

Clearing the Smoke on E-Cigarettes

■ Preliminary Primer on Electronic Cigarettes (E-Cigarettes)

Given Lorillard's recent acquisition of blu cigs (for \$135 mm), we thought it would be a good idea to put together a preliminary primer on the emerging e-cigarette category. Our analysis is based on discussions with retailers, distributors and industry experts as well as publicly available data on the category. We plan to follow up this primer with updates/news as it becomes available.

■ Early Stage Research Take Aways

1) The e-cigarette category has been growing in triple-digit territory, reaching an estimated \$250 mm during 2011 and is expected to double to \$500 mm by the end of 2012. 2) The estimated incremental annual revenue generated by the US e-cigarette market in 2012 will be greater than the moist smokeless tobacco category. 3) On an every day basis (excluding starter kits), consuming e-cigarettes is cheaper than traditional smoking (and margins are very high for the manufacturers). 4) The regulatory picture (federal/state) is still very unclear.

■ Barriers to Entry Higher than You Think?

While the electronic cigarette market is growing quickly (with new brands introduced by the day), the cost of competing is also rising. Just 2 days before being acquired by Lorillard, blu cigs settled a lawsuit with Dragonite (the Hong Kong based holder of 5 global patents for quality e-cig designs), granting blu cigs a license to the patent. However, with only a handful of patents in the industry, smaller players may have to pay for licenses to compete legally. Another concern is regulation where the FDA has not made a decision on how to regulate e-cigarettes (leaving open questions about the category's true potential).

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www.ubs.com/investmentresearch**Nik Modi**Analyst
nik.modi@ubs.com
+1-212-713 2204**Benjamin Schmid**Associate Analyst
benjamin.schmid@ubs.com
+1-212-713 6268**Russell Miller**Associate Analyst
russell.miller@ubs.com
+1-212-713 7983

Key Points

- (1) Since being introduced to the US from China in 2007, the e-cig category has been growing in triple-digit territory, reaching an estimated \$250 mm during 2011 and is expected to double to \$500 mm by the end of 2012. Looking ahead the Tobacco Vapor Electronic Cigarette Association expects the category to quadruple by mid 2014.
- (2) We estimate that incremental annual revenue generated by the US e-cigarette market will be greater than the moist smokeless tobacco category. We estimate e-cigarette sales may more than double in 2012, generating an additional \$250 mm in incremental tobacco revenue – over \$100 mm more than the moist smokeless category which we expect to grow by 5% or \$128 mm.
- (3) On April 23rd, 2 days before its announced acquisition by Lorillard, blu cigs settled a patent dispute with Dragonite/Ruyan (a Hong Kong based company) who reportedly owns the exclusive patent rights to specific high quality e-cigarette technologies internationally. Blu cigs' settlement (likely a prerequisite to Lorillard acquiring the company) grants blu cigs use of Dragonite's patent without further disruption in exchange for an undisclosed amount and continuing royalty. This settlement immediately raises the question if the barriers to entry in the e-cigarette market are higher than many currently believe.
- (4) In 2009 the FDA blocked the import of e-cigarettes from China, classifying them as a drug delivery device subject to regulation under the Food, Drug and Cosmetic Act (similarly to how the FDA regulates nicotine gum and patches). However, this classification was challenged in court by e-cigarette manufacturer, NJoy, who claimed e-cigarettes should be regulated like tobacco products, not nicotine replacement therapy or drug delivery devices. After NJoy and other manufacturers proved in court that e-cigs are marketed like any other tobacco product (not specifically as a method for smokers to quit), on December 7, 2010, Judge Leon and the appeals court ruled against the FDA 3-0 stating "the devices should be regulated at tobacco products rather than drug or medical products." The FDA appealed the ruling and the District of Columbia Circuit Court denied hearing the appeal on January 24, 2011.
- (5) While we are optimistic the FDA will not ban e-cigarettes as science indicates e-cigarettes are less harmful than regular cigarettes, there are many issues around e-cigarettes the FDA has to evaluate including the levels of nicotine in e-cigarette cartridges and ways the products can legally be marketed, including online methods. Some industry experts feel the FDA will allow tobacco companies to sell e-cigarettes with low levels of nicotine and will allow pharmaceutical companies to market prescription e-cigarettes with much higher levels of nicotine.

