

Rechargeable battery industry

To show structural growth



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► Investment points

HEV rechargeable battery industry to grow at a CAGR of 56% for next 5 years

The rechargeable battery industry's overall sales are predicted to continue expanding, although the demand for mobile IT devices is feared to fall due to the global economic slump. In 2009~2013, the sales amount of HEV rechargeable batteries are forecasted to balloon by 56% annually on the back of hybrid vehicle market expansion, while the overall sales amount of rechargeable batteries are expected to increase 7% annually.

Earnings gap to widen between cell and material companies due to oversupply

- ① In 2009, Samsung SDI's total OP is expected to drop 47.2% yoy and its rechargeable battery division's OP is forecasted to fall 19.4% yoy to W188.3bn.
- ② L&F Corp, an anode material supplier, is projected to see its OP jump 984.9% yoy.

Carmakers actively form strategic alliance with rechargeable battery makers

Unlike other car components, a rechargeable battery is a core component significantly affecting the performance of electric vehicles. As such, automobile companies are seeking to closely cooperate with their rechargeable battery suppliers through strategic alliances. Accordingly, rechargeable battery makers' future operating results heavily rely on whether or not to successfully form strategic alliance with their customer carmakers.

Non-cobalt-based anode materials, which excel cobalt-based anode material in terms of cost, energy density, and reliability, are forecasted to contribute to HEV rechargeable battery market

► Top pick

L&F (066970, BUY, TP: W31,000):

Successfully transforms itself into a rechargeable battery material specialist



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I. Summary

Investment points for rechargeable battery industry

1. Industry sales should continue expanding
2. Industry stands to benefit from expansion of eco-friendly automobile market

2009E OP growth:
Samsung SDI: -47.2% yoy
L&F Corp: +984.9% yoy

Rechargeable battery market should face an oversupply in 2009; cell makers to suffer from profitability drops; but material suppliers to achieve high profitability

Lithium-ion rechargeable battery market to expand

Automobile companies and rechargeable battery makers cooperate with each other thru strategic alliances

Non-cobalt-based anode materials are superior in terms of cost, energy density, and reliability

The rechargeable battery industry's sales are predicted to continue expanding, although its profitability is feared to decline as the demand for mobile IT devices slows amid the global economic slowdown. The market size of HEV rechargeable batteries in terms of sales amount is expected to balloon by 56% annually in 2009~2013 thanks to sales growth of hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and electric vehicles (EVs). In addition, rechargeable battery material suppliers, which are cost-competitive, are expected to see their profitability remain stable. And rechargeable battery companies stand to benefit as governments in major European countries, the US, and Japan are encouraging the public to purchase eco-friendly automobiles.

The rechargeable battery market is expected to face an oversupply from 2009 to 2H10. Thus rechargeable battery makers' profitability is feared to decline during this period. For instance, Samsung SDI's OP is projected to drop 47.2% yoy in 2009. But L&F Corp, an anode material supplier, is forecasted to see OP surge 984.9% yoy during the same year.

The market of rechargeable batteries used in mobile IT devices is expanding gradually, but rechargeable battery makers are aggressively expanding their production capacity in anticipation of a sharp rise in demand for HEV rechargeable batteries. As a result, the rechargeable battery market is expected to face an oversupply starting in 2009. Rechargeable battery cell makers are projected to suffer from profitability drops, whereas rechargeable battery material suppliers are likely to maintain their high profitability.

The use of lithium-ion rechargeable batteries in HEVs is likely to increase rapidly. Toyota and Nissan, the two leading HEV makers, said in 2H08 that they will start to use lithium-ion rechargeable batteries, instead of the existing NiMH rechargeable batteries. As carmakers increasingly adopt lithium-ion rechargeable batteries, the portion of lithium-ion rechargeable batteries in HEVs is forecasted to rise from a mere 3% this year to 83% in 2017 and lithium-ion rechargeable batteries are likely to become the main stream of HEV rechargeable batteries.

Rechargeable battery suppliers are actively forming strategic alliances with automakers. Panasonic Electric Vehicle Energy (PEVE) was established jointly by Toyota (60%) and Panasonic (40%), while Automotive Energy Supply Co. (AESC) was set up jointly by Nissan (51%) and NEC and NEC-Tokin (49%). Meanwhile, Lithium Energy Japan (LEJ) was launched jointly by Mitsubishi Motors (15%), Mitsubishi Corporation (34%), and GS Yuasa (51%). This is because unlike other auto parts, rechargeable batteries are a core component determining the performance of an electric vehicle.

More cost-competitive and stable anode materials (eg, NMC-, NM-, nickel-, manganese-, and olivine-based anode materials) have been developed to replace the cobalt-based (or LCO-based) anode material that requires a large amount of expensive cobalt. These new materials are expected to contribute to the HEV market expansion as they are more cost-competitive and have greater practical energy density. For instance, the practical energy density of LCO-based anode material is 140mAh/g, while that of NMC-based anode material is 170mAh/g.

Top pick: L&F Corp (TP: W31,000;
BUY)

We present L&F Corp as the top pick for the rechargeable battery industry and maintain the BUY rating and the target price of W31,000 for the company for the following: 1) its anode material sales are expected to continue expanding as the HEV rechargeable battery market grows; 2) it has strong market presence, supplying for major rechargeable battery manufacturers; and 3) the entry barrier to the rechargeable battery material market is high.

II. Valuation

New chapter opens for rechargeable battery industry; HEV rechargeable battery market to grow at a CAGR of 56%

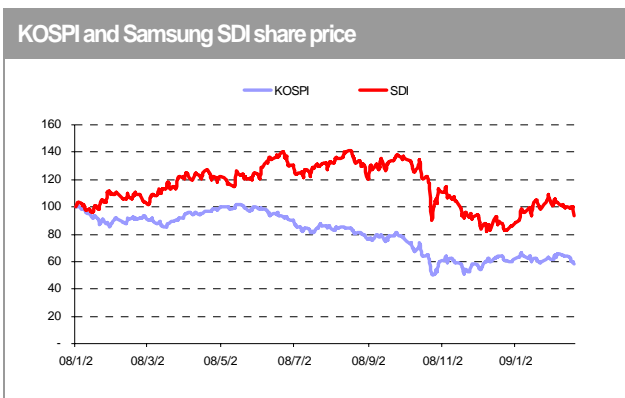
Investment point 1:
the rechargeable battery industry is forecasted to continue expanding in terms of sales amount; battery cell makers' profitability is feared to fall, whereas material suppliers' profitability is expected to rise

In 2009~2013, the HEV rechargeable battery market is projected to balloon at a CAGR of 56% as HEVs, PHEVs, and EVs start to generate significant sales, while the overall lithium-ion rechargeable battery market is predicted to increase at a CAGR of only 7%. There used to be some obstacles (eg, reliability, economic efficiency, cost competitiveness, and power density) preventing the HEV rechargeable battery market from expanding. Now, however, a rapid market expansion is possible as nickel, manganese, cobalt- (NMC-) based anode material is projected to replace cobalt-based anode material.

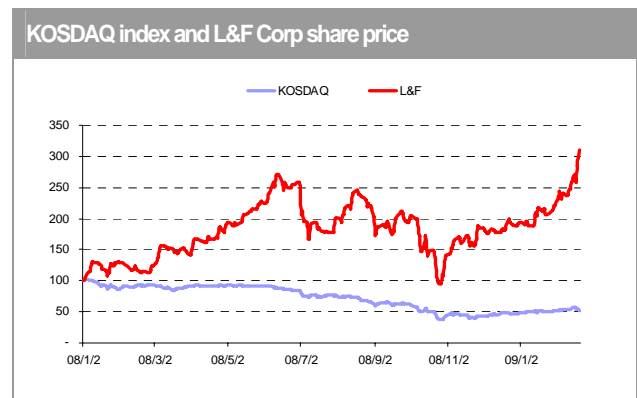
But profitability will vary significant from company to company, depending on whether they are a battery maker or a material supplier. As the rechargeable battery market is expected to face an oversupply this year, battery cell makers' profitability is expected to fall yoy in 2009. On the other hand, battery material suppliers are forecasted to see their profitability remain stable on the back of low-cost materials.

Investment point 2:
the HEV rechargeable battery market is to expand as a trend; rechargeable battery makers stand to benefit from this trend

Some fear that the HEV/EV business will slow down due to the decline in their relative economic efficiency, caused by the oil price drops. But we view that the HEV rechargeable battery market is expected to increase as a trend, because major countries in Europe, the US, and Japan are increasingly promoting eco-friendly automobiles, benefiting rechargeable battery makers.



Source: Bloomberg, Eugene Investment & Securities



Source: Bloomberg, Eugene Investment & Securities

Samsung SDI's OP should fall 47.2% yoy in 2009, while that of L&F Corp should skyrocket 984.9% yoy

In 2H07~3Q08, the overall rechargeable battery market was in tight supply and investors' attention to rising oil prices and energy stocks was high. As a result, Samsung SDI, producing rechargeable batteries, outperformed the stock market.

In 2009~1H10, however, the rechargeable battery market is expected to face an oversupply. This will lead Samsung SDI's OP to fall 47.2% yoy to W70.2bn in 2009 (consolidated basis) from W133.0bn in 2008. In particular, its rechargeable battery division's OP is likely to drop 19.4% to W188.3bn from W233.7bn during the same period.

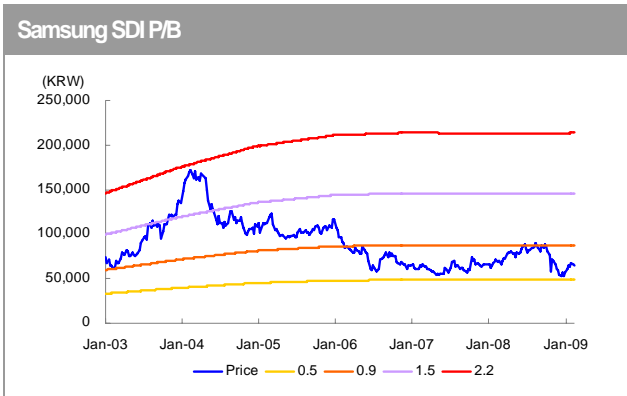
On the other hand, L&F Corp is likely to generate most of its 2009 OP from rechargeable battery anode materials. Specifically, its OP is forecasted to jump 984.9% yoy to W28.3bn in 2009 from W2.6bn in 2008. This explains why L&F Corp is outperforming the stock market.

Samsung SDI: target price of W77,000 (NAV valuation) and HOLD

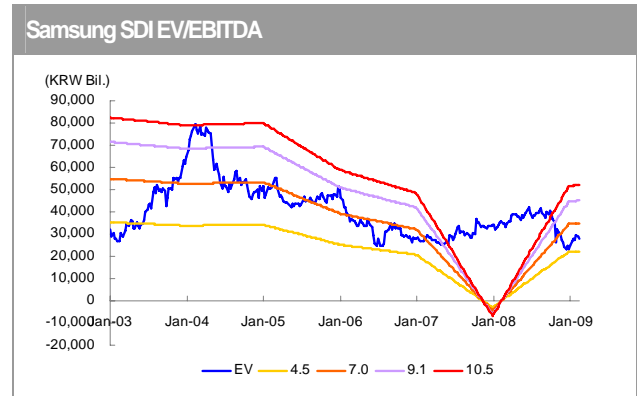
We maintain the HOLD rating and the target price of W77,000 for Samsung SDI. The target price was derived from the net asset value (NAV) valuation. And we applied a 50% discount to the company's investment assets related to Samsung Group considering their low liquidity.

| Samsung SDI valuation (NAV method) | | | | |
|------------------------------------|-----------------------|------------------|---------------------|--------------|
| Core Business | Divisions | | Value (W mn) | Portion |
| | CRT | | 274,908 | 7.8% |
| | PDP | | 143,640 | 4.1% |
| | Batteries | | 2,435,114 | 69.2% |
| | Total (A) | | 2,853,662 | 81.1% |
| Investment Assets | Listed Companies | Ownership | Value (W mn) | |
| | Samsung Fine Chemical | 11.5% | 130,251 | 3.7% |
| | Samsung Engineering | 5.1% | 116,280 | 3.3% |
| | Samsung C&T | 7.2% | 466,776 | 13.3% |
| | Hotel Shilla | 0.1% | 495 | 0.0% |
| | S1 | 11.0% | 200,426 | 5.7% |
| | Total (B) | | 914,229 | 26.0% |
| | | | 50% Discount | |
| | | | 457,114 | 13.0% |
| | Unlisted Companies | Ownership | Value (W mn) | |
| Samsung General Chem | 10.7% | 50,985 | 1.4% | |
| Samsung Everland | 4.0% | 10,000 | 0.3% | |
| SERI | | 1,214,619 | 34.5% | |
| Total (C) | | 1,275,604 | 36.2% | |
| Net Debt (D) | | -290,748 | -8.3% | |
| Contingent Debt (E) | | 1,356,753 | 38.5% | |
| Net Asset Value(A+B+C-D-E) | | 3,520,376 | 100.0% | |
| NAV per Shares | | 77,272 | | |

Source: Eugene Investment & Securities



Source: Eugene Investment & Securities



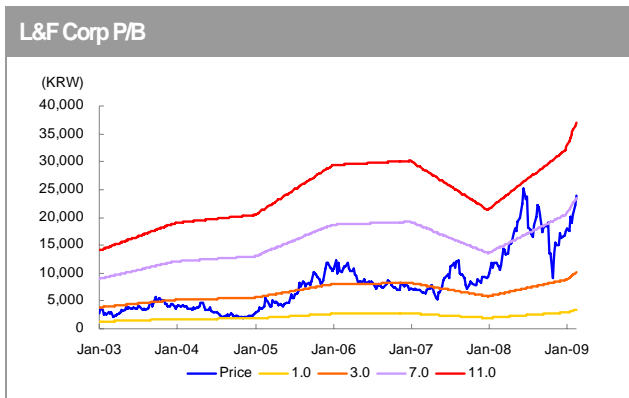
Source: Eugene Investment & Securities

L&F Corp: target price of W31,000
and BUY

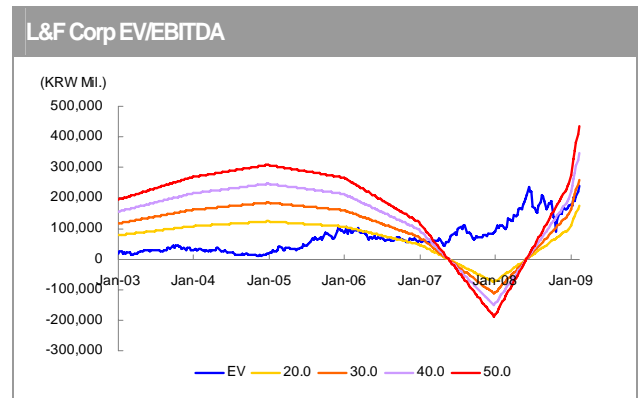
We reiterate the BUY rating and the target price of W31,000 for L&F Corp. We chose global material suppliers as its comparables and calculated their 2009E and 2010E P/E (50% weight) and EV/EBITDA (50% weight), from which we derived the target price of W31,000.

| L&F Corp's peer group valuations | | | | | | | | |
|----------------------------------|---------------|--------------------|-------------|-------------|------------|------------|---------------|------------|
| Company | Price (KRW) | Mkt. Cap. (KRW bn) | P/E (x) | | P/B (x) | | EV/EBITDA (x) | |
| | | | 2009E | 2010E | 2009E | 2010E | 2009E | 2010E |
| L&F | 27,650 | 283 | 7.7 | 5.5 | 4.3 | 2.4 | 8.0 | 5.5 |
| Sodiff Advanced Mat'l | 63,000 | 665 | 13.5 | 7.7 | 3.0 | 2.2 | 6.1 | 3.6 |
| CORNING INC | 15,087 | 23,450 | 16.9 | 9.7 | 1.1 | 1.1 | 17.4 | 8.4 |
| MERCK KGAA | 117,740 | 25,595 | 10.6 | 9.2 | 1.5 | 1.4 | 6.5 | 6.1 |
| PRAXAIR INC | 94,532 | 28,753 | 15.8 | 14.1 | 4.1 | 3.5 | 8.9 | 8.2 |
| CLARIANT AG-REG | 6,789 | 1,545 | 9.4 | 7.3 | 0.5 | 0.5 | 4.9 | 4.5 |
| KIC LIMITED | 6,800 | 103 | - | - | - | - | - | - |
| DONGJIN SEMICHEM CO LTD | 2,600 | 98 | - | - | - | - | - | - |
| AIR PRODUCTS & CHEMICALS INC | 78,012 | 16,483 | 12.9 | 11.3 | 2.2 | 1.9 | 7.1 | 6.5 |
| KONICA MINOLTA HOLDINGS INC | 12,235 | 6,505 | 17.5 | 11.9 | 0.9 | 0.9 | 4.3 | 3.7 |
| HITACHI CABLE LTD | 2,473 | 912 | - | - | 0.4 | 0.5 | 8.1 | 5.1 |
| MITSUJI MINING & SMELTING CO | 2,359 | 1,352 | - | - | 0.7 | 0.7 | 14.8 | 8.1 |
| TOSOH CORP | 2,327 | 1,399 | - | 9.4 | 0.4 | 0.4 | 8.4 | 8.0 |
| IDEMITSU KOSAN CO LTD | 103,949 | 4,158 | 10.1 | 9.0 | 0.5 | 0.5 | 5.8 | 5.4 |
| HITACHI METALS LTD | 7,643 | 2,802 | - | 16.0 | 0.8 | 0.8 | 9.9 | 6.1 |
| HITACHI CHEMICAL CO LTD | 15,097 | 3,146 | 50.3 | 13.0 | 0.8 | 0.8 | 4.9 | 3.6 |
| MITSUJI CHEMICALS INC | 3,538 | 2,803 | - | - | 0.3 | 0.3 | 12.7 | 9.9 |
| SEKISUI CHEMICAL CO LTD | 7,171 | 3,869 | 14.0 | 10.7 | 0.6 | 0.6 | 4.4 | 4.1 |
| JSR CORP | 18,069 | 4,624 | 16.6 | 12.1 | 1.0 | 0.9 | 5.1 | 4.6 |
| Weighted Average | | | 14.7 | 11.6 | 2.1 | 1.8 | 7.3 | 6.5 |

Source: Bloomberg, Eugene Investment & Securities (based on Feb 19 closing share prices)



Source: Eugene Investment & Securities



Source: Eugene Investment & Securities

Rechargeable battery markers' valuations

| | FY | SDI | LG Chem. | Sanyo | Sony | NEC | BYD |
|-----------------------|------|---------|----------|--------|---------|--------|--------|
| FY | | Dec. | Dec. | Mar. | Mar. | Mar. | Dec. |
| Price(2/17, KRW) | | 64,000 | 84,000 | 2,035 | 23,960 | 3,397 | 3,044 |
| Mkt. Cap.(KRW Bil.) | | 2,902 | 6,455 | 4,098 | 26,255 | 7,255 | 6,148 |
| Earnings | | | | | | | |
| Revenue (KRW Bil.) | 2007 | 3,792 | 10,795 | 15,231 | 67,117 | 37,643 | 2,591 |
| | 2008 | 4,650 | 14,654 | 16,539 | 72,713 | 37,844 | 5,804 |
| | 2009 | 3,764 | 12,144 | 29,342 | 119,641 | 64,180 | 7,137 |
| | 2010 | 3,500 | 13,113 | 27,464 | 113,196 | 60,903 | 8,474 |
| OP (KRW Bil.) | 2007 | -567 | 764 | 345 | 581 | 566 | 290 |
| | 2008 | 3 | 1,527 | 624 | 3,069 | 1,285 | 431 |
| | 2009 | 51 | 1,086 | 353 | -3,205 | -379 | 501 |
| | 2010 | 90 | 1,085 | 215 | -1,647 | -332 | 600 |
| EBITDA (KRW Bil.) | 2007 | -66 | 1,227 | 1,112 | 3,817 | 2,238 | 402 |
| | 2008 | 493 | 1,915 | 1,368 | 6,577 | 2,940 | 658 |
| | 2009 | 510 | 1,293 | 1,609 | 3,334 | 1,908 | 778 |
| | 2010 | 507 | 1,247 | 1,421 | 4,364 | 1,800 | 893 |
| Net Income (KRW Bil.) | 2007 | -592 | 686 | -364 | 1,022 | 74 | 197 |
| | 2008 | 39 | 1,104 | 235 | 3,028 | 186 | 302 |
| | 2009 | 57 | 699 | -116 | -2,049 | -4,169 | 350 |
| | 2010 | 51 | 668 | -159 | -1,265 | -939 | 385 |
| EPS (KRW) | 2007 | -12,998 | 8,358 | -588 | 1,021 | 36 | 96 |
| | 2008 | 852 | 13,840 | 38 | 3,019 | 91 | 147 |
| | 2009 | 1,243 | 8,905 | -31 | -1,998 | -1,906 | 165 |
| | 2010 | 1,117 | 8,510 | -103 | -1,508 | -480 | 180 |
| BPS (KRW) | 2007 | 96,689 | 46,224 | 52 | 26,908 | 4,104 | 670 |
| | 2008 | 96,987 | 61,000 | 43 | 34,270 | 4,922 | 1,237 |
| | 2009 | 98,262 | 65,766 | 1,980 | 48,620 | 5,615 | 1,386 |
| | 2010 | 99,405 | 69,989 | 1,937 | 46,687 | 5,157 | 1,533 |
| Profitability | | | | | | | |
| OP margin | 2007 | -15.0% | 7.1% | 2.3% | 0.9% | 1.5% | 11.2% |
| | 2008 | 0.1% | 10.4% | 3.8% | 4.2% | 3.4% | 7.4% |
| | 2009 | 1.4% | 8.9% | 1.2% | -2.7% | -0.6% | 7.0% |
| | 2010 | 2.6% | 8.3% | 0.8% | -1.5% | -0.5% | 7.1% |
| EBITDA margin | 2007 | -1.7% | 11.4% | 7.3% | 5.7% | 5.9% | 15.5% |
| | 2008 | 10.6% | 13.1% | 8.3% | 9.0% | 7.8% | 11.3% |
| | 2009 | 13.6% | 10.6% | 5.5% | 2.8% | 3.0% | 10.9% |
| | 2010 | 14.5% | 9.5% | 5.2% | 3.9% | 3.0% | 10.5% |
| NI margin | 2007 | -15.6% | 6.4% | -2.4% | 1.5% | 0.2% | 7.6% |
| | 2008 | 0.8% | 7.5% | 1.4% | 4.2% | 0.5% | 5.2% |
| | 2009 | 1.5% | 5.8% | -0.4% | -1.7% | -6.5% | 4.9% |
| | 2010 | 1.5% | 5.1% | -0.6% | -1.1% | -1.5% | 4.5% |
| ROE | 2007 | -12.8% | 21.1% | -78.4% | 3.8% | 0.9% | 20.2% |
| | 2008 | 0.8% | 25.0% | 286.2% | 10.8% | 2.2% | 13.1% |
| | 2009 | 1.2% | 13.8% | -4.7% | -3.6% | -31.2% | 12.1% |
| | 2010 | 1.1% | 11.8% | 2.3% | -2.1% | -11.9% | 12.5% |
| Multiple | | | | | | | |
| P/E | 2009 | 51.5 | 9.4 | n/a | n/a | n/a | 18.4 |
| | 2010 | 57.3 | 9.9 | n/a | n/a | n/a | 16.9 |
| P/B | 2009 | 0.7 | 1.3 | 1.0 | 0.5 | 0.6 | 2.2 |
| | 2010 | 0.6 | 1.2 | 1.1 | 0.5 | 0.7 | 2.0 |
| EV/EBITDA | 2009 | 5.2 | 7.0 | 7.3 | 7.9 | 10.0 | 9.9 |
| | 2010 | 5.0 | 7.3 | 8.3 | 6.0 | 10.6 | 8.6 |
| Growth | | | | | | | |
| Revenue growth | 2008 | 22.6% | 35.7% | 8.6% | 8.3% | 0.5% | 124.0% |
| | 2009 | -19.0% | -17.1% | 77.4% | 64.5% | 69.6% | 23.0% |
| | 2010 | -7.0% | 8.0% | -6.4% | -5.4% | -5.1% | 18.7% |
| CAGR | | -2.6% | 6.7% | 21.7% | 19.0% | 17.4% | 48.4% |
| OP growth | 2008 | RB | 99.9% | 81.0% | 428.7% | 127.0% | 48.4% |
| | 2009 | 1650.4% | -28.9% | -43.5% | BR | BR | 16.3% |
| | 2010 | 74.8% | -0.1% | -39.1% | RR | RR | 19.7% |
| CAGR | | n/a | 12.4% | n/a | n/a | n/a | 27.4% |
| EBITDA growth | 2008 | RB | 56.0% | 23.0% | 72.3% | 31.4% | 63.8% |
| | 2009 | 3.6% | -32.5% | 17.6% | -49.3% | -35.1% | 18.2% |
| | 2010 | -0.7% | -3.6% | -11.7% | 30.9% | -5.7% | 14.8% |
| CAGR | | n/a | 0.5% | 8.5% | 4.6% | -7.0% | 30.5% |
| EPS growth | 2008 | RB | 65.6% | RB | 195.8% | 153.1% | 53.1% |
| | 2009 | 45.9% | -35.7% | BR | BR | BR | 12.3% |
| | 2010 | -10.1% | -4.4% | RR | RR | RR | 9.2% |
| CAGR | | n/a | 0.6% | n/a | n/a | n/a | 23.4% |

