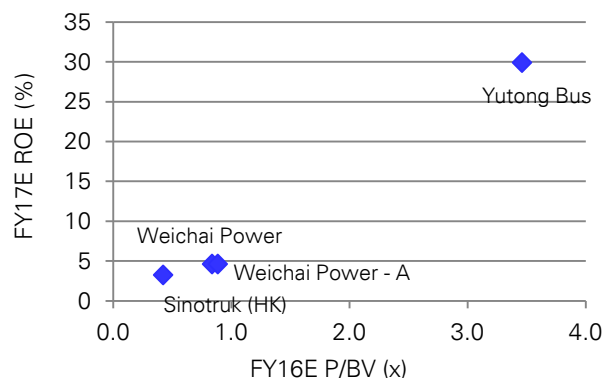
Global CV manufacturer stocks are trading at 1.8-2.8x FY16E P/BV in their respective regions. For Yutong Bus, we think that the average FY16/17E P/BV of 3.9x implied by our target price, at the higher end of the global trading average, is justified considering its relatively high FY17E ROE of 30%.

Figure 64: Global CV manufacturers – FY16E P/BV vs. FY17E ROE



Remark: Excluding outlier
 Source: Bloomberg Finance LP, Deutsche Bank estimates

Figure 65: China CV manufacturers under DB's coverage – FY16E P/BV vs. FY17E ROE



Remark: Excluding outlier
 Source: Bloomberg Finance LP, Deutsche Bank estimates

Cross check: discounted cash flow (DCF)

We also cross check our P/E-derived target price with a DCF model. To elaborate, we calculate the free cash flow of Yutong for FY18E explicitly. For FY19-26E, we assume that the EBIT growth rate will gradually decline until it reaches a terminal growth rate of 1.0%, which is our prudent assumption of the mature perpetual growth rate of the China auto sector after 10 years.

In deriving the discount rate (WACC), we use Deutsche Bank's house estimates of the China risk-free rate (3.9%) and equity risk premium (5.6%). Besides, we apply a beta of 1.0, a 5.0% pre-tax cost of debt (4.4% after-tax cost of debt), and 85% equity ratio.

Our DCF-derived equity value of RMB26.4 per share is in line with our P/E-based target price of RMB25.9 for Yutong.



Figure 66: Yutong Bus – DCF analysis

	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E
EBIT	4,876.1	5,418.5	5,801.8	6,071.3	6,264.8	6,409.6	6,524.2	6,620.2	6,705.2	6,772.2
YoY%	11.0%	11.1%	7.1%	4.6%	3.2%	2.3%	1.8%	1.5%	1.3%	1.0%
Less tax on EBIT	(609.5)	(677.3)	(725.2)	(758.9)	(783.1)	(801.2)	(815.5)	(827.5)	(838.1)	(846.5)
Effective tax rate	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Less change in working capital	939.7	1,216.9	365.1	109.5	32.9	9.9	3.0	0.9	0.3	0.0
Add depreciation and amortization	1,109.0	1,304.2	1,382.2	1,416.6	1,437.1	1,453.5	1,468.6	1,483.4	1,498.3	1,513.3
Less Capex	(1,935.4)	(2,282.5)	(2,475.8)	(2,648.5)	(2,801.6)	(2,936.7)	(3,055.9)	(3,161.3)	(3,254.8)	(3,287.3)
FCF	4,380.0	4,979.8	4,348.1	4,190.1	4,150.1	4,135.0	4,124.3	4,115.7	4,110.9	4,151.7
YoY%	69.9%	13.7%	-12.7%	-3.6%	-1.0%	-0.4%	-0.3%	-0.2%	-0.1%	1.0%
Terminal value										54,237.2
FCF + TV	4,380.0	4,979.8	4,348.1	4,190.1	4,150.1	4,135.0	4,124.3	4,115.7	4,110.9	58,388.8
Discount factor	1.09	1.18	1.29	1.40	1.52	1.65	1.80	1.95	2.12	2.31
NPV	4,028.3	4,212.2	3,382.5	2,997.8	2,730.8	2,502.4	2,295.4	2,106.8	1,935.3	25,280.5
Enterprise Value (sum of NPVs)	51,471.8									
Add net cash (end FY16E)	7,192.9									
Add associates (end FY16E)	0.0									
Add other investments (end FY16E)	0.0									
Less minorities	(135.8)									
Equity Value	58,528.9									
Issued shares (m)	2,213.9									
Equity Value (RMB/share)	26.4									
Cost of Capital Assumptions										
Ke	9.5%									
Risk free	3.9%									
Market Risk Premium	5.6%									
Beta	1.0									
Kd	5.0%									
Kd (after tax)	4.4%									
Target Debt / (Debt + Equity)	15.0%									
Target Equity / (Debt + Equity)	85.0%									
WACC	8.7%									

Source: Deutsche Bank estimates



Riding on the new energy drive

Key points

- Yutong is the largest manufacturer in the new energy bus segment, with 26.1% market share in 2015 in terms of new energy bus sales volume.
- We expect China's new energy bus sales to expand at a 27.9% five-year CAGR in 2015-20E and Yutong to sustain a new energy bus market share of 26.6-27.5% in 2016-18E.
- China's new energy bus demand is still heavily driven by government support for the NEV industry. Therefore, we summarize the major policies in this section.
- While the purchase price (net of subsidies) for a new energy bus is still higher than for a conventional engine bus, we estimate a higher profitability for new energy bus and similar pay-back period.

A global leading new energy bus manufacturer

Yutong is the largest bus manufacturer in China in terms of 2015 bus sales volume with 11% bus market share. The company manufactures and sells large, medium and light duty buses with length ranging from 5m to 25m.

Since 2012, Yutong has developed a comprehensive new energy bus model portfolio, including 1) pure-electric bus (EV bus) with vehicle length ranging 6-14m, and 2) plug-in hybrid bus (PHEV bus) with vehicle length ranging 8-18m. All of these are eligible for the relevant government subsidy.

Figure 67: Yutong Bus – new energy bus model portfolio

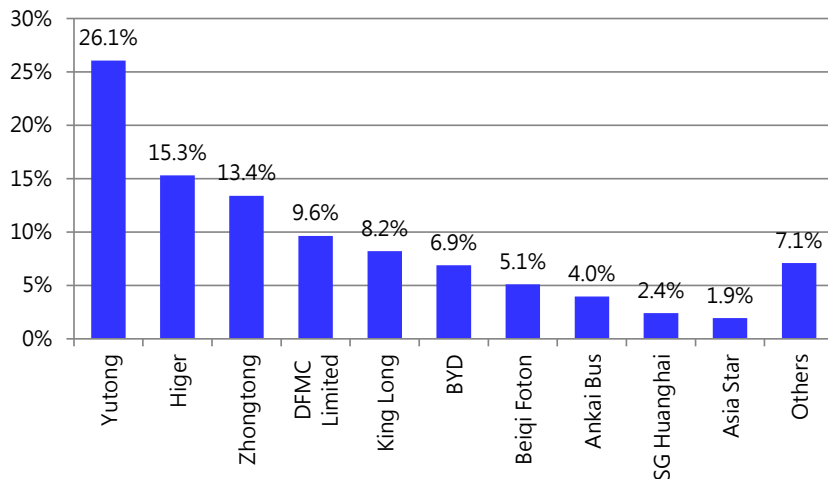
Model	Usage	Type	Vehicle length (m)	Driving range (km)	Battery capacity (kWh)
E6	Public bus/Commuter	EV	6.4	110-135	62
E7/E7+	Public bus/Commuter	EV	7.0	120-160	78
E8/E8 MINI	Public bus	EV	8.0-8.4	110-135/140-170	89
E8	Commuter	EV	8.0	110-130	89
E9	Commuter	EV	9.0	145-170	n.a.
E10	Public bus	EV	10.5	135-165/220-280	147/248
E10	Commuter	EV	10.7	140-180	147
E12	Public bus	EV	12.0	120-155/230-300	147/285
E12	Commuter	EV	12.0	150-180	147
H8/H8+	Public bus	PHEV	8.2-8.5	n.a.	n.a.
ZK6105CHEVNPG21	Public bus	PHEV	10.5	n.a.	n.a.
ZK6120CHEVNPG21	Public bus	PHEV	11.5	n.a.	n.a.
ZK6125CHEVNPG21	Public bus	PHEV	12.0	n.a.	n.a.
ZK6180CHEVNPG3	Public bus	PHEV	18.0	n.a.	n.a.

Source: Company data, Deutsche Bank



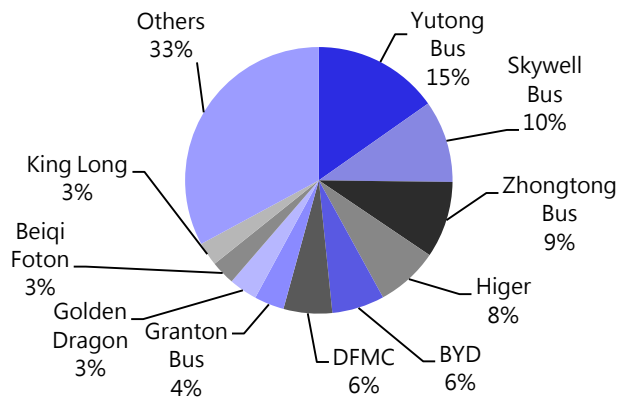
Yutong is also the leader in the new energy bus segment, with a 26.1% market share in 2015 in terms of new energy bus sales volume. While we notice that there was a drop in market share from the 42.1% seen in 2014, this was mainly due to the rush-in orders for smaller 6-8m length EV buses in 2015 (because central government over-subsidized the sub-segment), in our view.