E-Cigarette 101

The very first electronic cigarette was developed by Herbert A. Gilbert in 1962 and was described in its patent as "...a smokeless non-tobacco cigarette ... to provide a safe and harmless means for and method of smoking by replacing burning tobacco and paper with heated, moist, flavored air..." However, due to limitations in technology and because tobacco was not widely accepted as harmful at the time, the device never reached manufacturing.

The modern electronic cigarette was invented by Chinese pharmacist Hon Lik in 2003 and introduced to the Chinese market the following year. The company he worked for, Golden Dragon Holdings, changed its name to Ruyan (meaning "to resemble smoking"), and started exporting its products in 2005–2006, before receiving the first international patent in 2007.

Unlike Nicotine Replacement Therapy products (NRTs) such as nicotine gums and patches, an electronic cigarette looks and is used just like a regular cigarette. Typical e-cigarettes have 3 parts; a rechargeable lithium battery, atomizer (which heats up the cartridge ingredients to create vapor) and a flavor cartridge which contains the ingredients or e-liquid. The most common e-cigarette ingredients are nicotine, propylene glycol (sometimes substituted with vegetable glycerol like in Lorillard's blu cigs), flavoring and water. This compares to more than 7,000 dangerous chemicals involved in smoking cigarettes including carbon monoxide, polonium, formaldehyde, cadmium and ammonium to name a few.

High-end more modern e-cigarettes (like in the diagram) combine the atomizer and cartridge into one piece, making the e-cigarette easier to put together. The key theme behind e-cigarette design is to make it very comparable to a real cigarette which makes using e-cigarettes a much easier transition for traditional smokers.



Source: Lorillard, blu cigs

E-Cigarettes (Today) = e Commerce (Late 1990's)?

Today, the e-cigarette category is very fragmented with well over 100 individual brands. Most of these brands are owned by very small companies who import e-cigarettes from China and then sell them to consumers exclusively online. We liken the current boom in e-cigarette companies to the e-Commerce boom in the late 1990s (where ultimately only a handful of companies became viable businesses).

What E-Cigarettes are Consumers Buying?

In the table below are assessments of popular e-cigarette brands and their qualities.

Table 1: The Top 20 Electronic Cigarette Brands

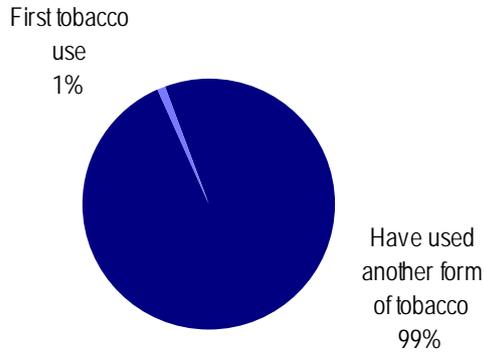
Brand	Starter Kit Price	Commentary
White Cloud	\$179.95	The high-end premium e-cig, cartridges use proprietary technology for the most consistent smoke, great battery, unique "iPod" like packaging
Vapor King	\$79.95	Produces very thick vapor which is key for some e-cig users, offers cigs in white and orange, black and blue and, pink and purple
NJOY	\$71.95	Gained distribution with 7-11, is one of the original e-cig brands, very easy to change cartridges but has few models to choose from
Green Smoke	\$69.99	First brand to introduce 2-part design that combines nicotine cartridge with atomizer, offers wide variety of well received flavors
blu cigs	\$69.95	Recently acquired by Lorillard, more stylish than other e-cigs with unique blue light, has on the go charger, lights up when near other e-cig users
Smoke Frii	\$67.95	Standard e-cig sold in 2 piece design, looks and feels like the user is smoking a regular cigarette which helps many with the switch
Volcano	\$64.99	Offers both two and three piece designs, has brand appeal and cartridges come in very unique flavors including Cherry Lava, Aloha Apple, and Pearadise
South Beach Smoke	\$59.99	Offers e-cigs in both a high quality two-piece design (Deluxe) and cheaper three-piece (Premium), one of the newer brands, brand name may have appeal
EverSmoke	\$59.99	A new brand, well designed and offered in multiple sizes, very unique charging case allows consumer to charge on the go
Pure	\$59.99	Has a "Pure Express Kit" for \$19.99, a much cheaper, simpler entry point for those trying out e-cigs, offers on the go charging
v2cigs	\$59.95	Offer great value and said to generate lots of vapor which is a positive among e-cig consumers
Safe Cig	\$59.95	The original e-cig, introduced the e-cig to the US in 2006, the most user friendly cigarette, comes with detailed guide on e-cig usage
Halo Cigs	\$54.99	Unlike most e-cigs Halo sells bottles of their own e-liquid, so users can refill their own cartridges, they also sell regular e-cigs but their focus is on e-liquid
Luci	\$54.99	Products have a sleek design and users can earn customer reward points when they buy new products and refer friends
Smoke Tip	\$53.95	Unique "Eazy-Drag" system uses an atomizer that enables users to puff with less effort, avg smoker gets up to 250 puffs per cartridge
Premium	\$49.95	Largest selection of cigarette flavors, with 18 cartridge flavors, also offers an electronic cigar and an electronic pipe
eSmoke	\$49.95	An original e-cig brand in the US, all of their products are three-piece assemblies, offers small e-cigs that look like real cigarettes
Bull Smoke	\$49.00	A new e-cig on the market, offers 10 flavors, battery life is above average, while name and bull logo have consumer appeal
ProSmoke	\$29.95	Very value oriented, uses original three-piece design, uses Vegetable Glycerin instead Propylene Glycol which produces more vapor with less throat irritation
Smokeless Image	\$29.95	Wide range of starter kits and e-cig colors appeal to wide consumer base, one of the cheapest e-cigs on the market
Average	\$63.87	

