



Build Your Dreams

# BYD Green Fleet Brief Intro for Mexico

Speaker: Stella Li  
Senior VP of BYD Group



It's not only what you drive  
It's the way you live

# Who is BYD?

## Automobiles



## New Energy

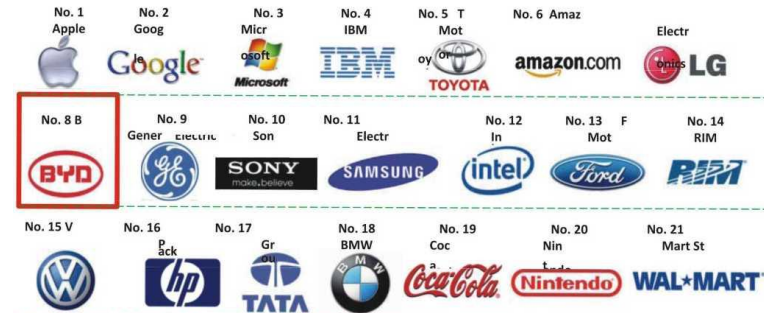


## IT



- ◆ USD 7.8 billion revenue in 2011, with 15,000 research engineers and 180,000 employees worldwide;
- ◆ No.1 rechargable battery manufacturer in the world;
- ◆ No.1 Electric Bus manufacturer in the world.
- ◆ No 2 cellphone, tablets and laptop components manufacturer in the world.
- ◆ Ranked 8th “Most Innovative Companies” by BLOOMBERG (2010)

## The 25 Most Innovative Companies 2010



# Zero Emission City Bus Solution

**BYD -- the LARGEST electric bus manufacturer in the world.**  
*1,500 units will be launched to the global market by the year end 2012.*



# Zero Emission Taxi Solution – BYD e6

Total of 300 e6 Taxi fleet have been running in China for 2.5 years,  
*1000 more units will be delivered to the market by the end of 2012.*





# BYD's Core Competencies >



## Rechargeable Batteries

- Dominant market share of rechargeable batteries
- Advanced Fe battery offers balance of safety, performance, and longevity



## Transportation

- In 2010, BYD was the largest domestic automobile manufacturer in China
- Product mix has expanded to include electric buses, SUV's, mini-vans, luxury sedans, and EV's.

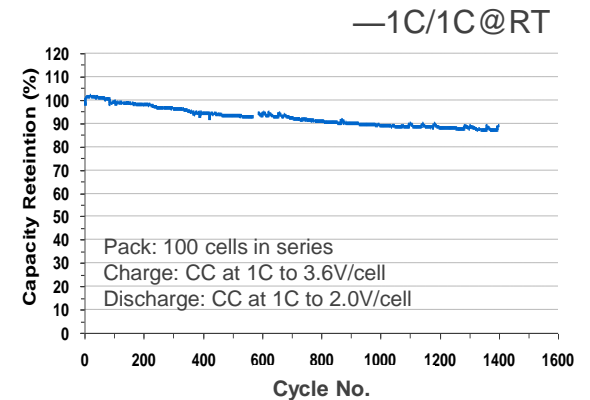
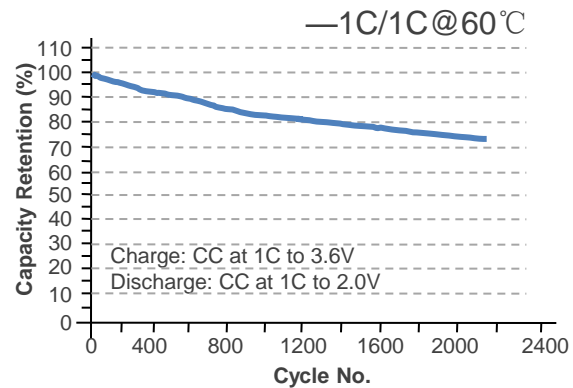
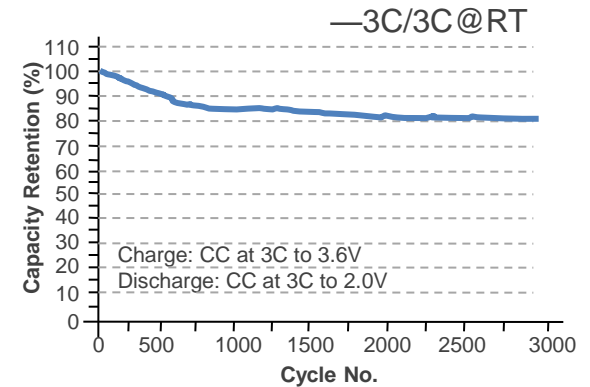
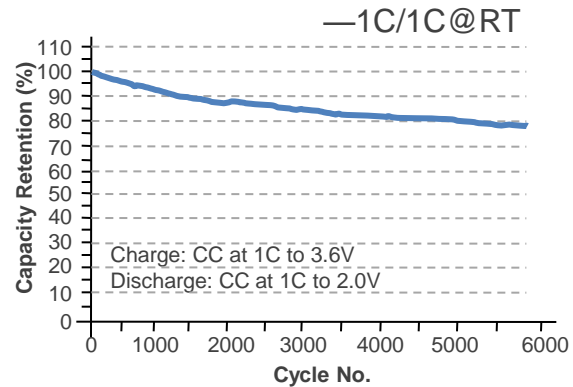
# Fe Battery Advantages >