Figure 68: China new energy bus market share by sales (2015)



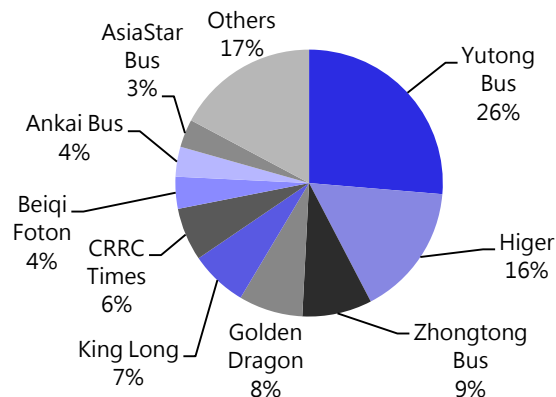
Source: Company data, CAAM, Deutsche Bank

Figure 69: 2015 EV bus market share by production



Source: MIIT

Figure 70: 2015 PHEV bus market share by production

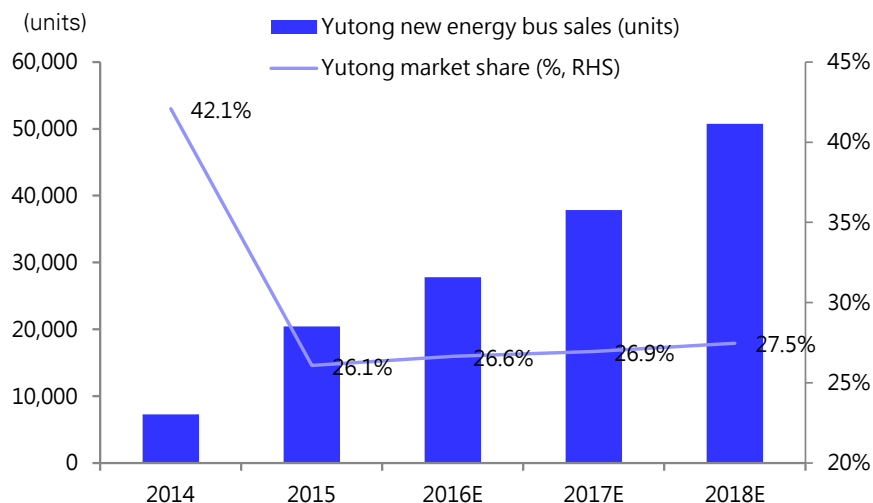


Source: MIIT

We forecast Yutong will maintain a market share of 27% in 2016-18E. This is a function of its comprehensive product portfolio, strong R&D capability and technology in battery efficiency management system, and good brand recognition.



Figure 71: Yutong's market share in new energy bus segment



Source: Company data, CAAM, Deutsche Bank estimates

Subsidies the biggest driver of new energy bus sales

We emphasize that China's new energy bus demand is still heavily driven by government support for the NEV industry and we summarize the major policy announcements in the past few years related to NEVs in below figure.

Figure 72: Summary of China's major new energy vehicle supportive policies

Date	Policy and summary of major implications
May 2010	<p>Notice of The Pilot Implementation of Private Purchase of New Energy Vehicles Subsidies</p> <ul style="list-style-type: none"> Officially initiated China's NEV subsidy program Started small-scale pilot testing in six cities in China
June 2012	<p>The 2012-2020 Development Plan for Fuel-efficient and New Energy Vehicle Industry</p> <ul style="list-style-type: none"> Roadmap for China's NEV industry development Targeted an cumulative NEV (EV and PHEV) sales volume of 500k units by 2015 and 5m units by 2020 Annual NEV production capacity to reach 2m units by 2020
September 2013	<p>Notice to Continue to Promote The Usage of New Energy Vehicles</p> <ul style="list-style-type: none"> NEV purchase subsidy standard for 2013-15 Set up required NEV ownership targets in pilot cities Priority given to NEVs in government procurement and public bus transit
July 2014	<p>Notice to Waive the Purchase Tax for New Energy Vehicles</p> <ul style="list-style-type: none"> Waiver of purchase tax for electric vehicle, plug-in electric vehicle and fuel-cell vehicle Both domestically produced and imported NEVs eligible for tax waiver
April 2015	<p>Notice to Promote The Usage of New Energy Vehicles for 2016-20</p> <ul style="list-style-type: none"> NEV purchase subsidy standard announced for 2016-20

Source: State Council, Ministry of Finance, Ministry of Science and Technology, Ministry of Industry and Information Technology, National Development and Reform Commission, Deutsche Bank



Central and local government subsidies for new energy bus purchase

According to the latest 2016-20E NEV purchase subsidy scheme announced in April 2015, eligible locally produced pure electric buses with vehicle lengths of 10-12 meters are entitled to a maximum subsidy of RMB500,000 in 2016, while 10-12m plug-in hybrid electric buses are entitled to RMB250,000.

Figure 73: Central government subsidies for new energy bus (10-12m) in 2016

(RMB'000)	Battery driving range (R) (unit: km)					
	6<=R<20	20<=R<50	50<=R<100	100<=R<150	150<=R<250	R>=250
EV Unit load energy consumption (E) (unit: Wh/km.kg)						
E<0.25	220	260	300	350	420	500
0.25<=E<0.35	200	240	280	320	380	460
0.35<=E<0.50	180	220	240	280	340	420
0.50<=E<0.60	160	180	200	250	300	360
0.60<=E<0.70	120	140	160	200	240	300
PHEV	n.a.	n.a.	200	230	250	250

Note: New energy buses with 6m and below in length qualify for 20% of the above standard bus subsidy (10-12m); new energy buses with 6-8m length qualify for 50% of the standard bus subsidy; new energy buses with 8-10m length qualify for 80% of the standard bus subsidy; new energy buses with 12m and above in length qualify for 120% of the standard bus subsidy.
Source: Ministry of Finance (MOF), Ministry of Science and Technology (MOST), Ministry of Industry and Information Technology (MIIT) and National Development and Reform Commission (NDRC)

The cash subsidy amount for NEV buses in 2016 is lower than 2013-15 levels and it carries stricter qualifying requirements. To elaborate, central government entities are implementing a much more stringent subsidy qualification standard in 2016 onwards, with detailed requirements on unit energy consumption and battery driving range, whereas in previous years vehicle length was the only benchmark for subsidy qualification.

Figure 74: Central government subsidies for new energy bus in 2013-15

(RMB'000)	Vehicle length (L) (unit: m)		
	6<=L<8	8<=L<10	L>=10
EV			
2013	300	400	500
2014	300	400	500
2015	300	400	500
PHEV			
2013	-	-	250
2014	-	-	250
2015	-	-	250

Source: Ministry of Finance

In addition, the central government subsidy will progressively decline in 2016-20. Except for fuel cell vehicles, the level of subsidy for other NEVs will dwindle by 20% in 2017-18 and 40% in 2019-20, from 2016 levels.

We, however, notice two positive developments in the new energy bus subsidy program, which we believe will support Yutong's growth:

- The subsidy cap has been raised by as much as 20% for 12m-long NEV buses with battery driving ranges of above 250km, and the cap for 10-12m NEV buses with driving ranges of above 250km remains at 2013-15 levels. This clearly indicates the central government's intention to promote high-end new energy buses rather than low-end buses with shorter driving ranges and less energy efficiency. As a result, we expect this development to benefit industry leaders with strong technological capabilities, such as Yutong Bus.

This development will benefit industry leaders with strong technological capabilities.



- Moreover, the renewed subsidy scheme for 2016-20 qualifies below-10m PHEV buses for NEV purchase subsidy, whereas this segment could not claim subsidies in previous years. For example, 8-10m PHEV buses will receive 80% of the subsidy provided to 10-12m PHEV buses (RMB200,000-250,000, depending on battery driving range). Yutong recently launched its new 8m-length H8 PHEV bus in April. With this specific policy support for smaller PHEV buses, we believe the 8-10m PHEV bus segment is likely to become the growth driver for new energy bus in 2016.

8-10m PHEV bus is likely to become the growth driver for new energy bus in 2016. Yutong launched its new 8m-length H8 PHEV bus in April.

In addition to central government financial incentives, local governments are also encouraged to provide supportive policies to stimulate NEV consumption. While more than half of the provinces in China have not yet implemented any stimulus policies to promote NEV usage, most of the major cities and provinces, where majority of the NEV sales come from, already have detailed subsidy measures in place.

Operating subsidies for new energy public bus operation

Meanwhile, in May 2015 the MOF, MIIT and Ministry of Transport (MOT) jointly announced *Measures on Perfecting the Public Bus Gasoline Price Subsidy Policy and to Speed up the Application of New Energy Public Bus*.

According to the policy, central government will provide additional subsidies to the operators of new energy public buses with annual operating mileage of no less than 30,000km in 2015-19. For example, EV public buses with a vehicle length of 8-10m are eligible for RMB60,000 operating subsidy, while 8-10m PHEV public buses are eligible for RMB30,000, which could cover more than 40% of annual operating cost for a new energy bus operator, on our estimate.