Source: Bloomberg, Eugene Investment & Securities

Anode material suppliers' valuations

| FY | FY | L&F | | Umicore | | Nippon Chemical | | Tanaka | | Toda Kogyo | | Sumitomo MM | | Nichia | |
|-----------------------|------|---------|--------|---------|--------|-----------------|--------|---------|------|------------|------|-------------|------|--------|--|
| | | Dec. | Dec. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | Mar. | |
| Price(2/18, KRW) | | 26,450 | 26,397 | 2,583 | 4,189 | 15,434 | 10,882 | 3,244 | | | | | | | |
| Mkt. Cap.(KRW Bil.) | | 271 | 3,168 | 230 | 203 | 8,977 | 135 | 405,710 | | | | | | | |
| Earnings | | | | | | | | | | | | | | | |
| Revenue (KRW Bil.) | 2007 | 76 | 10,580 | 387 | 163 | 269 | 7,822 | 1,333 | | | | | | | |
| | 2008 | 72 | 14,709 | 433 | 197 | 360 | 9,281 | 1,390 | | | | | | | |
| | 2009 | 151 | 13,913 | n/a | n/a | n/a | 12,915 | 2,338 | | | | | | | |
| | 2010 | 187 | 14,408 | n/a | n/a | n/a | 9,463 | 2,164 | | | | | | | |
| OP (KRW Bil.) | 2007 | -6 | 393 | 22 | 9 | 9 | 1,316 | 117 | | | | | | | |
| | 2008 | 3 | 493 | 28 | 14 | 8 | 1,274 | 121 | | | | | | | |
| | 2009 | 28 | 420 | n/a | n/a | n/a | 381 | 120 | | | | | | | |
| | 2010 | 37 | 422 | n/a | n/a | n/a | 105 | 62 | | | | | | | |
| EBITDA (KRW Bil.) | 2007 | -4 | 558 | 59 | 16 | 24 | 1,524 | 153 | | | | | | | |
| | 2008 | 5 | 763 | 65 | 22 | 26 | 1,524 | 161 | | | | | | | |
| | 2009 | 33 | 641 | n/a | n/a | n/a | 803 | n/a | | | | | | | |
| | 2010 | 42 | 657 | n/a | n/a | n/a | 588 | n/a | | | | | | | |
| Net Income (KRW Bil.) | 2007 | -6 | 832 | 12 | 3 | 9 | 1,020 | 62 | | | | | | | |
| | 2008 | 2 | 195 | 17 | 7 | -2 | 1,130 | -97 | | | | | | | |
| | 2009 | 36 | 253 | n/a | n/a | n/a | 580 | 32 | | | | | | | |
| | 2010 | 51 | 294 | n/a | n/a | n/a | 150 | 28 | | | | | | | |
| EPS (KRW) | 2007 | -593 | 6,640 | 140 | 280 | 193 | 1,784 | 519 | | | | | | | |
| | 2008 | 164 | 1,701 | 188 | 573 | -34 | 1,952 | -817 | | | | | | | |
| | 2009 | 3,418 | 2,189 | n/a | n/a | n/a | 1,011 | 265 | | | | | | | |
| | 2010 | 4,827 | 2,492 | n/a | n/a | n/a | 158 | 233 | | | | | | | |
| BPS (KRW) | 2007 | 1,937 | 16,922 | 3,211 | 4,026 | 4,989 | 6,878 | 3,412 | | | | | | | |
| | 2008 | 2,932 | 20,210 | 3,826 | 5,563 | 5,969 | 10,102 | 3,045 | | | | | | | |
| | 2009 | 6,164 | 22,690 | n/a | n/a | n/a | 16,207 | 5,007 | | | | | | | |
| | 2010 | 10,839 | 23,982 | n/a | n/a | n/a | 16,118 | 5,164 | | | | | | | |
| Profitability | | | | | | | | | | | | | | | |
| OP margin | 2007 | -7.5% | 3.7% | 5.7% | 5.7% | 3.5% | 16.8% | 8.8% | | | | | | | |
| | 2008 | 3.6% | 3.4% | 6.4% | 7.2% | 2.1% | 13.7% | 8.7% | | | | | | | |
| | 2009 | 18.8% | 3.0% | n/a | n/a | n/a | 3.0% | 5.1% | | | | | | | |
| | 2010 | 19.9% | 2.9% | n/a | n/a | n/a | 1.1% | 2.9% | | | | | | | |
| EBITDA margin | 2007 | -5.0% | 5.3% | 15.2% | 9.9% | 9.1% | 19.5% | 11.5% | | | | | | | |
| | 2008 | 6.9% | 5.2% | 15.0% | 10.9% | 7.3% | 16.4% | 11.6% | | | | | | | |
| | 2009 | 21.7% | 4.6% | n/a | n/a | n/a | 6.2% | n/a | | | | | | | |
| | 2010 | 22.6% | 4.6% | n/a | n/a | n/a | 6.2% | n/a | | | | | | | |
| NI margin | 2007 | -7.4% | 7.9% | 3.2% | 2.1% | 3.3% | 13.0% | 4.6% | | | | | | | |
| | 2008 | 2.2% | 1.3% | 3.8% | 3.6% | -0.4% | 12.2% | -7.0% | | | | | | | |
| | 2009 | 24.1% | 1.8% | n/a | n/a | n/a | 4.5% | 1.4% | | | | | | | |
| | 2010 | 27.4% | 2.0% | n/a | n/a | n/a | 1.6% | 1.3% | | | | | | | |
| ROE | 2007 | -24.5% | 53.8% | 4.3% | 7.0% | 3.9% | 29.0% | 16.1% | | | | | | | |
| | 2008 | 5.9% | 8.8% | 5.8% | 13.1% | -0.7% | 25.4% | -27.2% | | | | | | | |
| | 2009 | 70.0% | 11.5% | n/a | n/a | n/a | 6.4% | 5.5% | | | | | | | |
| | 2010 | 53.9% | 10.7% | n/a | n/a | n/a | 0.7% | 4.1% | | | | | | | |
| Multiple | | | | | | | | | | | | | | | |
| P/E | 2009 | 7.7 | 12.0 | n/a | n/a | n/a | 97.6 | 13.6 | | | | | | | |
| | 2010 | 5.5 | 10.5 | n/a | n/a | n/a | 25.5 | 7.7 | | | | | | | |
| P/B | 2009 | 4.3 | 1.2 | n/a | n/a | n/a | 1.0 | 0.6 | | | | | | | |
| | 2010 | 2.4 | 1.1 | n/a | n/a | n/a | 0.9 | 0.6 | | | | | | | |
| EV/EBITDA | 2009 | 8.0 | 6.8 | n/a | n/a | n/a | 20.3 | n/a | | | | | | | |
| | 2010 | 5.5 | 6.7 | n/a | n/a | n/a | 12.3 | n/a | | | | | | | |
| Growth | | | | | | | | | | | | | | | |
| Revenue growth | 2008 | -5.4% | 39.0% | 11.9% | 21.1% | 33.8% | 18.7% | 4.3% | | | | | | | |
| | 2009 | 109.8% | -5.4% | n/a | n/a | n/a | 39.1% | 68.1% | | | | | | | |
| | 2010 | 24.4% | 3.6% | n/a | n/a | n/a | -26.7% | -7.4% | | | | | | | |
| CAGR | | 35.1% | 10.8% | n/a | n/a | n/a | 6.6% | 17.5% | | | | | | | |
| OP growth | 2008 | RB | 25.4% | 24.9% | 54.3% | -19.1% | -3.2% | 3.6% | | | | | | | |
| | 2009 | 984.9% | -14.8% | n/a | n/a | n/a | -70.1% | -0.9% | | | | | | | |
| | 2010 | 32.0% | 0.3% | n/a | n/a | n/a | -72.4% | -48.0% | | | | | | | |
| CAGR | | n/a | 2.3% | n/a | n/a | n/a | n/a | n/a | | | | | | | |
| EBITDA growth | 2008 | RB | 36.9% | 9.8% | 33.5% | 7.8% | 0.0% | 5.2% | | | | | | | |
| | 2009 | 562.1% | -16.0% | n/a | n/a | n/a | -47.3% | n/a | | | | | | | |
| | 2010 | 29.3% | 2.5% | n/a | n/a | n/a | -26.8% | n/a | | | | | | | |
| CAGR | | n/a | 5.6% | n/a | n/a | n/a | n/a | n/a | | | | | | | |
| EPS growth | 2008 | RB | -74.4% | 34.2% | 105.0% | BR | 9.4% | BR | | | | | | | |
| | 2009 | 1985.1% | 28.7% | n/a | n/a | n/a | -48.2% | RB | | | | | | | |
| | 2010 | 41.2% | 13.9% | n/a | n/a | n/a | -84.3% | -12.3% | | | | | | | |
| CAGR | | n/a | -27.9% | n/a | n/a | n/a | n/a | n/a | | | | | | | |

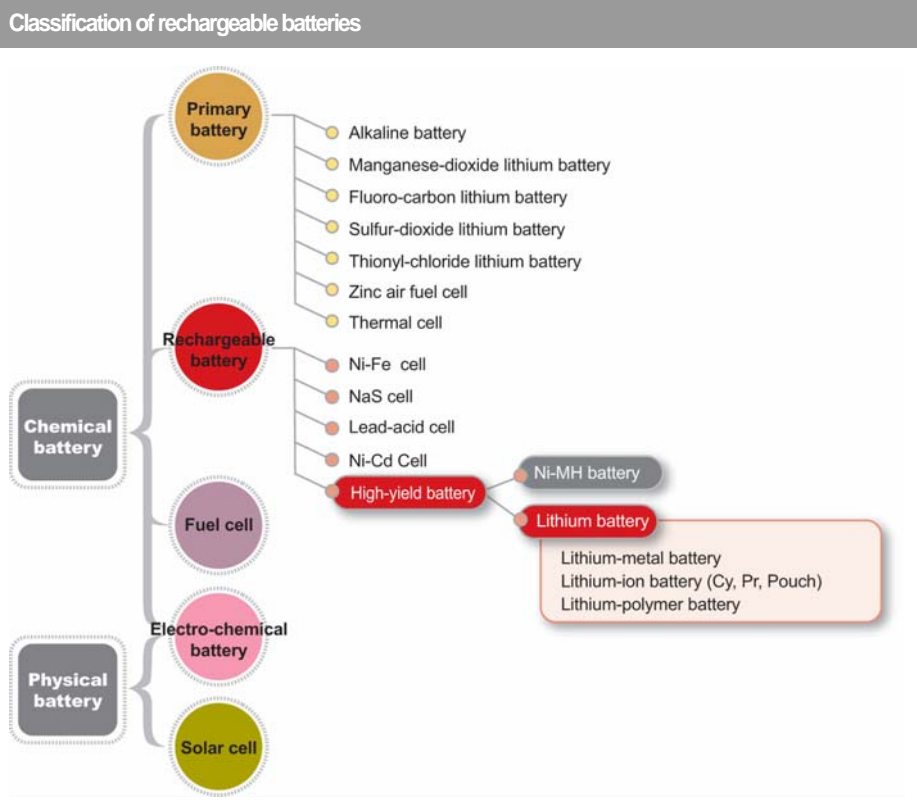
Source: Bloomberg, Eugene Investment & Securities

III. Rechargeable battery industry

III-1. Rechargeable battery summary

Types of rechargeable batteries

Batteries are largely divided into physical batteries and chemical batteries. And chemical batteries are divided into primary batteries, secondary batteries (ie, rechargeable batteries), and fuel cells. A chemical battery converts its chemical substance into electric energy through electro-chemical oxidization and de-oxidization. Primary batteries refer to alkaline batteries, mercury batteries, and other traditional batteries that are disposed of after being used only once. And secondary batteries refer to those batteries that can be repeatedly discharged and recharged. The development and evolution of rechargeable batteries helped expand the market of mobile IT devices (eg, mobile handsets, notebook PCs, and portable multimedia players).

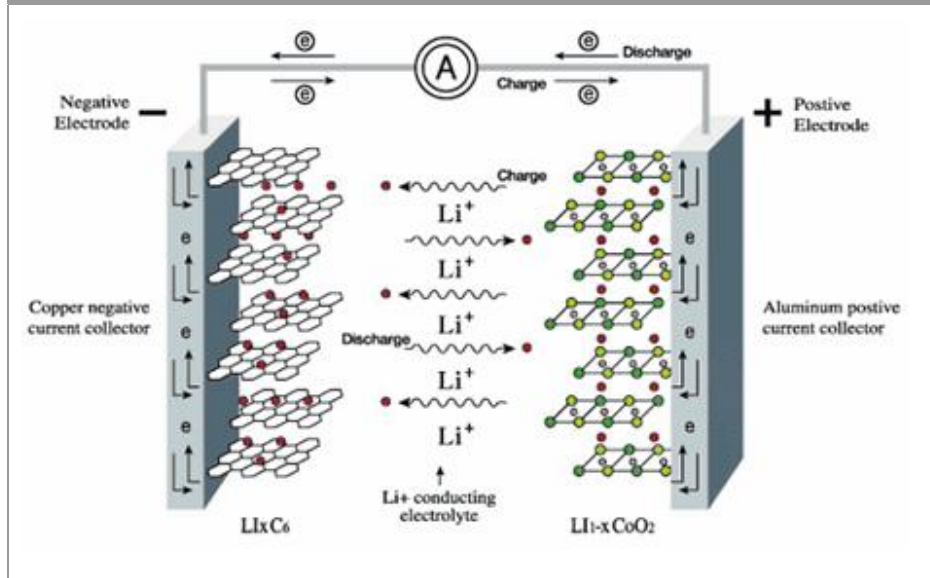


Source: compiled by Eugene Investment & Securities

Principle of rechargeable batteries

A rechargeable battery consists of anode, cathode, electrolyte, separator, and can. Electricity is generated as lithium ions pass through the electrolyte from the anode to the cathode, creating an electric current. For instance, the rechargeable battery is recharged when lithium ions move from the anode through the separator to the crystal structure of the cathode, and it is discharged when the reverse flow is made from the cathode to the crystal structure of the anode. In the past, there was the so-called memory effect, meaning that the storage capacity decreased over time as a solid solution was formed due to this reversible reaction. But the development of a lithium-ion battery, which has only a minimal memory effect, significantly increased the longevity of rechargeable batteries.

Working principle of rechargeable battery



Source: Industry data, Eugene Investment & Securities

Samsung SDI's rechargeable batteries



Source: Samsung SDI, Eugene Investment & Securities

Samsung SDI's fuel cells



Source: Samsung SDI, Eugene Investment & Securities

Direction of rechargeable battery development: high energy density

Rechargeable batteries have evolved rapidly with mobile IT devices developing. And the history of rechargeable battery development is that of high-energy-density materials (measuring unit: Wh/kg). Since lead-acid battery was first developed in 1860, efforts have consistently been made to increase the power output and the reliability. As a result, pole plate materials (for the anode and the cathode) were developed and made thinner and thinner. The rechargeable battery market started expanding rapidly in 1960s when nickel-cadmium battery was developed as its power output and currents were superior to those of the traditional lead-acid battery. And in early 1990s, Sony commercialized the first lithium-ion rechargeable battery, whose energy density was a way higher than that of the existing rechargeable batteries.

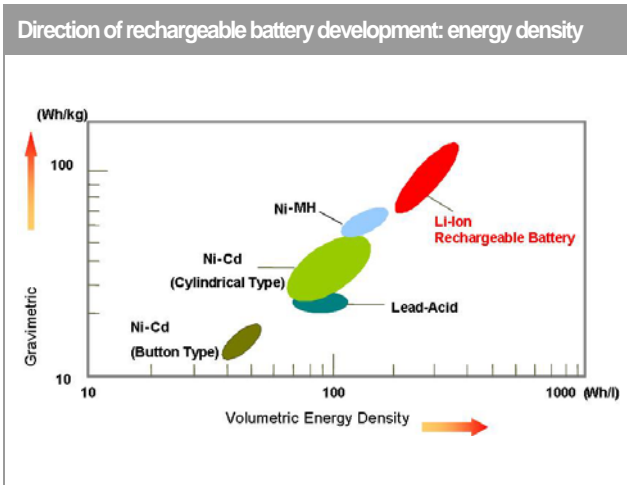
Rechargeable battery characteristics by type

| | Lead | NiCd | NiMH | Li-ion | Li-ion Polymer | Na-NiCl-Zebra |
|---------------------------------------|---|---|---|--|-------------------------------------|---|
| Specific energy (Wh/kg) | 25-45 | 50-70 | 50-70 | 100-140 | 110-150 | 90-120 |
| Theoretically Possible Energy (Wh/kg) | 175 | 240 | 300 | >450 | >450 | 788 |
| Power density(W/kg) | 50-100 | 150-200 | 100-200 | 100-200 | 120-200 | 200 |
| Cell voltage(V) | 2.00 | 1.25 | 1.25 | 3.60 | 3.60 | 2.58 |
| Cycle life (80% capacity) | 200-2,000 | 1,000-2,000 | 1,000-2,000 | 1,000 and more | 500 | 1,000-2,500 |
| Quick charge(h) | 6-8 | 2-4 | 1 | 2-4 | 2-4 | 6-8 |
| Self-discharge (%/month) | 5 | 20 | 30 | 5-10 | 5-10 | 100 |
| Temperature range | -20-60℃ | -40-60℃ | -20-60℃ | -20-60℃ | 0-60℃ | 270-350℃ |
| Disadvantages | heavy, low power density, chemical corrosion if handled improperly | heavy considering the amount of power, memory effect, contains toxic material | lightweight considering power, limited lifespan | difficult to manufacture, expensive | difficult to manufacture, expensive | sodium nickelchloride high temperature batteries have to be held at a certain temperature, otherwise they break |
| Fields of Application | lead batteries are distinguished by their ability to accept high currents for short periods, well suited for use as an automobile starter battery | toys, mobile phones | rechargeable batteries, older laptop models, mobile phones, hybrid cars and electric cars | laptops, hand-held devices and next generation hybrid vehicles | mobile phones and spare batteries | submarines, boats and electric cars |

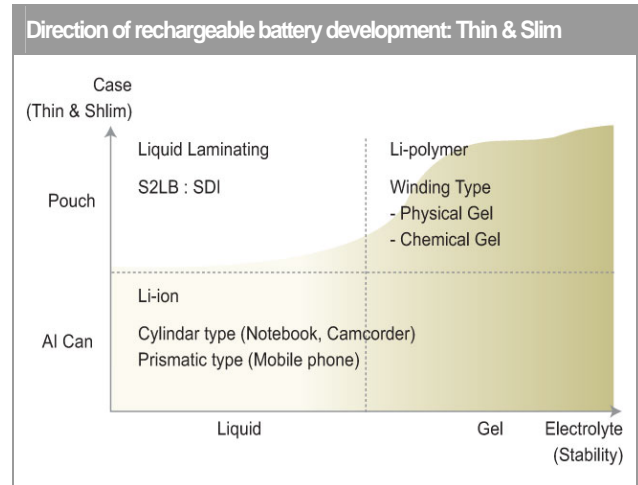
Source: Compiled by Eugene Investment & Securities

Lithium-ion rechargeable battery market accelerates growth

Lithium-ion rechargeable batteries boast higher energy density than the existing nickel-cadmium or nickel-metal hydride rechargeable batteries thanks to their superior chemical and electric characteristics. They are divided into lithium-ion batteries and lithium-ion polymer batteries depending on the type of the electrolyte used. Lithium-ion polymer battery uses polymer materials, instead of liquid electrolyte, and thus can be made into various shapes. It also generates less heat and is thus more reliable.



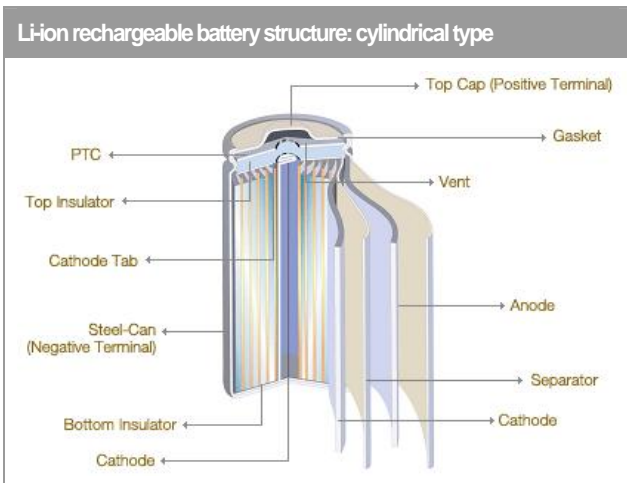
Source: Industry data, Eugene Investment & Securities



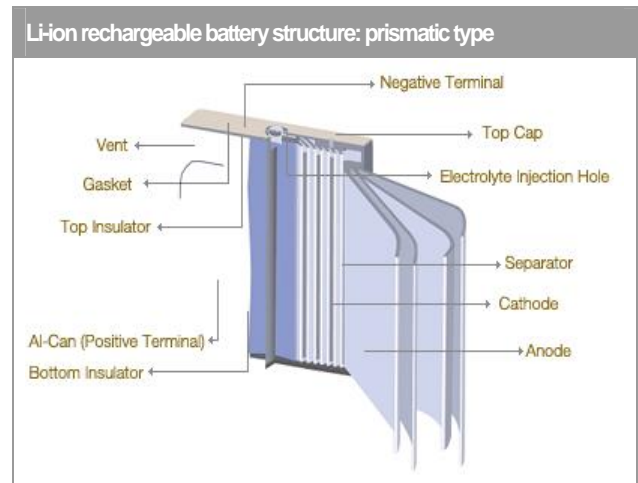
Source: Samsung SDI, Eugene Investment & Securities

Structure of lithium-ion battery

Lithium-ion battery is the common name for both lithium-ion battery and lithium-ion polymer battery, and consists of anode, cathode, electrolyte, separator, can, and protection circuit. By shape, lithium-ion batteries are divided into the cylindrical type and the prismatic type. A separator, which prevents a short circuit of the anode and the cathode, is put into the can along with the electrolyte. Besides, additional functions are provided to prevent the explosion or leakage caused by overcharge or over-current. A positive temperature coefficient (PTC) is used to prevent internal temperature growth, while a vent hinders internal pressure growth. In addition, a control circuit and a protection circuit module (including discharge/recharge switch and fuse) are necessary to avoid overcharge and over-current.

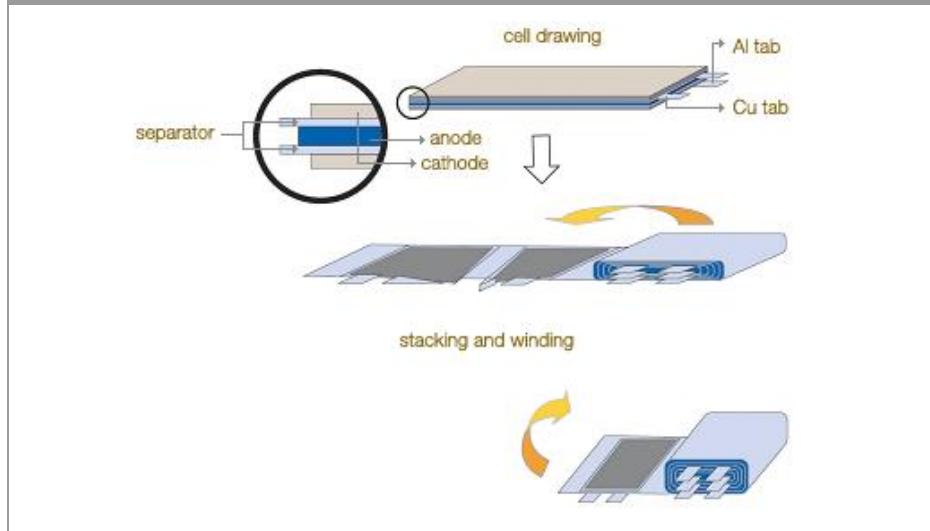


Source: Industry data, Eugene Investment & Securities



Source: Industry data, Eugene Investment & Securities

Lithium polymer rechargeable battery structure

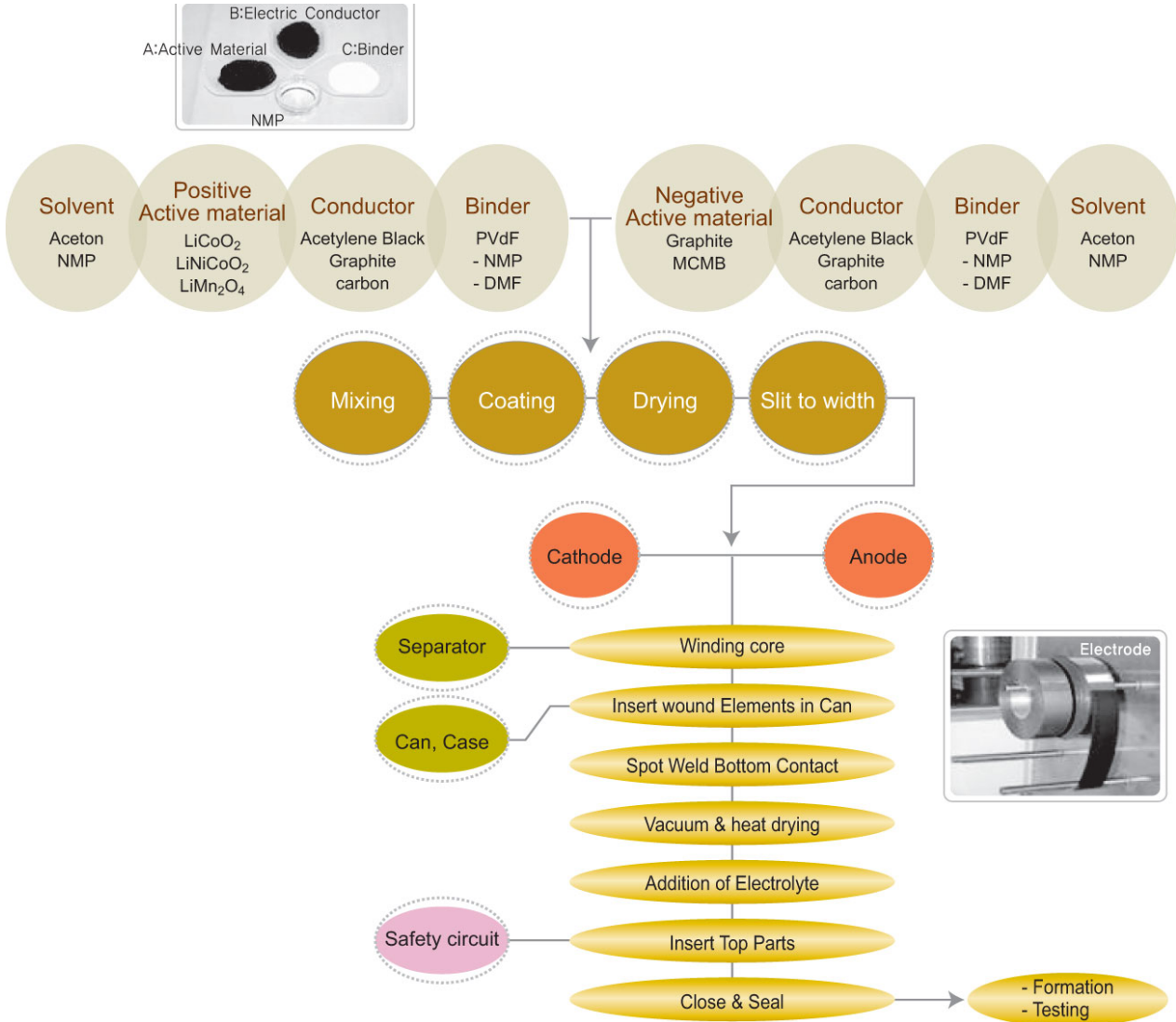


Source: Industry data, Eugene Investment & Securities

Manufacturing process of rechargeable battery

At the first stage, the raw material powder of the anode/cathode is mixed with a conductor and a binder, forming an anode/cathode compound. Then it is wrapped by the separator and then put into the can – a very sensitive process, in that if the compound is not completely isolated, it could react with the moisture contained in the air. This isolation is an essential process required to maintain the reliable battery quality.