## BYD Lithium-ion Iron-Phosphate (Fe) Battery Module



- More than 6,000 cycles life
- High energy output and high energy density
- Good performance in high temperature
- Excellent consistency

### Life Cycle Tests



# Cycle Life of BYD Fe Battery



**RANGE CRITICAL:**  
 First 4500 Cycles (12-15 yrs)

300 eTaxis: May 2015 => **18 MWh** Battery  
 300 Electric Buses: 2019 => **97 MWh** Battery

Fabricated "green"  
 no caustic materials in manufacturing  
 no heavy metals  
 no toxic electrolytes  
 Standard pack modules  
 simplifies repurposing



--- repurposed

Recycled



**ENERGY STORAGE:**  
 Next 4500 – 7200 Cycles (13-27 yrs)  
 10 ESS: May 2036 => 60 MWh Battery

# BYD Commercialized Green Fleet Global Rolling Out



BYD Electric Bus and e6 have been traveling all over the world, the commercialized operation experience proved our car and bus to be **MATURE** models with **INNOVATIVE** technologies.



**China -- Asia-Pacific**  
**Europe**  
**North America**  
**Latin America**



# China -- Shenzhen, World's LARGEST Public EV Fleet

|                        |   |
|------------------------|---|
| <b>Started:</b>        | January 2011  |
| <b>Fleet:</b>          | 200+ BYD buses<br><i>600 more buses within 2013</i>   |
| <b>Total Traveled:</b> | Over 9.21 <b>mil. km (5.53 mil. miles)</b>  |
| <b>Single Bus:</b>     | Over <b>77,000 km (46,200 miles)</b>  |
| <b>Battery:</b>        | Fe battery with 20 years<br>6,000 cycles life   |
| <b>BENEFITS:</b>       | Total cost of operation reduced<br>ZERO CO <sub>2</sub> emissions<br>Quick charge<br>Long range |



Updated by Sep. 1, 2012

## Largest All - Electric Bus Fleet >

# China -- Shenzhen, World's LARGEST Public EV Fleet

|                        |  |
|------------------------|--|
| <b>Started:</b>        | May 2010   |
| <b>Fleet:</b>          | 300+ BYD e6s<br>1,000 taxis and 600 police cars to be delivered in 2012                        |
| <b>Total Traveled:</b> | Over 24.4 mil. km (14.6 mil. miles)  |
| <b>Single eTaxi:</b>   | Over 200,000 km (124,274 miles)  |
| <b>Battery:</b>        | Fe battery with 20 years, 6,000 cycles life  |
| <b>BENEFITS:</b>       | Saves operating cost in maintenance and fuel (About 53% of operating costs for fleet vehicles) |



Updated by Sep. 1, 2012

## Battery is stable!

# China -- Shenzhen Bus Example

## Electric Bus Economic Benefits >

(Shenzhen Bus Example)

Daily Economic Impact to Change a City Bus to Electric Bus (Fuel Savings)

|                        | City Bus      | Electric Bus |
|------------------------|---------------|--------------|
| Daily Travel Distance  | 250 km        | 250 km       |
| Daily Fuel Consumption | 120 L         | /            |
| Fuel Price             | 7.8RMB/L      | /            |
| kWh Consumed           | /             | 320 kWh      |
| Electricity Price      | /             | 0.25RMB/kWh  |
| Daily Cost             | <b>936RMB</b> | <b>80RMB</b> |

According to diesel, Note: The price mentioned in the program is according to the current fuel and electric price in Shenzhen.

Daily Savings: **853 RMB/bus =136 USD/bus**

Annual Savings: **301,109 RMB/bus =48100 USD/bus**

***City Fuel Savings \$621 M Annually!***

Note: Estimating 353 days in operation per year and 13,000 buses in Shenzhen.