Figure 75: New energy public bus operating subsidies in 2015-19

(RMB'000)	Vehicle length (L) (unit: m)		
	6<=L<8	8<=L<10	L>=10
EV public bus	40	60	80
PHEV public bus	20	30	40
Fuel cell public bus	60	60	60
Super-capacitor public bus	20	20	20
Hybrid public bus	20	20	20

Source: MOF, MIIT, MOT

Impact from subsidy cuts well contained in our model

We estimate that the combined local and central government subsidy per NEV at the moment is probably close to, if not more than, the cost of the electric drivetrain. It is claimed by many industry participants that government overly subsidized new energy buses last year, especially for 6-8m length EV buses. This may have incentivized some auto manufacturers, especially lower quality ones, to launch 6m length EV buses just for the sake of getting government subsidies. There were even extreme cases in which some manufacturers inflated their NEV bus sales and a government investigation is now underway.

Government overly subsidized new energy buses last year, especially for 6-8m EV buses.

It is widely expected that the central government will soon implement a new NEV subsidy schema as a result of the fraud investigation. We believe the new policy only aims to crack down subsidy cheating rather than to depress NEV consumption. Indeed, the expected changes in subsidy standard will possibly cap the monetary amount based on battery capacity and energy efficiency, in our opinion, which indicates government's dedication to continue to promote high-end new energy buses.

China will soon implement a new NEV subsidy schema as a result of the investigation on subsidy cheating.



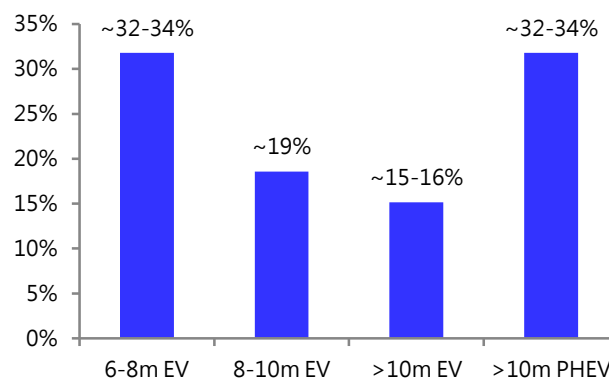
According to some press reports, the new subsidies for 6-8m new energy buses are likely to see a significant decline of c.40-50% compared with previous version and c.25% drop for 8-10m buses, whereas subsidies for 10m and above buses will remain the same.

Figure 76: Expected changes in new NEV subsidy policy

	Max. subsidy amount (RMB'000)		
	Original	Expected	% chg
>12m EV bus	600	600	0%
10-12m EV bus	500	500	0%
8-10m EV bus	400	300	-25%
6-8m EV bus	250	150	-40%
>12m PHEV bus	300	300	0%
10-12m PHEV bus	250	250	0%
8-10m PHEV bus	200	150	-25%
6-8m PHEV bus	125	75	-40%

Source: Deutsche Bank estimates

Figure 77: Yutong – new energy bus sales breakdown (FY15)



Source: Company data, Deutsche Bank estimates

While it is difficult to quantify the precise impact on Yutong's new energy bus sales and average selling price (ASP), our FY16-18 estimates have factored in 10.9-11.9% YoY drop in ASP and 12.8-14.0% YoY decline in gross profit per vehicle for new energy bus segment, respectively. We believe the drop in ASP and unit gross profit will be less than the decline in subsidy as 1) only c.50% of Yutong's new energy bus sales last year was from 6-10m vehicles; 2) Yutong will be able to partially pass through the reduced subsidy to customers; and 3) it will offset the impact by selling more PHEV buses with the launch of new H8 bus, which are selling at higher prices vs. EV buses in comparable length.

On the cost analysis, we forecast 10.0% YoY decline in per vehicle battery cost annually in FY16-18. This is in line with 1) our global auto team's projection of 6.5% per annum drop in pack level cost in FY14-20E, and 2) increasing contribution from PHEV buses, which use fewer batteries (in kWh terms) than EV buses. We also factor in 10.5-13.4% YoY drop in unit COGS (excluding battery) in FY16-18, given 1) economies of scale on 35% volume CAGR and 2) low raw material costs.



Figure 78: Deutsche Bank forecast on Yutong's new energy bus segment

	2015	2016E	2017E	2018E
Sales volume (units)	20,445	27,814	37,838	50,758
YoY		36.0%	36.0%	34.1%
ASP (RMB'000)	683.6	608.9	536.6	475.5
YoY		-10.9%	-11.9%	-11.4%
COGS per vehicle (RMB'000)	-491.1	-441.2	-392.4	-350.5
YoY		-10.2%	-11.1%	-10.7%
- Battery cost per vehicle (RMB'000)	-335.4	-301.8	-271.6	-244.5
YoY		-10.0%	-10.0%	-10.0%
- Other COGS per unit (RMB'000)	-155.8	-139.4	-120.7	-106.0
YoY		-10.5%	-13.4%	-12.2%
Gross profit per vehicle (RMB'000)	192.4	167.7	144.3	125.0
YoY		-12.8%	-14.0%	-13.3%
Gross profit margin (%)	28.2%	27.5%	26.9%	26.3%

Source: Company data, Deutsche Bank estimates

New energy bus has a better operating cost profile

After taking into consideration the various government subsidies, operation of new energy buses is very cost efficient when compared with the operation of conventional gasoline buses, putting new energy bus in a competitive situation vs. conventional internal combustion engine (ICE) bus.

While the purchase price (net of subsidies) for new energy bus is still higher than for ICE bus, we estimate higher profitability for new energy bus, due to lower operating costs, and a similar pay-back period to ICE bus.

Take Yutong's 7m-length E7 EV bus as an example. Although the purchase price for E7 is at a 1.8x premium to a comparable locally made Toyota Coaster 20-seater, the premium falls to 24% after deducting central and local government subsidies for a 6-8m EV bus with driving range of 100-150km. What is more, we forecast lower operating expenses for E7 with 75% lower electricity cost vs. gasoline consumption for Coaster. As a result, we estimate annual net profit for an E7 operator is 22% above that for a Toyota Coaster operator and the pay-back period for the two is very close at around 3.7-3.8 years.



Figure 79: Price comparison of Yutong E7 bus and a comparable ICE bus

(RMB)	Yutong E7 EV bus	Toyota Coaster 4.0L
Purchase price*	950,000	333,600
Central government subsidy	175,000	0
Local government subsidy**	175,000	0
License plate cost	0	120,000
Purchase tax	0	28,513
Net purchase price	600,000	482,113

* Purchase price for Toyota Coaster 4.0L is derived from average MSRP and applying a 30% discount.
** Assuming local government subsidy amount to match central government subsidy.
Source: Company data, Deutsche Bank estimates

Figure 80: Profit and return period comparison for Yutong E7 bus and a comparable ICE bus

(RMB)	Yutong E7 EV bus	Toyota Coaster 4.0L
Revenue* (rental income)	264,000	264,000
Operating cost	53,504	92,016
Wage and salary	36,000	36,000
Electricity/gasoline cost	9,504	38,016
Electricity/gasoline cost per km (RMB)**	0.30	1.20
Daily operating mileage (km)	120	120
Insurance fees	8,000	8,000
Maintenance ***	0	10,000
Profit	210,496	171,984
Income tax	52,624	42,996
Net profit	157,872	128,988
Net purchase price	600,000	482,113
Return period (year)	3.8	3.7

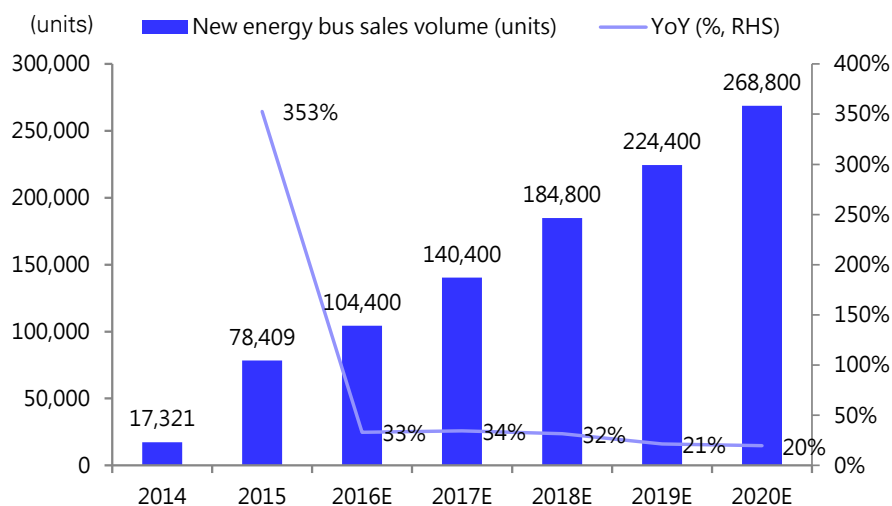
* Assuming daily rents of RMB1,000, 22 working days per month.
** Electricity cost for Yutong E7 per company data; Gasoline cost per km for Toyota Coaster derived by assuming 21.7L/100km fuel consumption and RMB5.53/L price for #93 gasoline.
*** Yutong provides 5-year warranty for its EV bus battery.
Source: Company data, Deutsche Bank estimates

Soaring sales amid government policy support

2015 new energy bus sales up three-fold YoY

According to the China Association of Automobile Manufacturers (CAAM), sales of total NEVs, including EV and PHEV, reached 331,092 units in 2015 (up 3.2x YoY), representing a 2011-15 four-year sales volume CAGR of 152.4%. New energy bus sales also recorded a historical high of 78,409 units in 2015, up 3.5x YoY, accounting for 90% of total new energy commercial vehicle sales and 24% of total NEV sales.

