

Ecopro (086520)

Not rated

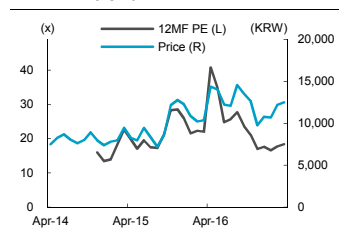
Stock price (Mar 14, KRW)	12,500
Market cap (USD mn)	232
Shares outstanding (mn)	21
52W High/Low (KRW)	15,495/8,650
6M avg. daily turnover (USD mn)	4.0
Free float (%)	81.2
Foreign ownership (%)	2.9
Major shareholders(%)	
Dongchae Lee and 10 others	18.8

Yr to	Sales	OP	NP	EPS	% chg	EBITDA	PE	EV/EBITDA	PB	ROE	DY
Dec	(W bn)	(W bn)	(W bn)	(KRW)	(YoY)	(W bn)	(x)	(x)	(x)	(%)	(%)
2014A	83	7	1	107	NM	21	69.0	9.2	1.4	2.0	0.0
2015A	107	6	0	13	(87.9)	21	943.8	14.2	2.0	0.2	0.0
2016F	170	10	4	230	1,668.6	31	47.0	9.6	1.3	3.1	0.0
2017F	315	24	14	655	184.8	49	19.1	6.0	1.4	7.4	0.0

Performance

	1M	6M	12M
Absolute (%)	7.8	(2.8)	4.8
Rel. to Kospi (%p)	4.9	(9.5)	(3.4)

12MF PE trend



Huge capacity increase to meet soaring demand

World's no. 2 NCA materials maker: Ecopro is Korea's sole producer of nickel-cobalt-aluminum oxide (NCA) anode materials for rechargeable batteries. Ecopro has the world's second-largest market share of 26% after Japan's Sumitomo. Major customers include Samsung SDI and SONY. In May 2016, Ecopro established Ecopro BM (71.9% owned) by splitting off its rechargeable batteries division. At the parent level, Ecopro is engaged in the environmental business, manufacturing industrial equipment, filters and catalysts used to curb air pollution and greenhouse gas emissions. The sales breakdown YTD 3Q16 was 80.7% rechargeable battery materials, 16.4% environmental materials and 2.9% others.

NCA is key to tackle driving range issue: The increasing penetration of electric vehicles (EV) should speed up material shipments. In 2016, the company's shipments of rechargeable battery materials grew 110.3% YoY to 4,000 tonnes, of which EV-use was limited to 150 tonnes, 3.8% of the total. But the EV-use material shipments recently appear to be growing fast. NCA has the greatest energy density among cathode materials. NCA materials were used mainly in non-IT devices that require peak high power output, such as power tools and cordless, robotic vacuum cleaners. Demand for rechargeable batteries is expected to keep increasing as non-IT device technology is trending toward larger capacities and more devices are becoming compatible with rechargeable batteries. As there will be a mounting need for greater power output and longer driving range for EV, it would accelerate demand for NCA batteries. In particular, China is expanding special treatment appreciating technological factors such as energy density and travel distance and this hints at increasing use of nickel-cobalt-manganese (NCM) batteries.

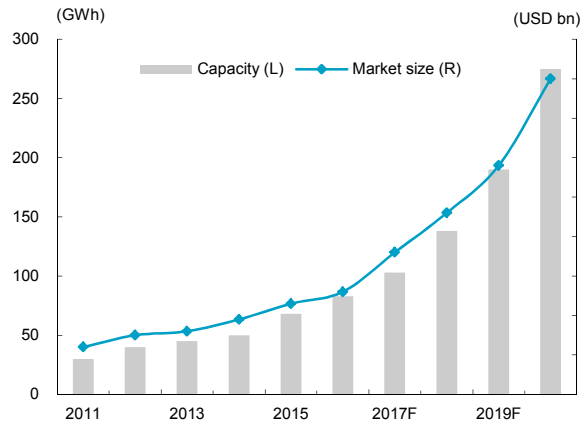
Capacity addition ahead of demand uptick: The effects of a massive capacity addition will likely soon materialize in earnest. Construction of a fifth plant (CAM4) that started in July 2016 should end in 2Q17. Accordingly, Ecopro will be equipped with the world's largest capacity of 970 tonnes per month compared to the previous 470 tonnes. To meet rising demand for rechargeable batteries, the company plans to build a sixth plant with the site already secured. At the no. 5 plant, the company will start full-fledged production of core shell gradient (CSG, advanced NCM) that combines the advantages of NCA and NCM. We believe CSG will help broaden the product portfolio.