# China -- Changsha / Xi'an, Electric Bus Roadshow



## Changsha, China

### Project overview:

Time: since 2011  
 Status: 2 buses for #103 route in Changsha  
 Plan: **100** buses to be delivered in 2013

Daily saving compared with normal Diesel Bus

|                  | BYD Electric Bus                            | Diesel Bus |
|------------------|---|------------|
| Fuel Consumption | 320KWh/250km<br>(Per single charge per day) | 120L/250km |
| Cost             | 16USD                                       | 137USD     |
| Savings          | 121USD/day                                  |            |

Reference: Electricity cost: 0.315RMB/kWh, Diesel cost: 7.19RMB/L in Changsha

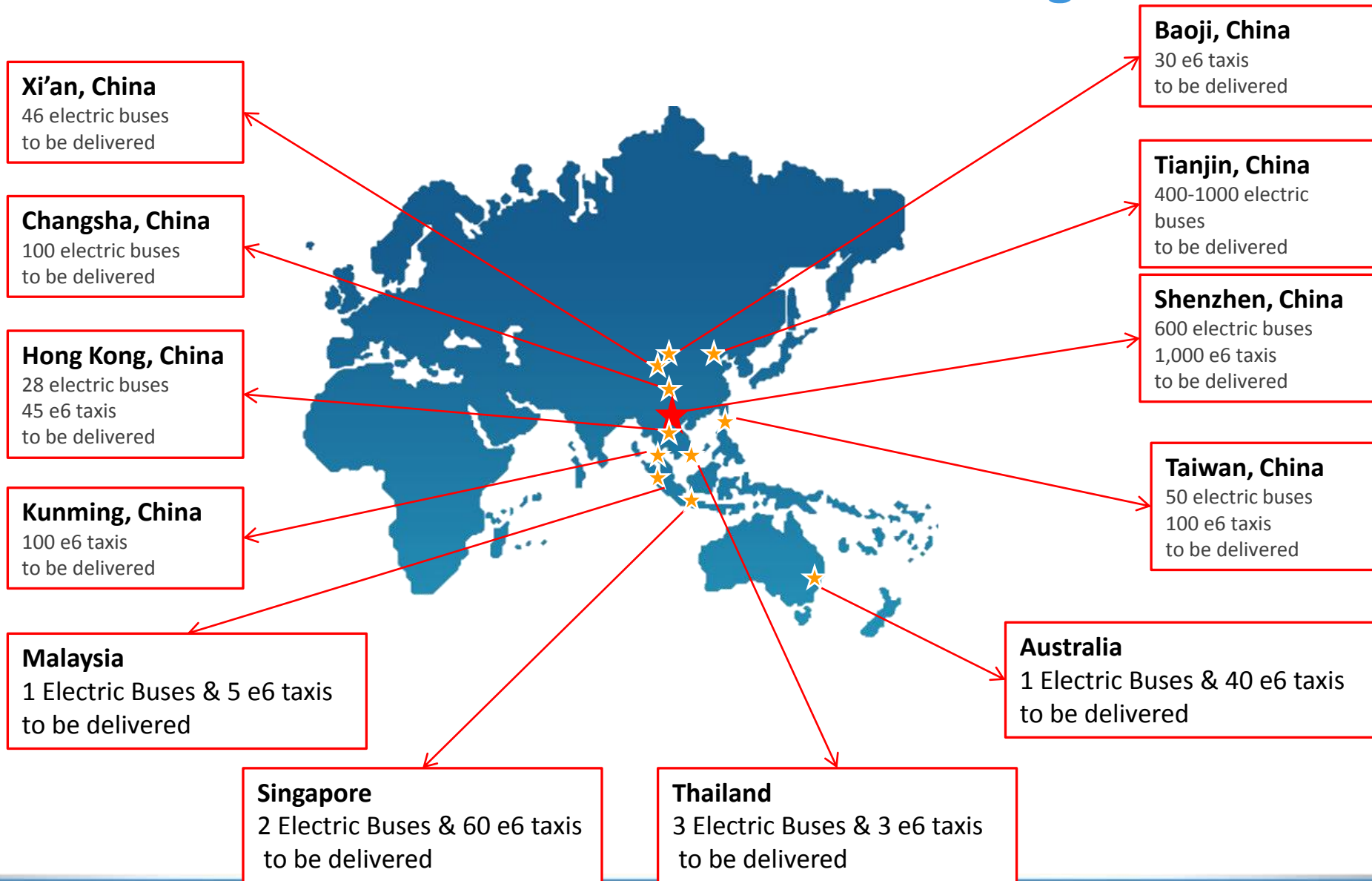
## Xi'an, China

### Project overview:

Time: since August, 2012  
 Status: 4 buses for Hi-tech #1 route in Xi'an  
 Plan: **50** buses to be delivered in 2013