Source: Electronic Cigarette Reviews

Who's Buying E-Cigarettes?

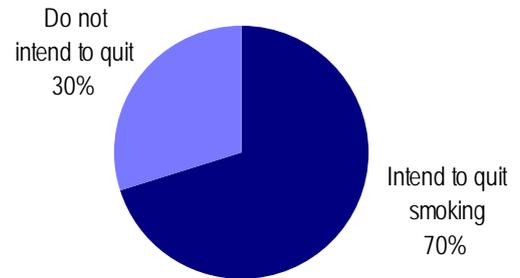
We provide some statistics on e-cigarette users in the charts below. Data is of course sparse on consumer usage given the relative nascent stage of the category.

Chart 1: 99% of e-cig users have used other tobacco products



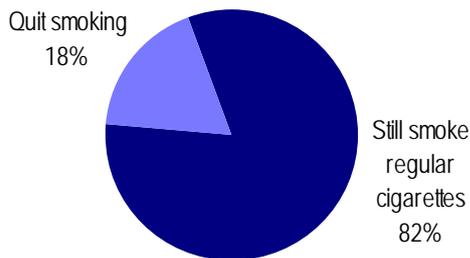
Source: ECH Research/Opinionaire

Chart 2: 70% use e-cigs with the intention to quit smoking



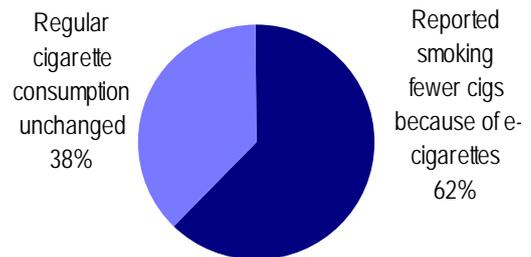
Source: ECH Research/Opinionaire

Chart 3: 82% reported smoking still smoking cigarettes...