Valuation lowered: In 2017, sales and OP should grow 85.0% and 139.5% YoY, respectively, beating the consensus forecasts. The OPM should gain 1.8%p to 7.7%. We attribute the healthy results to rechargeable battery facilities running at high utilization and a greater sales contribution from the high-margin environmental

Sangung Han
822-3276-4563
sangung@truefriend.com

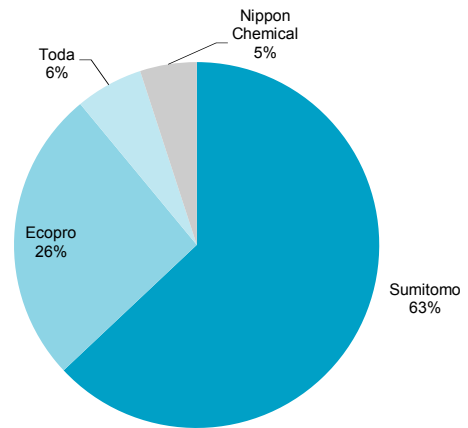
materials business. The stock trades at 19.7x 2017F PE (considering BWs), which is not burdensome. With downstream industries thriving, Ecopro's valuation multiple is rapidly getting lowered.

Figure 68. Lithium-ion battery market size



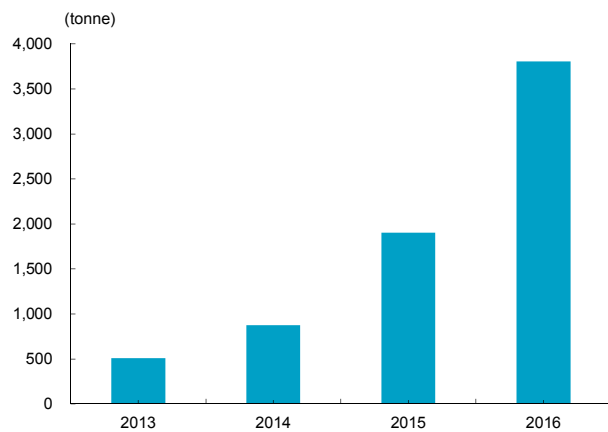
Source: SNE Research

Figure 69. Global NCA market share (2015 shipments)