# 2013 Electric Fleet Plan for Asia-Pacific Region



# Europe-- Electric Bus Roadshow



Madrid, España



Barcelona, España



Budapest, Hungría

**Amsterdam**   Madrid   Barcelona   Budapest   Szeged   Saiercibao

# Europe-- Shiphol International Airport Shuttle Bus

## Amsterdam, Netherlands

### Program overview:

Time: April- May 2012

Operator: Shiphol Airport



| Duration | Total Range | Total Fuel Savings | Total CO2 Reductions |
|----------|-------------|--------------------|----------------------|
| 30 days  | 2,500km     | 1,800USD           | 3,250kg              |

Reference: 1) compared with normal diesel bus

2) Electricity cost: 0.09euro/kWh

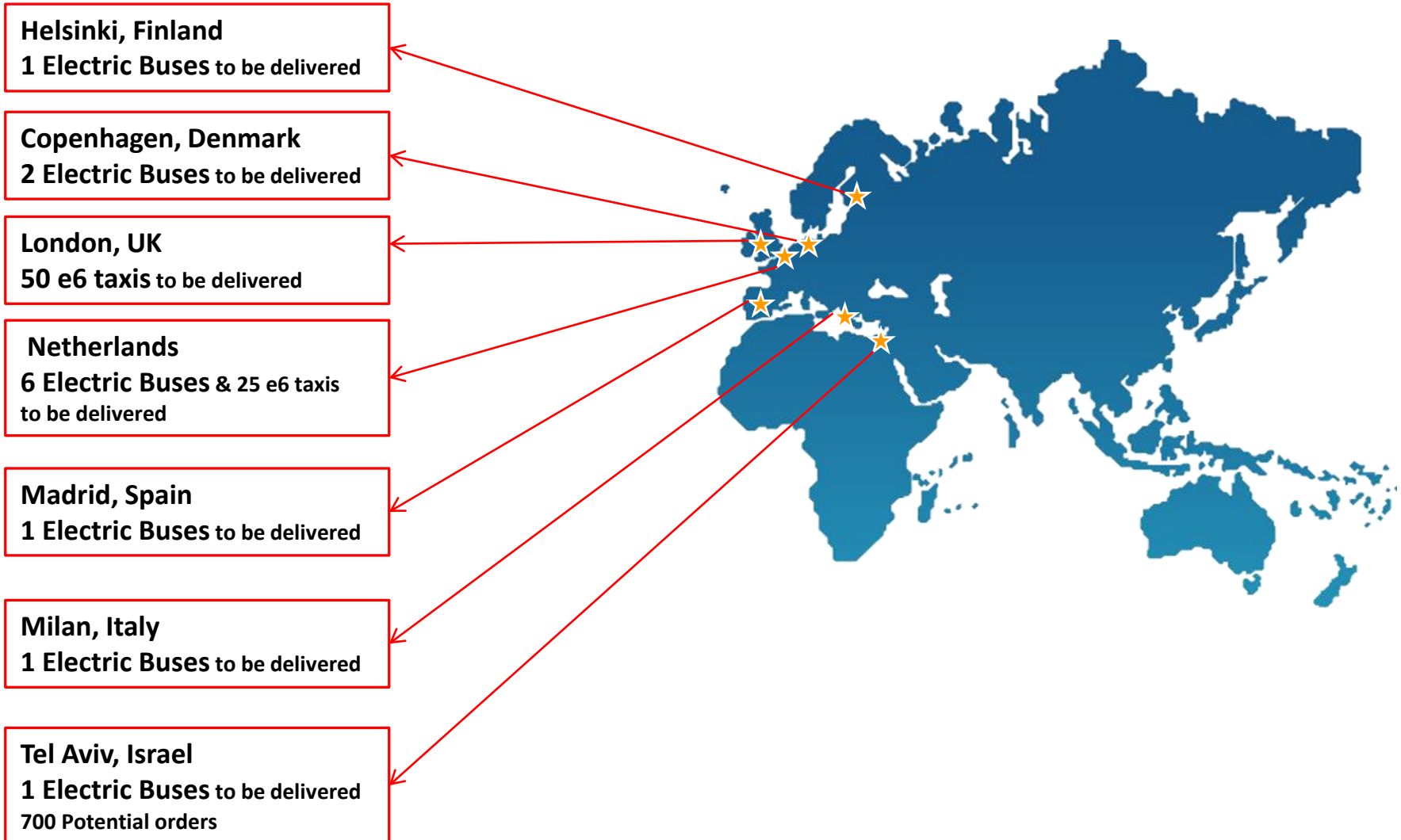
Diesel cost: 1.53euro/L in Netherlands

3) Fuel efficiency: Electric: 0.832km/kWh

Diesel: 2.32km/L

4) CO2 emission: 1.3 kg/km

# 2013 Electric Bus Plan for Europe Region





# North America -- USA and Canada Roadshow



Texas



Alexandria



Colorado



Los Angeles

Windsor

New York Washington D.C.