Figure 81: China annual new energy bus sales volume and growth trend



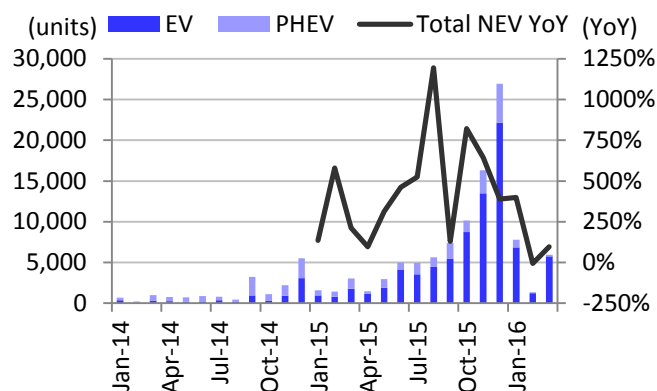
Source: CAAM, Deutsche Bank estimates

Year-to-date slowdown probably due to policy overhang

Going into 2016, there has been a marked slowdown in NEV sales with 1Q16 commercial NEV and new energy bus sales up by 1.5x and 31.0% YoY respectively, but down by 71.8% and 83.0% QoQ, respectively. We think that the slowdown in commercial NEV sales momentum YTD is attributable to the overhang related to the ongoing investigation of NEV bus subsidy cheating.

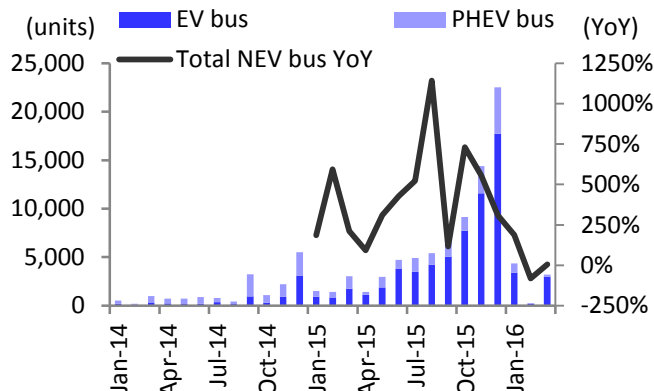


Figure 82: Commercial NEV sales



Source: CAAM, Deutsche Bank

Figure 83: New energy bus sales



Source: CAAM, Deutsche Bank

DB expects new energy bus sales to expand at 28% CAGR

Given the ongoing government policy support, we estimate new energy bus sales will expand at a 27.9% five-year CAGR in 2015-20. This will be front-end loaded with a faster sales growth rate of 33.1%/34.5%/31.6% in 2016/17/18 before slowing to 19.8-21.4% in 2019-20.

In addition, due to the inclusion of subsidy for PHEV buses below-10m, we expect faster growth for PHEV buses than EV buses in 2016-20.

Figure 84: China new energy bus sales forecast and breakdown

(units)	2015	2016E	2017E	2018E	2019E	2020E
EV bus	60,132	78,300	102,492	131,208	154,836	180,096
YoY%		30.2%	30.9%	28.0%	18.0%	16.3%
PHEV bus	18,277	26,100	37,908	53,592	69,564	88,704
YoY%		42.8%	45.2%	41.4%	29.8%	27.5%
Total new energy bus	78,409	104,400	140,400	184,800	224,400	268,800
YoY%		33.1%	34.5%	31.6%	21.4%	19.8%

Source: CAAM, Deutsche Bank estimates

Based on our bus sales forecast model, we expect China's new energy bus sales to contribute 17.2-40.0% to total bus sales in 2016-20. By the end of 2020, we estimate the new energy bus fleet will account for 32.6% of the total bus fleet in China.

We believe above 30% new energy bus penetration by 2020 is realistic as China aims to electrify a large portion of its public bus fleet (as high as 80% in eastern provinces) and government vehicles procurement.



Figure 85: China bus sales forecast model

(units)	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
Fleet size										
Total bus	2,739,508	2,599,051	2,484,445	2,516,663	2,576,201	2,642,861	2,717,741	2,801,092	2,893,098	2,993,895
New energy bus	12,285	15,482	19,540	36,861	115,270	218,528	356,643	538,135	752,100	975,778
<i>New energy bus penetration</i>	<i>0.4%</i>	<i>0.6%</i>	<i>0.8%</i>	<i>1.5%</i>	<i>4.5%</i>	<i>8.3%</i>	<i>13.1%</i>	<i>19.2%</i>	<i>26.0%</i>	<i>32.6%</i>
ICE bus	2,727,223	2,583,569	2,464,905	2,479,802	2,460,931	2,424,334	2,361,098	2,262,957	2,140,998	2,018,117
<i>ICE bus penetration</i>	<i>99.6%</i>	<i>99.4%</i>	<i>99.2%</i>	<i>98.5%</i>	<i>95.5%</i>	<i>91.7%</i>	<i>86.9%</i>	<i>80.8%</i>	<i>74.0%</i>	<i>67.4%</i>
Sales										
Total bus	487,862	507,373	560,059	606,918	595,382	606,000	624,000	641,160	657,189	671,976
New energy bus	2,285	3,198	4,058	17,321	78,409	104,400	140,400	184,800	224,400	268,800
<i>New energy bus contribution</i>	<i>0.5%</i>	<i>0.6%</i>	<i>0.7%</i>	<i>2.9%</i>	<i>13.2%</i>	<i>17.2%</i>	<i>22.5%</i>	<i>28.8%</i>	<i>34.1%</i>	<i>40.0%</i>
ICE bus	485,577	504,175	556,001	589,597	516,973	501,600	483,600	456,360	432,789	403,176
<i>ICE bus contribution</i>	<i>99.5%</i>	<i>99.4%</i>	<i>99.3%</i>	<i>97.1%</i>	<i>86.8%</i>	<i>82.8%</i>	<i>77.5%</i>	<i>71.2%</i>	<i>65.9%</i>	<i>60.0%</i>
Replacement										
Total bus	373,516	647,830	674,665	574,700	535,844	539,340	549,120	557,809	565,183	571,179
New energy bus	0	0	0	0	0	1,142	2,284	3,308	10,435	45,122
<i>New energy bus contribution</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.2%</i>	<i>0.4%</i>	<i>0.6%</i>	<i>1.8%</i>	<i>7.9%</i>
ICE upgrade to new energy	2,285	3,198	4,058	17,321	78,409	103,258	138,116	181,492	213,965	223,678
<i>ICE bus upgrade contribution</i>	<i>0.6%</i>	<i>0.5%</i>	<i>0.6%</i>	<i>3.0%</i>	<i>14.6%</i>	<i>19.1%</i>	<i>25.2%</i>	<i>32.5%</i>	<i>37.9%</i>	<i>39.2%</i>
ICE bus	371,231	644,632	670,607	557,379	457,435	434,940	408,720	373,009	340,783	302,379
<i>ICE bus contribution</i>	<i>99.4%</i>	<i>99.5%</i>	<i>99.4%</i>	<i>97.0%</i>	<i>85.4%</i>	<i>80.6%</i>	<i>74.4%</i>	<i>66.9%</i>	<i>60.3%</i>	<i>52.9%</i>

Source: CEIC, CAAM, Deutsche Bank estimates

Public bus replacement bodes well for new energy bus sales

Demand is skewed towards the public sector transport operators and we estimate this segment recorded c.55k units in 2015, accounting for c.70% of China's total new energy bus sales and c.63% of total new energy CV sales. There are strong policy indications that this demand will be maintained.

- In February 2015, the State Council unveiled a supportive policy to increase government procurement of NEVs in the public bus, taxi, environmental sanitation, and logistics sectors. The policy requires that 50% of government vehicles procured be NEVs.
- In November 2015, the Ministry of Transport (MOT), MOF and MIIT jointly announced *The Assessment Measures for the Application and Promotion of New Energy Public bus*, which specified a required new energy bus percentage for local government public bus purchases. To elaborate, 15-50% of local governments' public bus procurement in 2016 has to be new energy bus and the number increases progressively to 30-80% in 2019.

In our projections, we have assumed a new energy public bus adoption rate of c.36% of the public transport market by 2020E vs. c.13% in 2015E.

Figure 86: Required percentage of new energy public bus for public bus replacement and new additions

	2015	2016	2017	2018	2019
Beijing, Shanghai, Tianjin, Hebei, Shanxi, Jiangsu, Zhejiang, Shandong, Guangdong, Hainan	40%	50%	60%	70%	80%
Anhui, Jiangxi, Henan, Hubei, Hunan, Fujian	25%	35%	45%	55%	65%
Others	10%	15%	20%	25%	30%

Source: MOT, MOF, MIIT



Financials

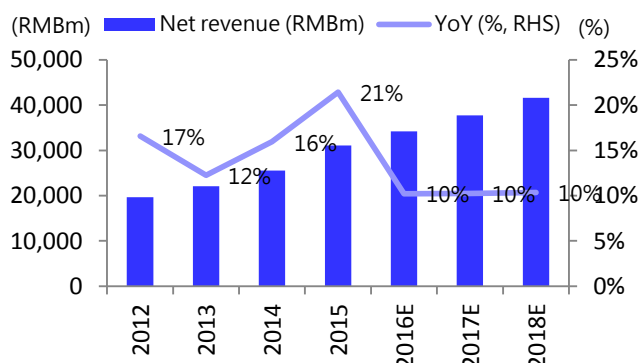
Key points

- We estimate Yutong Bus will deliver a 10.3% FY15-18E three-year net revenue CAGR, supported by a 35.4% new energy bus sales CAGR.
- We expect the volume contribution from new energy bus to increase to 50% by FY18E from 31% in FY15.
- With new energy bus remaining the growth driver for Yutong, we forecast an 11.1% FY15-18E three-year earnings CAGR.