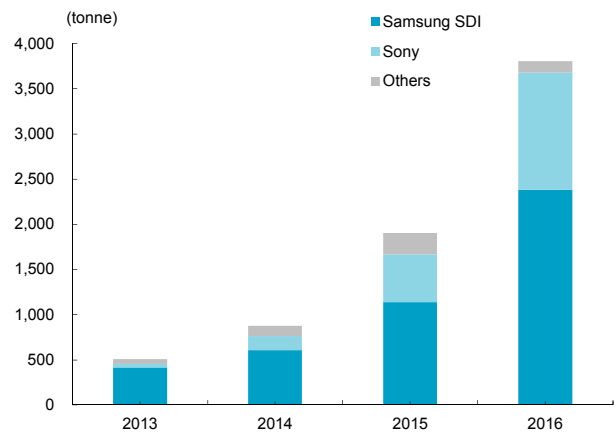
Source: Company data

Figure 70. NCA material shipments



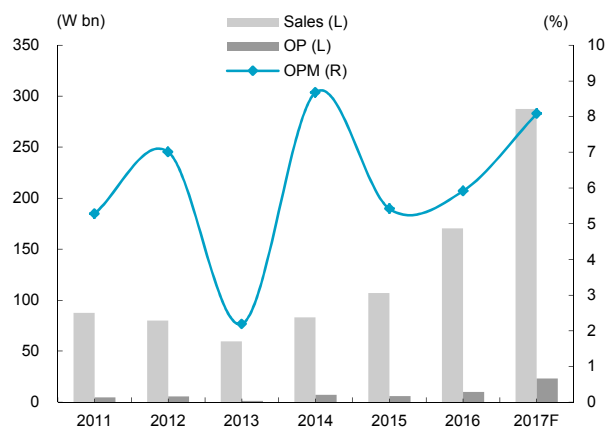
Source: Company data

Figure 71. NCA material shipments by customer



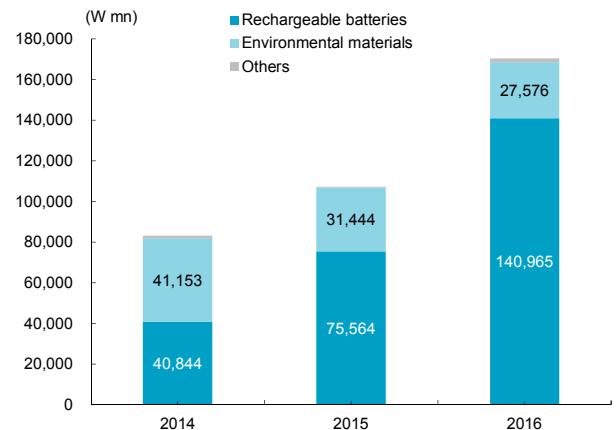
Source: Company data

Figure 72. Earnings



Source: Company data, Korea Investment & Securities

Figure 73. Sales breakdown



Source: Company data

Table 33. Capacity addition plans

Plant	Construction completion	Capacity (tonnes/month)	Note
CAM1	2008	50	NCA
CAM2	2010	150	NCA/NCM
CAM3	2015	150	NCA
CAM3N	2016	120	NCA
CAM4	2016	500	NCA/CSG
CAM5	Undecided	Over 900	NCA/CSG

Source: Company data

Table 34. Capacity and main clients at competitor

	Sumitomo	Toda	Japan Chemical Industry	Ecopro
Capacity (tonnes/month)	850	~300	~200	~470/~970
Main clients	Panasonic	Nissan/NEC	SONY	SDI/SONY

Note: With CAM4 going on stream in 2Q17, Ecopro's monthly capacity would expand from 470 tonnes to 970 tonnes

Source: Company data

Table 35. China top 10 bestselling EV (2016)

(units, USD, km, mi, kWh)

Brand	Model	Vehicles sold	Price	Driving range per charge (km)	Driving range per charge (mi)	Battery capacity	Efficiency
Beijing	Senova	38,035	34.69	210	130	38	5.5
BYD	e6	20,605	36.98	400	249	61.4	6.5
Emgrand	EC7	17,181	10.18	253	157	45.3	5.6
Zotye	Cloud 100	16,417	15.98	200	124	22	9.1
BYD	e5	15,639	24.98	305	190	48	6.4
Chery	QQ	14,936	5.28	200	124	22.3	9
Zotye	E200	13,154	7	200	124	24.5	8.2
ZD	D1	11,201	10.88	180	112	15.1	11.9
BYD Auto	Qin EV300	10,656	15.08	300	186	37.7	8
JMC	E100	9,569	6.5	150	93	15	10

Note: In China, the actual distance traveled is estimated to be one-third of the published figure.

