

June 6, 2013

## Silver Industry Costs

### What Silver Costs

Capitalizing on the in-depth gold industry analysis “[What Gold Costs](#)”, BMO Research has applied the same methodology to the Silver sector. As with the Gold Sector, the Silver sector has experienced substantial cost escalation and consumes free cash flow. The prevailing cost metrics understate the full cost of silver mining.

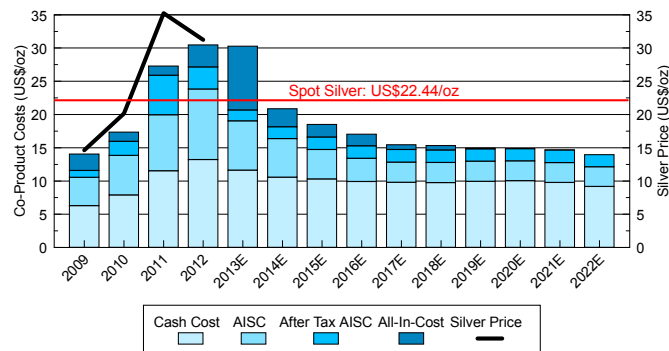
- 1: BMO Research expects silver companies to move in the direction of their gold peers and adopt “All-In-Sustaining-Cost” (AISC) accounting. BMO Research has extended AISC to capture interest and tax for After-Tax-AISC and then to include development (greenfield) capital for All-In-Costs.
- 2: At prevailing metal prices, silver stocks under coverage have costs below spot using cash costs. 42% of silver companies have AISC below spot, and only Fresnillo has All-In-Costs below spot silver.
- 3: As with the Gold Sector, greater fiscal discipline is required in the Silver Sector.

#### Outperform rated stocks to highlight include:

- + Silver Wheaton
- + Hochschild
- + Mandalay
- + Tahoe
- + MAG Silver
- + Bear Creek

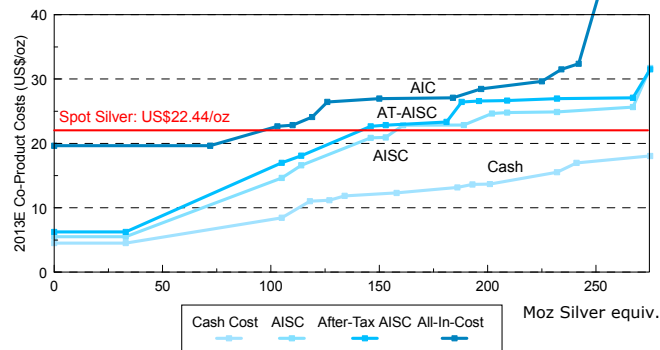
Lower All-In-Cost silver stocks include: Fresnillo and silver stream company Silver Wheaton.

Fig 1: Silver Stocks Have a Track Record of Spending to the Limit



Source: BMO Capital Markets

Fig 2: Only One BMO Silver Stock Has All-In-Costs Below Spot



Source: BMO Capital Markets

By 2015E, Tahoe, Mandalay, Hochschild and First Majestic also move to the better half of the All-In-Cost curve.

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# 1. What Silver Costs

**Substantial cost escalation over the past five years.**

**Silver sector industry continues to consume free cash flow.**

**The prevailing cash cost metric understates the full costs of silver mining.**

**BMO expects silver companies to follow the lead of the WGC and adopt All-In-Sustaining-Costs.**

**BMO Analysis also highlights the risk of using by-product accounting for the silver sector.**

**Total Cash Costs  
+ Corporate G&A + Other  
+ Exploration Expense  
+ Brownfield Capital  
= All-In-Sustaining-Costs  
+ Tax & Interest  
= After-Tax-AISC  
+ Greenfield Capital  
= All-In-Costs**

**BMO Research silver stocks have costs below spot at:  
~100% using Cash Costs  
<42% using AISC  
<25% using AT-AISC  
<only Fresnillo using AIC**

Like their gold peers, the silver industry has experienced substantial cost escalation in the last several years driven by lower cut-off grades, higher input costs (e.g., labour, energy and consumables), weaker US\$ currency, and price-linked costs (e.g., royalties).

The price of silver has undergone several "shock" declines since reaching a peak of US\$49.80/oz in April 2011. The recent decline of mid-April when silver declined 18% to ~US\$22/oz has come without commensurate cost pressure relief, which is resulting in margin squeeze.

More worrying, silver stocks within the BMO Research Coverage Universe have posted negative Free Cash Flow (Cash Flow from Operations less all Capital) for two of the last five years (including 2013E) while any positive FCF results have been relatively modest.