Rechargeable battery manufacturing process: cylindrical type (F.end)

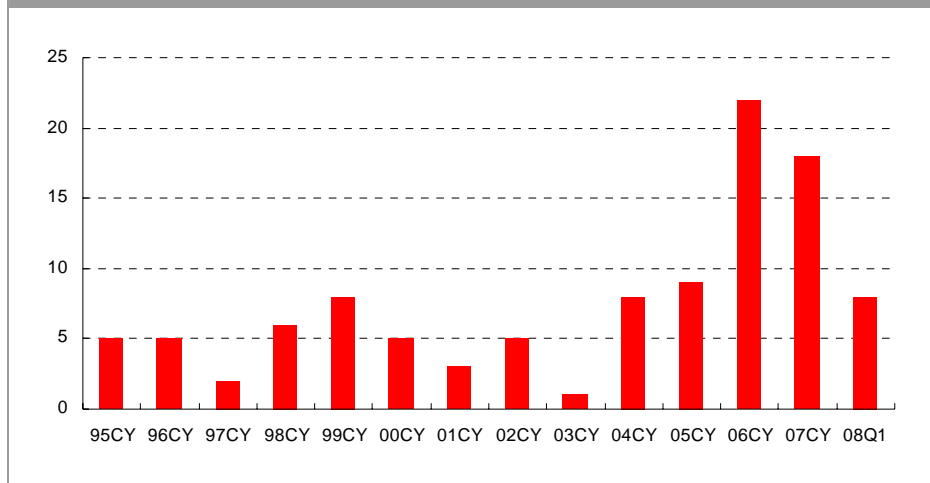


Source: Industry data, Eugene Investment & Securities

Safe accidents rise as batteries grow lighter and slimmer

Recently, a series of media reports was made about the explosions of overheated rechargeable batteries. This problem partly stems from the physical characteristics of lithium-ion battery itself and efforts are undertaken to develop new anode materials and less reactive electrolytes. And it is mainly attributed to the trend in which mobile IT devices get lighter and slimmer. As notebook PCs and mobile handsets become slimmer and lighter, they require thinner rechargeable batteries with a higher energy density (so that they can last longer). Accordingly, the room for the anode and the cathode grows smaller and the battery capacity has to be greater at the same time. This means that rechargeable batteries are exposed to an increased risk of safety devices (eg, overheating protection and gas ventilation) failing to function properly. Besides, the possibility of impurities accidentally introduced during the manufacturing process causing a short circuit also increases as mobile IT devices become lighter and slimmer.

Number of accidents related to rechargeable batteries



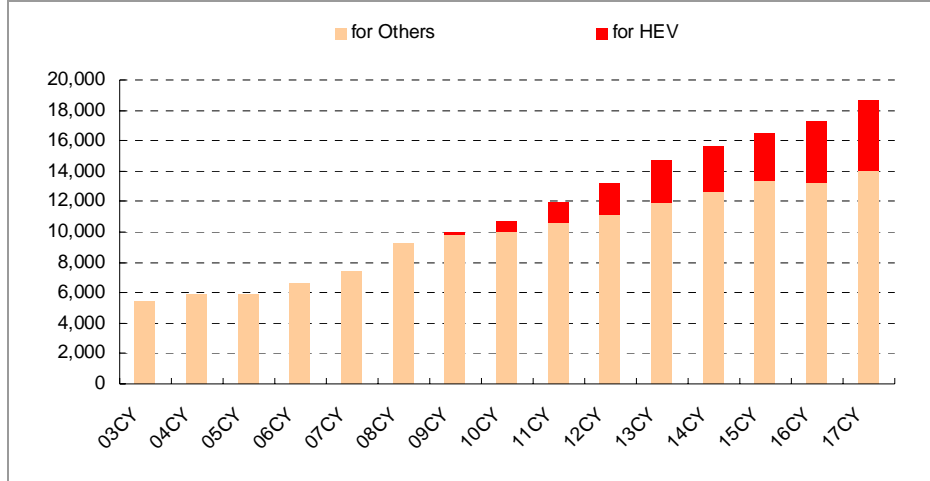
Source: Industry data, Eugene Investment & Securities

III-2. Current status of rechargeable battery market

Rechargeable battery market continues expanding

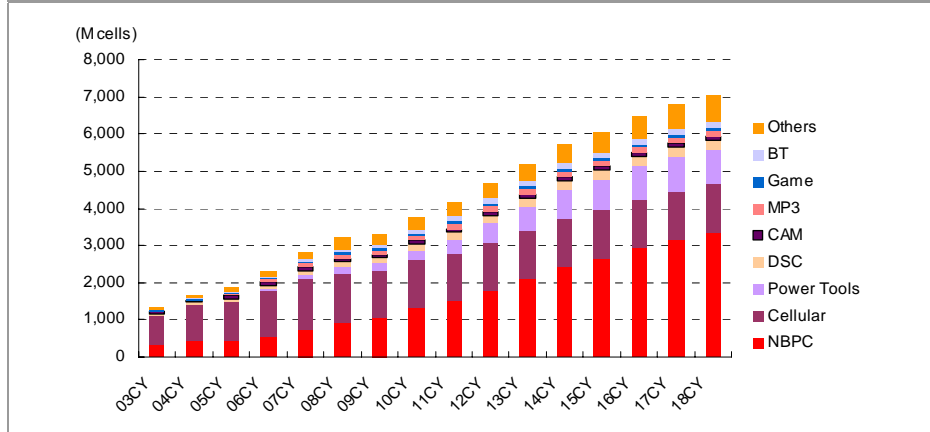
The rechargeable battery market has grown consistently (11% p.a.) in 2003-2009, during which the HEV rechargeable battery market didn't exist. The market segment of rechargeable batteries for mobile IT devices (eg, notebook PCs, mobile handsets, and game consoles), which have so far led the overall market growth, is predicted to achieve only gradual growth after reaching the US\$10bn mark in 2009. And starting in 2010, the HEV(EV) rechargeable battery market is expected to develop rapidly. Thus the overall market of rechargeable batteries is forecasted to continue the growth.

Market size of lithium-ion rechargeable batteries



Source: Industry data, Eugene Investment & Securities

Demand for rechargeable batteries by application



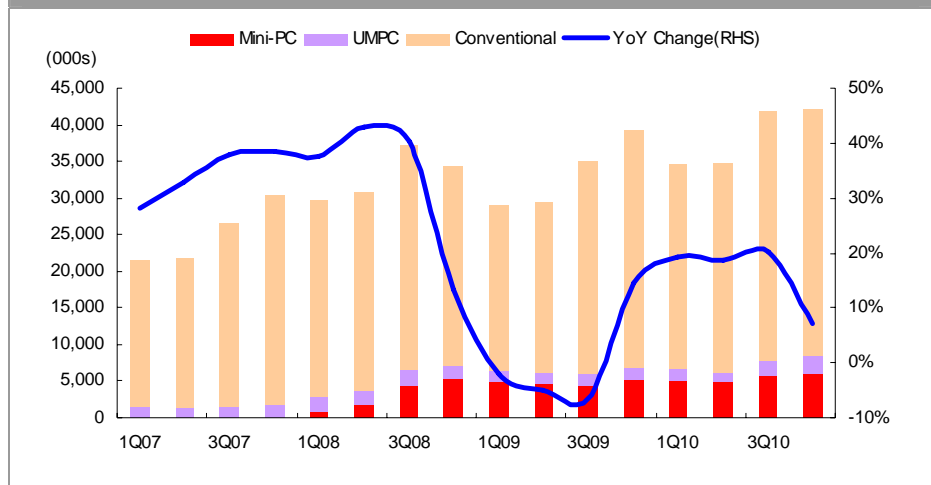
Source: Industry data, Eugene Investment & Securities

Notebook PCs to become biggest consumer of rechargeable batteries; cylindrical-type battery market is expected to continue growth

The demand of notebook PC rechargeable batteries is forecasted to post 135mn cells/year in 2010, catching up with that of mobile handset rechargeable batteries (ie, 125mn cells/year). In other words, notebook PCs are predicted to emerge as the biggest consumer of rechargeable batteries, in terms of the number of cells. Going forward, the market share of notebook PCs in the rechargeable battery market is expected to rapidly rise as: 1) the mobile handset market, the biggest consumer until 2009, decelerates its growth; and 2) the notebook PC market (including netbooks and ultra-mobile PCs) consistently expands. Specifically, notebook PCs currently account for 23~25% of the total demand for rechargeable batteries (in terms of the number of cells), but the figure is likely to rise to the 40% level going forward.

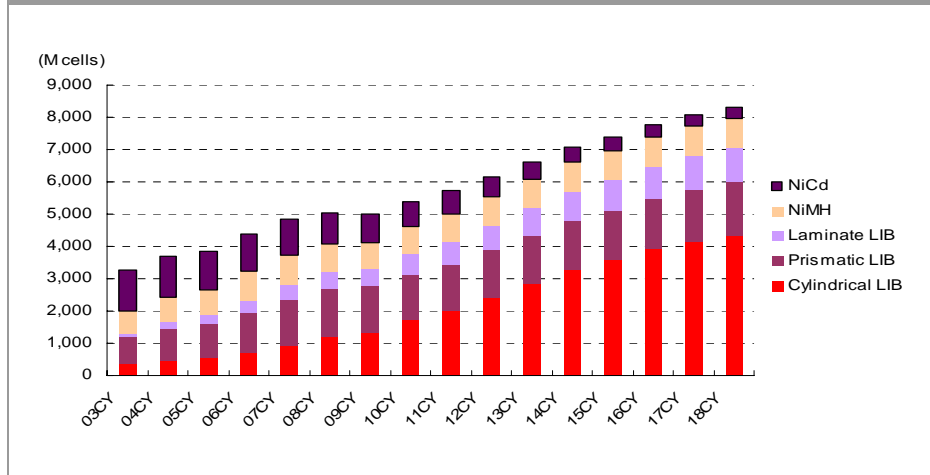
The demand for cylindrical-type rechargeable batteries is likely to somewhat slow down this year as: 1) notebook PC makers are reducing their inventory amid the economic downturn; and 2) although netbooks are selling well, they require fewer cylindrical-type rechargeable batteries than notebook PCs do. But the market of cylindrical-type rechargeable batteries is forecasted to continue its growth as the demand is likely to continue growing, albeit at a slower pace.

Forecast for notebook PC demand



Source: Eugene Investment & Securities

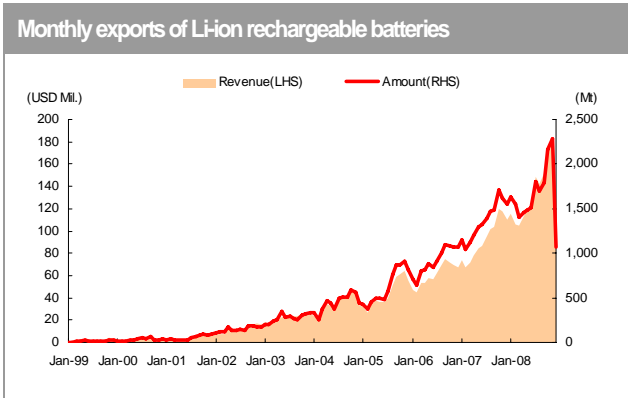
Forecast for rechargeable batteries by type



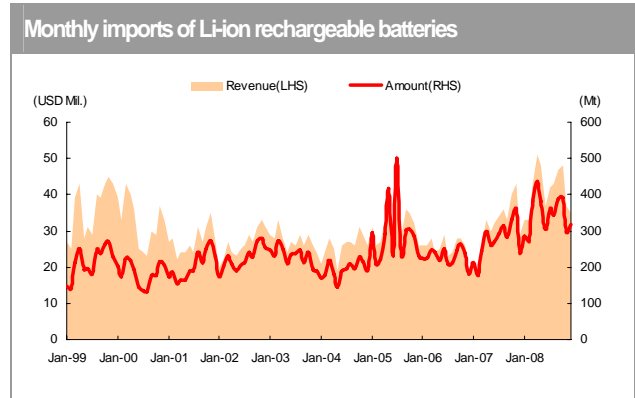
Source: Industry data, Eugene Investment & Securities

Exports of rechargeable batteries
increase

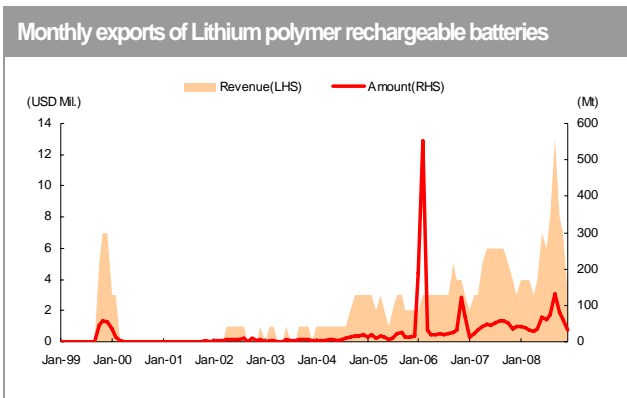
Korea's exports of rechargeable batteries are rapidly increasing as major domestic companies are raising their global market share and expanding production capacity. Specifically, the capacity increased from 510 tons/month in early 2005 to 2,350 tons/month in Nov 2008.



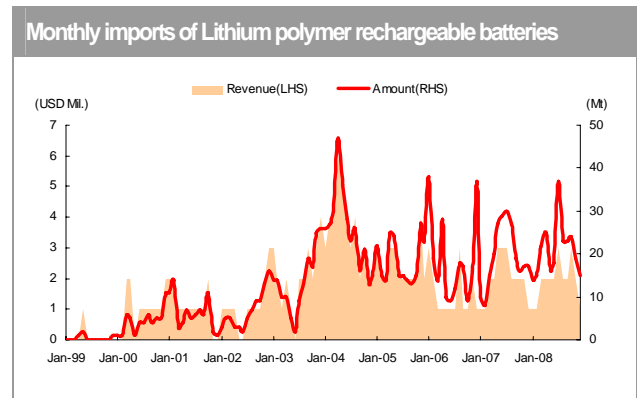
Source: KITA, Eugene Investment & Securities



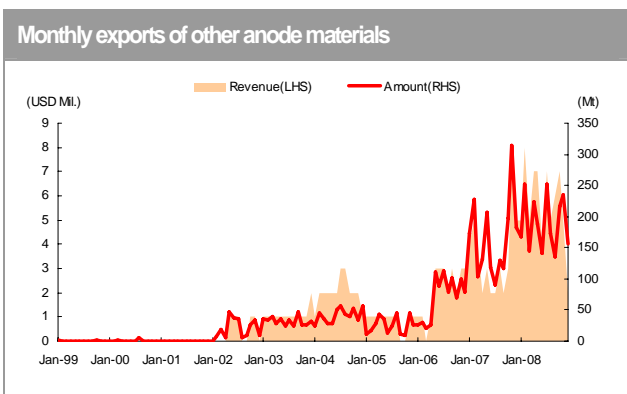
Source: KITA, Eugene Investment & Securities



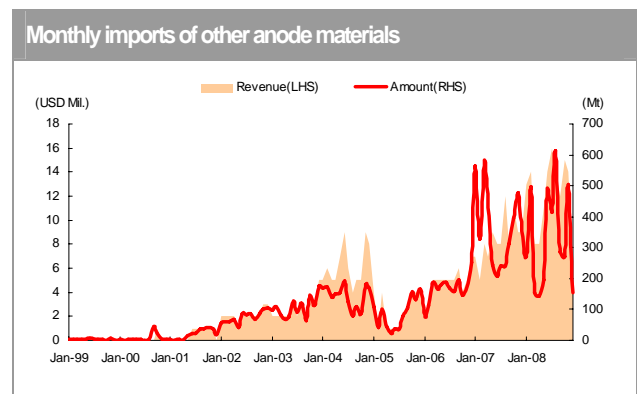
Source: KITA, Eugene Investment & Securities



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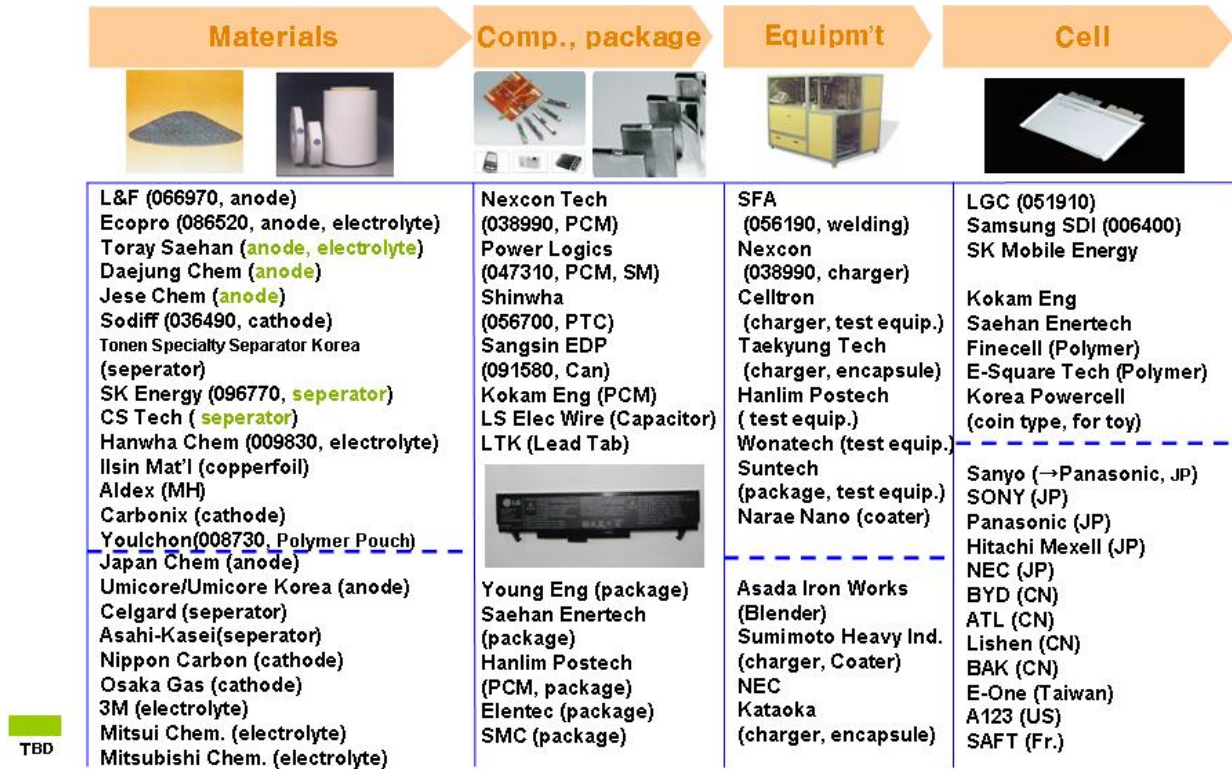
Earnings gap widens between cell makers and their suppliers

The domestic rechargeable battery industry is being significantly bipolarized between cell makers and material suppliers. Samsung SDI and LG Chemical, producing rechargeable batteries, are large enough to command the second and fifth global market share, respectively. On the other hand, suppliers providing battery makers with components and equipment (located in the middle of the value chain) are believed to be very less competitive. Meanwhile, L&F Corp is rapidly strengthening its market presence in the anode material market that has a high entry barrier.

This bipolarization stems from the fact that the rechargeable battery business requires large-scale facility investments in the initial stage and domestic conglomerates' aggressive investments have enabled them to raise their global market share. But components suppliers were faced with intensified competition and failed to achieve growth.

Meanwhile, taking advantage of its material development know-how, L&F Corp successfully entered the anode material market previously dominated by Japanese companies. This is encouraging, in that it will help the rechargeable battery industry achieve balanced growth in the future.

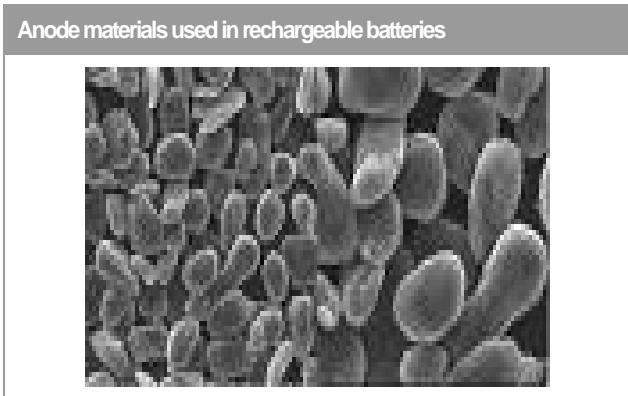
Value chain of rechargeable battery industry



Source: Eugene Investment & Securities

More domestic companies need to enter the material market

One of the characteristics of rechargeable batteries is that there are not many different types of materials and components used in them. And although the material business is more profitable than the component business, it is not easy for domestic companies to enter the material market because: 1) the material business requires the know-how accumulated for a long time; 2) battery materials significantly affect the battery performance; and 3) thus large cost and long time are required for R&Ds. But the competitiveness of the domestic rechargeable battery material industry is predicted to improve going forward, given that some domestic conglomerates recently started preparing to launch material business in anticipation that the HEV rechargeable battery market will expand.



Source: Industry data, Eugene Investment & Securities

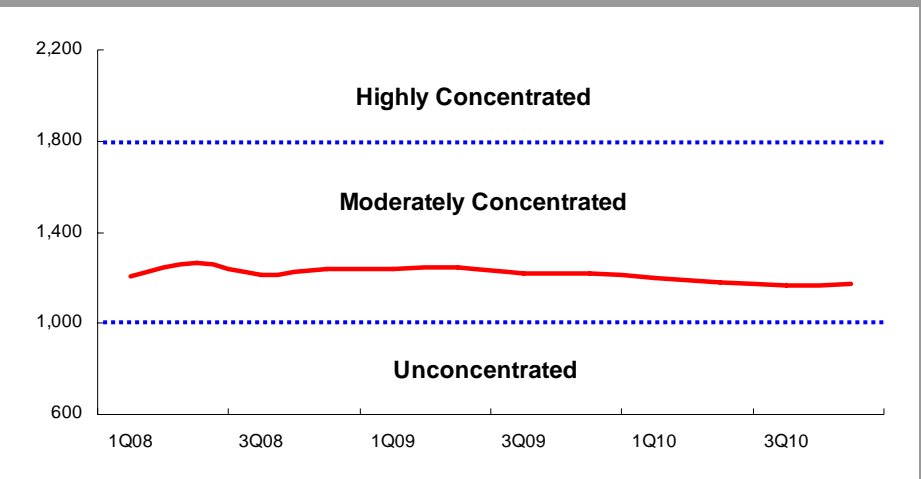


Source: Industry data, Eugene Investment & Securities

Competition is intense in rechargeable battery industry

Another characteristic is that the rechargeable battery industry is still in a stage where the competition is very intensive. The Herfindahl-Hirschman Index or HHI, a commonly accepted measure of market concentration, is estimated to have remained similar, posting 1,206 in 1Q08 and 1,238 in 4Q08, and this trend is likely to continue until 2010 considering the capacity expansion plans of rechargeable battery makers and the forecast for rechargeable battery demand. In other words, the industry is currently moderately competitive (less than 1,000: competitive marketplace; 1,000-1,800: moderately competitive marketplace; and 1,800 or greater: highly competitive marketplace), and the competition among companies is yet expected to continue. But the HEV/EV market expansion after 2010 will bring about significant changes to the rechargeable battery industry. Those HEV/EV rechargeable battery makers in strategic alliance with automobile companies will significantly widen their lead over those companies who have failed to do so, and this will inevitably change the industry structure.