Source: Marklines, Korea Investment & Securities

Table 36. Scheduled EV lineup

(km (mi), kWh)

Brand	Model	Driving range per charge	Battery capacity	Efficiency	Release
Tesla Motors	Model 3	362 (225)	65	5.6	2017
Opel/Vauxhall	Ampera-e	500 (311)	60	8.3	2017
VW	e-Crafter	208 (124)	43	4.8	2017
Nissan	Leaf	200 (124.3)	60	3.3	2017
Audi (VW Group)	e-tron quattro concept	500 (311)	95	5.3	2018
Jaguar	I-PACE Concept	354 (220)	90	3.9	2018
GLM	G4	400 (249)	-	-	2019
Porsche (VW Group)	Mission E	500 (311)	-	-	2020
Mitsubishi	eX Concept	400 (249)	45	8.9	2020
Mercedes-Benz (Daimler Group)	Urban eTruck	200 (124.3)	212	0.9	2020
VW	I.D. BUZZ	600 (373)	111	5.4	2020

Source: Marklines, Korea Investment & Securities

Figure 74. China EV policy revisions by industry chain

Category	New policies	Changes
Subsidy	2016-2020 new financial support program took effect from January 1, 2017	A gradual 20% subsidy cut (2017-2018 / 2019-2020)
Supporting models	2016 list replaced by new list(1 st round announcement)	Stricter technological requirements; Fewer subsidized models
Battery standards	2017 battery industry norms (to be released after expert opinion hearing)	Production capacity 3bn-5bn Gwh; Stricter technological requirements
EV manufacturers	New standards for manufacturers and products take effect from July 1, 2017	Higher entry barrier

Source: Korea Investment & Securities

Table 37. China's new policy measures for EV batteries

Date of issue	Regulator	New policy	Mechanisms
November 2016	MIIT	Guidelines for EV battery industry	- Increase capacity at lithium battery makers (0.2Gwh → 8Gw)
December 2016	MIIT	Subsidy policy for new/renewable energy (2017)	1. Electric passenger cars: Minimum battery energy density of 90wh/kg; Offer 1.1-times more subsidies if energy density exceeds 120wh/kg 2. Add indicators such as energy density, charging, energy saving for subsidies offered to electric buses
March 1, 2017	MIIT	Action plan for the development of the electric vehicle battery industry	1. Enhance affordability: Increase energy density of a single battery to more than 300wh/kg and that of a system battery to more than 260wh/kg; Reduce production cost to less than CNY1/wh 2. Secure product safety to ensure large-scale distribution 3. Cultivate a global battery maker with more than 100Gwh production capacity and 40Gwh in sales by 2020 4. Improve the technological prowess of core parts to a global level 5. Achieve the automation of batter production lines by 2020 to reduce costs

Source: MIIT, Korea Investment & Securities

Table 38. Capacity at top 20 local battery makers (end-2016)

(Gwh)

Company	Capacity	LFP	Ternary
Optimum Nano	12.0	12.0	
BYD	10.0	10.0	
Tianneng Group	8.0	6.0	2.0
CATL	7.5	3.8	3.8
CBAK	6.0		6.0
Guo Xuan	5.6	3.2	2.4
National Battery	5.0	5.0	
Wanxiang	4.0	4.0	
Zhuo Neng	3.4		3.4
Farasis	3.0		3.0
Zhihang	2.9		2.9
Yinlong	2.8		
EVE	2.5	1.5	1.0
Phylion Battery	2.5		
First Battery	2.5		2.5
Aviation Lithium Battery	2.4	2.3	0.2
Chaowei	2.3	1.0	1.3
Great Power	2.2	2.2	
Luotuo	2.0	1.5	0.5
Lishen	2.0	1.3	0.7
Total	88.6	53.8	29.7

