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

BYD’s Green City Solution

Justin Scalzi – Southwest Regional Sales Manager
Founded in 1995
60% American Owned
10% Berkshire Hathaway
World’s Largest Rechargeable Battery Manufacturer
World’s Largest Manufacturer of Battery Electric Buses
BYD’s Business Areas

**Transportation**
- Pure electric, hybrid and combustion automobiles
- Pure electric transit buses
- Pure electric fork lifts and trucks

**New Energy**
- Solar power generation
- Utility scale battery storage system
- Rechargeable batteries
- LED lighting

**Consumer Electronics**
- LCD touch panels
- Laptop and mobile devise components
- Industrial, PC and security cameras
- Power management circuitry
- And more.

Robust Research Institutes

- Transportation
- Material Science
- Wireless Communication
- Electric Power
BYD North American Headquarters
Los Angeles, CA

Opened in 2011
35,000 Square Feet
100 Year Old Building/ Green Renovation
Senior Management, Sales/Sales Support, Accounting, Maintenance, Parts
Job Creation in Downtown Los Angeles
Green Job Creation Lancaster, CA
BYD Bus & Coach
BYD Energy, LLC

Opened in 2013
BYD Bus & Coach 120,000 Square Feet
BYD Energy, LLC 44,000 Square Feet
Current Annual Plant Capacity is 300 Buses
Job Creation in LA County
BYD’s Core Competencies

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

**Low and Zero Emission Vehicles**
- BYD is China’s largest alternative fuel domestic automobile manufacturer in China
- BYD is the world’s largest battery electric bus manufacturer >2600 units operated on 4 continents
LiFe PO4 Battery Performance

BYD Lithium-ion Iron-Phosphate Battery Module

Life Cycle Tests

- Long Life Tested 10,000 cycles with over 70% capacity
- High energy output and high energy density average
- Stable performance in both high and low temperatures from 140F to -22F
Safest Battery Chemistry

BYD Lithium-ion Iron-Phosphate (Fe) Battery Safety Tests

Life Cycle Tests

-1C/1C@RT

Capacity Retention (%)

Charge: CC at 1C to 3.6V
Discharge: CC at 1C to 2.0V

BYD Lithium-ion Iron-Phosphate (Fe) Battery

Pierce

Strike

Flames

High Temperature

Extrusion

Short Circuit
Lifecycle of BYD Iron-Phosphate Modules

**Critical Range:**
First 6000 Cycles (16 yrs.)
Over 83% battery capacity

- **Electric Bus**
- **BYD e6**
- **Home Energy Storage**
- **Fixed Mega-Watt Grid Energy Storage Stations**

**Fabricated “green”**
- No caustic materials in manufacturing
- No heavy metals
- No toxic electrolytes

**Simplifies repurposing**

**Recycled**
**Green Disposal**
BYD Electric Bus - Advantages

- **100% Environmentally Friendly Battery**
- **0 Emissions**
- **In-Wheel Drive Technology**
- **Long Range**
- **Recyclable Aluminum Body**
- **~2 kWh per Mile Minimal Charging Infrastructure**
- **ADA Compatible**
Minimal Charging Infrastructure
BYD Bi-Directional Inverters

Discharge AC power back to the grid, to a load or vehicle to vehicle. Safety Contingency Plan (each bus is capable of powering a mobile hospital or a Red Cross emergency tent for a week).
BYD K7M 30’ Mid-e Bus

30’ Battery Electric Low Floor Bus
Proudly Built in Lancaster, CA
Range of ~150+ Miles on a Single Charge
Charging Time 2-2.5 Hours
Similar Price to CNG
BYD K9M 40’ Mid-e Bus

40’ Battery Electric Low Floor Bus
Proudly Built in Lancaster, CA
First 40’ Battery Electric Bus to Complete Altoona
Range of ~155 Miles on a Single Charge
Charging Time 4-4.5 Hours
BYD K11M 60’ Articulated Bus

60’ Battery Electric Low Floor Bus
Designed in California
Proudly Built in Lancaster, CA
Range of ~170 Miles on a Single Charge
Charging Time 2.5-3 Hours
BYD K11M 60’ Articulated Bus

Range of ~125 Miles on a Single Charge
Charging Time 2 - 2.5 Hours

Similar Price to CNG

40’ Battery Electric Low Floor Bus
Proudly Built in Lancaster, CA
First 40’ Battery Electric Bus to Complete Altoona
Range of ~155 Miles on a Single Charge
Charging Time 4 - 4.5 Hours
BYD Proprietary Redundant Drive System

- High-efficiency, in-wheel traction motors deliver an impressive 2,212 Ft/Lbs. of torque
- 30K Fluid replacement allows for simplified maintenance
- Energy recovery and battery recharging through optimal regenerative braking reduces brake component wear