Rechargeable battery industry's HHI



Source: Eugene Investment & Securities

III-3. Supply and demand forecast for rechargeable batteries: oversupply is expected in 2009

Aggressive capacity expansions

Despite the fear of economic slowdown, major rechargeable battery makers unveiled aggressive capacity expansion plans. Sanyo, the world's largest rechargeable battery maker in terms of market share, announced that it will invest US\$189mn to raise its capacity by 36% from 70mn cells/month in 1H08 to 95mn cells/month in 2009. Sony, the world's third largest, said that it will spend US\$371mn to increase its capacity by a whopping 80% from less than 50mn cells/month in 1H08 to 74mn cells/month in 2010. In addition, Panasonic released plans to increase its capacity from 30mn cells/month in 1H08 to 55mn cells/month in 2009 (+83%) and 80mn cells/month in 2011 (+167%). Domestic major companies are also planning to expand their production capacity. Samsung SDF's capacity is expected to increase 93% from 40mn cells/month in 1H08 to 77mn cells/month at end-2009, and that of LG Chemical is predicted to rise from an average of 35mn cells/month in 2008 to 65mn cells/month at end-2009 (+86%).

Major rechargeable battery makers' production capacity (mn cells/month)

| | 1Q08 | 2Q08 | 3Q08 | 4Q08 | 1Q09 | 2Q09 | 3Q09 | 4Q09 | 1Q10 | 2Q10 | 3Q10 | 4Q10 | 2008 | 2009 | 2010 |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Sanyo | 72.7 | 76.6 | 78.2 | 82.6 | 87.1 | 91.6 | 96.1 | 96.1 | 96.1 | 105.1 | 105.1 | 105.1 | 77.5 | 92.7 | 102.9 |
| SDI | 41.7 | 50.1 | 53.1 | 59.1 | 66.6 | 77.1 | 77.1 | 77.1 | 77.1 | 87.1 | 87.1 | 87.1 | 51.0 | 74.4 | 84.6 |
| Sony | 50.7 | 53.6 | 54.6 | 54.6 | 54.6 | 57.6 | 62.3 | 62.3 | 62.3 | 72.3 | 78.3 | 84.3 | 53.4 | 59.2 | 74.3 |
| Matsushita | 26.6 | 28.1 | 28.1 | 28.1 | 28.1 | 36.1 | 36.1 | 36.1 | 36.1 | 51.1 | 51.1 | 51.1 | 27.7 | 34.1 | 47.4 |
| LGC | 30.5 | 18.7 | 36.3 | 40.8 | 45.3 | 58.8 | 58.8 | 65.3 | 65.3 | 73.3 | 73.3 | 83.3 | 31.6 | 57.1 | 73.8 |
| BYD | 51.0 | 54.0 | 60.0 | 60.0 | 60.0 | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | 56.3 | 78.0 | 84.0 |
| Others | 80.4 | 80.4 | 85.8 | 84.3 | 88.3 | 95.1 | 104.1 | 104.1 | 108.1 | 118.1 | 122.6 | 122.6 | 82.7 | 97.9 | 117.9 |
| Total Capa. | 353.6 | 361.5 | 396.1 | 409.5 | 430.0 | 500.3 | 518.5 | 525.0 | 529.0 | 591.0 | 601.5 | 617.5 | 380.1 | 493.4 | 584.7 |
| Total Shipments | 250.2 | 264.2 | 290.3 | 317.9 | n/a | n/a | n/a | n/a | | | | | 280.6 | n/a | n/a |
| Ship. / Capa | 71% | 73% | 73% | 78% | n/a | n/a | n/a | n/a | | | | | 74% | n/a | n/a |

Source: IIT, Eugene Investment & Securities

Aggressive capacity expansions are aimed at HEVs rather than IT devices

We view that they are aggressively expanding capacity in order not to meet a rising demand for mobile IT devices (eg, notebook PCs and mobile handsets), but to cope with the expansion of the HEV/EV rechargeable battery market. As mentioned earlier in this report, the market of rechargeable batteries used in mobile IT devices has grown about 20% annually so far, but is likely to achieve only gradual growth for the time being due to the global economic slump. For instance, the sales volume of notebook PCs (even if including the well-selling netbooks) is forecasted to decrease 6% yoy to 112.5mn units in 2009. And the mobile handset market is also likely to slightly contract this year. The number of rechargeable batteries required for a single unit of IT device will increase as consumers demand that it last longer. But this alone cannot fully explain the aggressive capacity expansion plans released by rechargeable battery companies. We view that they are seeking to increase capacity before the HEV/EV rechargeable battery market starts to significantly expand. Of note, a single unit of HEV or EV requires the equivalent of 2,000~6,000 cylindrical rechargeable batteries used in notebook PCs.

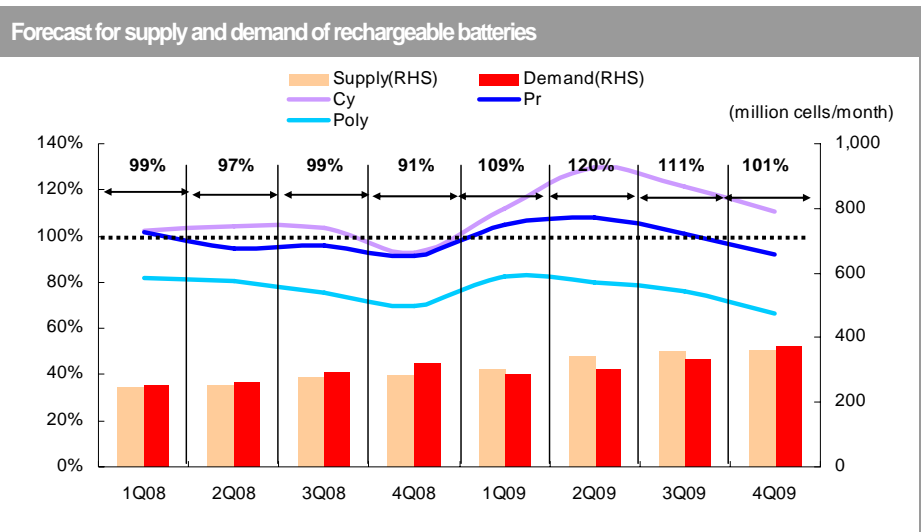
Expansion plans to be implemented as scheduled despite economic slump

Some say that Japanese companies will have difficulty in expanding capacity considering the recent appreciation of the Japanese yen. But we view that their capacity expansions will go as planned, despite the stronger Japanese yen, given that: 1) the expansions are for HEVs rather than for mobile IT devices; and 2) automakers are steadily expanding capacity according to their HEV development roadmap.

For instance, Honda decided last month not to participate in the F1 racing game, citing the recent sluggish car sales amid the economic downturns, but said that it will increase investments in the eco-friendly automobile business, which shows how much Japanese carmakers are interested in HEV/EVs. Accordingly, Japanese rechargeable battery companies are highly unlikely to change their capacity expansion plans.

Rechargeable battery market to face an oversupply

The rechargeable battery market has so far experienced a supply shortage, but is likely to face an oversupply starting this year, except for lithium-ion polymer rechargeable batteries, whose supply is not sufficient enough due to yield problems. This is because the demand from notebook PCs and mobile handsets is slowing down, whereas the supply volume of rechargeable batteries started increasing significantly. Thus the oversupply ratio is forecasted to post 9% in 1Q09, 20% in 2Q09, 11% in 3Q09, and 1% in 4Q09. And the oversupply will likely continue until 1H10, given that the HEV rechargeable battery market is not expected to significantly expand until 2010.

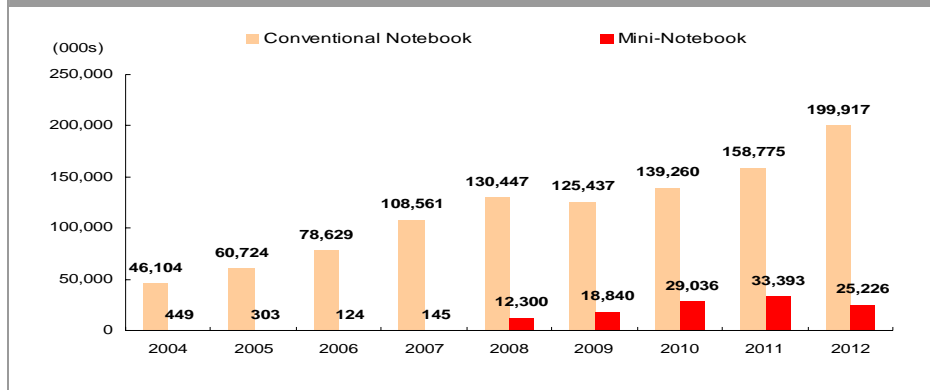


Source: Eugene Investment & Securities

Cell makers are to suffer from profitability drop

The OP margin of rechargeable battery makers has so far been as high as over 10%, but is expected to decline due to the supply glut. It is a positive that netbooks are likely to continue selling well this year, but they require only 3-4 cylindrical-type rechargeable batteries, whereas regular notebook PCs need 6-8 cells.

Market size forecast for notebook PCs and netbooks



Source: Eugene Investment & Securities

III-4. HEV signals a significant transition period for the rechargeable battery industry

HEV market outlook is bright

The concept of an EV has a long history, but its development has been slow due to the limitations to economic efficiency and rechargeable battery technologies. Thus the market views about HEV, PHEV, EV, and BEV (battery electric vehicle) were largely negative. But positive views began to emerge recently as some progress was made in terms of economic efficiency (ie, manufacturing cost, which had been pointed out as the biggest stumbling block preventing HEV market growth). Since 2H08, crude oil prices have dropped sharply, sparking some controversy as to when the HEV market will start to significantly develop, but we believe that the development of HEV/EVs will further increase given that: 1) crude oil prices may rise back; and 2) HEV/EVs are eco-friendly.

History of electric vehicles

| | First boom (the dawn) Late 19C–WWI | Second boom (1990s) | Third boom (The present) |
|---------|---|--|---|
| | <ul style="list-style-type: none"> - Battery developed (1800) - Motor developed (1931) - Gasoline engine developed (1876) - Sales of electric vehicles come in larger than those of regular automobiles (1910s) | <ul style="list-style-type: none"> - US state of California legislates the Zero Emission Vehicle law - GM in 1996 [EV-1] - Toyota [RAV4-EV] - Honda [EV-Plus] - Toyota [Prius]: successfully builds an eco-friendly brand image - Honda in 1999 [Insight] - Ford in 2004 [Escape] | <ul style="list-style-type: none"> - PHEV & HEV have been developed - Automakers and battery makers merge with each other in 2008 - Daimler[Benz S400] Li-ion in 2009 - Toyota [Prius] Ni-MH - Honda [Insight] Ni-MH - Volkswagen [Golf] Ni-MH - Mitsubishi [i MiEV] Li-ion - Fuji [Plug-in Stella] Li-ion - Daimler [Smart ED] Li-ion - EVs to be produced in 2010 should adopt Li-ion batteries |
| Battery | Lead-acid | Ni-MH | Ni-MH, Li-ion |
| | <ul style="list-style-type: none"> - Technologies of internal combustion engine developed rapidly during WWI | <ul style="list-style-type: none"> - Why they failed to be commercialize - Batteries weren't powerful enough to cover enough distance (Ni-MH: less than 200km) - Batteries were too heavy and expensive (The 1997 prius model would incur a loss of 500,000 yen per each car sold) | Still on going |

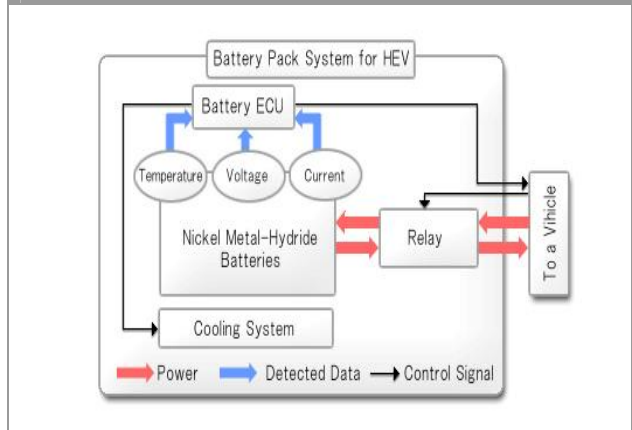
Source: L&F Corp, Eugene Investment & Securities

HEV battery



Source: Toyota, Eugene Investment & Securities

HEV battery structure

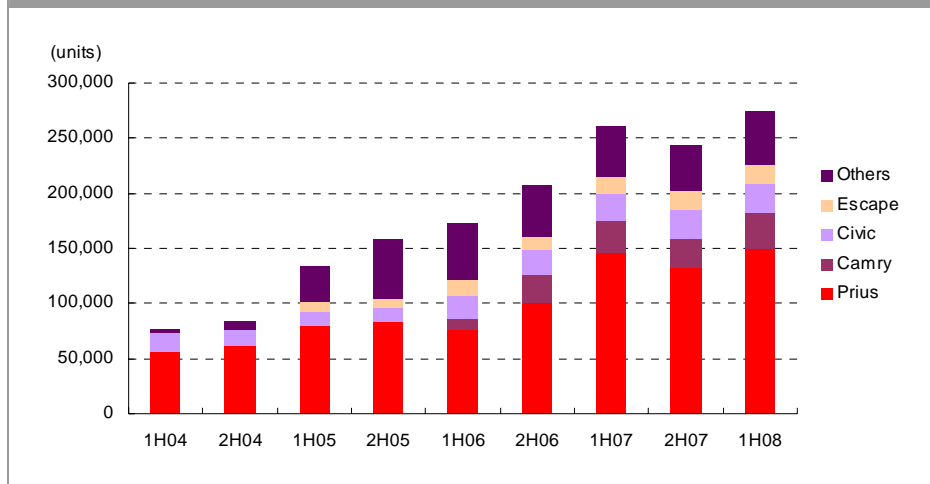


Source: Industry data, Eugene Investment & Securities

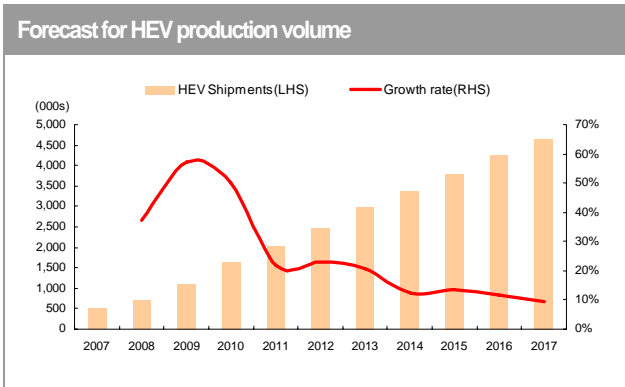
Rechargeable batteries are a core component of HEV; HEV rechargeable batteries should become new growth driver

HEVs have so far been made by Japanese carmakers such as Toyota and Honda. Recently, Nissan, Subaru, and Mitsubishi also started producing HEVs, and General Motors of the US and Daimler of Europe started making them as well. This signals that the rechargeable battery market is facing a transition period. The sales volume of HEVs is estimated to have decreased 6% from 512,000 units in 2007 to 483,000 units in 2008 due to the economic downturn as well as the crude oil price drops. But the 6% drop is relatively less significant relative to regular automobiles. And the sales volume of HEVs is likely to continuously increase going forward. To sum it up, the rechargeable battery market has so far been led by mobile IT devices, but HEV/PHEV, and EV rechargeable batteries will greatly contribute to the market growth going forward.

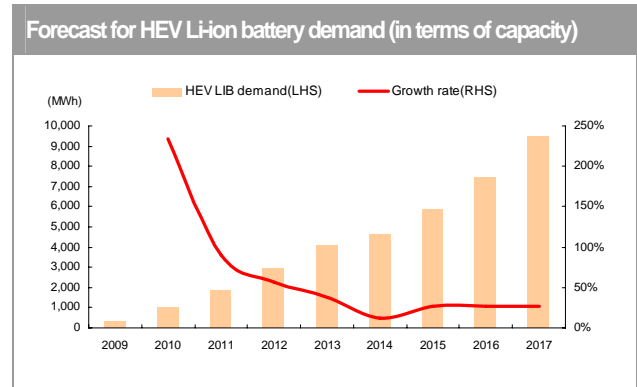
Sales volume of HEVs by model



Source: Industry data, Eugene Investment & Securities



Source: Industry data, Eugene Investment & Securities



Source: Industry data, Eugene Investment & Securities

Lithium-ion battery to replace NiMH battery as the former excels the latter in terms of cost competitiveness, reliability, and longevity

So far, HEV rechargeable batteries have largely been made using nickel-metal hydride (NiMH). But starting in 2010, the use of lithium-ion in manufacturing HEV rechargeable batteries is likely to increase rapidly. For instance, Toyota and Nissan, the two leaders in the HEV market, said in 2H08 that they will use lithium-ion batteries for their cars, instead of NiMH. Until now, carmakers have used NiMH due to high reliability and strong cost competitiveness, although it had low energy density and power density. But they are now replacing NiMH with lithium-ion as: 1) the cost competitiveness of lithium-ion batteries has rapidly improved thanks to the progress made in the development and mass production of lithium-ion battery materials; and 2) its reliability and longevity, previously pointed out as shortcomings, have also improved noticeably. With automobile companies increasingly adopting lithium-ion batteries, the share of lithium-ion in the HEV rechargeable battery market is expected to climb from a mere 3% this year to 83% in 2017. In other words, lithium-ion batteries are likely to become the mainstream of HEV rechargeable batteries.

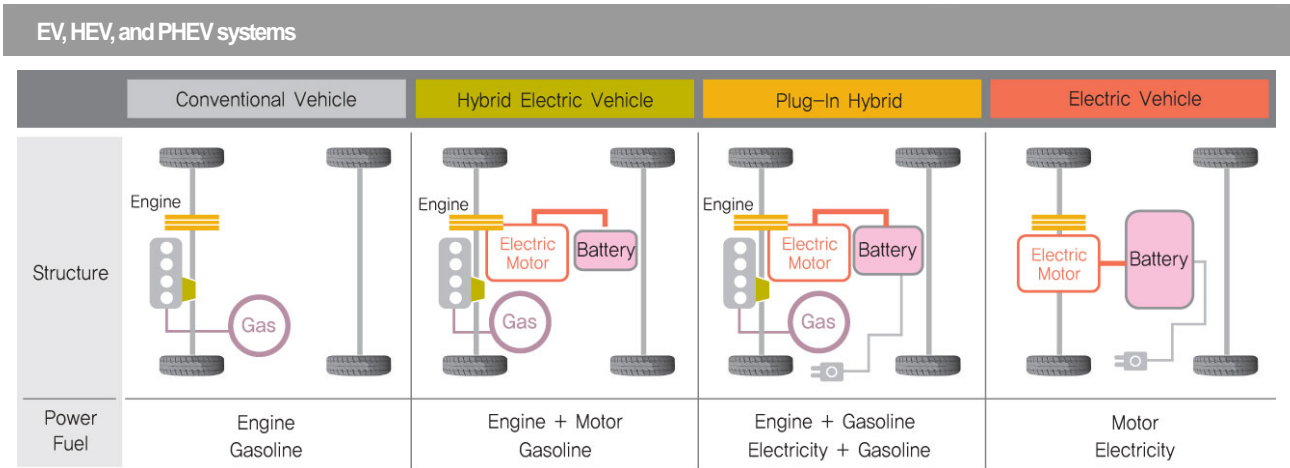
Sales volume forecast for HEV, PHEV, and BEV using Li-ion cells (000s)

| | 07CY | 08CY | 09CY | 10CY | 11CY | 12CY | 13CY | 14CY | 15CY | 16CY | 17CY |
|-------------------|------|------|------|--------|--------|--------|--------|-------|-------|-------|-------|
| Toyota HEV | | | | 40 | 100 | 102 | 610 | 658 | 706 | 706 | 706 |
| Nissan HEV | | | | 15 | 60 | 160 | 280 | 390 | 520 | 640 | 700 |
| Honda HEV | | | | | 30 | 155 | 460 | 615 | 770 | 825 | 850 |
| GM HEV | | | | 50 | 100 | 140 | 190 | 190 | 220 | 250 | 250 |
| Ford HEV | | | | 0 | 0 | 12 | 56 | 98 | 118 | 148 | 168 |
| Other HEV | | | 18 | 53 | 64 | 129 | 172 | 212 | 222 | 242 | 262 |
| Toyota PHEV | | | | 2 | 3 | 15 | 45 | 75 | 1,210 | 150 | 200 |
| GM PHEV | | | | 3 | 16 | 70 | 80 | 80 | 80 | 80 | 80 |
| Chrysler PHEV | | | | | 0 | 10 | 30 | 60 | 100 | 100 | 100 |
| Nissan PHEV | | | | 10 | 22 | 54 | 106 | 158 | 210 | 265 | 370 |
| Mitsubishi BEV | | | 2 | 4 | 8 | 13 | 25 | 40 | 50 | 60 | 60 |
| Other PHEV/BEV | | | 6 | 22 | 38 | 60 | 72 | 82 | 102 | 147 | 192 |
| NiMH HEV | 509 | 495 | 887 | 1,384 | 1,651 | 1,625 | 788 | 738 | 688 | 728 | 788 |
| LIB HEV | | | 18 | 158 | 354 | 698 | 1,763 | 2,163 | 2,556 | 2,811 | 2,976 |
| LIB PHEV | | | 3 | 12 | 29 | 105 | 165 | 225 | 315 | 370 | 440 |
| LIB BEV | | | 5 | 29 | 58 | 117 | 193 | 270 | 347 | 432 | 562 |
| LIB Vehicle Total | | | 26 | 199 | 441 | 920 | 2,126 | 2,653 | 3,218 | 3,613 | 3,978 |
| yoy Change | | | | 665.4% | 121.6% | 108.6% | 131.1% | 24.8% | 21.3% | 12.3% | 10.1% |

Source: Industry data, Eugene Investment & Securities

HEV, EV, and PHEV require rechargeable batteries with different characteristics

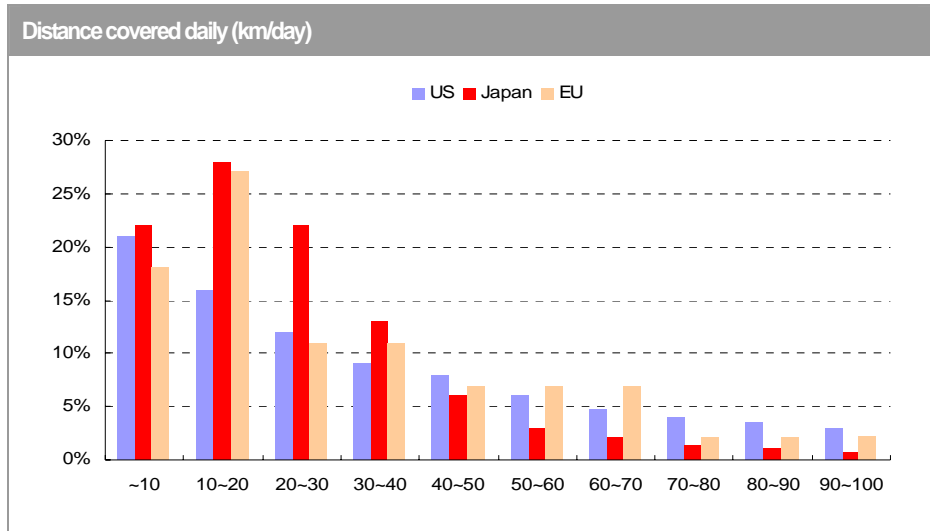
HEV, EV, and PHEV all require rechargeable batteries with different characteristics, as rechargeable batteries determine their performance. For instance, HEV rechargeable batteries need high power density so that a high torque can be produced, while EV rechargeable batteries need high energy density because EVs have no auxiliary power unit but should be able to run for a long time.



Source: Eugene Investment & Securities

EV rechargeable batteries are to be commercialized ahead of HEV or PHEV rechargeable batteries

Motorists drive for a somewhat longer time in the US than in Japan or Europe, but two thirds of US motorists drive for an average of less than 50km per day. Volt, an EV version of Chevrolet, to be mass produced by General Motors starting in 2010, can run for 64km on a single charge. This indicates that EV rechargeable batteries are likely to be commercialized earlier than HEV or PHEV rechargeable batteries.