Source: Huatai Securities, Korea Investment & Securities

Balance sheet

FY-ending Dec. (W bn)	2014A	2015A	2016F	2017F
Current Assets	57	64	126	234
Cash & Cash Equivalent	1	5	22	41
Accounts & Other Current Receivables	16	23	43	79
Inventory	33	32	55	101
Non-current Assets	128	157	229	289
Investment Assets	1	7	12	22
Tangible Assets	103	119	159	174
Intangible Assets	21	21	43	63
Total Assets	185	221	356	523
Current Liabilities	98	85	141	294
Accounts & Other Current Payables	10	15	17	32
ST debt & bond	59	66	56	46
Current prortion of LT debt	20	4	4	4
Non-current Liabilities	11	34	32	34
Debentures	3	20	20	20
LT debt & Financial Liabilities	6	10	10	10
Total Liabilities	109	119	172	328
Capital Stock	7	8	11	8
Capital Surplus	64	88	163	163
Other Reserves	(0)	0	0	0
Retained Earnings	6	6	10	24
Shareholders' Equity	77	102	183	195

Income statement

FY-ending Dec. (W bn)	2014A	2015A	2016F	2017F
Sales	83	107	170	315
Cost of Sales	65	89	142	267
Gross Profit	19	18	28	49
SG&A Expense	11	12	18	25
Operating Profit	7	6	10	24
Financial Income	0	0	1	2
Interest Income	0	0	1	2
Financial Costs	5	6	6	4
Interest Expense	5	5	5	3
Other Non-operating Gains	(1)	(2)	(3)	(5)
Gains(Losses) in Associates, Subsidiaries and JV	(1)	1	(0)	(0)
Earnings before tax	0	(1)	2	16
Income Taxes	(1)	(1)	(2)	2
Net Income	1	0	4	14
Other Comprehensive Income	(0)	(0)	(0)	(0)
Total Comprehensive Income	1	(0)	4	14
EBITDA	21	21	31	49

Cash flow

FY-ending Dec. (W bn)	2014A	2015A	2016F	2017F
C/F from operations	14	22	43	114
Net profit	1	0	4	14
Depreciation	12	14	16	18
Amortization	2	2	4	6
Net incr. in W/C	(8)	0	21	76
Others	7	6	(3)	(0)
C/F from investing	(18)	(33)	(93)	(83)
Capex	(10)	(27)	(56)	(33)
Decr. in fixed assets	0	0	0	0
Incr. in investment	(2)	(3)	(5)	(10)
Net incr. in intangible assets	(6)	(2)	(26)	(27)
Others	1	0	(6)	(13)
C/F from financing	3	14	68	(12)
Incr. in equity	0	2	78	(2)
Incr. in debt	6	15	(10)	(10)
Dividends	0	0	0	0
Others	(3)	(3)	0	0
C/F from others	0	0	0	0
Increase in cash	(1)	3	18	19

Note: K-IFRS (consolidated)

Key financial data

FY-ending Dec.	2014A	2015A	2016F	2017F
Per-share data (KRW)				
EPS	107	13	230	655
BPS	5,187	6,003	8,584	9,114
DPS	0	0	0	0
Growth (%)				
Sales growth	39.7	28.9	58.9	85.0
OP growth	453.2	(19.5)	73.5	139.5
NP growth	NM	(87.3)	2,200.5	220.8
EPS growth	NM	(87.9)	1,668.6	184.8
EBITDA growth	53.0	0.0	43.4	58.2
Profitability (%)				
OP margin	8.7	5.4	5.9	7.7
NP margin	1.8	0.2	2.6	4.4
EBITDA margin	25.7	20.0	18.0	15.4
ROA	0.8	0.1	1.5	3.2
ROE	2.0	0.2	3.1	7.4
Dividend yield	0.0	0.0	0.0	0.0
Dividend payout ratio	0.0	0.0	0.0	0.0
Stability				
Net debt (W bn)	91	93	64	33
Debt/equity ratio (%)	126.1	97.8	48.9	40.9
Valuation (x)				
PE	69.0	943.8	47.0	19.1
PB	1.4	2.0	1.3	1.4
EV/EBITDA	9.2	14.2	9.6	6.0

■ **Guide to Korea Investment & Securities Co., Ltd. stock ratings based on 12-month forward share price performance relative to the market index**

- BUY: Expected to outperform the market index by 15%p or more
- Hold: Expected to underperform or outperform the market index by less than 15%p
- Underweight: Expected to underperform the market index by 15%p or more
- Korea Investment & Securities does not offer target prices for stocks with Hold or Underweight ratings.