Indianapolis

Chicago

Denver

Los Angeles

Vancouver

Seattle

Portland

Oakland

# North America -- Los Angeles International Airport Shuttle Bus

## Los Angeles, USA

### Program overview:

Time: October - November 2011

Operator: Hertz

Route: Airport terminal to Rental Car Pick-up



| Duration | Total Range | Total Fuel Savings | Total CO2 Reductions |
|----------|-------------|--------------------|----------------------|
| 30 days  | 2,000km     | 900USD             | 2,600kg              |

Reference: 1) compared with normal diesel bus

2) Electricity cost: 0.06USD/kWh

Diesel cost: 4.17USD/gallon in LA

3) Fuel efficiency: Electric: 0.52miles/kWh

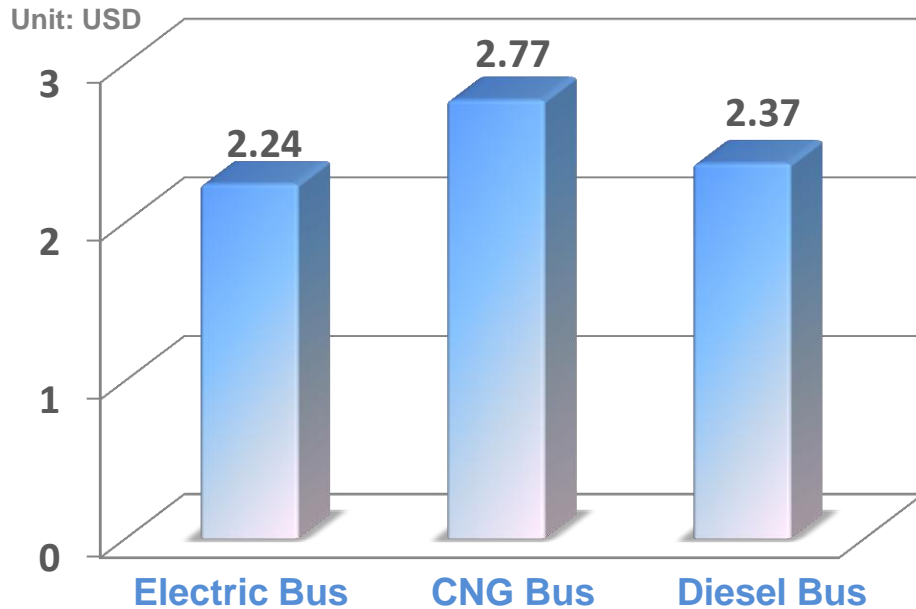
Diesel: 5.22miles/gallon

4) CO2 emission: 1.3 kg/km

# North America -- Total Cost Comparison of Diesel, CNG & Electric Bus

- Premise: 1) Comparison of BYD Electric Bus, normal CNG bus and Diesel bus in US under same operating condition
- 2) BYD Bus Leasing Model with 0 down payment and 12 years life cycle.

### Total Cost per Mile



**BYD Electric Bus Savings**  
over *CNG bus*: **\$0.53/mile**  
over *Diesel bus*: **\$0.13/mile**

### BYD Electric Bus Total Lifetime Savings

Over *CNG Bus*: **\$336,762**  
=  $\$0.53 * 150(\text{mile}) * 353(\text{day}) * 12(\text{year})$

Over *Diesel Bus*: **\$82,692**  
=  $\$0.13 * 150(\text{mile}) * 353(\text{day}) * 12(\text{year})$

**BYD Electric Bus is the **LOWEST** Cost Solution!**



# Latin America -- Electric Bus Demonstration



## Sao Paulo, Brazil

### Project overview:

September, 2012 City of Sao Paulo, Brazil's Mayor Gilberto Kassab drove BYD's electric bus.