Stable revenue and earnings growth outlook

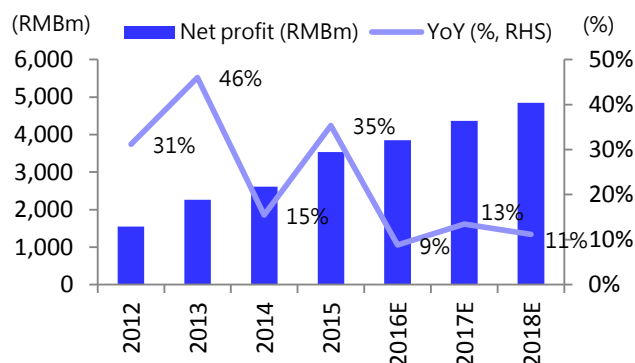
We estimate Yutong Bus will deliver a 10.3% FY15-18E three-year net revenue CAGR. We also foresee product mix improvement with slower conventional ICE bus sales growth. With new energy bus remaining the growth driver for Yutong, we forecast an 11.1% FY15-18E three-year earnings CAGR.

Figure 87: Yutong Bus – revenue and growth trend



Source: Company data, Deutsche Bank estimates

Figure 88: Yutong Bus – net profit and growth trend



Source: Company data, Deutsche Bank estimates

Stable profitability on increasing new energy contribution

We project a 14.6% bus sales volume CAGR over FY15-18 for Yutong, driven mainly by a 35.4% CAGR in new energy bus sales during the same period, on our estimates. Meanwhile, we only forecast a mild 2.5% CAGR for conventional ICE bus sales in FY15-18. We expect the volume contribution from new energy bus to increase to 50% by FY18E from 31% in FY15.

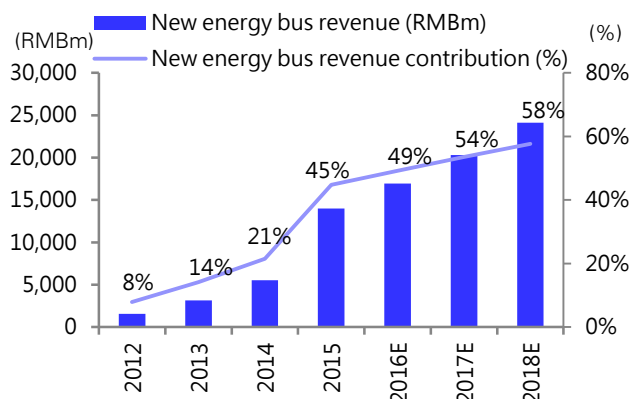
Figure 89: Yutong Bus – sales volume breakdown

(units)	2012	2013	2014	2015	2016E	2017E	2018E
New energy bus	1,791	3,897	7,291	20,445	27,814	37,838	50,758
YoY (%)		117.6%	87.1%	180.4%	36.0%	36.0%	34.1%
Conventional ICE bus	49,897	52,171	54,107	46,573	47,970	49,169	50,153
YoY (%)		4.6%	3.7%	-13.9%	3.0%	2.5%	2.0%
Total bus sales	51,688	56,068	61,398	67,018	75,784	87,007	100,911
YoY (%)		8.5%	9.5%	9.2%	13.1%	14.8%	16.0%

Source: Company data, Deutsche Bank estimates

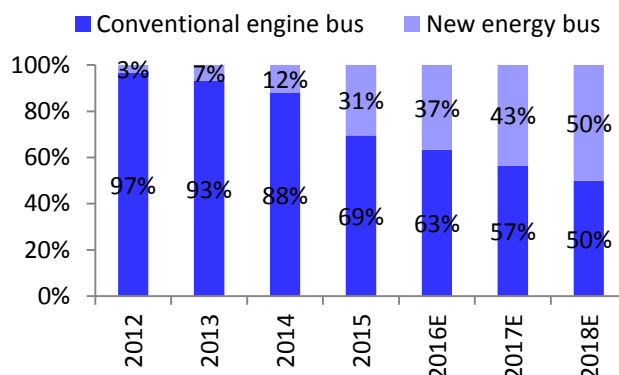


Figure 90: Yutong Bus – new energy bus revenue



Source: Company data, Deutsche Bank estimates

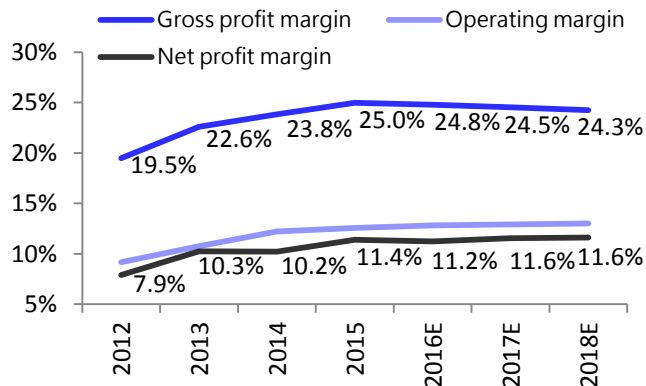
Figure 91: Yutong Bus – bus sales breakdown



Source: Company data, Deutsche Bank estimates

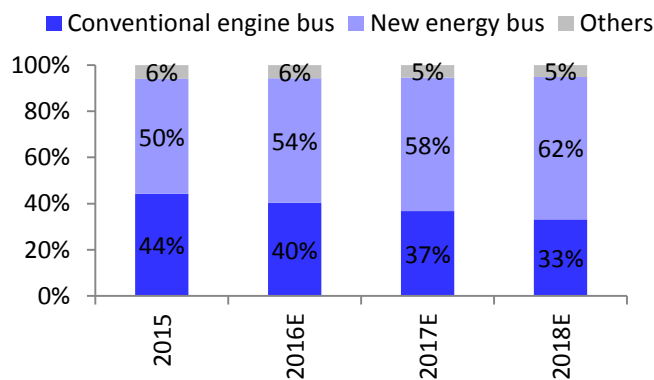
In FY12-15, Yutong experienced an expansion in both its gross profit margin and net profit margin. In our view, this is mainly attributable to the gradual increase in sales contribution from new energy buses. Due to a decrease in government subsidy to NEVs in 2016-20E, partly offset by low raw material prices, we forecast a mild declining trend in gross profit margin to 24.3-24.8% levels in FY16-18E, from 25.0% in FY15. On the other hand, we estimate a stable net profit margin of 11.2-11.6% in FY16-18E.

Figure 92: Yutong Bus – profit margin trend



Source: Company data, Deutsche Bank estimates

Figure 93: Yutong Bus – gross profit breakdown



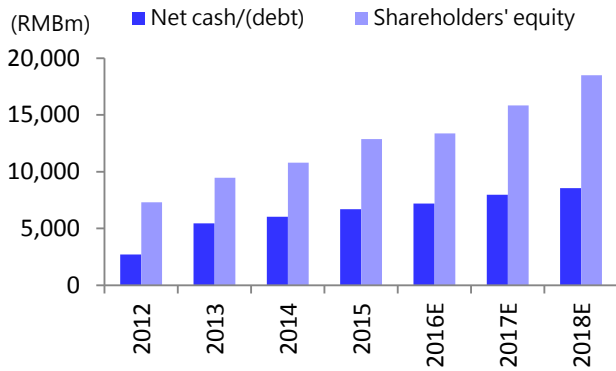
Source: Company data, Deutsche Bank estimates

Balance sheet remains solid with sustainable net cash

Since FY08, Yutong Bus has been recording strong operating cash inflows each year. Together with rational capex spending and solid revenue growth, Yutong has been in a strong net cash position since FY08. Going forward, we expect Yutong to sustain its net cash position on continued solid growth in the new energy bus segment.

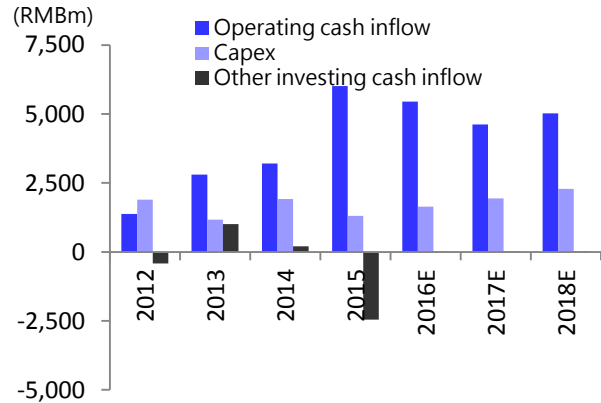


Figure 94: Yutong Bus – net cash and shareholders' equity



Source: Company data, Deutsche Bank estimates

Figure 95: Yutong Bus – operating and investing cash flow

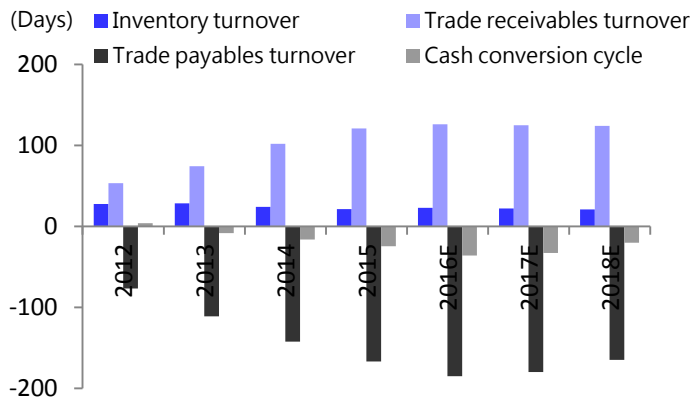


Source: Company data, Deutsche Bank estimates

Efficient cash management to contain conversion cycle

Yutong Bus has been able to maintain a short and stable cash conversion cycle since FY10 and we expect this healthy trend to continue, assuming 1) disciplined inventory planning with less than one month of inventory; 2) efficient cash collection to contain receivables days at about four months, and 3) good relationships with suppliers, which can sustain payables days at approximately 5-6 months. This should keep Yutong's negative cash conversion cycle at a level of about one month, on our estimates.