Source: Industry data, Eugene Investment & Securities

Direction of HEV, PHEV, and EV
rechargeable battery development:

- 1) new customized batteries or 2)
existing cylindrical batteries

Rechargeable batteries for HEV, PHEV, and EV are developed in the following two manners: 1) rechargeable batteries customized for HEV, PHEV, or EV are newly developed; or 2) the existing cylindrical-type 18650 cell is utilized. Of note, the 18650 cell is a representative rechargeable battery whose diameter and length are 18mm and 65mm, respectively.

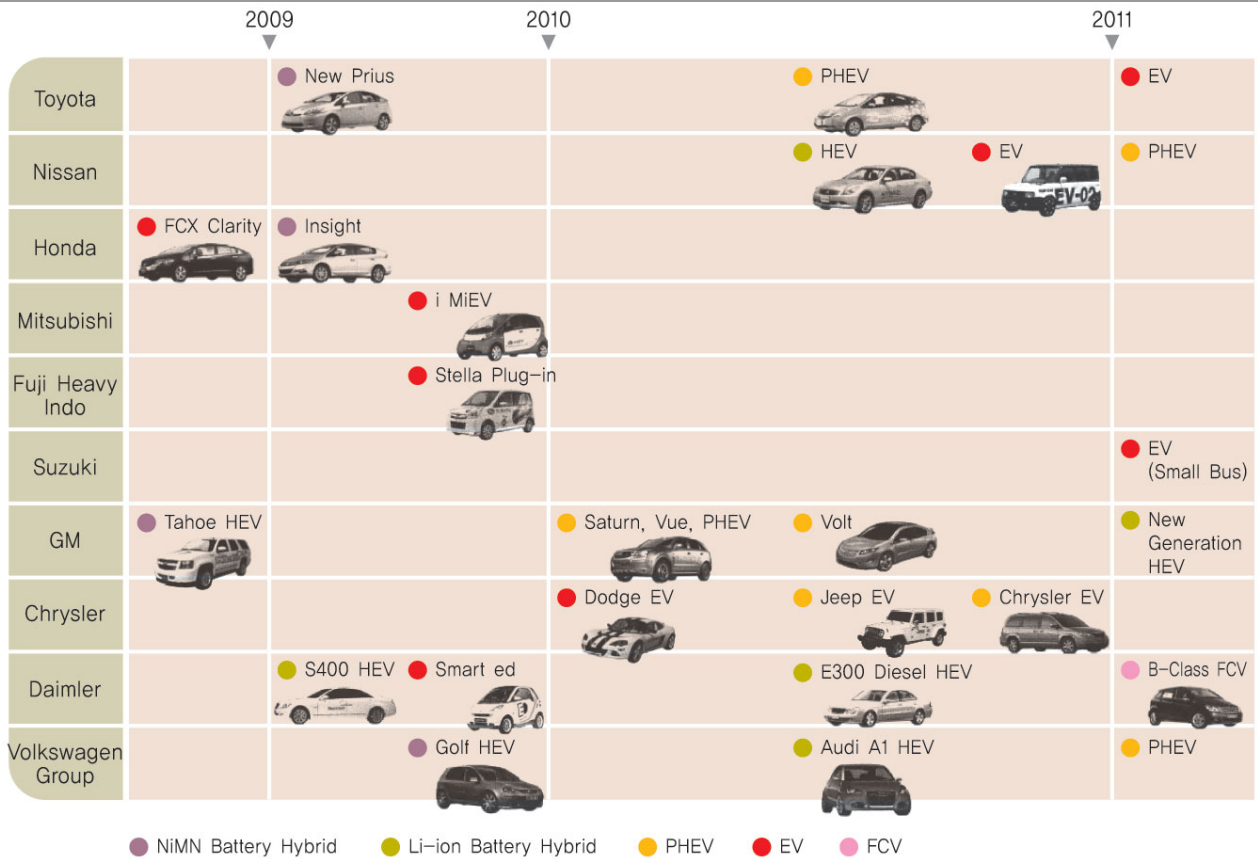
Most carmakers have rechargeable batteries developed at the same time when they start to develop a new car model. But Daimler and BMW are using 2,000 and 5,088 units of the 18650 cell in their “Smart electric drive” and “Mini E” models, respectively (these are small-sized commuting cars), and Tesla Motors is using 6,831 units of the 18650 cell for one of its car models. The reason why they use the 18650 cell is that it has long been used in notebook PCs and other mobile IT devices so that its quality and reliability have already been proved. But in the mid to long term, automobile companies are expected to prefer those rechargeable batteries customized for their cars. As mentioned earlier in this report, the fact that even a compact-sized car requires 250~850 times as many rechargeable batteries than notebook PCs do explains why rechargeable battery makers are aggressively expanding their production capacity. In the future, rechargeable battery makers are predicted to further accelerate their capacity expansions, as HEV/PHEV/EVs are developed even for general passenger vehicles and sports utility vehicles (SUVs).

Alliances between automakers and rechargeable battery makers and their road map for product development

| Battery Manufacturers | Shareholders | Auto Assemblers | Battery Type | MP Model | Type | Year | | | | |
|--|--|----------------------------|----------------------|----------------------|-------------------|-----------|--------|--------------|------|------|
| Panasonic EV Energy (PEVE) | Toyota 60% Panasonic 40% | Toyota | Li-ion | Mini Van | HEV | 2010 | | | | |
| | | | | Lexus 600h | HEV | 2012 | | | | |
| | | | | Prius III | HEV | 2013 | | | | |
| | | | | Sedan | PHEV | 2009 | | | | |
| | | | | n/a | BEV | 2013 | | | | |
| | | Hino | NiMH | HEV | | | | | | |
| | | Sanyo | | Ford | Li-ion | Escape | HEV | 2012 | | |
| | | | | | | Edge(SUV) | HEV | 2012 | | |
| | | | | | | Fusion | HEV | 2013 | | |
| | | | | Mercury(Ford) | Mariner(SUV) | HEV | 2012 | | | |
| Milan | HEV | | | | 2013 | | | | | |
| Lincoln | MKZ | | | HEV | 2013 | | | | | |
| Volkswagen | Li-ion | | | Toualeg(SUV) | HEV | 2011 | | | | |
| | | | | Golf Touran | HEV | 2012 | | | | |
| Porsche | Cayenne | | | HEV | 2011 | | | | | |
| Audi | 07 | | | HEV | 2011 | | | | | |
| Telsa | Li-ion | Roadstar Sedan | 18650 | 20080 | 2011 | | | | | |
| Daimler | Li-ion | Smart ED | 18650 | 2010 | | | | | | |
| Honda | NiMH | Civic | HEV | 2010 | | | | | | |
| Automotive Energy Supply Co. (AESC) | Nissan Motors 51% NEC Co. 42% NEC-Tokin 7% | Nissan | Li-ion (NCM Type) | Sedan(FR) | HEV | 2010 | | | | |
| | | | | X-Trail(SUV) | HEV | 2012 | | | | |
| | | | | Sedan | HEV | 2012 | | | | |
| | | | | n/a | HEV | 2015 | | | | |
| | | | | Sedan | PHEV | 2015 | | | | |
| | | | | Compact Sedan | BEV | 2010 | | | | |
| | | | | n/a | BEV | 2015 | | | | |
| | | | | Renault | Sedan | BEV | 2011 | | | |
| | | | | Mazda | n/a | HEV | | | | |
| | | | | Suzuki | n/a | BEV | | | | |
| Subaru(Fuji Heavy Ind.) | Compact Sedan | BEV | 2009 | | | | | | | |
| Lithium Energy Japan (LEJ) | GS Yuasa Co. 51% Mitsubishi Co. 34% Mitsubishi Motors 15% (cf. Mitsubishi Co. holds a 14% stake in Mitsubishi Motors) | Honda | Li-ion (NCM Type) | Civic | HEV | 2011 | | | | |
| | | | | Insight | HEV | 2012 | | | | |
| | | | | CR-Z | HEV | 2012 | | | | |
| | | | | FIT | HEV | 2015 | | | | |
| | | | | n/a | HEV | 2015 | | | | |
| | | | | Mitsubishi | iMiEV | BEV | 2009 | | | |
| | | | | PSA(Peugeot) | n/a | BEV | 2012 | | | |
| | | | | LG Chem. | LG Holdings 30.1% | GM | Li-ion | Volt | PHEV | 2010 |
| | | | | | | | | Tahoe, Yukon | HEV | 2012 |
| | | | | | | | | Escalade | HEV | 2012 |
| Sierra | HEV | 2012 | | | | | | | | |
| Silverado | HEV | 2012 | | | | | | | | |
| n/a | HEV | 2015 | | | | | | | | |
| Hyundai | Li-ion | Avante LPG | HEV | | | | | 2009 | | |
| | | Sonata | HEV | | | | | 2010 | | |
| Hitachi Vehicle Energy (HVE) | Hitachi 64.9% | GM | Li-ion (NCM Type) | | | | | Malibu | HEV | 2010 |
| | | | | | | | | Vue | HEV | 2010 |
| | | | | Aura | HEV | 2010 | | | | |
| | | | | Isuzu Motors | | | | | | |
| | | | | Mitsubishi Fuso Saab | | | | | | |
| Johnson Controls-Saft Advanced Power Solutions (JCS) | Johnson Cont. 51% Saft 49% | BMW | Li-ion | 7-Series | HEV | 2009 | | | | |
| | | | | X6 | HEV | 2010 | | | | |
| | | | | Vue | PHEV | 2010 | | | | |
| | | | | Daimler | S400 | HEV | 2009 | | | |
| | | | | A123 | | Daimler | Li-ion | E-Class | HEV | 2012 |
| S-Class | HEV | 2012 | | | | | | | | |
| BMW | 3-Series | HEV | 2012 | | | | | | | |
| | 5-Series | HEV | 2012 | | | | | | | |
| Chrysler | Chrysler EV | PHEV | 2013 | | | | | | | |
| | Jeep | PHEV | 2013 | | | | | | | |
| | Dodge EV | BEV | 2011 | | | | | | | |
| THINK | City | BEV | 2010 | | | | | | | |
| BYD | MidAmerican Energy 39.6% | BYD Auto | | | | F3DM | PHEV | 2009 | | |
| | | | | | | F3e | BEV | 2009 | | |
| | | | | EnerDel | THINK | City | 26650 | 2009 | | |
| E-One | BMW | MiniE | 18650 | 2010 | | | | | | |
| GAIA | Volkswagen | Golf Twin Drice | PHEV | n/a | | | | | | |
| SB Limotive | Samsung SDI 50% BOSCH 50% | Volkswagen PSA(Peugeot) | | | TBD TBD | | | | | |

Source: Compiled by Eugene Investment & Securities

Electric vehicle production plan of major automobile companies



Source: IIT, Eugene Investment & Securities

Automakers are forming strategic alliance with rechargeable battery makers

PEVE is a joint venture established by Toyota with large HEV sales (60%) and Panasonic (40%) and will supply lithium-ion rechargeable batteries for Toyota's major car models such as Prius and Lexus. PEVE's customer base in the HEV rechargeable battery market is likely to further expand as: 1) Panasonic recently merged with Sanyo Electric; and 2) Sanyo Electric is predicted to supply lithium ion rechargeable batteries for Ford (including Mercury and Lincoln), Volkswagen, Audi, and Tesla Motors. Meanwhile, AESC, set up jointly by Nissan (51%) and NEC & NEC-Tokin (49%), is going to supply rechargeable batteries for Nissan, Renault, Mazda, and Fuji Heavy Industries (Subaru), and Lithium Energy Japan (LEJ), a joint venture launched by Mitsubishi Motors (15%), Mitsubishi Corp (34%), and GS Yuasa (51%), will supply for Honda, Mitsubishi Motors, and PSA Group.

Competition intensifies among carmakers to secure competitive rechargeable batteries, which are a core component of HEV/EVs

Unlike other car electronics components, rechargeable battery is a core component determining the performance of HEV, PHEV, and EV. And HEV rechargeable batteries have yet to be standardized and thus many technical aspects such as materials, control methods, and circuit composition are currently under review. Thus individual companies are manufacturing rechargeable batteries with very different specifications from one another. On the part of carmakers, they need to secure superior rechargeable batteries in order to dominate the HEV market. So many of them are actively forming strategic alliance with rechargeable battery makers for joint development and exclusive supply.






LG Chemical succeeds in entering market in early stage

Recently, General Motors selected LG Chemical as a rechargeable battery supplier for its EV model, "Volt." This is meaningful in that LG Chemical has successfully entered the HEV/EV rechargeable battery market in an early stage. Of note, the market has so far been dominated by Japanese rechargeable battery companies. Meanwhile, General Motors is scheduled to begin the mass production of Volt in 2H10 (to be exact, November 2010) and sell the standard model for about US\$40,000, and has set the sales target at 10,000 units for 2011 and 60,000 units for 2012. Besides, LG Chemical is expected to supply rechargeable batteries for large-sized SUVs (ie, Tahoe and Yukon) and pick-up trucks (ie, Sierra and Silverado HEV). In other words, LG Chemical is predicted to take advantage of its strong competitiveness in rechargeable batteries for mobile IT devices and penetrate the even-larger-sized HEV rechargeable battery market.

SB LiMotive's entry into HEV rechargeable battery market gets delayed

On the other hand, Samsung SDI, which has so far quickly raised its share in the market of rechargeable batteries for mobile IT devices, is now in a somewhat different situation. It established a joint venture, SB LiMotive, along with Bosch of Germany, which is expected to develop one or two HEV rechargeable battery models for European automobile companies. Previously, it sought to develop HEV rechargeable batteries along with a major US carmaker, but no progress has been made yet. If SB LiMotive starts to develop a new HEV rechargeable battery model now, it will take a considerable period of time before it is mass-produced, given that it has to go through a series of processes such as determining specifications, producing and testing samples, and conducting field tests.

Specifications of HEV / EV rechargeable batteries by company

| | Automotive Energy Supply | Sanyo | GS Yuasa Lithium Energy Japan | Hitachi Vehicle Energy | Toshiba |
|------------------|--|--|--|---|--|
| Cell | Laminate type | Cylindrical type | Prismatic type | Cylindrical type | Prismatic type |
| Voltage | 3.6V | 3.6V(Estimated) | 3.7V | 3.6V | 2.4V |
| Capacity | 3.7Ah(HEV), 13Ah(EV) | 5Ah(Estimated) | 6Ah(HEV), 50Ah(EV) | 5.5Ah | 4.2Ah |
| Energy density | 70Wh/kg(HEV) 90Wh/kg(EV) | 90Wh/kg(HEV) | 67.1Wh/kg(HEV) 109Wh/kg(EV) | Closed | 65Wh/kg |
| Power | 3,000W/kg(HEV) 1,900W/kg | 3,500W/kg(HEV) | 3,600W/kg(HEV) 550W/kg(EV) | Closed | 1,200W/kg |
| Anode material | Mn type | Reform of NMC type | NMC type(HEV) Mn type(EV) | Closed (Exploit Mn type) | Co type |
| Cathode material | Amorphous Carbon | Closed | Graphite or Amorphous Carbon | Closed (Exploit Amorphous Carbon) | Titanic-acid lithium |
| Appearance |  |  |  |  |  |

Source: Industry data, Eugene Investment & Securities

Demand forecast for lithium-ion rechargeable batteries used in automobiles

(MWh)

| | 07CY | 08CY | 09CY | 10CY | 11CY | 12CY | 13CY | 14CY | 15CY | 16CY | 17CY |
|------------------|------|------|------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| AESC | | | 1 | 261 | 600 | 1,480 | 2,878 | 4,255 | 5,950 | 8,060 | 11,433 |
| PEVE | | | 2 | 48 | 120 | 191 | 935 | 1,266 | 1,745 | 2,155 | 2,730 |
| LGC | | | 14 | 77 | 206 | 981 | 1,056 | 1,060 | 1,122 | 1,178 | 1,250 |
| LEJ/GSY | | | 33 | 69 | 160 | 347 | 811 | 1,195 | 1,480 | 1,706 | 1,722 |
| Sanyo | | | | | 3 | 55 | 140 | 208 | 256 | 308 | 345 |
| A123 | | | 1 | 40 | 120 | 494 | 888 | 1,310 | 1,819 | 1,825 | 1,830 |
| 18650 | | | 45 | 266 | 499 | 1,052 | 1,165 | 1,166 | 1,167 | 1,168 | 1,169 |
| Others | | | 98 | 365 | 625 | 775 | 807 | 807 | 807 | 808 | 810 |
| LIB Total | | | 196 | 1,120 | 2,323 | 5,372 | 3,700 | 11,280 | 14,370 | 17,195 | 21,335 |
| HEV | | | 15 | 152 | 334 | 716 | 1,812 | 2,206 | 2,633 | 2,922 | 3,128 |
| PHEV | | | 59 | 177 | 411 | 1,477 | 1,975 | 2,543 | 3,386 | 3,846 | 4,366 |
| BEV | | | 122 | 793 | 1,577 | 3,186 | 4,912 | 6,522 | 8,355 | 10,433 | 13,833 |
| Total | | | 196 | 1,122 | 2,322 | 5,379 | 8,699 | 11,271 | 14,374 | 17,201 | 21,327 |
| yoy Change | | | | 472.4% | 107.0% | 131.7% | 61.7% | 29.6% | 27.5% | 19.7% | 24.0% |

Source: Industry data, Eugene Investment & Securities

Development should continue consistently despite economic slump, crude oil price fall, and concern over economic efficiency

Many experts have a conservative view on the HEV market, citing the global economic slowdown, declining oil prices, and low economic efficiency of HEV/EVs. But despite being faced with these difficulties, automobile companies are not reducing HEV investments because they believe that HEVs will prevail in the end, although the HEV business may remain unprofitable for next several years. The Japanese government pays a subsidy for HEV buyers, and other governments may follow suit, which could help HEV makers achieve the economies of scale and ease the cost burden.

Measure to cut CO2 emissions by country; CO2 emissions by vehicle and fuel type

| EU | US | JP |
|---|---|---|
| Commission of the EU (DEC 2007) | Energy Independence and Security Act (DEC 2007) | METI/MLIT (Feb 2007) |
| CO2 Emission Regulation | CAF | New Fuel Economy Regulation |
| 2006 Actual 150~160g/km 2012 130g/km Pooling System and Penalty Proposed | 2020 35MPG (14.9km/gasoline) Current 27.5MPG passenger Car, 22.2MPG SUV/truck Meeting Twenty in Ten | 2004 Actual 13.6km/gasoline 2015 Target 16.8km/gasoline |

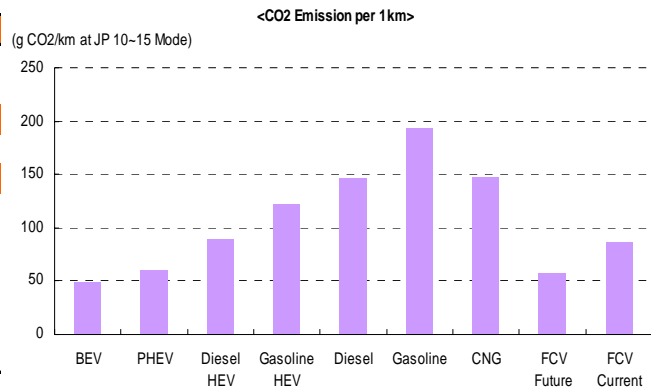
Ref) 130g CO2/km = 17.8km/gasoline, 20.2km/diesel

<Low CO2 Car Available in EU as of Oct 07>

| Brand | Model | g CO2/km |
|---------------|---------------------|------------|
| Smart | For Two Coupe | 88 |
| VW | Polo Bluemotion | 99 |
| Toyota | Prius | 104 |
| Mini | Cooper D | 104 |
| Honda | Civic Hybrid | 109 |
| Peugeot | 107 | 109 |
| Toyota | Aigo | 109 |
| Citroen | C1 | 109 |
| Daihatsu | Kuore | 109 |
| Renault | Megane 1.5cDi | 117 |
| BMW | 118d | 119 |

Note) Tank to wheel

Source: Sanyo, IIT, Eugene Investment & Securities



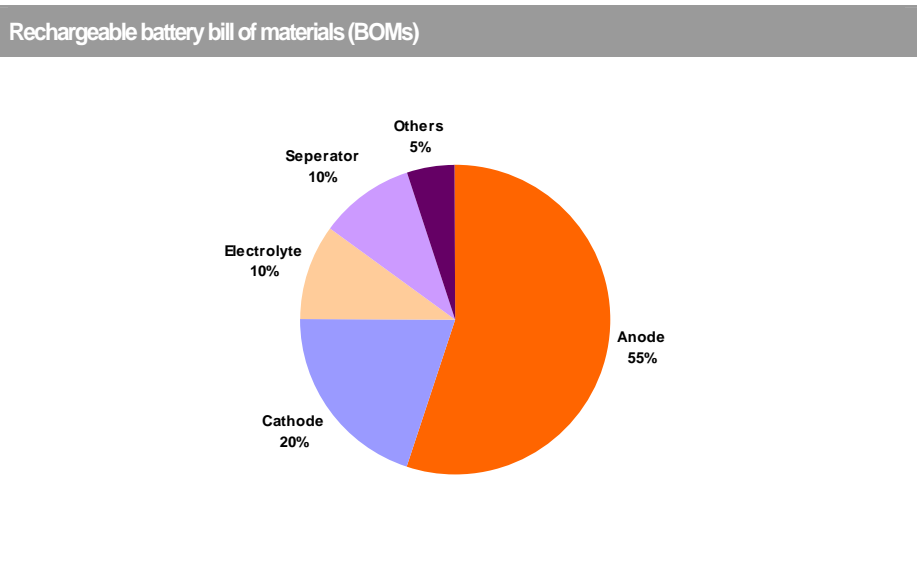
HEV is eco-friendly

Currently, Europe, the US, and Japan are taking measures to cut their CO2 gas emissions by 20~30%. In the US, the Department of Energy introduced the FreedomCAR and Fuel Partnership program, spending US\$1.2bn to decrease exhaust fumes and encouraging the purchase of the vehicles burning alternative fuels. And the California Air Resources Board (CARB) is considering giving preferential treatment to PHEVs according to its zero emission vehicle regulation. Meanwhile, Japan is seeking to help its automakers reduce their HEV manufacturing cost by one seventh and enhance the car performance, and China is pushing for the so-called 863 project, in which it has been developing cutting-edge technologies related to eco-friendly automobiles in three different areas since 1986. In conclusion, some are concerned that the HEV, PHEV, and EV market may not expand as rapidly due to the ongoing declines of oil prices. But we view that the trends of the HEV development and market expansion will not change considering the worldwide environmental regulations.

III-5. Anode material, the hot topic for rechargeable battery industry

Various new anode materials are under development

Recently, anode materials began attracting attention. This is because they not only account for the largest portion of the total material cost of rechargeable batteries, but also determines the overall battery performance. Until recently, LCO-based anode material (ie, LiCoO₂) accounted for over 70% of the anode material market. But since a few years ago, new materials have been developed as follows. NMC-based anode material (ie, Li[NiMnCo]O₂) is made by adding nickel and manganese in addition to cobalt. And NM-based anode material (ie, Li[NiM]O₂) contains nickel and manganese. Manganese-based anode material (ie, LiMn₂O₄) and nickel-based anode material (ie, LiNi₂O₂) are composed of manganese and nickel, respectively. Beside, olivine-based anode material (ie, LiFePo₄) is newly becoming the center of interest.



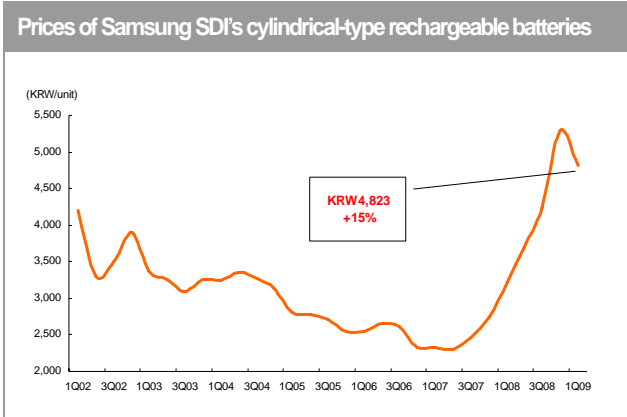
Source: Eugene Investment & Securities

Anode material market estimated to be as large as 32,000 tons or W1.9tn as of 2008

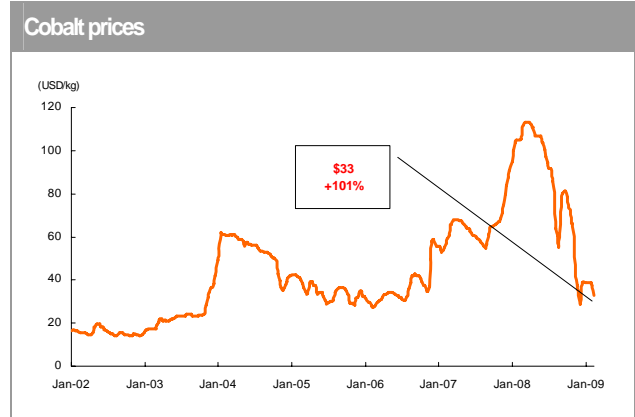
The size of the anode material market posted 26,800 tons or about W1.1tn in 2007 and is estimated to have increased 19% yoy to 32,000 tons or W1.9tn in 2008. The world's capacity to supply anode materials is estimated to have swelled to 39,200 tons as of end-2008 on the back of rechargeable battery makers' aggressive expansions and the development of HEVs using rechargeable batteries. And the market is predicted to expand even faster in the future thanks to the increased adoption of rechargeable batteries in HEV/EVs.