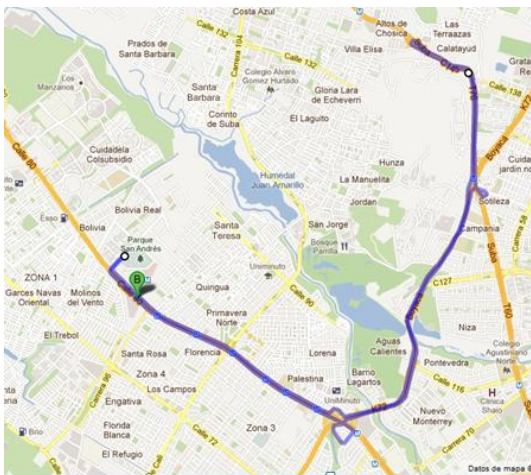
## Bogota, Colombia

### Project overview:

March, 2012, BYD cooperated with Transmilenio in Colombia to display the bus.



# Latin America -- Clinton Climate Initiative Bus Test



## Bogota, Colombia

**Time:** March, 2012

**Testing Program:** CCI C40 and the IADB

# Latin America -- Clinton Climate Initiative Test

BYD Electric Bus proved to be with the **HIGHEST** energy efficiency and the **LOWEST** energy cost



| Bus Type         | Test Repetitions | Average Energy Consumption | Average Energy Efficiency  | Energy Cost USD/100km | Energy Cost per km |
|------------------|------------------|----------------------------|--|-----------------------|--------------------|
| Diesel           | 49               | 13.34 [gal/100km]          | 2.06 [km/L]  | \$61.36               | \$0.61             |
| Hybrid           | 50               | 8.87 [gal/100km]           | 3.06 [km/L]  | \$40.80               | \$0.41             |
| BYD Electric Bus | 47               | 112 [kWh/100km]            | 11.03[km/L-eq]<br>(based on energy output)<br>or 6.68[km/L-eq]<br>(based on costs) | \$19.04               | <b>\$0.19</b>      |



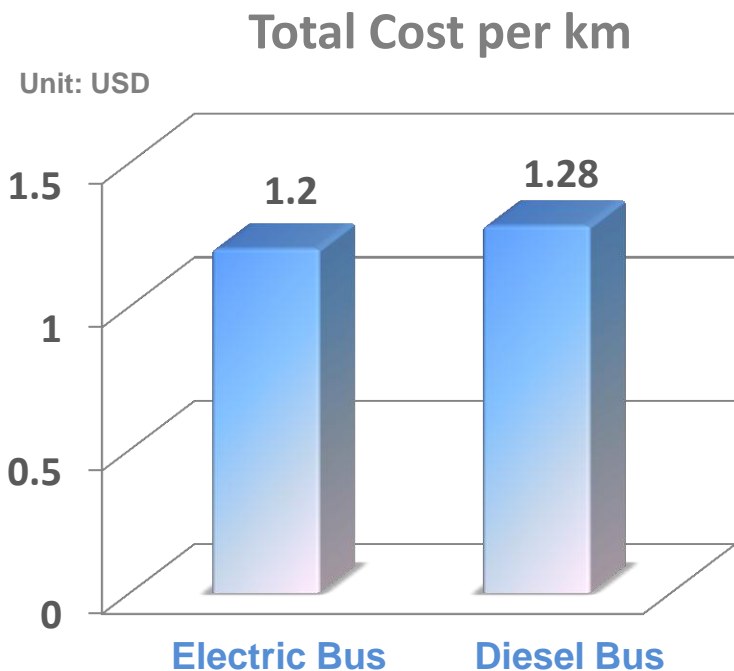
**BYD Electric Bus Energy Cost Savings**  
*over Diesel bus: **\$0.42/km***  
*over Hybrid bus: **\$0.22/km***

**BYD Electric Bus cost is 69% lower than the diesel bus, 54% lower than the hybrid bus.**

Reference: 1. Calculations are based on Clinton Climate Initiative report (full report supplied upon request)  
 2. Diesel price: \$4.60/gallon; Electricity price : \$0.17/kW in Colombia

# Latin America -- Total Cost Comparison of Diesel, CNG & Electric Bus

- Premise: 1) Comparison of BYD Electric Bus and Diesel bus in Colombia (under same operating condition)
- 2) Colombia Government offers a special tariff of 5% and 0% VAT for BYD Electric Bus.
- 3) 10 BYD Electric Buses will be delivered to Bogota within Q1, 2013
- 4) BYD Bus Leasing Model with 0 down payment and 12 years life cycle.