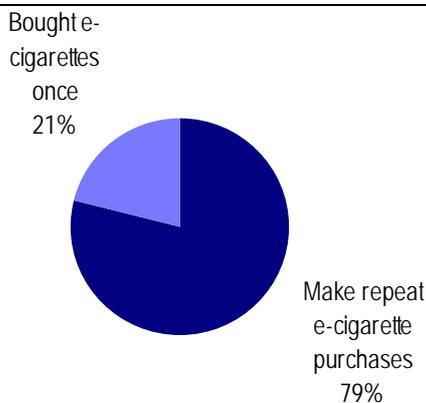
Source: ECH Research/Opinionaire

Chart 4: ...However 62% of those smoke fewer cigarettes



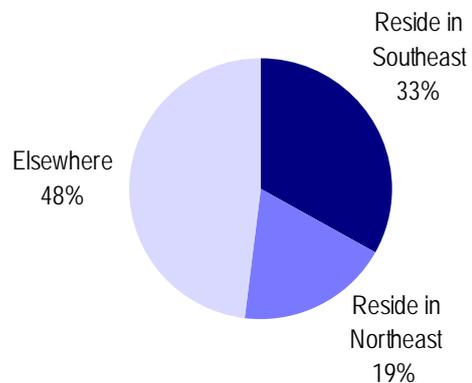
Source: ECH Research/Opinionaire

Chart 5: 79% make repeat purchases of e-cigs



Source: ECH Research/Opinionaire

Chart 6: Most e-cigarette users reside in the South

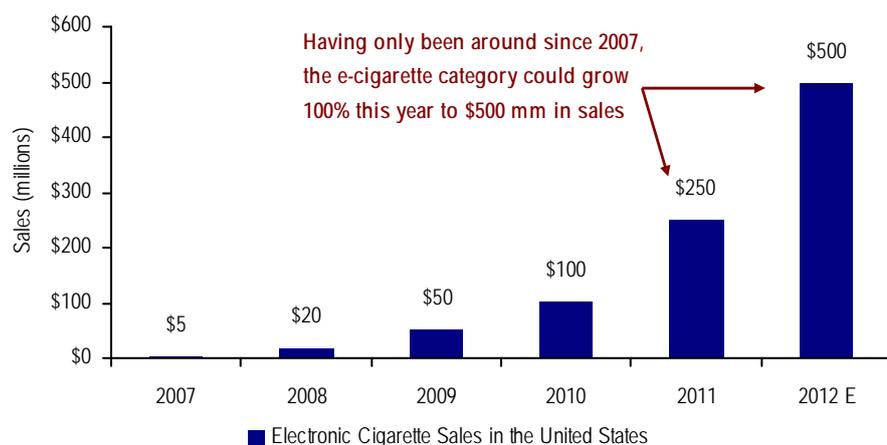


Source: ECH Research/Opinionaire

E-Cigarette Sales are Growing at Triple Digit Rates

Since being introduced to the US from China in 2007, the E-cig category has been growing in triple-digit territory, reaching an estimated \$250 mm during 2011 and is expected to double to \$500 mm by the end of 2012. Looking ahead the Tobacco Vapor Electronic Cigarette Association expects the category to quadruple by mid 2014 after growing 233% last year from 750,000 units sold in 2010 to 2.5 million in 2011.

Chart 7: The e-cigarette category has grown over 100% annually since its introduction to the US market



Source: UBS estimates

We believe category growth will be driven by 3 drivers:

1) Relative Risk

Despite the fact that e-cigarettes are not approved by the FDA (unlike nicotine gums and patches) the available science seems pretty clear that e-cigarettes carry a lower harm profile than traditional cigarettes. Because e-cigarette use does not involve combustion nor the 7,000 harmful chemicals included in cigarettes, e-cigarettes are touted by tobacco control experts, including Bill Godshall of Smoke Free Pennsylvania, as being 99% less harmful than regular cigarettes.

2) Lower Peripheral Risk

By only emitting odorless, toxic free vapor, e-cigarettes can be used in the presence of others without exposing them to the risks of second hand smoke. According the Center for Disease Control (CDC), those who are frequently exposed to second hand smoke (often at home or work) are 20-30% more likely to develop lung cancer or heart disease to someone who is not exposed. All in all, second hand smoke contains over 70 cancer causing chemicals and is responsible for nearly 50,000 premature deaths in the United States each year, according to CDC.

3) "Vaping" is Cheaper than Smoking

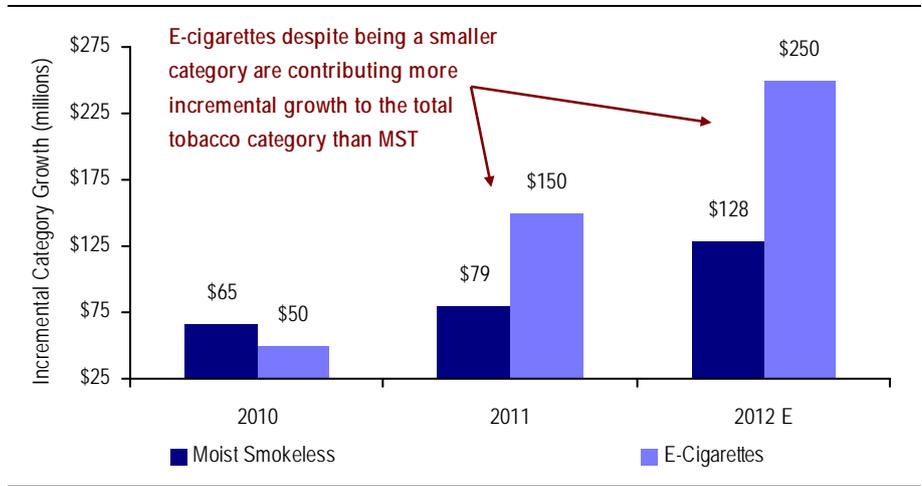
A pack a day smoker could end up spending over \$1,825 a year on cigarettes (assuming \$5 per pack), which is \$1,150 more than the average annual cost of e-