Figure 96: Yutong Bus – turnover days and cash conversion cycle



Source: Company data, Deutsche Bank estimates



Figure 97: Zhengzhou Yutong Bus – consolidated income statement

Yearend December (RMBm)	2013	2014	2015	2016E	2017E	2018E
Net revenue	22,056.5	25,573.7	31,059.1	34,235.9	37,746.2	41,647.6
Cost of sales	(17,076.4)	(19,481.4)	(23,305.9)	(25,753.5)	(28,491.5)	(31,543.8)
Gross (loss)/profit	4,980.1	6,092.4	7,753.2	8,482.4	9,254.7	10,103.9
<i>Gross profit margin (%)</i>	22.6%	23.8%	25.0%	24.8%	24.5%	24.3%
Selling and distribution expenses	(1,323.4)	(1,518.1)	(2,034.4)	(2,139.7)	(2,264.8)	(2,394.7)
Administrative expenses	(1,284.2)	(1,452.4)	(1,812.9)	(1,951.4)	(2,113.8)	(2,290.6)
Operating profit (EBIT)	2,372.4	3,121.9	3,905.9	4,391.2	4,876.1	5,418.5
<i>Operating profit margin (%)</i>	10.8%	12.2%	12.6%	12.8%	12.9%	13.0%
Impairment gains/(losses) on assets	(12.3)	(356.5)	(240.7)	(200.0)	(200.0)	(200.0)
Gain/(losses) on change in fair value	8.2	14.5	(41.0)	(100.0)	0.0	0.0
Investment income	36.0	97.9	61.7	64.8	68.1	71.5
Finance income/(costs), net	2.9	24.9	142.4	10.8	12.5	10.9
Non-operating income	220.9	167.9	331.9	348.5	366.0	384.3
Non-operating expense	(9.5)	(19.8)	(55.9)	(58.7)	(61.6)	(64.7)
Profit before income tax	2,618.5	3,050.8	4,104.3	4,456.6	5,061.1	5,620.4
Income tax credit/(expense)	(327.6)	(398.2)	(516.7)	(557.1)	(632.6)	(702.6)
Profit for the period/year	2,290.9	2,652.6	3,587.7	3,899.6	4,428.4	4,917.9
Minority interest	(27.9)	(40.0)	(52.5)	(57.0)	(64.7)	(71.9)
Profit attributable to equity holders	2,263.0	2,612.6	3,535.2	3,842.6	4,363.7	4,846.0
<i>YoY%</i>	46.0%	15.5%	35.3%	8.7%	13.6%	11.1%

Source: Company data, Deutsche Bank estimates



Figure 98: Zhengzhou Yutong Bus – consolidated balance sheet

As at 31 December (RMBm)	2013	2014	2015	2016E	2017E	2018E
Current assets	13,352.3	17,223.5	22,983.1	24,756.5	26,885.7	28,976.8
Cash and cash equivalent	5,613.0	6,016.3	6,699.2	7,192.9	7,973.5	8,539.9
Bills and accounts receivables	5,071.8	9,309.9	11,363.4	12,388.9	13,591.0	14,844.8
Prepayments	228.7	260.2	427.6	449.0	471.4	495.0
Other receivables	109.7	171.6	260.0	273.0	286.7	301.0
Inventory	1,415.5	1,159.5	1,547.4	1,698.3	1,736.3	1,893.4
Other current assets	913.6	306.0	2,685.5	2,754.4	2,826.7	2,902.7
Non-current assets	5,263.2	6,600.0	7,156.0	7,935.5	8,846.9	9,914.5
Available-for-sale financial assets	142.4	149.0	378.7	397.6	417.5	438.3
Property, plant and equipment	3,281.0	3,630.3	4,071.8	4,511.4	5,027.0	5,632.5
Construction in progress	593.1	956.0	584.8	614.1	644.8	677.0
Intangible assets	703.2	939.4	1,463.5	1,722.4	2,033.1	2,405.9
Goodwill	0.5	0.5	0.5	0.5	0.5	0.5
Long term deferred expense	0.0	11.6	10.3	10.8	11.3	11.9
Deferred tax asset	319.1	407.3	561.2	589.3	618.7	649.7
Other non-current assets	224.0	505.8	85.2	89.4	93.9	98.6
Total assets	18,615.5	23,823.5	30,139.1	32,692.0	35,732.6	38,891.3
Current liabilities	8,533.7	12,358.8	16,317.0	18,247.0	18,734.1	19,108.2
Short term borrowings	160.4	0.0	0.0	0.0	0.0	0.0
Bills and accounts payables	6,099.1	9,104.7	12,191.1	13,915.2	14,186.0	14,333.0
Advance received from customers	851.9	1,211.4	1,933.6	2,030.3	2,131.8	2,238.4
Payroll payable	499.4	586.8	704.5	739.7	776.7	815.5
Tax payable	173.6	269.3	270.2	283.7	297.9	312.8
Other payables	698.1	1,163.6	1,211.2	1,271.8	1,335.3	1,402.1
Other current liabilities	51.2	22.9	6.4	6.4	6.4	6.4
Non-current liabilities	570.4	604.2	882.8	926.9	973.2	1,021.9
Long term borrowings	4.1	0.0	0.0	0.0	0.0	0.0
Accrued liabilities	298.4	314.6	496.1	520.9	546.9	574.3
Deferred income tax liabilities	0.8	3.1	0.0	0.0	0.0	0.0
Other non-current liabilities	267.1	286.4	386.7	406.0	426.3	447.6
Total liabilities	9,104.1	12,962.9	17,199.7	19,173.9	19,707.4	20,130.1
Net assets	9,511.4	10,860.6	12,939.4	13,518.0	16,025.2	18,761.2
Minority interests	33.4	56.1	78.8	135.8	200.5	272.3
Share capital and other reserves	4,939.6	4,753.9	5,048.5	5,048.5	5,048.5	5,048.5
Retained earnings	4,538.5	6,050.6	7,812.0	8,333.7	10,776.2	13,440.3
Total equity	9,511.4	10,860.6	12,939.4	13,518.0	16,025.2	18,761.2

Source: Company data, Deutsche Bank estimates



Figure 99: Zhengzhou Yutong Bus – consolidated cash flow statement

Yearend December (RMBm)	2013	2014	2015	2016E	2017E	2018E
Cash flows from operating activities						
Profit before income tax	2,290.9	2,652.6	3,587.7	3,899.6	4,428.4	4,917.9
Adjustments for:						
Impairment provisions for assets	12.3	356.5	240.7	200.0	200.0	200.0
Depreciation and amortization	643.2	669.1	738.2	943.8	1,109.0	1,304.2
Losses (gains) on disposal of fixed assets	(1.3)	(0.4)	5.0	0.0	0.0	0.0
Losses (gains) from in fair value changes	(8.2)	(14.5)	41.0	0.0	0.0	0.0
Finance costs	13.6	50.0	31.7	99.5	94.7	83.4
Losses (gains) arising from investments	(36.0)	(97.9)	(61.7)	(264.8)	(268.1)	(271.5)
Change in working capital:	(112.7)	(410.3)	1,427.1	566.5	(939.7)	(1,216.9)
Net cash flow from operating activities	2,801.9	3,205.3	6,009.7	5,444.6	4,624.3	5,017.1
Cash flows from investing activities						
Net capital expenditure	(1,146.1)	(1,914.1)	(1,294.4)	(1,642.3)	(1,935.4)	(2,282.5)
Acquisition of subsidiary and associates	0.0	(568.0)	0.0	(33.5)	(35.2)	(36.9)
Net change in investments	185.7	736.1	(2,508.4)	(6.0)	(6.3)	(6.6)
Cash received from investments income	7.4	32.2	40.3	51.9	54.5	57.2
Other investing cash flow	800.0	0.0	0.1	0.0	0.0	0.0
Net cash flow from investing activities	(153.1)	(1,713.8)	(3,762.4)	(1,629.9)	(1,922.3)	(2,268.8)
Cash flows from financing activities						
Equity issuance	47.3	33.9	0.0	0.0	0.0	0.0
Net change in borrowings	(284.6)	(194.5)	(4.1)	0.0	0.0	0.0
Interest expenses and dividends	(931.9)	(922.0)	(1,608.4)	(3,321.0)	(1,921.3)	(2,181.9)
Other financing cash flow	(16.4)	(93.9)	122.1	0.0	0.0	0.0
Net cash flow from financing activities	(1,185.6)	(1,176.5)	(1,490.4)	(3,321.0)	(1,921.3)	(2,181.9)
Net increase in cash and cash equivalent	1,463.3	315.0	756.9	493.7	780.6	566.3
Cash and equivalent at beginning of the year	4,061.5	5,524.0	5,857.3	6,699.2	7,192.9	7,973.5
FX gains/(losses) on cash and equivalents	(0.8)	18.4	53.0	0.0	0.0	0.0
Cash and cash equivalent at end of the year	5,524.0	5,857.3	6,667.3	7,192.9	7,973.5	8,539.9

Source: Company data, Deutsche Bank estimates



Risks

Sudden change in the country's NEV bus subsidy policy

Yutong and the whole EV sector is inextricably linked to government policy, both for sales and for subsidies throughout the industry. While we have reviewed the current regulations and conclude these will be supportive through till 2020, the key risk for Yutong is any sudden unfavorable change in the government's NEV bus subsidy policy. In addition, if the macroeconomic environment remains weak for a longer-than-expected period, NEV sales might also be depressed.