Silver stocks have taken advantage of by-product accounting in an effort to show the lowest (best) costs. Reallocation of costs into capital, or into corporate costs, is also a trick of the trade employed by the silver sector to offer the appearance of lower costs.

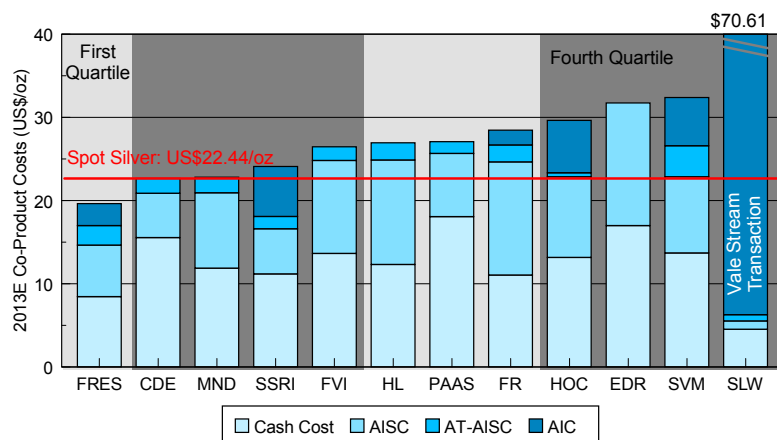
### Introduction of New Cost Metrics to Enhance Transparency

BMO Research expects silver companies to move in a similar direction to their gold peers and adopt "All-In-Sustaining-Cost" (AISC) accounting as proposed by the World Gold Council (WGC) to provide a better view of the cost structure of the silver mining industry.

BMO Research provides a detailed analysis of AISC accounting and argues in a detailed report titled "What Gold Costs" that the interpretation of AISC should capture interest and tax for After-Tax-AISC (AT-AISC) and then to include development (greenfield) capital for All-In-Costs (AIC).

Relevant to the silver sector where by-product exposure is significantly higher than that observed in the gold sector, BMO Research analysis also highlights the risks in using by-product accounting.

Fig 3: BMO Research Co-Product Costs for 2013E, with Production Quartiles



Source: BMO Capital Markets

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**The combination of the rising cost base and the re-investment of funds into the business appear to have outstripped the desire to accumulate cash.**

### Spending at the Limits

The combination of the rising cost base and the re-investment of funds into the business appear to have outstripped the desire to accumulate cash in the silver sector.

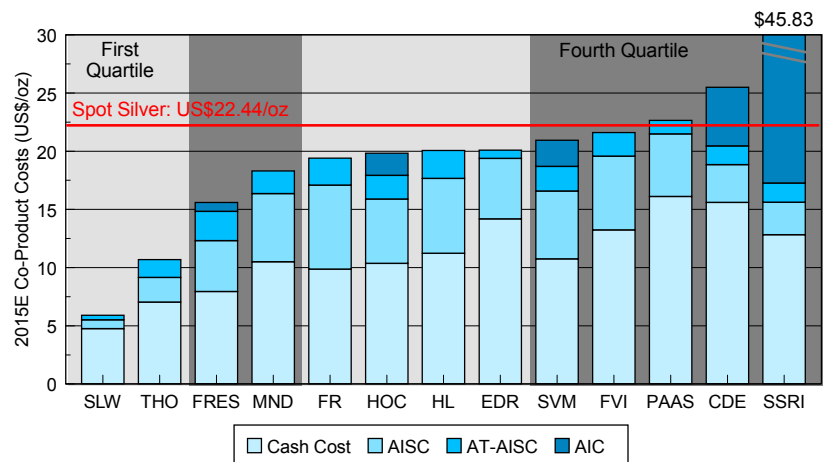
The forecast of declining All-In-Cost is encouraging and reflects the expected reduction in capital expenditure, but the outlook may be optimistic given the industry track record.

The dramatic silver price fall in mid-April requires the industry to introduce greater fiscal discipline to address the spending patterns.

A number of silver producers have already announced cuts in discretionary expenditures (Hochschild, First Majestic and Endeavour Silver) and several others (Pan American and Coeur Mining) have hinted toward revisions.

**The dramatic silver price fall in mid-April requires the industry to introduce greater fiscal discipline to address the spending patterns.**

Fig 4: BMO Research Co-Product Costs for 2015E, with Production Quartiles



Source: BMO Capital Markets

### Who Stands Out on Cost Analysis

Only Fresnillo has All-In-Costs below spot silver with Coeur Mining and Mandalay hovering around the price of spot silver. By 2015E, Silver Wheaton, Tahoe, Fresnillo, Mandalay, First Majestic and Hochschild occupy the better half of the All-In-Cost curve.