■ **Guide to Korea Investment & Securities Co., Ltd. stock rating allocation (as of Dec 31, 2016)**

BUY	Hold	Underweight (Sell)
77.6%	21.1%	1.3%

Note: % of companies under coverage with this rating

■ **Guide to Korea Investment & Securities Co., Ltd. sector ratings for the next 12 months**

- Overweight: Recommend increasing the sector's weighting in the portfolio compared to its respective weighting in the Kospi (Kosdaq) based on market capitalization.
- Neutral: Recommend maintaining the sector's weighting in the portfolio in line with its respective weighting in the Kospi (Kosdaq) based on market capitalization.
- Underweight: Recommend reducing the sector's weighting in the portfolio compared to its respective weighting in the Kospi (Kosdaq) based on market capitalization.

■ **Analyst Certification**

I/We, as the research analyst/analysts who prepared this report, do hereby certify that the views expressed in this research report accurately reflect my/our personal views about the subject securities and issuers discussed in this report. I/We do hereby also certify that no part of my/our compensation was, is, or will be directly or indirectly related to the specific recommendations or views contained in this research report.

■ **Important compliance notice**

As of the end of the month immediately preceding the date of publication of the research report or the public appearance (or the end of the second most recent month if the publication date is less than 10 calendar days after the end of the most recent month), Korea Investment & Securities Co., Ltd., or its affiliates does not own 1% or more of any class of common equity securities of the companies mentioned in this report.

There is no actual, material conflict of interest of the research analyst or Korea Investment & Securities Co., Ltd., or its affiliates known at the time of publication of the research report or at the time of the public appearance.

Korea Investment & Securities Co., Ltd., or its affiliates has not managed or co-managed a public offering of securities for the companies mentioned in this report in the past 12 months;

Korea Investment & Securities Co., Ltd., or its affiliates has not received compensation for investment banking services from the companies mentioned in this report in the past 12 months; Korea Investment & Securities Co., Ltd., or its affiliates does not expect to receive or intend to seek compensation for investment banking services from the companies mentioned in this report in the next 3 months.

Korea Investment & Securities Co., Ltd., or its affiliates was not making a market in securities of the companies mentioned in this report at the time that the research report was published.

Korea Investment & Securities Co., Ltd. does not own over 1% of Hanon Systems, S&T Motiv, Woory Industrial, L&F, Ecopro and People & Technology shares as of March 16, 2017.

Korea Investment & Securities Co., Ltd. owns over 1% of Creative & Innovative System shares as of March 16, 2017.

Korea Investment & Securities Co., Ltd. has not provided this report to various third parties.

Neither the analyst/analysts who prepared this report nor their associates own any shares of the company/companies mentioned in this report as of March 16, 2017.

Korea Investment & Securities Co., Ltd. has lead-managed an initial public offering of Creative & Innovative System Corporation.

Prepared by: Jinwoo Kim

Global Disclaimer

■ General

This research report and marketing materials for Korean securities are originally prepared and issued by the Research Center of Korea Investment & Securities Co., Ltd., an organization licensed with the Financial Supervisory Service of South Korea. The analyst(s) who participated in preparing and issuing this research report and marketing materials is/are licensed and regulated by the Korea Financial Investment Association in Korea only. This report and marketing materials are copyrighted and may not be copied, redistributed, forwarded or altered in any way without the consent of Korea Investment & Securities Co., Ltd.