Given plans for an industry-wide capacity ramp, a slowdown in industry NEV sales would lead to more serious capacity underutilization concerns and could be followed by more severe price cuts. This would inevitably hurt margins for industry participants such as Yutong Bus.

Volatility in raw material prices and availability of materials

Raw materials and components are the major risks on the cost side. Even though the company may be able to pass some raw material price increases on to customers, we believe the chance of a comprehensive and effective pass-through is limited given market competition and the time lag in passing costs on.

Ability to adopt new technology and develop new models

Our sales and earnings estimates are based on the assumption that Yutong Bus can adopt new NEV technologies and apply them to auto design/manufacturing. Should the company fail to commercialize R&D efforts made to the development of new energy bus models, there could be downside to our FY16-18 sales volume and earnings forecasts for Yutong.



Company background

Long history in the China bus industry

Zhengzhou Yutong Bus Co., Ltd. (Yutong Bus) is a large bus manufacturer with advanced technology, headquartered in Zhengzhou, Henan province, China. It is the largest bus manufacturer in China in terms of 2015 bus sales volume. Yutong Bus was listed on the Shanghai Stock Exchange in 1997, the first listed company in China's bus industry. The company manufactures and sells large and medium size buses with lengths ranging from 5m to 25m. The products cover segments including, but not limited to, highway passenger transit, tourism, public transport, school buses, and special vehicles.

Yutong Bus's history can be traced back to the Henan Provincial Department of Transport Zhengzhou Bus Repair Factory, which was established in 1963. The first coach (JT660) was produced that year. With the implementation of shareholding system reform, Yutong Bus was established in 1993. Besides conventional engine buses, Yutong Bus also produces new energy buses. Currently, the combined annual production capacity of the company's three manufacturing plants is 65,000 units. Yutong Bus exports its products to more than 130 countries and regions, including Cuba, Venezuela, Peru, Australia, Hong Kong, Macao, Taiwan, the Philippines, Kazakhstan, Britain, France, Russia, Saudi Arabia, Israel, Ghana, Sudan and other markets.

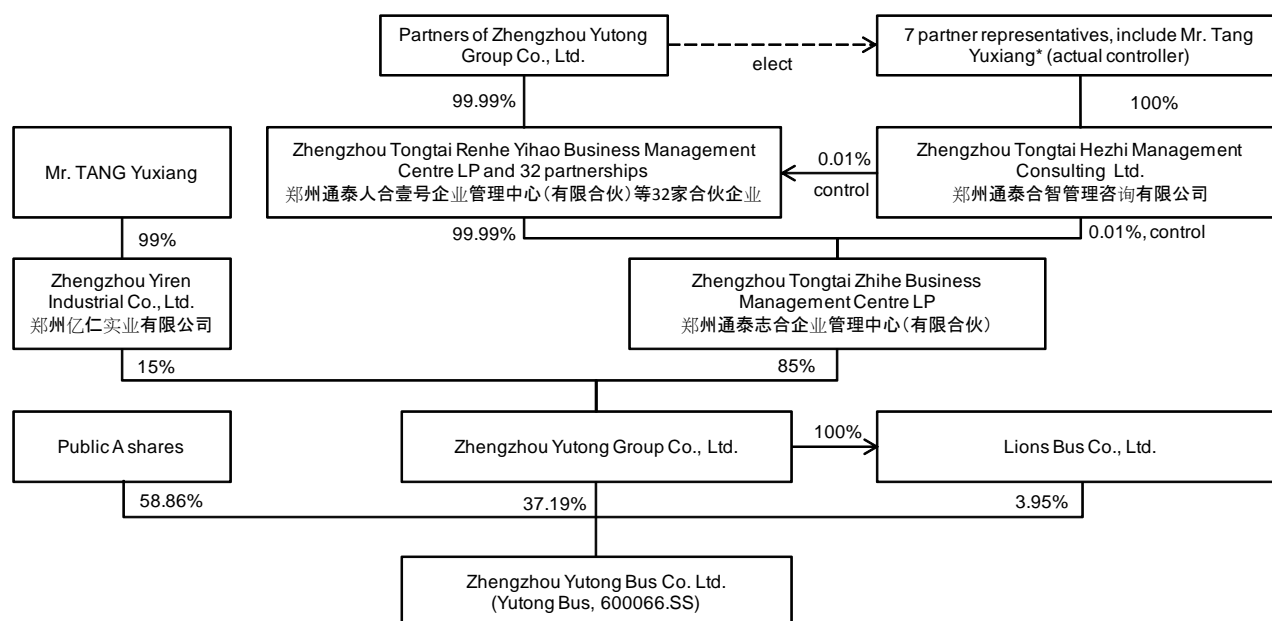
Figure 100: Zhengzhou Yutong Bus – development milestones

Year	Milestones
1963	Established Henan Provincial Department of Transport Zhengzhou Bus Repair Factory and produced the first coach in Henan (JT660)
1968	Henan Provincial Department of Transport Zhengzhou Bus Repair Factory was renamed as Zhengzhou Bus Repair Factory
1985	Zhengzhou Bus Repair Factory was renamed as Zhengzhou Bus Factory
1993	Implemented shareholding system reform and established Zhengzhou Yutong Bus Co., Ltd. with a sales volume of 708 units
1995	Yutong's annual sales volume reached 2,000 units for the first time
1997	Zhengzhou Yutong Bus Co., Ltd. was listed on the Shanghai Stock Exchange and became the first listed company in China's bus industry
1997	Established international brand strategy and began to use the trademark "Yutong"
1998	Invested RMB400m in Yutong Industrial Park and put it into operation
2002	Yutong's annual sales volume exceeded 10,000 units for the first time
2005	Launched its overseas market strategy and became the first Chinese bus builder to export CKD parts
2006	Granted the Certificate for the Exemption from Export Inspection
2009	Established Zhengzhou Yutong Bus Co., Ltd. Specialty Vehicle Branch
2009	Set up the internationally advanced cathodic electro coating line and the first experimental center for buses and parts in China
2011	Launched Yutong TSM (Yutong Electro coating Standard) intelligent operating system
2012	Yutong New Energy Bus Plant was put into operation
2013	Daily production capacity exceeded 310 units
2014	Yutong's sales volume of buses and coaches exceeded 60,000 units for the first time, among which new energy bus reached 7,405 units, representing 90% YoY growth
2015	Yutong successfully completed the world's first trial operation of unmanned bus

Source: Company data, Deutsche Bank



Figure 101: Zhengzhou Yutong Bus – corporate structure



Source: Company data, Deutsche Bank

Diversified product portfolio covering IC and NEV buses

Yutong Bus offers a diversified and complementary portfolio of bus models, which enables the company to cover different market segments ranging from large buses to medium and light buses. The company's model portfolio consists of both conventional internal combustion engine buses and new energy buses that are able to satisfy a wide range of customer demands.

Figure 102: Yutong Bus – new energy bus model portfolio

Model	Usage	Type	Vehicle Driving range (km) length (m)		Battery capacity (kWh)
E6	Public bus/Commuter	EV	6.4	110-135	62
E7/E7+	Public bus/Commuter	EV	7.0	120-160	78
E8/E8 MINI	Public bus	EV	8.0-8.4	110-135/140-170	89
E8	Commuter	EV	8.0	110-130	89
E9	Commuter	EV	9.0	145-170	n.a.
E10	Public bus	EV	10.5	135-165/220-280	147/248
E10	Commuter	EV	10.7	140-180	147
E12	Public bus	EV	12.0	120-155/230-300	147/285
E12	Commuter	EV	12.0	150-180	147
H8/H8+	Public bus	PHEV	8.2-8.5	n.a.	n.a.
ZK6105CHEVNPG21	Public bus	PHEV	10.5	n.a.	n.a.
ZK6120CHEVNPG21	Public bus	PHEV	11.5	n.a.	n.a.
ZK6125CHEVNPG21	Public bus	PHEV	12.0	n.a.	n.a.
ZK6180CHEVNPG3	Public bus	PHEV	18.0	n.a.	n.a.

Source: Company data, Deutsche Bank



Experienced management team

Yutong Bus's senior management, including the executive directors and non-executive directors, has on average more than 20 years of experience in the automobile industry.