Silver stocks with the greatest reduction in All-In-Costs from 2013E to 2015E include Silver Wheaton, Endeavour Silver and Hochschild.

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## 2. Silver Industry Cost Pressure

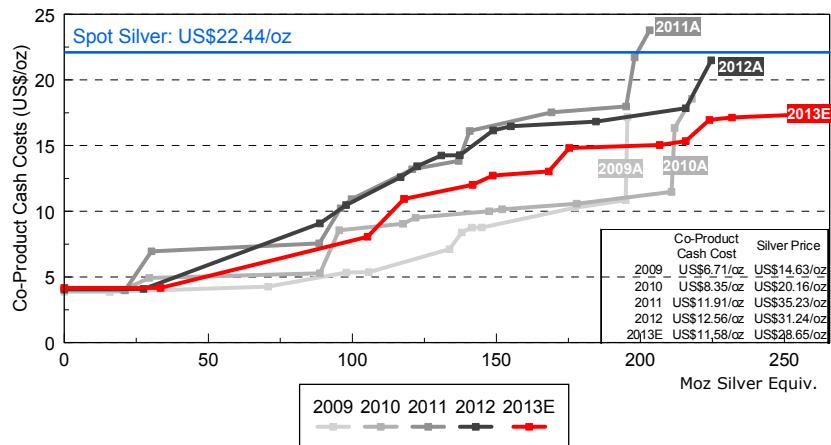
The global silver industry has experienced substantial cost escalation over the past decade with co-product cash costs nearly doubling from US\$6.71/oz in 2009 to US\$12.56/oz in 2012 for the BMO Research universe.

The cost increase was mostly driven by lower cut-off grades, higher input costs (e.g., labour, energy and consumables), weaker US\$ currency, and price-linked costs (e.g., royalties).

Many silver producers achieved better cash margins (silver price less cash cost) for 2009 through 2011, but margins have been under pressure in 2012 and 2013E as the rate of cost escalation has continued while the price of silver has declined.

Fig 5: BMO Research Silver Stock Co-Product Cost Curves 2009A-2013E

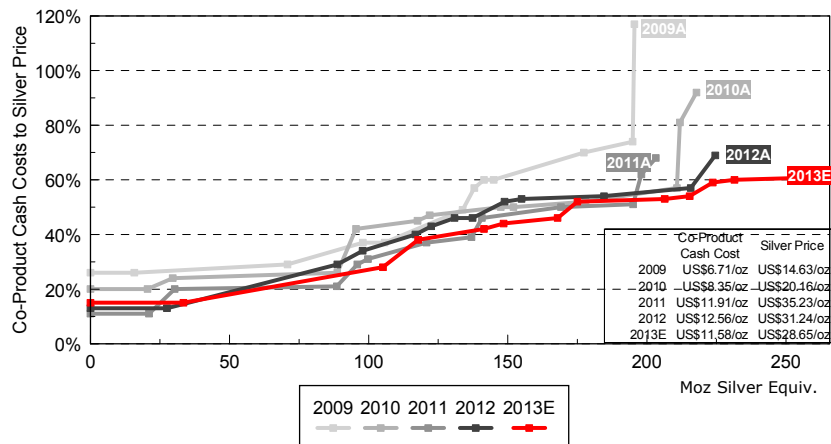
The cost increase was mostly driven by higher input costs (oil, steel, labour and consumables), weaker US\$ currency, lower cut-off grades and price-linked costs (e.g., royalties).



Source: BMO Capital Markets

Fig 6: BMO Research Silver Stock Co-Product Cost to Silver Price 2009A-2013E

Margins have been under pressure in 2012 and 2013E as the rate of cost escalation has continued while the price of silver has declined.



Source: BMO Capital Markets

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### Declining Grades Drive Rising Costs

BMO Research analysis indicated that the decline in processed ore grades is one of the largest contributors to increasing cash costs in the silver industry.

According to BMO Research analysis, the average processed grades declined 53% from 257g/t in 2009 to 121g/t in 2012.