Anode materials are manufactured through mixing, calcination, and sintering processes

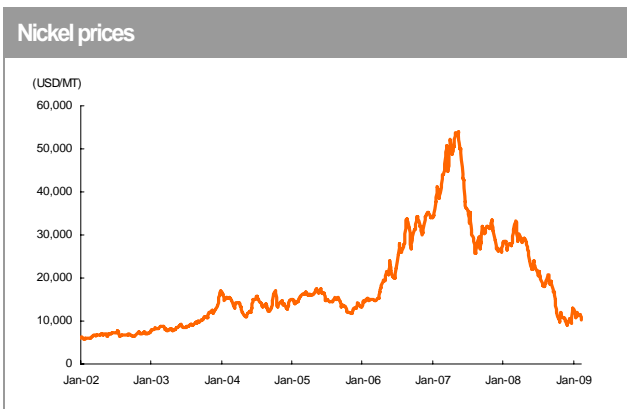
Anode material is produced by combining different nanometer-sized ceramic particles. The production know-how is very important, in that even a minor difference in the particle size has a significant impact on the properties of rechargeable battery. In general, anode material is produced by mixing different ceramic particles (ie, mixing), vaporizing the organic materials contained (ie, calcination), and heating the uniformly composed oxide at a high temperature, turning it into a coherent mass (ie, sintering).



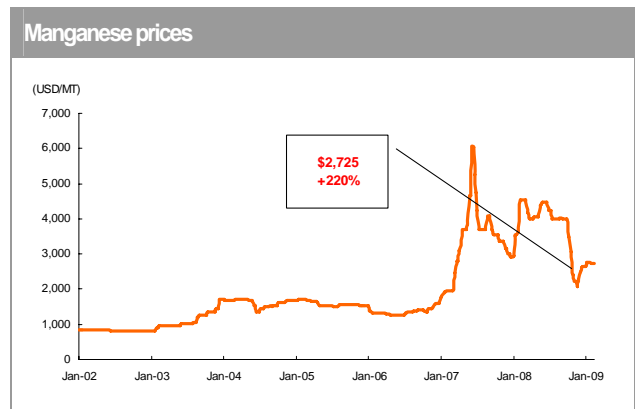
Source: Eugene Investment & Securities



Source: Bloomberg, Eugene Investment & Securities



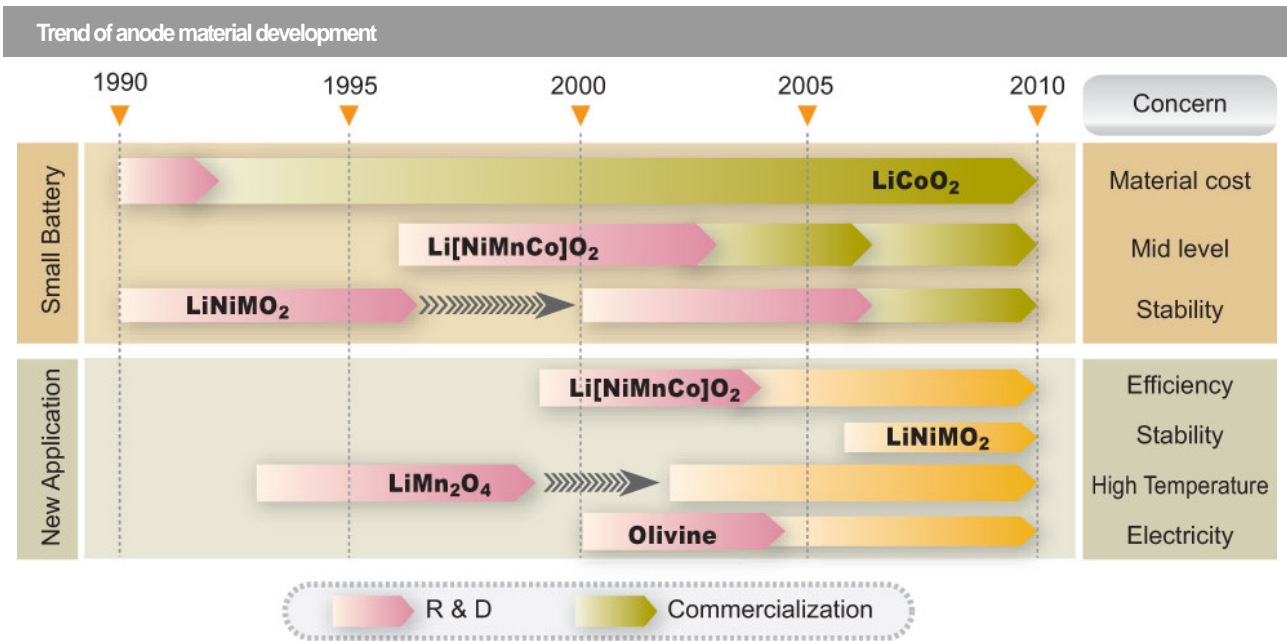
Source: Bloomberg, Eugene Investment & Securities



Source: Bloomberg, Eugene Investment & Securities

LCO-based anode material is costly

Cobalt is expensive relative to the other raw materials used in anode materials and thus imposes significant cost burden. For instance, rechargeable battery prices had consistently declined due to oversupply until 1H07, but the prices of cobalt and other raw materials (ie, nickel and manganese) had surged, weighing on the profitability of rechargeable battery makers. Besides, LCO-based anode material has another shortcoming that has to be resolved. Since it has a layered structure, its temperature could rise due to internal factors such as internal short-circuit, in which case oxygen is produced, reacting with electrolyte and causing fire.



Source: L&F Material, Eugene Investment & Securities

Properties of different anode materials

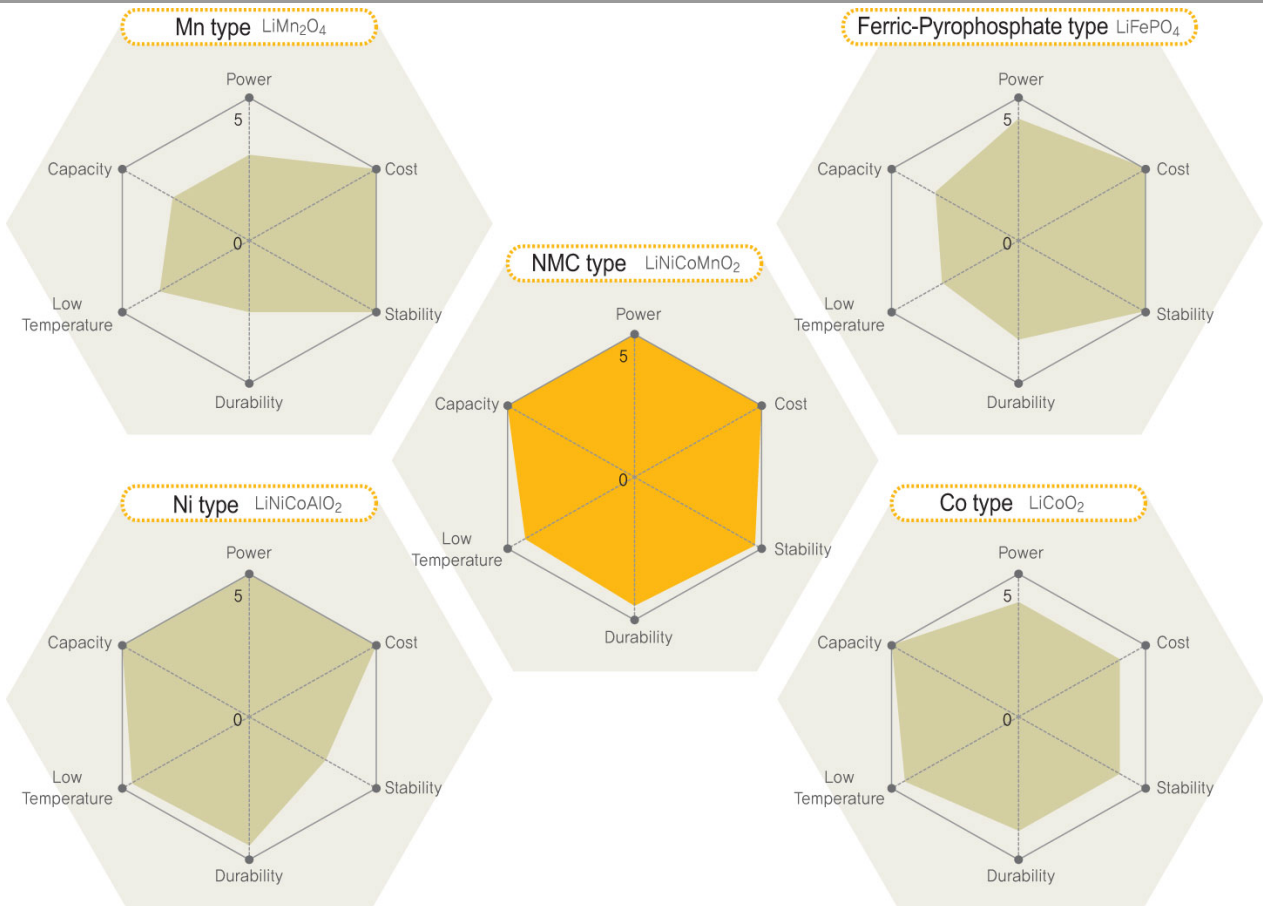
| | LiCoO ₂ | LiNiO ₂ | LiMn ₂ O ₄ | Li[NiCoMn]O ₂ | LiFePO ₄ |
|---------------------------------|---|---|--|--|---|
| Crystalline structure | Layered structure | Layered structure | Spinel | Layered structure | Olivine |
| Equilibrium voltage (V, vs. Li) | 3.7 | 3.6 | 4.1 | 3.6V | 3.5 |
| Theoretical capacity (mAh/g) | 274 | 275 | 148 | 285 | 170 |
| Available capacity (mAh/g) | 140 | 192 | 120~130 | 170 | 150 |
| Total | <ul style="list-style-type: none"> - Easy to produce - Excellent cycle - High stability - Expensive | <ul style="list-style-type: none"> - Inexpensive - Low toxicity - High capacity - Difficult to produce - Low temperature stability - Low life cycle | <ul style="list-style-type: none"> - Inexpensive - Easy to produce - High temperature stability - Low capacity | <ul style="list-style-type: none"> - High capacity - Stability - Temperature stability - Difficult to produce mat'ls | <ul style="list-style-type: none"> - High temperature stability - Low voltage - Low capacity - Difficult to produce |

Source: L&F Material, Eugene Investment & Securities

Killing three birds with one stone:
cost, energy density, and reliability

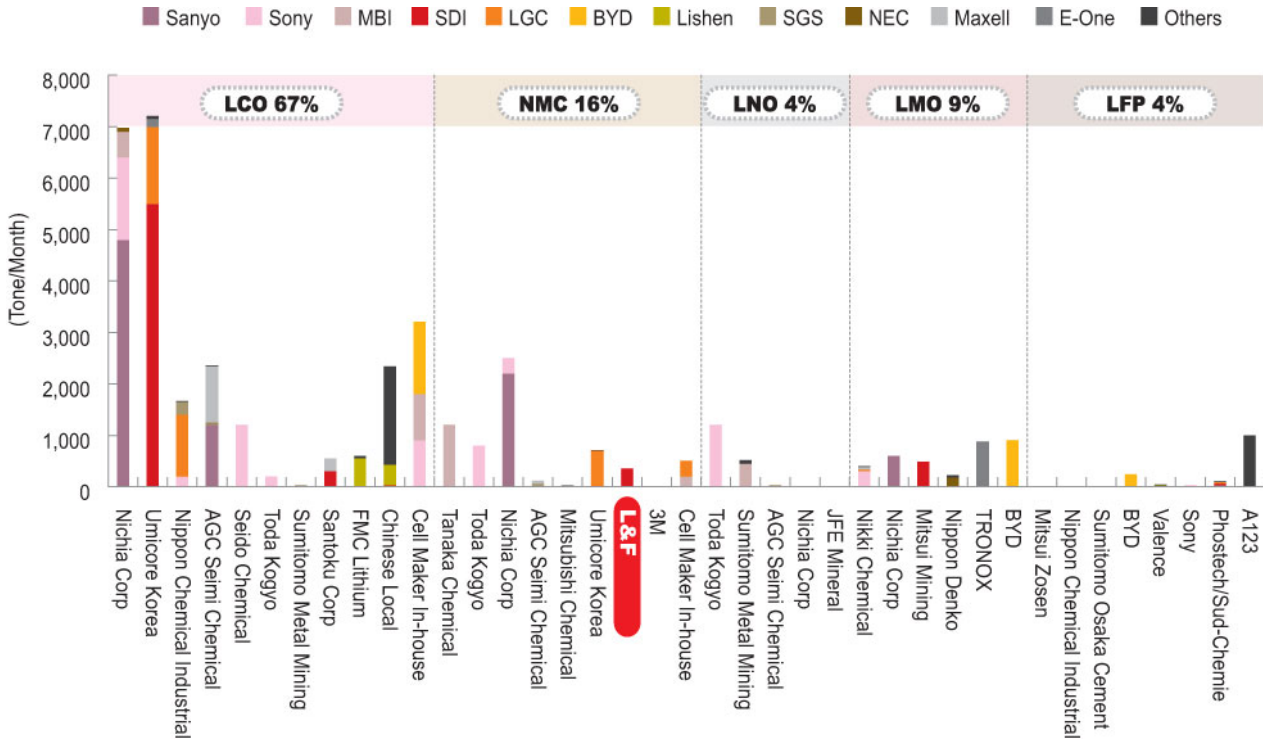
Thus efforts were made to develop less costly and more reliable anode materials. As a result, various new anode materials based on NMC, NM, nickel, manganese, and olivine have been developed. These new anode materials have their own merits and shortcomings, but all of them significantly reduced the cost burden when compared with LCO-based anode material. And the practical energy density of these new anode materials is greater than that of LCO-based anode material. Specifically, the practical energy density of NMC and nickel-based anode materials is 170mAh/g and 192mAh/g, respectively, while that of LCO-based anode material is 140mAh/g. On top of that, NMC, manganese, and olivine-based anode materials are more reliable than LCO-based anode material.

Comparisons of anode materials



Source: Industry data, Eugene Investment & Securities

Anode material supply chain



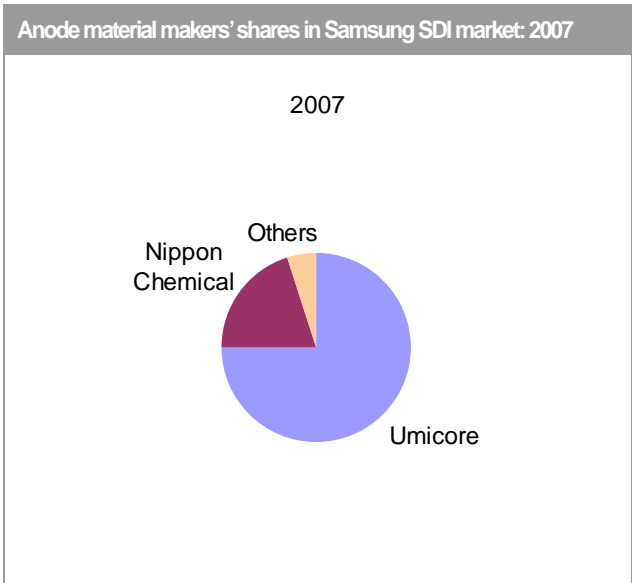
Source: IIT, Eugene Investment & Securities

Even if raw material prices fall back, LCO-based anode material is unlikely to regain popularity

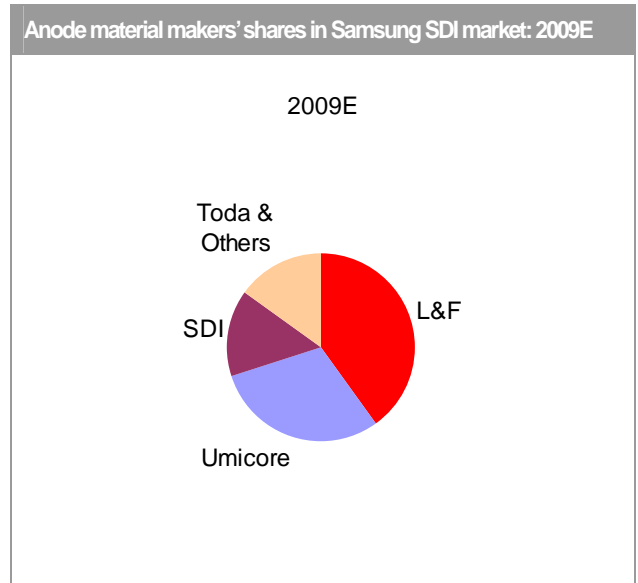
Some might argue that since cobalt prices are falling back consistently, the use of LCO-based anode material will increase again and new anode materials will spread only at a slow pace. But this is highly unlikely given that new anode materials are superior to LCO-based anode material in terms not only of cost but also overall properties. For instance, NCM-based anode material excels LCO-based anode material in terms of cost, reliability, durability, and capacity. In addition, nickel and manganese are less expensive than cobalt. Considering all this, LCO-based anode material is highly unlikely to regain its popularity.

Use of new anode materials increases rapidly

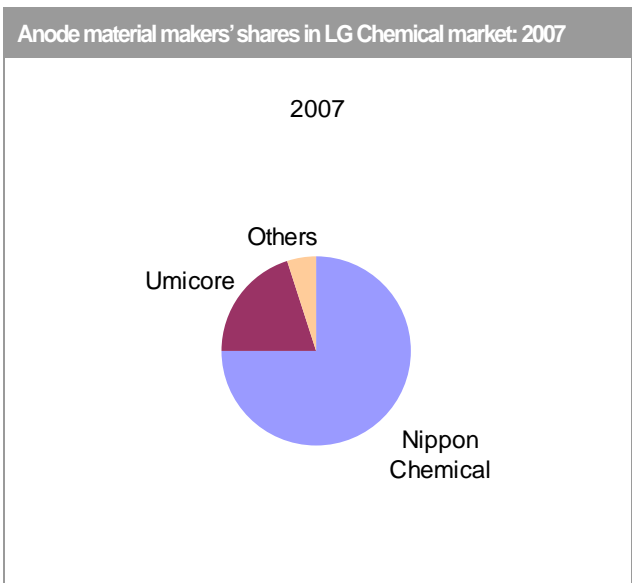
In 2007, the global anode material market broke down as follows by raw material: LCO (79%), NMC (10%), nickel-cobalt-aluminum or NCA (5%), manganese (5%), and olivine (1%). Only one year later, the market share of LCO dropped to 67%, while that of NMC (16%), manganese (9%), nickel (4%), and olivine (4%) increased rapidly.



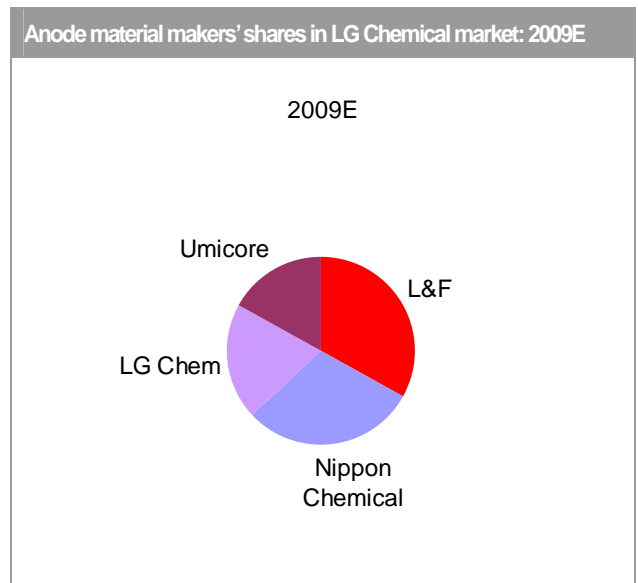
Source: Eugene Investment & Securities



Source: Eugene Investment & Securities



Source: Eugene Investment & Securities



Source: Eugene Investment & Securities

Domestic rechargeable battery makers' market shares should change

Domestic major rechargeable battery makers are rapidly adopting new anode materials (eg, NMC and NM), which are less costly and have better physical properties. As such, the market shares of companies supplying NCM-based and other new anode materials are estimated to have risen.

In 2007, Samsung SDI, producing rechargeable batteries, purchased LCO-based anode material from Umicore and Nippon Chemical Industries. But this year, it is forecasted to purchase more NCM-based anode material from L&F Corp and/or produce more of it on its own. Likewise, LG Chemical, which procured LCO-based anode material from Nippon Chemical Industries and Umicore in 2007, is likely to purchase more NCM-based anode material from L&F Corp and/or produce more of it on its own.

Samsung SDI (006400)

Delayed entry into HEV rechargeable battery market is a negative factor

► Investment points

The rechargeable battery division, accounting for 70% of Samsung SDI's operating value, is expected to suffer a profitability drop due to oversupply. Its subsidiary, SB LiMotive's market entry is getting delayed relative to its competitors. Another subsidiary Samsung Mobile Display's (SMD) AM-OLED business is unlikely to turn positive. As such Samsung SDI deserves a conservative valuation. Thus we maintain the HOLD rating and the target price of W77,000 for Samsung SDI.

1. 1Q09 sales and OP to post W1,311.9bn and W13.6bn, respectively (consolidated)

- ① The burden of the PDP module business increased recently as LCD TV sales expanded faster than PDPTV sales.
- ② Samsung Electronics' management of the PDP module business on behalf of Samsung SDI is unlikely to produce the desired effect.
- ③ Sales of netbook rechargeable batteries are likely to expand, but the profitability burden is likely to increase due to oversupply of rechargeable batteries.

2. SB LiMotive's delayed entry into HEV battery market is a negative factor

- ① Major automakers and rechargeable battery makers are increasingly forming strategic alliances with each other.
- ② Relative to its competitors, SB LiMotive's market entry has been delayed, which is a negative factor for Samsung SDI's rechargeable battery business.

► Valuation

Profitability of rechargeable battery business is expected to decline, while the PDP module business is likely to perform poorly. We maintain the HOLD rating and the target price of W77,000 for Samsung SDI

We reiterate the HOLD rating and the target price of W77,000 for Samsung SDI given that: 1) the rechargeable battery industry is likely to face an oversupply; 2) Samsung Electronics' operation of the PDP module business on the behalf of Samsung SDI is unlikely to produce the desired effect; and 3) subsidiaries' earnings improvements are being delayed.

► Earnings Forecasts

(Wbn, W, %, x)

| | 2006A | 2007A | 2008P | 2009E | 2010E | 2011E | 2012E |
|--------------------|--------|----------|-------|--------|-------|-------|-------|
| Sales | 4,908 | 3,792 | 4,650 | 3,764 | 3,500 | 3,440 | 3,395 |
| Chg (%) | (14.2) | (22.7) | 22.6 | (19.0) | (7.0) | (1.7) | (1.3) |
| OP | 14 | (567) | 3 | 51 | 90 | 88 | 101 |
| OP margin (%) | 0.3 | (15.0) | 0.1 | 1.4 | 2.6 | 2.6 | 3.0 |
| EBITDA | 462 | (66) | 493 | 510 | 507 | 493 | 505 |
| EBITDA margin (%) | 9.4 | (1.7) | 10.6 | 13.6 | 14.5 | 14.3 | 14.9 |
| NP | 91 | (592) | 39 | 57 | 51 | 30 | 79 |
| EPS (W) | 1,991 | (12,998) | 852 | 1,243 | 1,117 | 666 | 1,741 |
| DPS (W) | 600 | 0 | 0 | 0 | 0 | 0 | 0 |
| P/E (x) | 32.3 | na | 75.1 | 51.5 | 57.3 | 96.0 | 36.8 |
| EV/EBITDA (x) | 6.0 | na | 5.7 | 5.2 | 5.0 | 4.8 | 4.3 |
| P/B (x) | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 |
| ROE (%) | 2.0 | (12.8) | 0.8 | 1.2 | 1.1 | 0.6 | 1.7 |
| Dividend yield (%) | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Source: Eugene Investment & Securities

HOLD (maintain)

Comment

Target Price & Expected Return

| | |
|-----------------|---------|
| TP (12M) | W77,000 |
| CP (Feb 18) | W64,000 |
| Expected return | 20.3% |

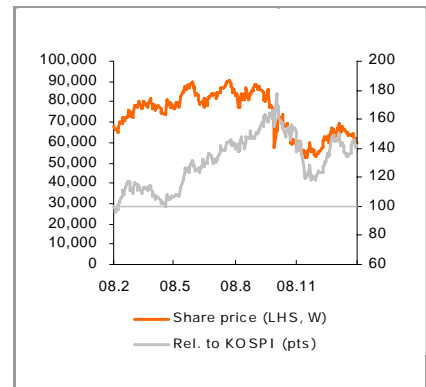
Trading Data

| | |
|--------------------------------------|-------------------|
| Market cap | W2,915.7bn |
| KOSPI portion | 0.51% |
| # of outstanding shares ('000) | 45,558 |
| 52w low/high | W52,600 / W90,400 |
| 3m daily avg trading val. | W41.4bn |
| Foreign ownership | 12.1% |
| Major shareholders (%) | |
| Samsung Electronics | 19.7% |
| Mirae Asset Investments and 8 others | 9.7% |
| KITMC | 9.6% |

Performance

| | 1M | 6M | 12M |
|-------------------|-------|--------|-------|
| Absolute (%) | (0.3) | (29.2) | (5.9) |
| Rel. to KOSPI (%) | 1.6 | (0.2) | 28.5 |

Price Trend



Earnings forecast

1Q09 sales and OP to post W1,311.9bn and W13.6bn, respectively (consolidated)

Samsung SDI achieved relatively favorable results in 4Q08 thanks to: 1) the depreciation of the Korean won; and 2) the strong performance of the rechargeable battery division relative to the other divisions. But in 1Q09, its quarterly sales and OP are both forecasted to decrease qoq despite the weaker Korean won because of the following: 1) its PDP module sales will come in poor as the display market enters a low-demand season and LCD TV becomes even more popular than PDP TV; 2) currently, Samsung Electronics operates Samsung SDI's PDP module division, but this is unlikely to produce the desired effect, because Samsung Electronics, manufacturing both LCD TV and PDP TV, now has to purchase more LCD panels from its joint venture S-LCD that it had established with Sony as the Japanese LCD TV maker's market presence has weakened. In other words, Samsung Electronics has less room to take care of Samsung SDI's PDP module division; 3) Samsung SDI's rechargeable battery division is unlikely to maintain its profitability. This is because the rechargeable battery market is facing an oversupply as: a) the growth in demand for notebook PCs (requiring 6~8 packs of rechargeable batteries) is limited; and b) the market share of netbooks (requiring only 4~6 packs) is expected to rise.