Figure 103: Zhengzhou Yutong Bus – senior management

Name	Age	Position	Background
TANG Yuxiang	62	Chairman and President	Chairman of Yutong Bus and Chairman and President of Zhengzhou Yutong Group Co., Ltd. (Yutong Group)
NIU Bo	43	Director and General Manager	Board Director and General Manager of Yutong Bus; previously served as Assistant General Manager and Deputy General Manager of the company
CAO Jianwei	39	Director	Board Director of Yutong Bus and Yutong Group; previously served as Head of Business Administration and Head of HR of the company
YU Li	41	Director and Secretary of the Board	Board Director and Board Secretary of the company and Board Director of Yutong Group; previously served as Head of Security and Investment at Yima Coal Industry Group Co., Ltd and Board Secretary at Henan Dayou Energy Co., Ltd.
ZHANG Baofeng	44	Director	Board Director and Head of Production of the company; previously served as Assistant Chief of Process Technology, Chief of Process Technology, Factory Director at Second Factory and Deputy Head of Technology of the company
DUAN Haiyan	45	Director	Board Director and Head of Technology of the company; previously served as Head of Overseas Product Management Department, Deputy Head of Product Engineering Department, Head of Marketing Engineering Department and Head of Product Engineering Department of the company
DAI Lingmei	50	Deputy General Manager	Deputy General Manager of the company; previously served as Assistant Head of No. 6 Workshop; Head of No. 6 Workshop; Head of Process Technology and Head of Technology of the company
LIU Chunzhi	48	Chief Financial Officer	Chief Financial Officer of the company; previously served as General Manager at Assa Abloy Baodean Security Products Co., Ltd and Greater China Area CFO of Assa Abloy Group

Source: Company data, Deutsche Bank



The author of this report wishes to acknowledge the contributions made by Ms. Lu Xu, an employee of Crisil, a third-party provider to Deutsche Bank of offshore research support services.



Appendix 1

Important Disclosures

Additional information available upon request

Disclosure checklist			
Company	Ticker	Recent price*	Disclosure
Yutong Bus	600066.SS	21.66 (CNY) 18 May 16	NA
BYD-A	002594.SZ	58.56 (CNY) 18 May 16	7,14,15
BYD	1211.HK	42.15 (HKD) 18 May 16	7,14,15
BAIC Motor	1958.HK	5.42 (HKD) 18 May 16	7
SAIC Motor	600104.SS	19.81 (CNY) 18 May 16	NA

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Historical recommendations and target price: Yutong Bus (600066.SS)

(as of 5/18/2016)



Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

Historical recommendations and target price: BYD-A (002594.SZ)

(as of 5/18/2016)



Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

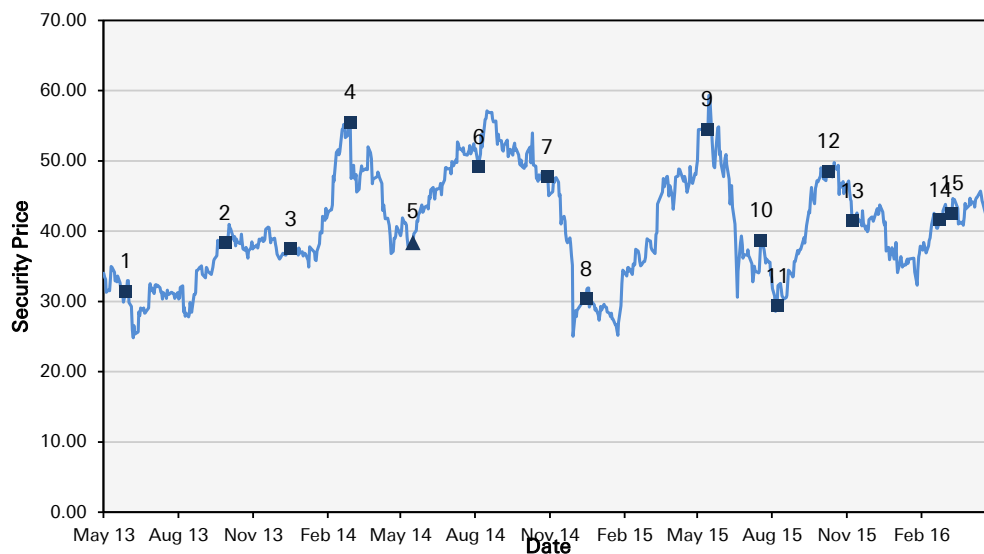
*New Recommendation Structure as of September 9,2002

1.	12/03/2015:	Upgrade to Sell, Target Price Change CNY27.70	5.	29/10/2015:	Sell, Target Price Change CNY34.90
2.	02/06/2015:	Sell, Target Price Change CNY40.90	6.	27/11/2015:	Sell, Target Price Change CNY35.90
3.	07/08/2015:	Sell, Target Price Change CNY34.80	7.	14/03/2016:	Sell, Target Price Change CNY38.20
4.	27/08/2015:	Sell, Target Price Change CNY30.90	8.	29/03/2016:	Sell, Target Price Change CNY39.50



Historical recommendations and target price: BYD (1211.HK)

(as of 5/18/2016)



Previous Recommendations

- Strong Buy
- Buy
- Market Perform
- Underperform
- Not Rated
- Suspended Rating

Current Recommendations

- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

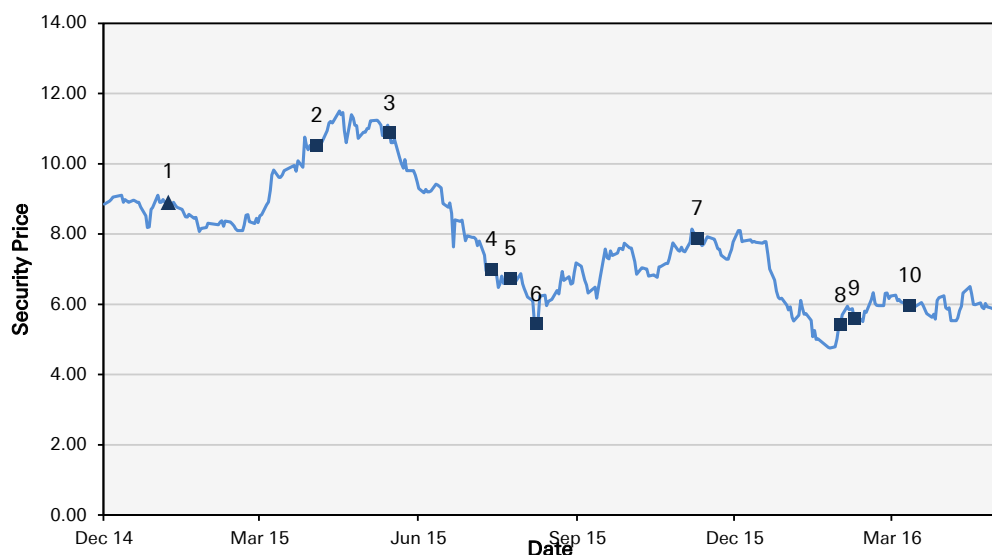
*New Recommendation Structure as of September 9,2002

1.	17/06/2013:	Sell, Target Price Change HKD24.70	9.	02/06/2015:	Hold, Target Price Change HKD51.10
2.	17/10/2013:	Sell, Target Price Change HKD31.10	10.	07/08/2015:	Hold, Target Price Change HKD43.50
3.	06/01/2014:	Sell, Target Price Change HKD30.30	11.	27/08/2015:	Hold, Target Price Change HKD37.30
4.	20/03/2014:	Sell, Target Price Change HKD41.40	12.	29/10/2015:	Hold, Target Price Change HKD42.50
5.	05/06/2014:	Upgrade to Hold, Target Price Change HKD37.30	13.	27/11/2015:	Hold, Target Price Change HKD43.50
6.	25/08/2014:	Hold, Target Price Change HKD45.90	14.	14/03/2016:	Hold, Target Price Change HKD45.60
7.	17/11/2014:	Hold, Target Price Change HKD48.50	15.	29/03/2016:	Hold, Target Price Change HKD47.00
8.	04/01/2015:	Hold, Target Price Change HKD34.90			



Historical recommendations and target price: BAIC Motor (1958.HK)

(as of 5/18/2016)



Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	25/01/2015:	Upgrade to Buy, Target Price Change HKD11.30	6.	26/08/2015:	Buy, Target Price Change HKD8.90
2.	21/04/2015:	Buy, Target Price Change HKD12.30	7.	27/11/2015:	Buy, Target Price Change HKD9.50
3.	02/06/2015:	Buy, Target Price Change HKD13.40	8.	18/02/2016:	Buy, Target Price Change HKD7.40
4.	31/07/2015:	Buy, Target Price Change HKD10.10	9.	26/02/2016:	Buy, Target Price Change HKD7.10
5.	11/08/2015:	Buy, Target Price Change HKD9.30	10.	29/03/2016:	Buy, Target Price Change HKD7.30

Historical recommendations and target price: SAIC Motor (600104.SS)

(as of 5/18/2016)



Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	24/09/2015:	Upgrade to Buy, Target Price Change CNY20.50	3.	28/01/2016:	Buy, Target Price Change CNY23.80
2.	27/11/2015:	Buy, Target Price Change CNY23.20			



Equity rating key

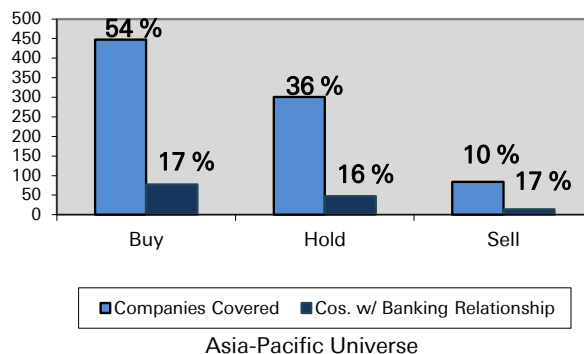
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Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock

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