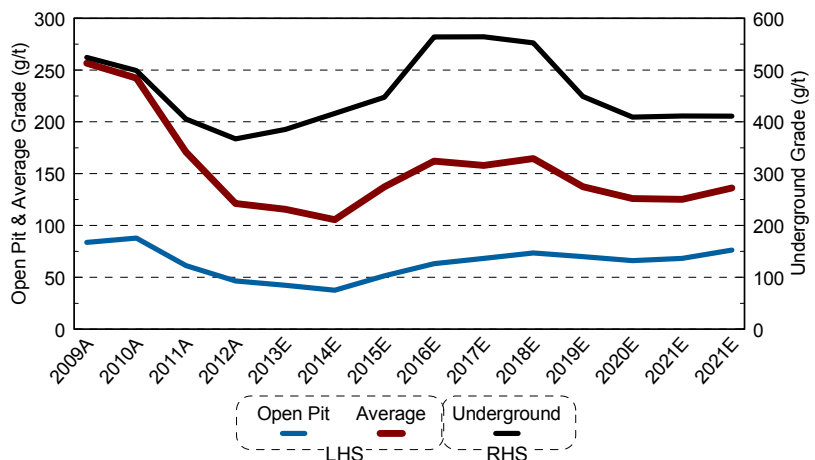
Lower grade ore reduces the value of the material handled and consequently increased the cost per contained metal. Increasing silver prices up until 2011 allowed miners to reduce the grade of ore as the value of the material increases.

The silver price in 2009 was US\$14.63/oz or US\$0.47/gram increasing to a high of US\$35.29/oz or US\$1.13/gram in 2011, which allowed miners to process lower grade ore and still achieve a reasonable margin.

Miners have also reduced cut-off grade as the SEC allows reserves to be calculated using a rolling 3-year average silver price, which increased from ~US\$13.32/oz in 2008 to US\$16.59/oz in 2010, and US\$28.88/oz in 2012.

The impact of lower process grades has significantly increased the US\$/oz cash costs through time.

Fig 7: Processed Ore Grade at Silver Mines Through Time



According to BMO Research analysis, the average processed grades declined from 257g/t in 2009 to 121g/t in 2012.

Source: BMO Research

### Forecasting Improving Grades

There is light at the end of the tunnel with BMO Research analysis indicating that average processed ore grades have the potential to increase over the next several years as silver miners begin to deliver higher grade deposits such as Escobal (Tahoe Resources), Juanacipio (Fresnillo and Mag Silver) and San Luis (Silver Standard).

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### Free Cash Flow Shows More Signs of Cost Pressure

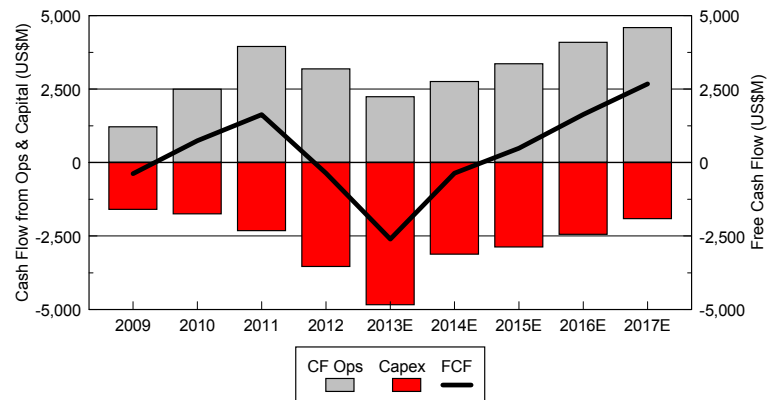
The BMO Research silver stock universe has posted negative Free Cash Flow (Cash Flow from Operations less Capital Expenditure) for three of the past five years (including forecast 2013E). Silver miners benefitted from rising silver prices in 2010 and 2011 generating cumulative free cash flow of US\$2.4B. However escalating costs, combined with increased capital budgets, largely consumed industry free cash flow in 2012.

As highlighted in the report titled "What Gold Costs", BMO Research analysis highlights the increasing disconnect between current cash cost metric and the full costs of mining.

The WGC move to AISC accounting increases transparency of costs thereby providing a better view of the cash generation ability of the business.

Fig 8: BMO Research Silver Stock Universe Free Cash Flow, Spot Prices

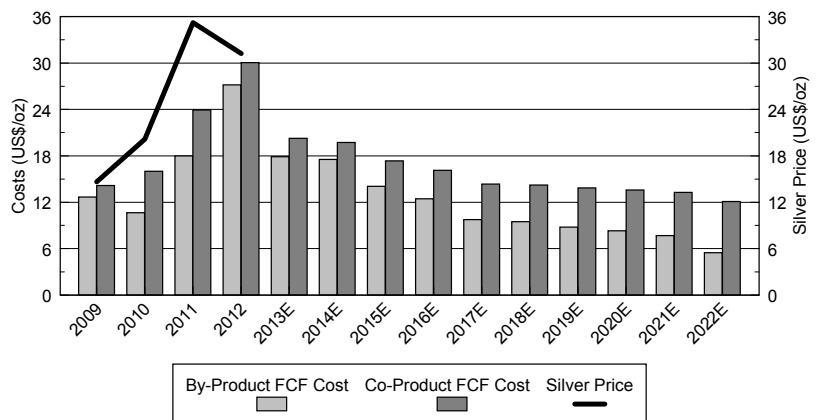
The BMO Research silver stock universe has posted negative FCF for most of the recent past, while any positive FCF results have been relatively modest.