This research report and marketing materials are for information purposes only. They are not and should not be construed as an offer or solicitation of an offer to purchase or sell any securities or other financial instruments or to participate in any trading strategy. This research report and marketing materials do not provide individually tailored investment advice. This research report and marketing materials do not take into account individual investor circumstances, objectives or needs, and are not intended as recommendations of particular securities, financial instruments or strategies to any particular investor. The securities and other financial instruments discussed in this research report and marketing materials may not be suitable for all investors. The recipient of this research report and marketing materials must make their own independent decisions regarding any securities or financial instruments mentioned herein and investors should seek the advice of a financial adviser. Korea Investment & Securities Co., Ltd. does not undertake that investors will obtain any profits, nor will it share with investors any investment profits. Korea Investment & Securities Co., Ltd., its affiliates, or their affiliates and directors, officers, employees or agents of each of them disclaim any and all responsibility or liability whatsoever for any loss (director consequential) or damage arising out of the use of all or any part of this report or its contents or otherwise arising in connection therewith. Information and opinions contained herein are subject to change without notice and may differ or be contrary to opinions expressed by other business areas of Korea Investment & Securities Co., Ltd. The final investment decision is based on the client's judgment, and this research report and marketing materials cannot be used as evidence in any legal dispute related to investment decisions.

■ Country-specific disclaimer

United States: This report is distributed in the U.S. by Korea Investment & Securities America, Inc., a member of FINRA/SIPC, and is only intended for major U.S. institutional investors as defined in Rule 15a-6(a)(2) under the U.S. Securities Exchange Act of 1934. All U.S. persons that receive this document by their acceptance thereof represent and warrant that they are a major U.S. institutional investor and have not received this report under any express or implied understanding that they will direct commission income to Korea Investment & Securities Co., Ltd. or its affiliates. Pursuant to Rule 15a-6(a)(3), any U.S. recipient of this document wishing to effect a transaction in any securities discussed herein should contact and place orders with Korea Investment & Securities America, Inc., which accepts responsibility for the contents of this report in the U.S. The securities described in this report may not have been registered under the U.S. Securities Act of 1933, as amended, and, in such case, may not be offered or sold in the U.S. or to U.S. person absent registration or an applicable exemption from the registration requirement.

United Kingdom: This report is not an invitation nor is it intended to be an inducement to engage in investment activity for the purpose of section 21 of the Financial Services and Markets Act 2000 of the United Kingdom ("FSMA"). To the extent that this report does constitute such an invitation or inducement, it is directed only at (i) persons who are investment professionals within the meaning of Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (as amended) of the United Kingdom (the "Financial Promotion Order"); (ii) persons who fall within Articles 49(2)(a) to (d) ("high net worth companies, unincorporated associations etc.") of the Financial Promotion Order; and (iii) any other persons to whom this report can, for the purposes of section 21 of FSMA, otherwise lawfully be made (all such persons together being referred to as "relevant persons"). Any investment or investment activity to which this report relates is available only to relevant persons and will be engaged in only with relevant persons. Persons who are not relevant persons must not act or rely on this report.

Hong Kong: This research report and marketing materials may be distributed in Hong Kong to institutional clients by Korea Investment & Securities Asia Limited (KISA), a Hong Kong representative subsidiary of Korea Investment & Securities Co., Ltd., and may not otherwise be distributed to any other party. KISA provides equity sales service to institutional clients in Hong Kong for Korean securities under its sole discretion, and is thus solely responsible for provision of the aforementioned equity selling activities in Hong Kong. All requests by and correspondence with Hong Kong investors involving securities discussed in this report and marketing materials must be effected through KISA, which is registered with The Securities & Futures Commission (SFC) of Hong Kong. Korea Investment & Securities Co., Ltd. is not a registered financial institution under Hong Kong's SFC.

Singapore: This report is provided pursuant to the financial advisory licensing exemption under Regulation 27(1)(e) of the Financial Advisers Regulation of Singapore and accordingly may only be provided to persons in Singapore who are "institutional investors" as defined in Section 4A of the Securities and Futures Act, Chapter 289 of Singapore. This report is intended only for the person to whom Korea Investment & Securities Co., Ltd. has provided this report and such person may not send, forward or transmit in any way this report or any copy of this report to any other person. Please contact Korea Investment & Securities Singapore Pte Ltd in respect of any matters arising from, or in connection with, the analysis or report (Contact Number: 65 6501 5600).