cigarettes which would cost a pack a day smoker \$675 annually. This is excluding any incremental health care expenses related to smoking cigarettes as well as any life and health insurance premiums a cigarette smoker is required to pay. We do note however, the initial ~\$60 starter kit cost of e-cigarettes often deters smokers at the counter, who could satisfy their immediate needs with a \$5 pack of cigarettes.

Small Category but Meaningful Incremental Growth Contribution

Interestingly, the estimated incremental annual revenue generated by the US e-cigarette market will be greater than the moist smokeless tobacco category. We estimate e-cigarette sales may more than double in 2012, generating an additional \$250 mm in incremental tobacco revenue – over \$100 mm more than the moist smokeless category which we expect to grow by 5% or \$128 mm.

Chart 8: E-cigarettes will contribute more incremental growth than MST in 2012



Source: UBS estimates

Barriers to Entry Could be Higher than Many Believe

On April 23rd, 2 days before its announced acquisition by Lorillard, blu cigs settled a patent dispute with Dragonite/Ruyan (a China based company) who reportedly owns the exclusive patent rights to a specific high quality e-cigarette technology internationally. Blu cigs' settlement (likely a prerequisite to Lorillard acquiring the company) grants blu cigs use of Dragonite's patent without further disruption in exchange for an undisclosed amount and continuing royalty. This settlement immediately raises the question if the barriers to entry in the e-cigarette market are higher than many currently believe.

Having already acquired the license to Dragonite's high quality, specific e-cigarette patent, blu cigs gains significant credibility and can continue to expand its distribution (recently gained distribution at Canadian C-store giant Couche Tard) without disruption. Meanwhile, smaller players and new entrants to the category may find themselves knocking at Dragonite's door for potentially expensive patent rights or in court on intellectual property violations.

Regulation Update

Without official FDA approval, the FDA is a significant X-factor on the future development of the e-cigarette category (though the science seems pretty consistent that e-cigarettes are significantly less harmful than traditional tobacco products).

1) FDA Watch

In 2009 the FDA blocked the import of e-cigarettes from China, classifying them as a drug delivery device subject to regulation under the Food, Drug and Cosmetic Act (similarly to how the FDA regulates nicotine gum and patches). However, this classification was challenged in court by e-cigarette manufacturer, NJoy, who claimed e-cigarettes should be regulated like tobacco products, not nicotine replacement therapy or drug delivery devices. After NJoy and other manufacturers proved in court that e-cigs are marketed like any other tobacco product (not specifically as a method for smokers to quit), on December 7, 2010, Judge Leon and the appeals court ruled against the FDA 3-0 stating “the devices should be regulated at tobacco products rather than drug or medical products.” In effect this ruling then immediately lifted the ban on importing e-cigarettes from China and left e-cigarettes to be evaluated and approved by the FDA under the Family Smoking and Tobacco Control Act of 2009. The FDA appealed the ruling and the District of Columbia Circuit Court then denied hearing the appeal on January 24, 2011.

While we are optimistic the FDA will not ban e-cigarettes as science indicates e-cigarettes are less harmful than regular cigarettes, there are many issues around e-cigarettes the FDA has to evaluate including the levels of nicotine in e-cigarette cartridges and ways the products can legally be marketed, including online methods. Some industry experts feel the FDA will allow tobacco companies to sell e-cigarettes with low levels of nicotine and will allow pharmaceutical companies to market prescription e-cigarettes with much higher levels of nicotine.

2) Local Legislation

Much of e-cigarette regulation will be determined by local governments and municipalities. One of the greatest benefits of e-cigarettes is that since they are odorless and do not emit toxic smoke, they theoretically can be used where cigarettes cannot; however some states are banning their public use. Below are the most recent state and local regulatory updates.