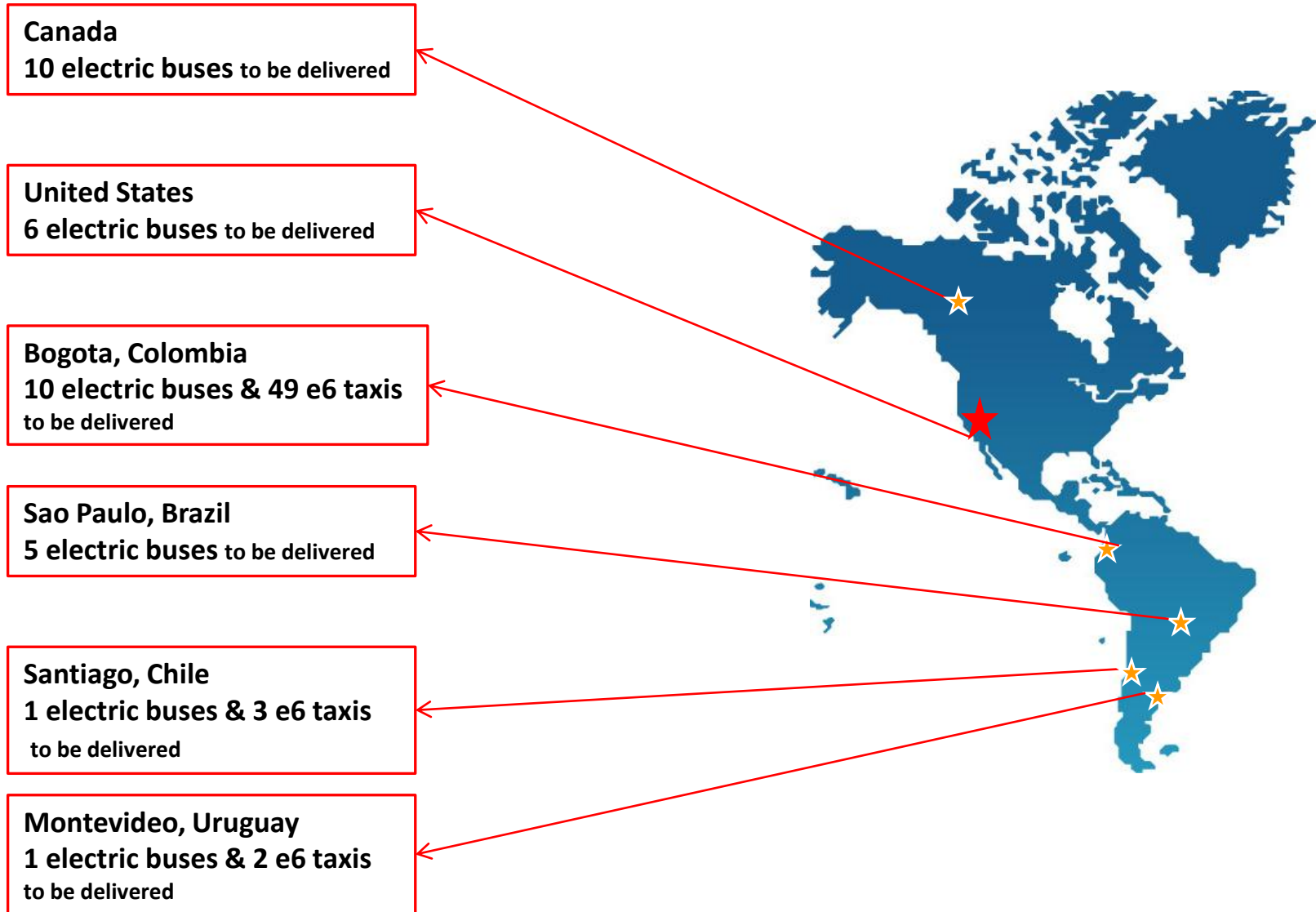
**BYD Electric Bus Savings**  
Over Diesel bus: **\$0.08/km**

**BYD Electric Bus**  
**Total Lifetime Savings**

Over Diesel Bus: **\$84,720**  
 $= \$0.08 * 250(km) * 353(day) * 12(year)$

**BYD Electric Bus is the **LOWEST** Cost Solution!**

# 2013 Electric Bus Plan for America Region





An aerial photograph of Mexico City, showing a dense urban grid with various buildings and green spaces. The sky is blue with several large, stylized, greyish-blue clouds at the top. The text 'What if we bring BYD pure electric buses to Mexico City...' is overlaid in a large, blue, sans-serif font across the middle of the image.