Source: BMO Capital Markets

Fig 9: BMO Research Silver Stock Universe Free Cash Flow Costs

Any cost metric that provides a better view of the cash generation ability of the business appears to be an improvement on the current method.



Source: BMO Capital Markets

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### 3. All-In-Sustaining-Costs

BMO Research in the June 4, 2013 report titled “What Gold Costs” has extended the interpretation of the All-In-Sustaining-Costs (AISC) to capture interest and tax for After-Tax-AISC (AT-AISC) and then to include development capital for All-In-Costs (AIC). Analysis of the AISC, AT-AISC and AIC has been undertaken using the by-product and co-product method.

Fig 10: BMO Research All-In-Sustaining-Costs

Analysis of the AISC, AT-AISC and AIC has been undertaken using the by-product and co-product method.

	\$ Per Ounce of Silver		\$ Per Ounce of Silver Eq
		Total Cash Costs	XXX
		Add back By-Product Revenue	XXX
		Co-Product Total Cash Costs	XXX
Total Cash Costs	XXX	Corporate G&A and Other	XXX
Corporate G&A and Other	XXX	Exploration Expense	XXX
Exploration Expense	XXX	Sustaining Capital	XXX
Sustaining Capital	XXX	<b>All-In-Sustaining-Costs</b>	<b>XXX</b>
<b>All-In-Sustaining-Costs</b>	<b>XXX</b>		
		Interest Expense	XXX
		Income Tax Expense	XXX
		<b>After-Tax-AISC</b>	<b>XXX</b>
Interest Expense	XXX		
Income Tax Expense	XXX	Development Capital	XXX
<b>After-Tax-AISC</b>	<b>XXX</b>	<b>All-In-Costs</b>	<b>XXX</b>
Development Capital	XXX		
<b>All-In-Costs</b>	<b>XXX</b>		

Source: BMO Capital Markets

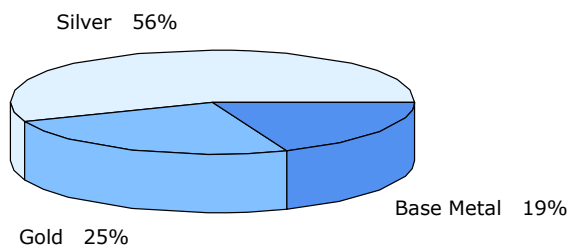
#### The By-Product Effect

Silver producers on average have higher by-product exposure than the gold sector.

Silver producers on average have higher by-product exposure than the gold sector. The majority of gold mines within the BMO Research Coverage Universe principally produce gold with minor (<15%) by-product credits with some exceptions (i.e., Penesquito and La Ronde have appreciable lead and zinc credits, Alumbrera and Boddington have appreciable copper credits and El Penon and Kupol have appreciable silver credits).

In contrast, BMO Research analysis indicates that only 56% of revenue for silver companies under coverage comes from silver with 25% of revenue derived from gold and 19% from base metals (zinc > lead > copper).

Fig 11: Silver Sector By-Product Exposure by Revenue (%)



Source: BMO Capital Markets

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**The impact of higher by-product exposure within the silver sector has a number of risks when using by-product accounting.**

**BMO Research supports the application of co-product accounting within the silver sector.**

The impact of higher by-product exposure within the silver sector has a number of risks when using by-product accounting, including:

1. With increasing by-product exposure (above 15% of revenue) total cash costs grow increasingly negative. While this supports a producer's desire to show the lowest (best) costs a negative cash cost bears little relevance on the cost of the business.
2. Capex contribution (sustaining and development) can impact by-product cash costs significantly and show disproportionate lower (low capex) and higher AISC and AIC costs (high capex).
3. Co-product show less volatility and better correlation with FCF costs.

For these reasons, BMO Research supports the application of co-product accounting within the silver sector.

Fresnillo and Hochschild are leaders in co-product accounting and improving transparency within the silver sector.

Regrettably, North American silver producers continue to cling to by-product accounting practices.