<table>
<thead>
<tr>
<th>Drive-axle diameter</th>
<th>Type</th>
<th>BYD-3425TZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor diameter</td>
<td>Max power</td>
<td>180kw</td>
</tr>
<tr>
<td></td>
<td>Average power</td>
<td>150kw</td>
</tr>
<tr>
<td></td>
<td>Max torque</td>
<td>1500Nm</td>
</tr>
<tr>
<td></td>
<td>Max rotate speed</td>
<td>5000rpm</td>
</tr>
<tr>
<td>Motor quantity</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Brake</td>
<td>Knorr</td>
<td></td>
</tr>
<tr>
<td>Max loading</td>
<td>28660lbs</td>
<td></td>
</tr>
<tr>
<td>Gradeability</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>ITEM</td>
<td>K11M 3#</td>
<td>K11M 1#</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Battery</td>
<td>228 cells × 3 (270 Ah)</td>
<td>228 cells × 3 (250 Ah)</td>
</tr>
<tr>
<td>High Voltage</td>
<td>730 V</td>
<td>730 V</td>
</tr>
<tr>
<td>Power</td>
<td>591 KW.H</td>
<td>547 KW.H</td>
</tr>
</tbody>
</table>
Lifecycle Cost Analysis CNG vs. BYD K11

<table>
<thead>
<tr>
<th>Monthly Cost Analysis</th>
<th>CNG Bus</th>
<th>BYD Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price ($)</td>
<td>1,200,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Depreciation Term</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Value ($)</td>
<td>2.65</td>
<td>0.30</td>
</tr>
<tr>
<td>Energy Efficiency (mile/unit)</td>
<td>0.37</td>
<td>0.40</td>
</tr>
<tr>
<td>Average Cost ($/mile)</td>
<td>0.65</td>
<td>0.18</td>
</tr>
<tr>
<td>Maintenance Cost ($/mile)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monthly Cost</th>
<th>CNG Bus</th>
<th>BYD Bus</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leasing Payment</td>
<td>$11,710</td>
<td>$11,710</td>
<td></td>
</tr>
<tr>
<td>Energy Cost</td>
<td>$2,235</td>
<td>$2,376</td>
<td></td>
</tr>
<tr>
<td>Maintenance Cost</td>
<td>$5,100</td>
<td>$1,080</td>
<td></td>
</tr>
<tr>
<td>Monthly Total</td>
<td>$19,045</td>
<td>$15,166</td>
<td>$3,879</td>
</tr>
<tr>
<td>Number of Buses in Fleet</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mileage/day</td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Day/Month</td>
<td></td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

By the end of the lifetime, the initial cost of the CNG bus saves $3,879. The total savings over the life of the bus is $46,552.
## Operational Cost Analysis CNG vs. BYD K11

### Monthly Cost Analysis

<table>
<thead>
<tr>
<th></th>
<th>CNG Bus</th>
<th>BYD Bus</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price ($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation Term</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Value ($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Efficiency (mile/unit)</td>
<td>2.55</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Average Cost ($/mile)</td>
<td>0.37</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Maintenance Cost ($/Mile)</td>
<td>0.85</td>
<td>0.18</td>
<td></td>
</tr>
</tbody>
</table>

### Monthly Cost Comparison

![Cost Comparison Chart]

**Mileage/day**
- CNG Bus: $7,335
- BYD Bus: $3,456
- Difference: $3,879

**Number of Buses in Fleet**
- CNG Bus: 1
- BYD Bus: 1

**Leasing Payment**
- CNG Bus: $2,235
- BYD Bus: $2,376

**Energy Cost**
- CNG Bus: $5,100
- BYD Bus: $1,080

**Maintenance Cost**
- CNG Bus: $3,456
- BYD Bus: $3,456
- Difference: $0

**Monthly Total**
- CNG Bus: $7,335
- BYD Bus: $3,456
- Difference: $52.89%

**Bus Monthly**
- CNG: $7,335
- BYD: $3,456
- Difference: $3,879

**Fleet Monthly**
- CNG: $7,335
- BYD: $3,456
- Difference: $3,879

**Annual Cost**
- CNG: $88,024
- BYD: $41,472
- Difference: $46,552
E6 Support Vehicle - Advantages

- Environmentally-Friendly Battery
- Zero Emissions
- Fire Safe
- 187 Miles
- Large Luggage Space
- Spacious Interior
- No Heavy Metals
- Low Center of Gravity
- 90 mph
- Spacious Interior
Global Adoption of BYD PV

75 MW – Largest Solar Farm in South Africa
Operational : May, 2013

24.4 MW Solar Farm in Germany
Operational : July, 2012

3.58 MW Solar Farm in Bulgaria
Operational : June, 2012

2.5 MW Solar Farm in Italy
Operational : August, 2011

10.8 MW Solar Roof Project in China
Operational : October, 2012
Industry Adoption of BYD Energy Storage Systems

China State Grid 6MW ESS
Capacity: 6 MW/36 MWh
Location: Hebei, China
Finished time: Dec., 2011

Chevron Micro-Grid ESS
Capacity: 2MW/4MWh
Location: CA, US
Finished time: Oct. 2011

UPA 500 kWh ESS
Capacity: 250kW/500kWh
Nominal Output Voltage: 415VAC
Running since December 9th, 2012

Chevron Qatar 500 kWh ESS
Capacity: 250kW/500kWh
Nominal Output Voltage: 415VAC
Location: Doha, Qatar

Largest Battery Storage Station in the world!

Largest US CERTS-Based Micro-Grid with BYD Environmentally-Friendly Batteries.

2 h storage for the grid application, like back up, capacity reserve

2 h storage for the micro-grid application
Thank you!

Justin Scalzi
Southwest Regional Sales Manager
Justin.scalzi@byd.com
949.220.6491