# What if we bring BYD pure electric buses to Mexico City...

# Mexico -- Total Cost Comparison of Diesel, CNG & Electric Bus

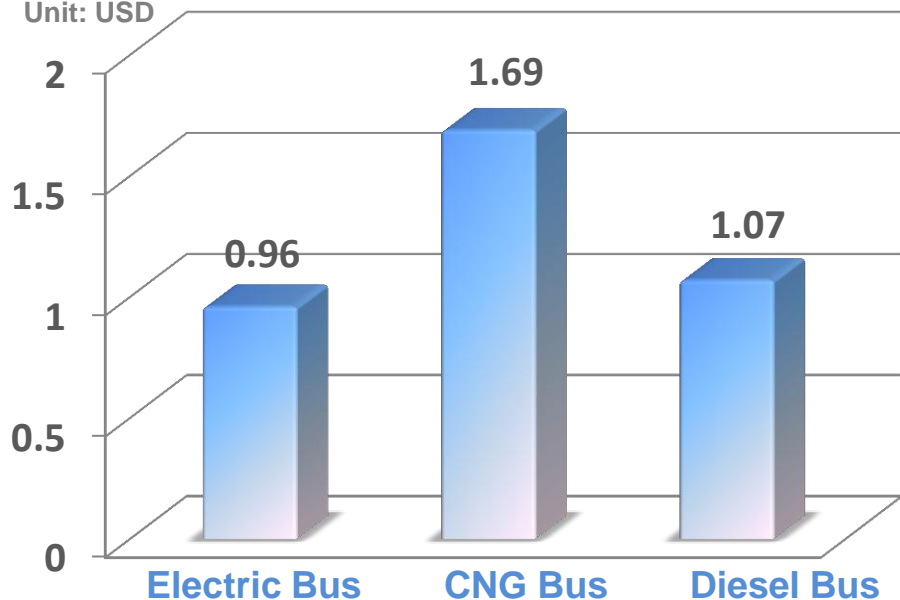
Premise: 1) Comparison of BYD Electric Bus, normal CNG bus and Diesel bus in Mexico under same operating condition

2) BYD Bus Leasing Model with 0 down payment and 12 years life cycle.

3) Mexico case: if Mexico Government offers the same incentives on tariff and VAT as Colombia, and 6% annual interest rate in Brazil (e.g. Brazil BNEDF offers 6% for BYD but 12% for Diesel bus), BYD Electric Bus will bring impressive economic and environmental benefits.

## Total Cost per km

Unit: USD



**BYD Electric Bus Savings**  
over *CNG bus*: **\$0.73/km**  
over *Diesel bus*: **\$0.11/km**

## BYD Electric Bus Total Lifetime Savings

Over **CNG Bus**: **\$ 773,070**  
=  $\$0.53 * 250(km) * 353(day) * 12(year)$

Over **Diesel Bus**: **\$ 116,490**  
=  $\$0.13 * 250(km) * 353(day) * 12(year)$

**BYD Electric Bus is the **LOWEST** Cost Solution!**

# BYD Electric Bus Environmental Benefits

## Noise Pollution Reduction>

Noise has been shown to affect people's blood pressure, mental health, and living environment. BYD Electric Bus is with the LOWEST Exterior Noise compared with Diesel bus and Hybrid bus. (See below chart )

## Emissions Avoidance>

Diesel bus and Hybrid bus produce harmful emissions to the environment, including CO, HC, NO<sub>x</sub> CO<sub>2</sub> and Particulate Matters. Those gases will cause greenhouse effect and affect human's health. BYD Electric Bus is WITHOUT any direct emissions! (See below chart)

| Bus Type<br>Items         | Diesel Bus | Hybrid Bus | BYD Electric Bus |
|---------------------------|------------|------------|------------------|
| Exterior Noise            | 80dBA      | 75dBA      | 60dBA            |
| CO <sub>2</sub> Emissions | 936g/km    | 835g/km    | 0                |

Note: 1) CO2 emissions data is from CCI test.  
2) Noise data is from ALTOONA test.



# BYD Electrified Transportation Reverse Charging Technology >

Allows for flexibility in usage.  
May support hospitals, police stations and housing facilities in case of emergencies or can be used to power a special event located off the grid.



**STRANDED VEHICLE ASSIST**

V2G  
Vehicle to Grid

V2L  
Vehicle to Load

V2V  
Vehicle to Vehicle





# It's not only what you drive, it's the way you live.



- *Sustainable Public Transportation*
- *Sustainable Utility Eco-systems*
- *Zero Emissions Commercial Eco-systems*
- *Zero Emissions Residential Eco-systems*

BYD has a master plan to repurpose electrified transportation battery modules into large-scale, grid-storage applications at a fraction of the cost, driving the economic and environmental recovery of our Nations.



Build Your Dreams

# Thank You!



IT'S NOT ONLY WHAT YOU DRIVE  
IT'S THE WAY YOU LIVE

BYD's Green City Solution

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