Fig 12: BMO Research Calculations of All-in-Sustaining Costs, After-Tax-AISC & All-In-Costs in 2012

	First Majestic 2012		Fresnillo 2012		Hecla 2012		Silvercorp 2012	
	By-Product US\$/oz	Co-Product US\$/oz Ag Eq	By-Product US\$/oz	Co-Product US\$/oz Ag Eq	By-Product US\$/oz	Co-Product US\$/oz Ag Eq	By-Product US\$/oz	Co-Product US\$/oz Ag Eq
Moz Silver & Silver Equivalent	8,371	9,078	35,937	61,210	5,430	11,514	5,614	8,390
Gross Cash Costs	\$11.65	\$10.75	\$19.17	\$11.26	\$31.65	\$14.93	\$18.77	\$12.56
- By-Product Revenue	(\$2.70)		(\$33.47)		(\$39.43)		(\$14.95)	
Total Cash Costs	\$8.96	\$10.75	(\$14.30)	\$11.26	(\$7.78)	\$14.93	\$3.82	\$12.56
+ G&A and Other Expenses	\$2.53	\$2.34	\$1.48	\$0.87	\$12.97	\$6.12	\$4.84	\$3.24
+ Exploration Expense	\$0.00	\$0.00	\$6.50	\$3.82	\$5.86	\$2.76	\$0.66	\$0.44
+ Sustaining Capital	\$15.60	\$14.38	\$16.65	\$9.78	\$22.04	\$10.39	\$6.89	\$4.61
= ASIC	\$27.09	\$27.46	\$10.33	\$25.72	\$33.09	\$34.20	\$16.21	\$20.85
+ Interest Expense	\$0.27	\$0.25	\$0.11	\$0.06	\$0.45	\$0.21	\$0.00	\$0.00
+ Corporate Tax	\$2.64	\$2.43	\$7.94	\$4.66	\$1.64	\$0.77	\$8.13	\$5.44
= After-Tax-AISC	\$30.00	\$30.15	\$18.38	\$30.44	\$35.17	\$35.18	\$24.34	\$26.29
+ Development Capital	\$8.20	\$7.56	\$0.00	\$0.00	\$0.00	\$0.00	\$4.13	\$2.77
= All-In-Costs	\$38.20	\$37.71	\$18.38	\$30.44	\$35.17	\$35.18	\$28.48	\$29.06

Source: BMO Capital Markets



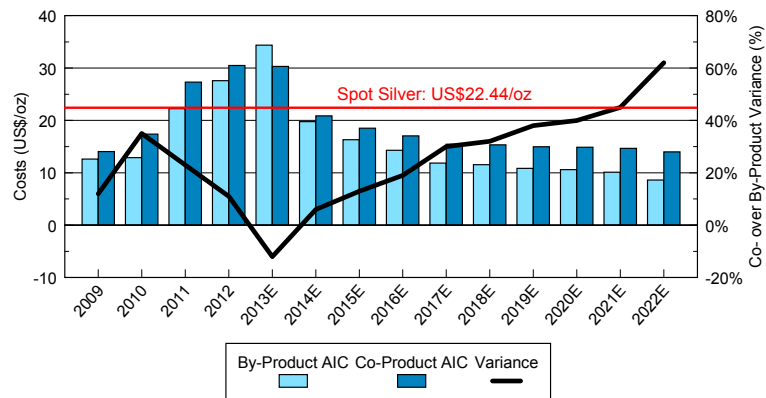
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### By-Product versus Co-Product Cost Analysis

Fig 13: BMO Research By-Product & Co-Product AIC Analysis

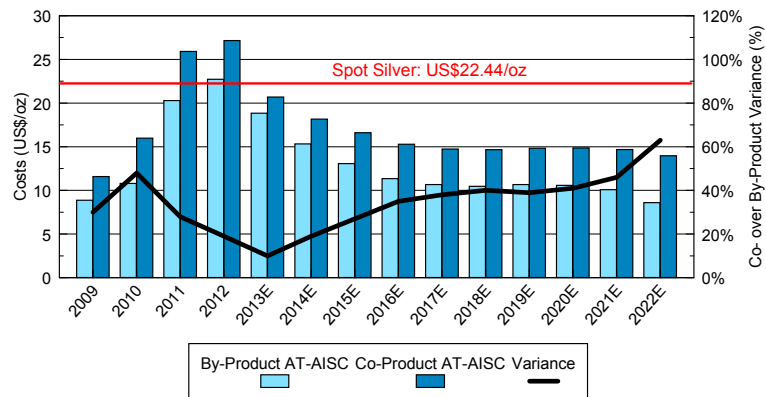
By-Product and Co-Product accounting show a high level of variance due to the sector's high by-product exposure and level of capital (sustaining + development) requirements.