- **Massachusetts** Board of Health in conjunction with 30 local Massachusetts communities outlawed the sale of tobacco products in pharmacies, including e-cigarettes. 27 of those municipalities also outlawed smoking e-cigarettes in public places despite the fact that there is no scientific evidence indicating exhaled vapour poses a health hazard to bystanders.
- **California's** Governor Schwarzenegger vetoed a bill that would ban the sale of electronic cigarettes within the state on grounds stating that "if adults want to purchase and consume these products with an understanding of the associated health risks, they should be able to do so."
- **New Jersey** voted to treat e-cigarettes as tobacco products in 2009 under the New Jersey Smoke Free Air Act. Assemblywoman Conney Wagner who sponsored the legislation argued that e-cigs "looked like the real thing," and because of their flavoring could appeal to children.
- **New Hampshire** banned the sale of electronic cigarettes to minors in July 2010 through legislation driven by a group called "Breathe New Hampshire." Members of the group argued that e-cigarettes are trendy like any other new electronic device and would appeal to minors like a new cell phone.
- **Arizona's** legislature has passed a ban on selling e-cigarettes to minors and is now waiting governor approval.
- **Washington's** King County board of health banned smoking e-cigarettes in public in addition to banning their sale to minors. Washington's Pierce County also prohibits e-cigarette sales to minors.
- **Maryland** also recently banned the sale of e-cigs to minors after passing legislation introduced by Delegate Aruna Miller.
- **Iowa's** Linn County regulates e-cigarettes with other tobacco products and requires retailers who sell e-cigarettes to have a retail tobacco license.
- **Oregon** - while the **Federal Aviation Administration** has not ruled on e-cigarette usage on planes, a February 2012 Continental Airlines flight was diverted back to its original airport in Oregon after a passenger refused to stop using an e-cigarette after being asked to stop. Individual airlines are permitted by the FAA to establish their own policies on e-cigarettes.

■ **Statement of Risk**

The tobacco industry is highly regulated, and faces litigation, and legislation risk. Other risks associated with tobacco stocks are increases in excise taxes, smoking bans, and negative pricing prospects.

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UBS 12-Month Rating	Rating Category	Coverage ¹	IB Services ²
Buy	Buy	51%	34%
Neutral	Hold/Neutral	40%	35%
Sell	Sell	9%	15%
UBS Short-Term Rating	Rating Category	Coverage ³	IB Services ⁴
Buy	Buy	less than 1%	25%
Sell	Sell	less than 1%	17%

1:Percentage of companies under coverage globally within the 12-month rating category.

2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.

3:Percentage of companies under coverage globally within the Short-Term rating category.

4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Rating allocations are as of 31 March 2012.

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UBS 12-Month Rating	Definition
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Market Return Assumption (MRA) is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium).

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Company Disclosures

Company Name	Reuters	12-mo rating	Short-term rating	Price	Price date
Lorillard ¹⁶	LO.N	Buy	N/A	US\$128.96	14 May 2012

Source: UBS. All prices as of local market close.

Ratings in this table are the most current published ratings prior to this report. They may be more recent than the stock pricing date

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Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report.

Lorillard (US\$)



Source: UBS; as of 14 May 2012

Note: On August 4, 2007 UBS revised its rating system. (See 'UBS Investment Research: Global Equity Rating Definitions' table for details). From September 9, 2006 through August 3, 2007 the UBS ratings and their definitions were: Buy 1 = FSR is > 6% above the MRA, higher degree of predictability; Buy 2 = FSR is > 6% above the MRA, lower degree of predictability; Neutral 1 = FSR is between -6% and 6% of the MRA, higher degree of predictability; Neutral 2 = FSR is between -6% and 6% of the MRA, lower degree of predictability; Reduce 1 = FSR is > 6% below the MRA, higher degree of predictability; Reduce 2 = FSR is > 6% below the MRA, lower degree of predictability. The predictability level indicates an analyst's conviction in the FSR. A predictability level of '1' means that the analyst's estimate of FSR is in the middle of a narrower, or smaller, range of possibilities. A predictability level of '2' means that the analyst's estimate of FSR is in the middle of a broader, or larger, range of possibilities. From October 13, 2003 through September 8, 2006 the percentage band criteria used in the rating system was 10%.

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