Specifically, in 1Q09, Samsung SDI is expected to generate sales of W1,311.9bn (-10.1% qoq) and OP of W13.6bn (-73.4% qoq) on a consolidated basis.

Samsung SDI earnings forecast by division

(consolidated basis; W100mn)

| | | 1Q08 | 2Q08 | 3Q08 | 4Q08P | 1Q09E | 2Q09E | 3Q09E | 4Q09E | 2008P | 2009E |
|-----------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Revenue | Total | 10,996 | 12,636 | 14,804 | 14,592 | 13,119 | 13,421 | 13,428 | 12,912 | 53,029 | 52,879 |
| | CRT | 3,050 | 3,260 | 3,440 | 2,960 | 2,498 | 2,202 | 2,306 | 2,334 | 12,710 | 9,340 |
| | MD | | | | | | | | | | |
| | PDP | 4,470 | 4,830 | 5,520 | 5,350 | 4,571 | 4,423 | 4,444 | 3,985 | 20,170 | 17,423 |
| | Batteries | 3,330 | 4,110 | 5,310 | 5,410 | 5,017 | 5,605 | 5,716 | 5,775 | 18,160 | 22,113 |
| Revenue portion | Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | CRT | 27.7% | 25.8% | 23.2% | 20.3% | 19.0% | 16.4% | 17.2% | 18.1% | 24.0% | 17.7% |
| | MD | | | | | | | | | | |
| | PDP | 40.6% | 38.2% | 37.3% | 36.7% | 34.8% | 33.0% | 33.1% | 30.9% | 38.0% | 32.9% |
| | Batteries | 30.3% | 32.5% | 35.9% | 37.1% | 38.2% | 41.8% | 42.6% | 44.7% | 34.2% | 41.8% |
| OP | Total | -349 | 366 | 801 | 512 | 136 | 114 | 306 | 146 | 1,330 | 702 |
| | CRT | -32 | 114 | 124 | 54 | 40 | 19 | 36 | 7 | 261 | 102 |
| | MD | -271 | -76 | | | | | | | -347 | |
| | PDP | -634 | -514 | -264 | -497 | -573 | -660 | -513 | -554 | -1,908 | -2,300 |
| | Batteries | 319 | 575 | 763 | 679 | 429 | 506 | 524 | 424 | 2,337 | 1,883 |
| OP margin | Total | -3.2% | 2.9% | 5.4% | 3.5% | 1.0% | 0.9% | 2.3% | 1.1% | 2.5% | 1.3% |
| | CRT | -1.0% | 3.5% | 3.6% | 1.8% | 1.6% | 0.9% | 1.5% | 0.3% | 2.1% | 1.1% |
| | MD | | | | | | | | | | |
| | PDP | -14.2% | -10.6% | -4.8% | -9.3% | -12.5% | -14.9% | -11.5% | -13.9% | -9.5% | -13.2% |
| | Batteries | 9.6% | 14.0% | 14.4% | 12.6% | 8.6% | 9.0% | 9.2% | 7.3% | 12.9% | 8.5% |

Source: Samsung SDI, Eugene Investment & Securities

2009 sales and OP are to post W5,287.9bn and W70.2bn, respectively, on a consolidated basis; profitability is to fall as rechargeable battery market faces an oversupply

In 2009, Samsung SDI is projected to produce sales of W5,287.9bn and OP of W70.2bn on a consolidated basis. Specifically, sales are expected to increase because the rechargeable battery division has expanded its production capacity. But OP is forecasted to decline as the rechargeable battery division's operating loss is likely to increase and the division's OP margin is likely to fall due to oversupply. Some forecast that Japanese rechargeable battery makers will cancel their capacity expansion plans due to the appreciation of the Japanese yen and the poor IT demand, but we view that the rechargeable battery market will face an oversupply because the Japanese rechargeable battery makers are expanding their production capacity in expectation of sales growth of HEVs and EVs starting 2010.

Samsung SDI's quarterly earnings forecast

(parent company basis; W100mn)

| | 1Q08 | 2Q08 | 3Q08 | 4Q08P | 1Q09E | 2Q09E | 3Q09E | 4Q09E | 2007 | 2008P | 2009E |
|--------------------------|---------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|----------------|---------------|---------------|
| Revenue | 11,009 | 12,904 | 13,014 | 9,568 | 9,113 | 9,545 | 9,680 | 9,307 | 37,925 | 46,495 | 37,645 |
| CRT | | | | | | | | | 3,173 | | |
| MD | | | | | | | | | 11,384 | 0 | |
| PDP | 4,336 | 4,685 | 5,244 | 5,029 | 4,251 | 4,113 | 4,133 | 3,706 | 14,171 | 19,294 | 16,203 |
| Battery | 3,263 | 4,028 | 5,098 | 5,194 | 4,816 | 5,381 | 5,488 | 5,544 | 8,672 | 17,583 | 21,228 |
| Others | 440 | 527 | 74 | (655) | 45 | 51 | 59 | 58 | 525 | 386 | 213 |
| COGS | 10,225 | 11,316 | 11,233 | 7,872 | 8,103 | 8,483 | 8,486 | 8,145 | 36,674 | 40,645 | 33,217 |
| GP | 784 | 1,588 | 1,781 | 1,696 | 1,010 | 1,062 | 1,194 | 1,162 | 1,251 | 5,850 | 4,428 |
| SG&A | 1,729 | 1,711 | 1,329 | 1,052 | 939 | 983 | 987 | 1,005 | 6,921 | 5,821 | 3,914 |
| OP | (945) | (123) | 453 | 644 | 72 | 79 | 207 | 156 | (5,671) | 29 | 514 |
| EBITDA | 505 | 1,313 | 1,741 | 1,366 | 1,129 | 1,136 | 1,445 | 1,395 | (657) | 4,925 | 5,104 |
| RP | (537) | 389 | 632 | 217 | 142 | 166 | 325 | (10) | (6,705) | 701 | 624 |
| NP | (306) | 496 | 587 | (389) | 135 | 149 | 291 | (9) | (5,922) | 388 | 566 |
| Profitability (%) | | | | | | | | | | | |
| GP margin | 0.1 | 12.3 | 13.7 | 17.7 | 11.1 | 11.1 | 12.3 | 12.5 | 3.3 | 12.6 | 11.8 |
| OP margin | (8.6) | (1.0) | 3.5 | 6.7 | 0.8 | 0.8 | 2.1 | 1.7 | (15.0) | 0.1 | 1.4 |
| EBITDA margin | 4.6 | 10.2 | 13.4 | 14.3 | 12.4 | 11.9 | 14.9 | 15.0 | (1.7) | 10.6 | 13.6 |
| RP margin | (4.9) | 3.0 | 4.9 | 2.3 | 1.6 | 1.7 | 3.4 | (0.1) | (17.7) | 1.5 | 1.7 |
| NP margin | (2.8) | 3.8 | 4.5 | (4.1) | 1.5 | 1.6 | 3.0 | (0.1) | (15.6) | 0.8 | 1.5 |
| qoq (%) | | | | | | | | | | | |
| Revenue | (4.3) | 17.2 | 0.9 | (26.5) | (4.8) | 4.7 | 1.4 | (3.9) | | | |
| GP | RB | 102.5 | 12.1 | (4.8) | (40.5) | 5.2 | 12.4 | (2.7) | | | |
| OP | RR | RR | RB | 42.3 | (88.9) | 10.6 | 161.2 | (24.3) | | | |
| RP | RR | RB | 62.5 | (65.7) | (34.3) | 16.8 | 95.2 | BR | | | |
| NP | RR | RB | 18.5 | BR | RB | 10.8 | 94.6 | BR | | | |
| yoy (%) | | | | | | | | | | | |
| OR | 26.9 | 49.7 | 42.6 | (16.8) | (17.2) | (26.0) | (25.6) | (2.7) | (22.7) | 22.6 | (19.0) |
| GP | 39.4 | 267.5 | 418.7 | RB | 28.8 | (33.1) | (33.0) | (31.5) | (81.9) | 367.7 | (24.3) |
| OP | RR | RR | RB | RB | RB | RB | (54.4) | (75.7) | BR | RB | 1650.4 |
| RP | RR | RB | RB | RB | RB | (57.3) | (48.6) | BR | BR | RB | (11.0) |
| NP | RR | RB | RB | RR | RB | (69.9) | (50.5) | RR | BR | RB | 45.9 |

Source: Samsung SDI, Eugene Investment & Securities

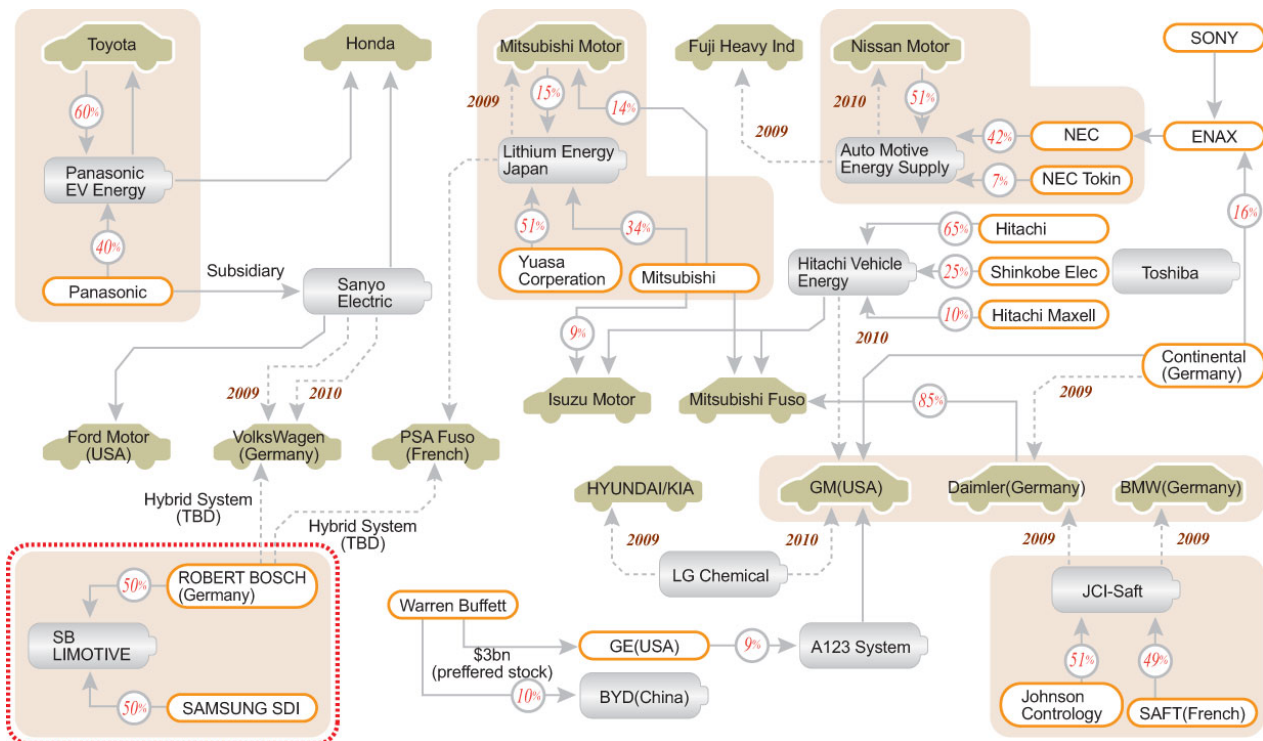
SB LiMotive's delayed entry into HEV rechargeable battery market is a negative factor

SM LiMotive's delayed entry into HEV rechargeable battery market is a negative factor

As can be seen in the charts below, global major carmakers already either formed strategic alliance or established a joint venture with rechargeable battery makers in order to jointly develop HEV rechargeable batteries. Samsung SDI also announced last year that it will set up a joint venture, named SB LiMotive, along with Bosch of Germany to supply HEV/EV rechargeable batteries and systems. Samsung SDI recently said that SB LiMotive will soon start to supply HEV rechargeable batteries for European automobile companies (for one or two of their car models).

But we view that SB LiMotive will not generate sales from HEV rechargeable batteries within one or two years, given that it takes up to 2~3 years for an auto part to be mass-produced following sample production, approval, and mass production test. Considering its leadership in the market of rechargeable batteries for mobile IT devices, Samsung SDI will eventually enter the HEV rechargeable battery market. But the fact that its entry into the market has been delayed relative to its Japanese and Korean peers is a negative factor for its rechargeable battery business.

Alliances between battery makers and automobile companies



Source: Industry data, Eugene Investment & Securities

AMOLED business is unlikely to improve operating results

Samsung Mobile Display (SMD), another subsidiary jointly established by Samsung Electronics, is not likely to produce equity method gains for Samsung SDI this year, either, considering the following. First, the mobile handset makers, the major consumers of TFT-LCD and STN-LCD modules produced by SMD, are expected to suffer a moderate market contraction this year. And mobile handset makers, faced with poor earnings, are likely to increasingly press SMD to lower prices. Second, the AMOLED business is unlikely to turn positive this year as it continues requiring large facility investments and it is not easy to win large-scale orders. All in all, SMD is highly unlikely to improve its operating results this year.

Samsung SDI financial statements

Balance Sheet

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|-------------------------------------|---------|---------|---------|---------|---------|
| Current assets | 1,586.4 | 1,465.3 | 1,599.7 | 1,895.6 | 2,022.0 |
| Cash & short-term investment | 707.4 | 403.3 | 761.4 | 1,000.7 | 1,165.4 |
| Trade accounts receivable | 372.1 | 545.6 | 450.9 | 438.6 | 415.4 |
| Inventories | 387.1 | 318.3 | 199.2 | 275.4 | 260.9 |
| Fixed assets | 4,804.5 | 5,104.8 | 4,724.4 | 4,590.3 | 4,527.9 |
| Investment assets | 2,005.9 | 2,424.7 | 2,793.1 | 2,733.4 | 2,618.6 |
| Tangible assets | 2,744.1 | 2,614.1 | 1,897.5 | 1,826.5 | 1,881.9 |
| Intangible assets | 54.6 | 66.0 | 33.9 | 30.3 | 27.3 |
| Total assets | 6,390.9 | 6,570.1 | 6,324.1 | 6,485.9 | 6,549.8 |
| Current liabilities | 1,255.0 | 879.7 | 931.4 | 1,117.3 | 1,063.4 |
| Trade accounts payable | 388.0 | 344.0 | 267.4 | 260.1 | 246.4 |
| Short-term borrowings | 0.0 | 0.0 | 0.0 | 0.0 | 100.0 |
| Current portion of long-term debts | 199.7 | 0.0 | 54.1 | 256.9 | 135.3 |
| Long-term liabilities | 489.3 | 1,062.9 | 783.3 | 702.6 | 769.6 |
| Debentures and long-term borrowings | 293.0 | 747.1 | 543.8 | 453.1 | 509.7 |
| Others | 196.3 | 315.8 | 239.5 | 249.5 | 259.9 |
| Total liabilities | 1,744.3 | 1,942.6 | 1,714.8 | 1,819.9 | 1,832.9 |
| Paid-in capital | 240.7 | 240.7 | 240.7 | 240.7 | 240.7 |
| Capital surplus | 1,275.8 | 1,276.3 | 1,329.0 | 1,329.0 | 1,329.0 |
| Capital adjustment | (147.7) | 464.7 | 355.1 | 355.1 | 355.1 |
| Treasury stock | (245.3) | (233.0) | (231.1) | (231.1) | (231.1) |
| Eamed surplus | 3,277.8 | 2,645.8 | 2,684.6 | 2,741.2 | 2,792.1 |
| Total equity | 4,646.6 | 4,627.4 | 4,609.4 | 4,666.0 | 4,716.9 |
| Total borrowings | 492.7 | 747.1 | 597.9 | 710.0 | 745.0 |
| Net borrowings (net cash) | (214.7) | 343.8 | (163.5) | (290.7) | (420.4) |
| Invested capital | 2,618.9 | 2,706.2 | 1,768.9 | 1,768.0 | 1,816.6 |

Income Statement

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|--|---------|----------|---------|---------|---------|
| Sales | 4,907.6 | 3,792.5 | 4,649.5 | 3,764.5 | 3,500.0 |
| Chg (%) | (14.2) | (22.7) | 22.6 | (19.0) | (7.0) |
| GP | 690.1 | 125.1 | 585.0 | 442.8 | 460.8 |
| GP margin (%) | 14.1 | 3.3 | 12.6 | 11.8 | 13.2 |
| SG&A expenses | 676.5 | 692.1 | 582.1 | 391.4 | 371.1 |
| Chg (%) | 2.7 | 2.3 | (15.9) | (32.8) | (5.2) |
| OP | 13.6 | (567.1) | 2.9 | 51.4 | 89.8 |
| Chg (%) | (87.0) | BR | RB | 1,650.4 | 74.8 |
| EBITDA | 462.0 | (65.7) | 492.5 | 510.4 | 506.9 |
| Chg (%) | (17.6) | BR | RB | 3.6 | (0.7) |
| Non-operating OP | 84.9 | (103.4) | 67.1 | 11.0 | (30.9) |
| Interest income | 51.3 | 40.6 | 45.7 | 22.1 | 21.5 |
| Interest expense | 0.0 | 5.6 | 29.7 | 27.0 | 26.7 |
| Foreign currency related gain/loss | 10.4 | (0.8) | (70.2) | 31.4 | 37.8 |
| Equity method gains/losses | 120.1 | (162.5) | 8.1 | (69.7) | (127.3) |
| Other non-operating OP | (97.0) | 25.0 | 113.2 | 54.2 | 63.8 |
| Pretax income from cont. operations | 98.6 | (670.5) | 70.1 | 62.4 | 58.9 |
| Corporate tax | 7.9 | (78.3) | (6.8) | 5.8 | 7.9 |
| Profit from discontinued operations | 0.0 | 0.0 | (38.0) | 0.0 | 0.0 |
| NP | 90.7 | (592.2) | 38.8 | 56.6 | 50.9 |
| Chg (%) | (62.2) | BR | RB | 45.9 | (10.1) |
| NP margin (%) | 1.8 | (15.6) | 0.8 | 1.5 | 1.5 |
| EPS | 1,991 | (12,998) | 852 | 1,243 | 1,117 |
| Chg (%) | (62.2) | BR | RB | 45.9 | (10.1) |
| Fully diluted EPS | | | 852 | 1,243 | 1,117 |
| Chg (%) | | | | 45.9 | (10.1) |

Cash Flow Statement

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|--|-----------|---------|---------|---------|---------|
| Operating cash flow | 801.6 | 129.9 | 836.6 | 805.2 | 771.1 |
| NP | 90.7 | (592.2) | 38.8 | 56.6 | 50.9 |
| Depr. & amort. | 448.3 | 501.3 | 489.6 | 459.1 | 417.1 |
| Other non-cash items | 12.9 | 292.1 | 30.4 | 363.0 | 297.1 |
| Chg in working capital | 249.7 | (73.4) | 277.8 | (73.5) | 5.9 |
| Dec (Inc) in receivable | 126.4 | (175.8) | (126.0) | 12.3 | 23.1 |
| Dec (Inc) in inventory | 15.3 | 40.6 | 27.3 | (76.2) | 14.5 |
| Inc (Dec) in payable | 1.2 | (46.5) | 112.8 | (7.3) | (13.7) |
| Others | 106.8 | 108.3 | 263.7 | (2.3) | (18.0) |
| Investing cash flow | (1,028.5) | (355.8) | (651.6) | (384.6) | (469.5) |
| Disposal (acquisition) of ST inv. assets | 151.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Disposal (acq.) of LT inv. securities | (35.0) | 3.3 | (182.2) | 0.0 | (0.0) |
| Facility investment | (1,130.6) | (542.8) | (485.9) | (425.0) | (515.0) |
| Disposal of tangible assets | 20.3 | 170.6 | 18.5 | 41.0 | 46.1 |
| Dec (Inc) in intangible assets | (0.7) | (2.1) | (0.3) | (0.5) | (0.6) |
| Financing cash flow | 457.7 | (78.2) | 172.8 | (181.3) | (136.9) |
| Inc (Dec) in borrowings | 194.2 | 250.8 | 250.0 | (181.3) | (136.9) |
| Inc (Dec) in equity | (59.8) | (20.7) | (77.2) | 0.0 | 0.0 |
| Dividend payout | 65.7 | 26.4 | 0.0 | 0.0 | 0.0 |
| Inc (Dec) in cash | 230.8 | (304.1) | 358.1 | 239.3 | 164.7 |
| Beginning cash | 476.6 | 707.4 | 403.3 | 761.4 | 1,000.7 |
| Ending cash | 707.4 | 403.3 | 761.4 | 1,000.7 | 1,165.4 |
| Gross cash flow | 551.9 | 203.3 | 558.8 | 878.7 | 765.2 |
| Gross investment | 929.8 | 429.2 | 373.8 | 458.0 | 463.6 |
| Free cash flow | (377.9) | (225.9) | 185.0 | 420.7 | 301.6 |

Financial Ratios

| YE Dec | 2006A | 2007A | 2008P | 2009E | 2010E |
|---------------------------|--------|----------|--------|--------|--------|
| Per share data (W) | | | | | |
| EPS | 1,991 | (12,998) | 852 | 1,243 | 1,117 |
| BPS | 97,338 | 96,689 | 96,987 | 98,262 | 99,405 |
| DPS | 600 | 0 | 0 | 0 | 0 |
| Valuation (x, %) | | | | | |
| P/E | 32.3 | na | 75.1 | 51.5 | 57.3 |
| P/B | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 |
| P/C | 5.5 | 15.4 | 5.4 | 3.4 | 3.9 |
| EV/EBITDA | 6.0 | na | 5.7 | 5.2 | 5.0 |
| Dividend yield | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| Profitability (%) | | | | | |
| OP margin | 0.3 | (15.0) | 0.1 | 1.4 | 2.6 |
| EBITDA margin | 9.4 | (1.7) | 10.6 | 13.6 | 14.5 |
| NP margin | 1.8 | (15.6) | 0.8 | 1.5 | 1.5 |
| ROE | 2.0 | (12.8) | 0.8 | 1.2 | 1.1 |
| ROIC | 0.5 | (15.4) | 0.1 | 2.6 | 4.3 |
| Stability (% , x) | | | | | |
| Net debt/equity ratio | (4.6) | 7.4 | (3.5) | (6.2) | (8.9) |
| Current ratio | 126.4 | 166.6 | 171.7 | 169.7 | 190.1 |
| Interest coverage ratio | (0.3) | 16.2 | (0.2) | 10.6 | 17.2 |
| Activity (x) | | | | | |
| Total asset turnover | 0.8 | 0.6 | 0.7 | 0.6 | 0.5 |
| Receivable turnover | 11.1 | 8.3 | 9.3 | 8.5 | 8.2 |
| Inventory turnover | 12.3 | 10.8 | 18.0 | 15.9 | 13.1 |
| Payable turnover | 12.6 | 10.4 | 15.2 | 14.3 | 13.8 |

Source: Samsung SDI, Eugene Investment & Securities

L&F Corp (066970)

Transforms into battery material specialist

► Investment points

We maintain the BUY rating and the target price of W31,000 for L&F Corp, given that its anode material sales are expected to continue expanding despite the economic downturn and its overall sales and earnings are predicted to significantly improve.

1. Earnings to significantly improve starting in 2009

As rechargeable battery makers expand their production capacity, their use of nickel-based anode material, produced by L&F Corp, is likely to rise rapidly. Accordingly, 2009 sales and OP are forecasted to jump a whopping 109.8% and 984.9% yoy, respectively, to W150.6bn and W28.3bn.

2. Rechargeable battery companies' capacity expansions and HEV rechargeable battery market growth are positives

Rechargeable battery makers around the world are expanding their production capacity. And major companies are increasingly adopting L&F Corp's anode materials. In the long term, L&F Corp's anode material sales and profitability are expected to rapidly rise as the rechargeable battery market expands thanks to the introduction of HEVs.