Source: BMO Capital Markets

Fig 14: BMO Research By-Product & Co-Product AT-AISC Analysis

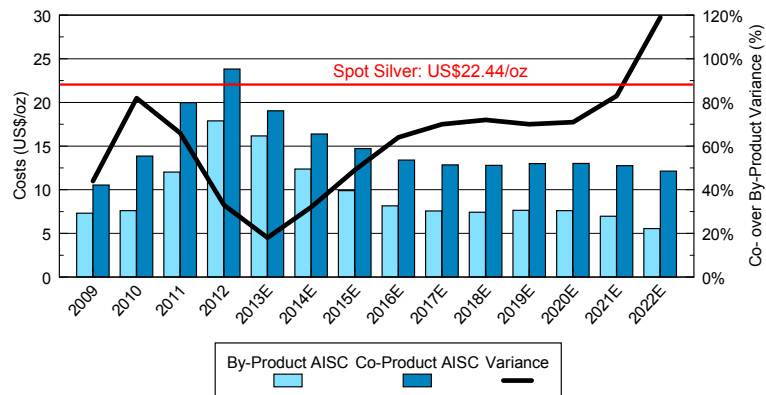
AT-AISC shows less volatility than AIC accounting as the impact of development capital is removed.



Source: BMO Capital Markets

Fig 15: BMO Research By-Product & Co-Product AISC Analysis

The variance between by-product and co-product accounting is greatest for AISC.



Source: BMO Capital Markets

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### Improvements in AIC & AISC Forecast Ahead

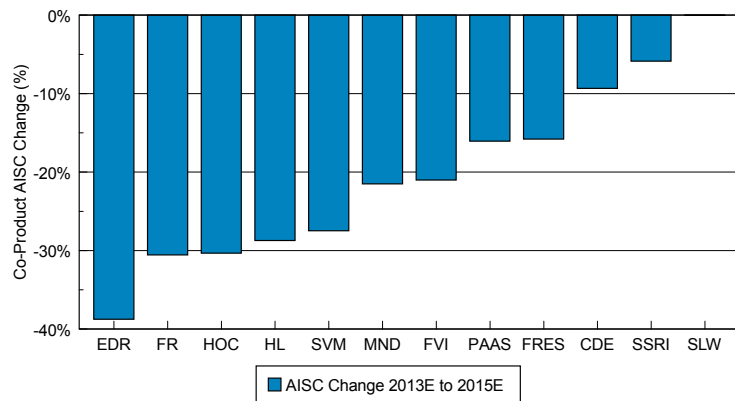
BMO Research forecasts lower All-In-Sustaining-Costs from US\$19.05/oz in 2013E to US\$14.73/oz in 2015E and lower All-In-Costs from US\$30.30/oz in 2013E to US\$18.52/oz in 2015E, using the co-product method.

The cost improvement from 2013E to 2015E is mostly driven by lower sustaining (brownfield) capital (by US\$2.20/oz) and reduced greenfield capital by US\$7.70/oz.

Fig 16: Change in Co-Product AISC Forecast From 2013E to 2015E

The greatest reduction in AISC is expected to be:

- + Endeavour
- + First Majestic
- + Hochschild
- + Hecla

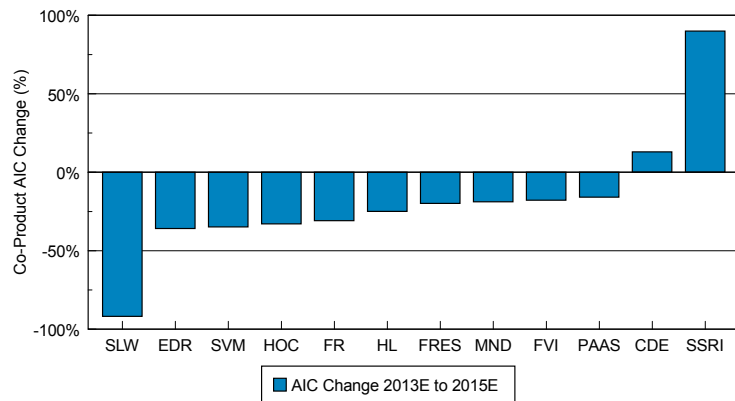


Source: BMO Capital Markets

Fig 17: Change in Co-Product AIC Forecast From 2013E to 2015E

The greatest reduction in AIC is expected to be:

- + Silver Wheaton
- + Endeavour
- + Silvercorp
- + Hochschild



Source: BMO Capital Markets

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### Costs Show a Worrying Trend

The combination of the rising cost base and the re-investment of funds into the business appear to have outstripped the desire to accumulate cash in the silver sector.