► Valuation

Maintain BUY and target price of W31,000

L&F Corp and its subsidiary, named L&F Material, are expected to see their EPS soar thanks to the rising sales portion of anode material. Thus we reiterate the BUY rating and the target price of W31,000 for L&F Corp.

► Earnings Forecasts

(Wbn, W, %, x)

| | 2006 | 2007 | 2008P | 2009E | 2010E | 2011E | 2012E |
|--------------------|------|--------|-------|-------|-------|-------|-------|
| Sales | 126 | 76 | 72 | 151 | 187 | 202 | 215 |
| Chg (%) | 21.8 | (39.9) | (5.4) | 109.8 | 24.4 | 7.7 | 6.6 |
| OP | 0 | (6) | 3 | 28 | 37 | 42 | 45 |
| OP margin (%) | 0.2 | (7.5) | 3.6 | 18.8 | 19.9 | 20.7 | 20.9 |
| EBITDA | 2 | (4) | 5 | 33 | 42 | 47 | 49 |
| EBITDA margin (%) | 1.9 | (5.0) | 6.9 | 21.7 | 22.6 | 23.1 | 23.0 |
| NP | 1 | (6) | 2 | 36 | 51 | 55 | 56 |
| EPS (W) | 85 | (593) | 164 | 3,418 | 4,827 | 5,174 | 5,305 |
| DPS (W) | 50 | 30 | 50 | 50 | 50 | 50 | 50 |
| P/E (x) | 85.3 | na | 161.4 | 7.7 | 5.5 | 5.1 | 5.0 |
| EV/EBITDA (x) | 24.6 | na | 53.9 | 7.6 | 5.2 | 4.1 | 3.3 |
| P/B (x) | 2.6 | 4.8 | 9.0 | 4.3 | 2.4 | 1.7 | 1.3 |
| ROE (%) | 3.1 | (24.5) | 5.9 | 70.0 | 53.9 | 37.2 | 27.8 |
| Dividend yield (%) | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

Source: Eugene Investment & Securities

BUY(maintain)
Comment

Target Price & Expected Return

| | |
|-----------------|---------|
| TP(12M) | W31,000 |
| CP(Feb 18) | W26,450 |
| Expected return | 17.2% |

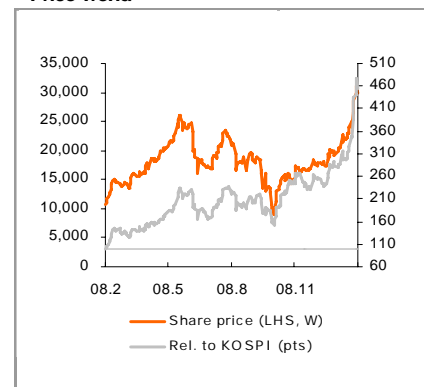
Trading Data

| | |
|--------------------------------|------------------|
| Market cap | W270.9bn |
| KOSPI portion | 0.05% |
| # of outstanding shares ('000) | 10,241 |
| 52w low/high | W8,880 / W26,450 |
| 3m daily avg trading val. | W3.2bn |
| Foreign ownership | 0.8% |
| Major shareholders (%) | |
| Serotics and 13 others | 25.4% |

Performance

| | 1M | 6M | 12M |
|-------------------|------|------|-------|
| Absolute (%) | 31.6 | 16.5 | 147.2 |
| Rel. to KOSPI (%) | 33.5 | 45.5 | 181.6 |

Price Trend



Rechargeable battery oversupply rather offers an opportunity to L&F Corp

Earnings to remain strong in 1Q09 with sales and OP expected to post W25.7bn and W4.0bn, respectively

1Q09 sales and OP are predicted to come in at W25.70bn and W39.90bn, respectively. Out of this, anode material sales are likely to post W18.69bn or 73%. Although rechargeable battery makers significantly lowered their utilization rate in late 4Q08 to reduce their inventory, L&F Corp's profitability sharply improved. In 1Q09, its sales and earnings are both expected to improve as: 1) rechargeable battery makers are restocking their inventory; and 2) their production volume of rechargeable batteries used in notebook PCs, particularly, netbooks, is increasing.

L&F Corp's earnings forecast

(Wmn)

| | 1Q08 | 2Q08 | 3Q08 | 4Q08P | 1Q09E | 2Q09E | 3Q09E | 4Q09E | 2007 | 2008P | 2009E |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|----------------|
| Revenue | 13,234 | 14,582 | 23,488 | 20,477 | 25,701 | 32,428 | 45,283 | 47,187 | 75,917 | 71,781 | 150,600 |
| BLU | 12,960 | 12,071 | 11,876 | 8,113 | 6,864 | 6,287 | 5,841 | 5,249 | 74,264 | 45,019 | 24,242 |
| Ag paste | 0 | 0 | 0 | 0 | 0 | 0 | 568 | 1,091 | 0 | 0 | 1,659 |
| Anode | 0 | 2,249 | 11,409 | 12,212 | 18,694 | 26,002 | 38,721 | 40,701 | 0 | 25,869 | 124,118 |
| Others | 275 | 262 | 204 | 152 | 144 | 139 | 153 | 147 | 1,653 | 892 | 582 |
| COGS | 13,114 | 14,379 | 21,110 | 14,273 | 17,720 | 22,212 | 30,339 | 32,521 | 78,389 | 62,877 | 102,792 |
| GP | 120 | 203 | 2,378 | 6,204 | 7,982 | 10,216 | 14,943 | 14,666 | (2,472) | 8,904 | 47,807 |
| SG&A | 890 | 952 | 894 | 3,560 | 3,983 | 4,499 | 5,353 | 5,666 | 3,212 | 6,295 | 19,501 |
| OP | (770) | (749) | 1,484 | 2,644 | 3,998 | 5,717 | 9,591 | 9,000 | (5,684) | 2,609 | 28,307 |
| EBITDA | (453) | (226) | 2,210 | 3,406 | 4,985 | 6,772 | 10,750 | 10,183 | (3,777) | 4,937 | 32,690 |
| RP | (1,265) | (409) | 1,455 | 1,416 | 5,059 | 7,695 | 12,603 | 13,003 | (6,233) | 1,197 | 38,360 |
| NP | (1,265) | (406) | 1,455 | 1,822 | 4,791 | 7,287 | 11,935 | 12,314 | (5,644) | 1,606 | 36,327 |
| Profitability (%) | | | | | | | | | | | |
| GP margin | 0.9 | 1.4 | 10.1 | 30.3 | 31.1 | 31.5 | 33.0 | 31.1 | (3.3) | 12.4 | 31.7 |
| OP margin | (5.8) | (5.1) | 6.3 | 12.9 | 15.6 | 17.6 | 21.2 | 19.1 | (7.5) | 3.6 | 18.8 |
| EBITDA margin | (3.4) | (1.5) | 9.4 | 16.6 | 19.4 | 20.9 | 23.7 | 21.6 | (5.0) | 6.9 | 21.7 |
| RP margin | (9.6) | (2.8) | 6.2 | 6.9 | 19.7 | 23.7 | 27.8 | 27.6 | (8.2) | 1.7 | 25.5 |
| NP margin | (9.6) | (2.8) | 6.2 | 8.9 | 18.6 | 22.5 | 26.4 | 26.1 | (7.4) | 2.2 | 24.1 |
| qoq (%) | | | | | | | | | | | |
| Revenue | (15.7) | 10.2 | 61.1 | (12.8) | 25.5 | 26.2 | 39.6 | 4.2 | | | |
| GP | RB | 68.7 | 1073.8 | 160.9 | 28.7 | 28.0 | 46.3 | (1.9) | | | |
| OP | RR | RR | RB | 78.1 | 51.2 | 43.0 | 67.8 | (6.2) | | | |
| RP | RR | RR | RB | (2.6) | 257.2 | 52.1 | 63.8 | 3.2 | | | |
| NP | RR | RR | RB | 25.3 | 162.9 | 52.1 | 63.8 | 3.2 | | | |
| yoy (%) | | | | | | | | | | | |
| OR | (34.6) | (27.0) | 17.5 | 30.4 | 94.2 | 122.4 | 92.8 | 130.4 | (39.9) | (5.4) | 109.8 |
| GP | 118.2 | RB | RB | RB | 6545.6 | 4942.6 | 528.4 | 136.4 | BR | RB | 436.9 |
| OP | RR | RR | RB | RB | RB | RB | 546.2 | 240.4 | BR | RB | 984.9 |
| RP | RR | RR | RB | RB | RB | RB | 766.3 | 818.0 | BR | RB | 3104.9 |
| NP | RR | RR | RB | RB | RB | RB | 720.4 | 575.7 | BR | RB | 2161.9 |

Source: L&F Corp, Eugene Investment & Securities

Rechargeable battery companies' capacity expansions and oversupply are positives for L&F Corp

Despite the stronger Japanese yen and the global economic slump, domestic and overseas rechargeable battery makers are likely to continue aggressive capacity expansions. Thus the rechargeable battery market is expected to face an oversupply starting this year. Accordingly, their profitability is feared to decline. But this oversupply is rather a positive for L&F Corp, in that because newly developed rechargeable batteries are forecasted to increasingly adopt its nickel-manganese-cobalt-based (NMC) anode material, which is cost-competitive.

Favorable operating environment: 1)
high entry barrier

Some fear that new competitors, including conglomerates, will appear in the near future as L&F Corp's anode material sales expand rapidly and its profitability rises fast. But the anode material market has a high entry barrier, in that it takes very long to develop a new anode material. In order to be able to manufacture an anode material, a company has to have the know-how about the forming and processing of nanometer-sized ceramic particles. In contrast to the other component markets, it is not easy for a new company to enter the market. In general, anode material is produced by mixing uniform-sized particles (ie, mixing), vaporizing the organic materials contained (ie, calcination), and heating the uniformly composed oxide at a high temperature, turning it into a coherent mass (ie, sintering). During these processes, the uniformity and homogeneity of the particles are regarded as the key factors. L&F Corp boasts experienced R&D staffs, who have been involved in R&Ds since the days of phosphor processing technology. They have enabled L&F Corp to successfully develop a new anode material.

Favorable operating environment: 2)
growing market of HEV
rechargeable batteries

Recently, detailed production plans are being established for HEVs, PHEVs, and EVs, and they need lithium-ion rechargeable batteries produced using L&F Corp's anode material. Specifically, the combined sales volume of HEVs, PHEVs, and EVs is projected to rise from 26,000 in 2009 to 199,000 in 2010 to 441,000 in 2011. In other words, the rechargeable battery market is forecasted to expand consistently, despite the slowing demand for rechargeable batteries used in mobile IT devices.

L&F Corp financial statements

Balance Sheet

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|-------------------------------------|-------|-------|-------|--------|--------|
| Current assets | 21.4 | 12.3 | 33.5 | 61.5 | 91.0 |
| Cash & short-term investment | 8.7 | 5.3 | 21.3 | 35.6 | 65.6 |
| Trade accounts receivable | 7.5 | 4.5 | 6.7 | 15.0 | 14.5 |
| Inventories | 2.6 | 1.6 | 4.1 | 9.4 | 9.5 |
| Fixed assets | 16.7 | 17.5 | 29.5 | 46.4 | 69.0 |
| Investment assets | 3.0 | 2.9 | 4.8 | 16.2 | 37.1 |
| Tangible assets | 13.6 | 13.1 | 21.9 | 25.9 | 26.5 |
| Intangible assets | 0.1 | 1.5 | 2.8 | 4.3 | 5.4 |
| Total assets | 38.1 | 29.8 | 63.0 | 107.9 | 160.1 |
| Current liabilities | 11.7 | 9.4 | 22.5 | 31.6 | 32.9 |
| Trade accounts payable | 8.5 | 5.5 | 8.8 | 17.7 | 17.8 |
| Short-term borrowings | 0.0 | 2.0 | 10.6 | 8.6 | 6.6 |
| Current portion of long-term debts | 0.0 | 0.0 | 0.0 | 0.0 | 3.3 |
| Long-term liabilities | 0.3 | 0.3 | 6.5 | 6.5 | 6.5 |
| Debentures and long-term borrowings | 0.0 | 0.0 | 6.1 | 6.1 | 6.1 |
| Others | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 |
| Total liabilities | 12.0 | 9.7 | 29.0 | 38.1 | 39.5 |
| Paid-in capital | 4.6 | 4.6 | 5.1 | 5.1 | 5.1 |
| Capital surplus | 8.7 | 9.0 | 19.4 | 19.4 | 19.4 |
| Capital adjustment | (0.9) | (1.2) | 0.4 | 0.4 | 0.4 |
| Treasury stock | (1.0) | (1.5) | 0.0 | 0.0 | 0.0 |
| Eamed surplus | 13.7 | 7.7 | 9.1 | 44.9 | 95.7 |
| Total equity | 26.1 | 20.0 | 34.0 | 69.8 | 120.6 |
| Total borrowings | 0.0 | 2.0 | 16.7 | 14.7 | 16.0 |
| Net borrowings (net cash) | (8.7) | (3.3) | (4.6) | (20.9) | (49.6) |
| Invested capital | 15.6 | 15.0 | 25.8 | 34.0 | 35.2 |

Income Statement

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|--|--------|--------|-------|---------|-------|
| Sales | 126.3 | 75.9 | 71.8 | 150.6 | 187.3 |
| Chg (%) | 21.8 | (39.9) | (5.4) | 109.8 | 24.4 |
| GP | 4.8 | (2.5) | 8.9 | 47.8 | 62.7 |
| GP margin (%) | 3.8 | (3.3) | 12.4 | 31.7 | 33.5 |
| SG&A expenses | 4.5 | 3.2 | 6.3 | 19.5 | 25.4 |
| Chg (%) | 31.0 | (28.7) | 96.0 | 209.8 | 30.2 |
| OP | 0.3 | (5.7) | 2.6 | 28.3 | 37.4 |
| Chg (%) | (93.4) | BR | RB | 984.9 | 32.0 |
| EBITDA | 2.4 | (3.8) | 4.9 | 32.7 | 42.3 |
| Chg (%) | (54.6) | BR | RB | 562.1 | 29.3 |
| Non-operating OP | 0.6 | (0.5) | (1.4) | 10.1 | 20.0 |
| Interest income | 0.3 | 0.4 | 0.2 | 0.5 | 0.8 |
| Interest expense | 0.0 | 0.0 | 0.7 | 1.0 | 1.0 |
| Foreign currency related gain/loss | (0.1) | (0.1) | (1.6) | (0.3) | (0.4) |
| Equity method gains/losses | (0.3) | (1.0) | 1.2 | 11.3 | 20.8 |
| Other non-operating OP | 0.6 | 0.2 | (0.6) | (0.4) | (0.3) |
| Pretax income from cont. operations | 0.9 | (6.2) | 1.2 | 38.4 | 57.3 |
| Corporate tax | 0.1 | (0.6) | (0.4) | 2.0 | 6.0 |
| Profit from discontinued operations | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NP | 0.8 | (5.6) | 1.6 | 36.3 | 51.3 |
| Chg (%) | (79.6) | BR | RB | 2,161.9 | 41.2 |
| NP margin (%) | 0.6 | (7.4) | 2.2 | 24.1 | 27.4 |
| EPS | 85 | (593) | 164 | 3,418 | 4,827 |
| Chg (%) | (79.9) | BR | RB | 1,985.1 | 41.2 |
| Fully diluted EPS | | | 163 | 3,387 | 4,823 |
| Chg (%) | | | | 1,979.3 | 42.4 |

Cash Flow Statement

| YE Dec (Wbn) | 2006A | 2007A | 2008P | 2009E | 2010E |
|--|-------|-------|--------|--------|--------|
| Operating cash flow | 5.9 | (2.9) | 1.5 | 26.7 | 39.1 |
| NP | 0.8 | (5.6) | 1.6 | 36.3 | 51.3 |
| Depr. & amort. | 2.1 | 1.9 | 2.3 | 4.4 | 4.9 |
| Other non-cash items | 0.7 | 1.9 | (0.1) | (11.4) | (17.6) |
| Chg in working capital | 2.2 | (1.0) | (2.3) | (2.6) | 0.5 |
| Dec (Inc) in receivable | 4.1 | 3.0 | (2.1) | (8.3) | 0.5 |
| Dec (Inc) in inventory | 2.7 | 0.8 | (2.5) | (5.3) | (0.0) |
| Inc (Dec) in payable | (3.6) | (3.0) | 2.9 | 8.9 | 0.0 |
| Others | (1.0) | (1.9) | (0.7) | 2.1 | 0.0 |
| Investing cash flow | (0.5) | (3.7) | (13.4) | (9.9) | (6.6) |
| Disposal (acquisition) of ST inv. assets | 6.8 | 0.4 | 0.6 | 0.0 | 0.0 |
| Disposal (acq.) of LT inv. securities | (0.6) | (1.0) | (0.7) | 0.0 | (0.0) |
| Facility investment | (6.2) | (2.2) | (11.8) | (8.4) | (5.5) |
| Disposal of tangible assets | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Dec (Inc) in intangible assets | (0.1) | (1.4) | (1.6) | (1.5) | (1.1) |
| Financing cash flow | 1.3 | 3.6 | 28.5 | (2.5) | (2.5) |
| Inc (Dec) in borrowings | 0.0 | 2.0 | 15.3 | (2.0) | (2.0) |
| Inc (Dec) in equity | 0.1 | (0.6) | 12.1 | (0.5) | (0.5) |
| Dividend payout | 0.9 | 0.4 | 0.2 | 0.5 | 0.5 |
| Inc (Dec) in cash | 6.7 | (3.0) | 16.6 | 14.3 | 30.0 |
| Beginning cash | 1.0 | 7.7 | 4.7 | 21.3 | 35.6 |
| Ending cash | 7.7 | 4.7 | 21.3 | 35.6 | 65.6 |
| Gross cash flow | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gross investment | (1.7) | 4.7 | 15.7 | 12.5 | 6.0 |
| Free cash flow | 5.4 | (6.6) | (11.9) | 16.8 | 32.5 |

Financial Ratios

| YE Dec | 2006A | 2007A | 2008P | 2009E | 2010E |
|---------------------------|--------|--------|--------|--------|--------|
| Per share data (W) | | | | | |
| EPS | 85 | (593) | 164 | 3,418 | 4,827 |
| BPS | 2,742 | 1,937 | 2,932 | 6,164 | 10,839 |
| DPS | 50 | 30 | 50 | 50 | 50 |
| Valuation (x, %) | | | | | |
| P/E | 85.3 | na | 161.4 | 7.7 | 5.5 |
| P/B | 2.6 | 4.8 | 9.0 | 4.3 | 2.4 |
| P/C | 18.8 | na | 68.3 | 9.6 | 7.3 |
| EV/EBITDA | 24.6 | na | 53.9 | 7.6 | 5.2 |
| Dividend yield | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 |
| Profitability (%) | | | | | |
| OP margin | 0.2 | (7.5) | 3.6 | 18.8 | 19.9 |
| EBITDA margin | 1.9 | (5.0) | 6.9 | 21.7 | 22.6 |
| NP margin | 0.6 | (7.4) | 2.2 | 24.1 | 27.4 |
| ROE | 3.1 | (24.5) | 5.9 | 70.0 | 53.9 |
| ROIC | 1.6 | (26.9) | 9.3 | 89.7 | 96.6 |
| Stability (%., x) | | | | | |
| Net debt/equity ratio | (33.2) | (16.3) | (13.5) | (29.9) | (41.1) |
| Current ratio | 183.0 | 130.1 | 148.8 | 194.7 | 276.3 |
| Interest coverage ratio | (0.8) | 15.4 | 6.0 | 50.1 | 203.9 |
| Activity (x) | | | | | |
| Total asset turnover | 3.2 | 2.2 | 1.5 | 1.8 | 1.4 |
| Receivable turnover | 13.3 | 12.6 | 12.8 | 13.9 | 12.7 |
| Inventory turnover | 30.6 | 35.8 | 25.2 | 22.3 | 19.8 |
| Payable turnover | 12.3 | 10.8 | 10.0 | 11.3 | 10.6 |

Source: L&F Corp, Eugene Investment & Securities

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Investment Ratings

The investment ratings shown below are based on the expected rate of return of the company during the next 12 months based on the closing share price on the release date.

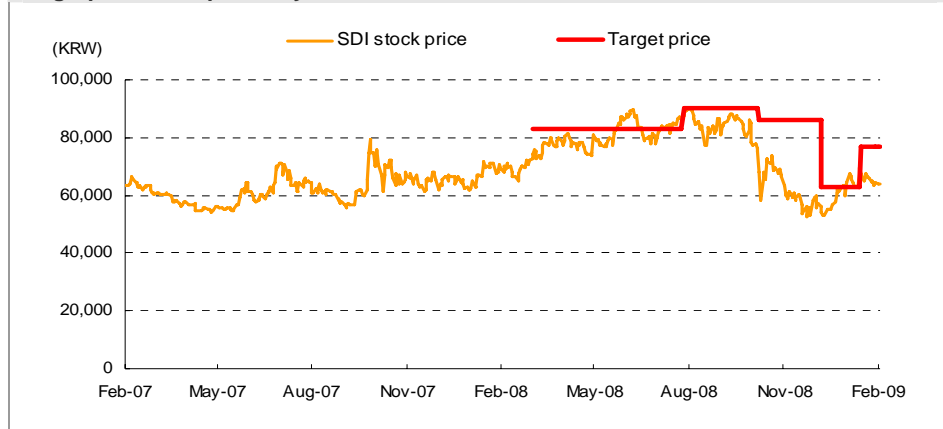
Eugene Investment & Securities introduced a new investment rating system on Apr 1, 2008.

| Revised | Previous |
|--|--|
| <ul style="list-style-type: none"> • STRONG BUY : The share price is expected to rise more than 50% • BUY: The share price is expected to rise 15%~less than 50% • HOLD: The share price is expected to rise 5%~less than 15% • REDUCE: The share price is expected to rise less than 5% | <ul style="list-style-type: none"> • BUY 1: The share price is expected to rise more than 25% • BUY 2: The share price is expected to rise 15%~less than 25% • HOLD: The share price is expected to rise 5%~less than 15% • REDUCE: The share price is expected to rise less than 5% |

Investment ratings and target prices for the past two years

| | | | | | | |
|--------|------------|------------|------------|------------|------------|------------|
| Date | 2008.03.18 | 2008.04.01 | 2008.04.10 | 2008.04.24 | 2008.06.10 | 2008.08.12 |
| Rating | HOLD | HOLD | HOLD | HOLD | HOLD | HOLD |
| TP | 83,000 | 83,000 | 83,000 | 83,000 | 83,000 | 90,000 |
| Date | 2008.09.29 | 2008.10.23 | 2008.11.17 | 2008.12.23 | 2009.01.30 | 2009.02.23 |
| Rating | HOLD | HOLD | HOLD | HOLD | HOLD | HOLD |
| TP | 90,000 | 86,000 | 86,000 | 63,000 | 77,000 | 77,000 |

Target price for the past two years



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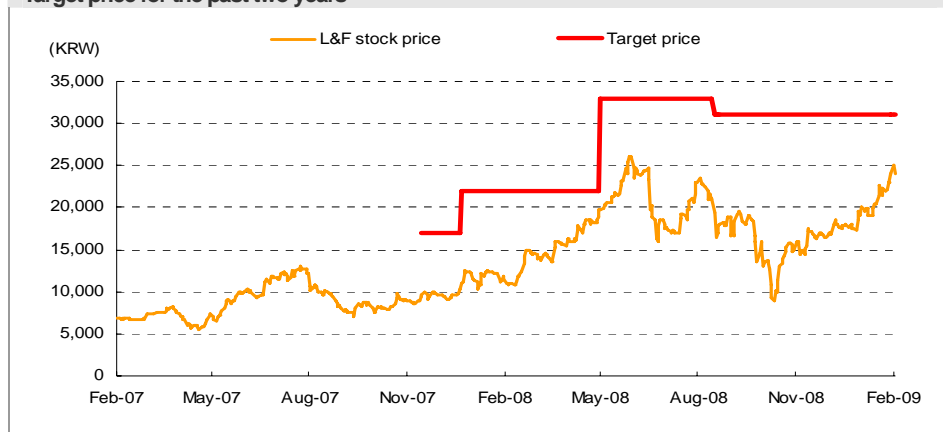
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Investment ratings and target prices for the past two years

| | | | | | | |
|--------|------------|------------|------------|------------|------------|------------|
| Date | 2007.12.10 | 2008.1.11 | 2008.2.4 | 2008.5.16 | 2008.06.10 | 2008.06.26 |
| Rating | BUY1 | BUY1 | BUY1 | STRONG BUY | STRONG BUY | STRONG BUY |
| TP | 17,000 | 22,000 | 22,000 | 33,000 | 33,000 | 33,000 |
| Date | 2008.07.25 | 2008.09.02 | 2008.09.29 | 2008.11.10 | 2008.11.17 | 2008.12.23 |
| Rating | STRONG BUY | STRONG BUY | STRONG BUY | STRONG BUY | STRONG BUY | STRONG BUY |
| TP | 33,000 | 31,000 | 31,000 | 31,000 | 31,000 | 31,000 |
| Date | 2009.02.05 | 2009.02.23 | | | | |
| Rating | BUY | BUY | | | | |
| TP | 31,000 | 31,000 | | | | |

Target price for the past two years



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