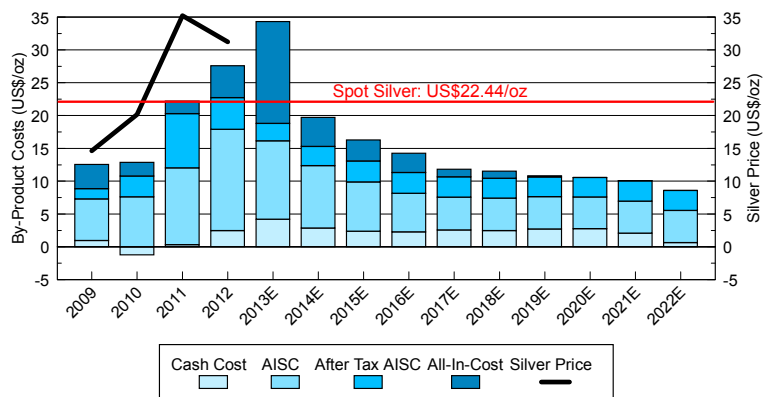
The forecast of declining All-In-Cost is encouraging and reflects the expected reduction in capital expenditure, but the outlook may be optimistic given the industry track record.

The recent decline of mid-April when silver declined 18% to ~US\$22/oz has come without commensurate cost pressure relief, which is resulting in margin squeeze.

A number of silver producers have already announced cuts in discretionary expenditures (Hochschild, First Majestic and Endeavour Silver) and several others (Pan American and Coeur Mining) have hinted toward revisions.

Fig 18: BMO Research By-Product All-In-Cost Analysis

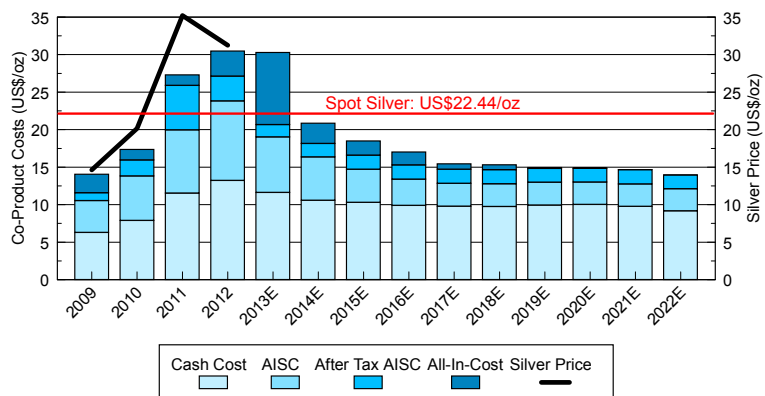
The combination of the rising cost base and the re-investment of funds into the business appear to have outstripped the desire to accumulate cash.



Source: BMO Capital Markets

Fig 19: BMO Research Co-Product All-In-Cost Analysis

The 18% decline in the price of silver in mid-April has motivated a number of silver producers to cut costs.



Source: BMO Capital Markets

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### Composition of Costs Change Through Time

Like the gold sector, the composition of the silver industry cost structure has changed through time with cash costs reducing while AISC and AIC increase in importance to 2013E.

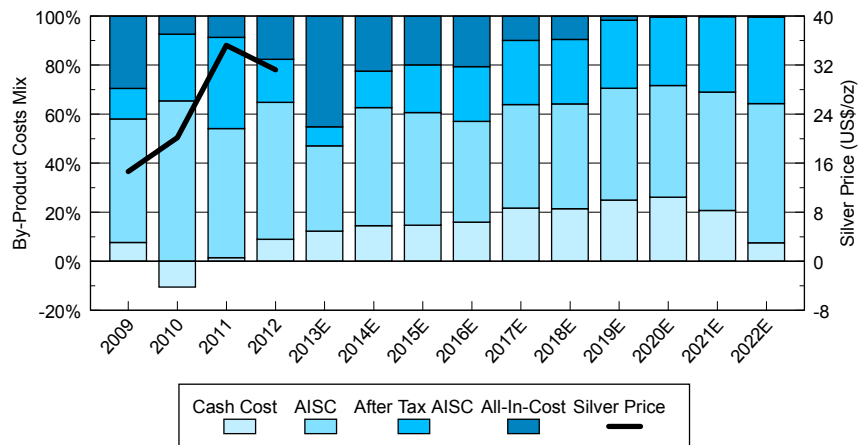
The pursuit of brownfield (in AISC) and greenfield (in AIC) growth appears to have shifted the costs more into capital than expense over the past decade.

BMO Research forecasts a decline in the capital outlay beyond 2013E as the known greenfield and brownfield capital projects enter production. New projects beyond the BMO Research assumptions may alter the forecast.

A number of projects including Navidad (Pan American Silver) and Santa Ana (Bear Creek) have the potential to be reactivated thereby continuing the greenfield capital spend.

Fig 20: BMO Research By-Product All-In-Cost Mix Analysis

The pursuit of brownfield (in AISC) and greenfield (in AIC) growth appears to have shifted the costs more into capital than expense over the past five years.

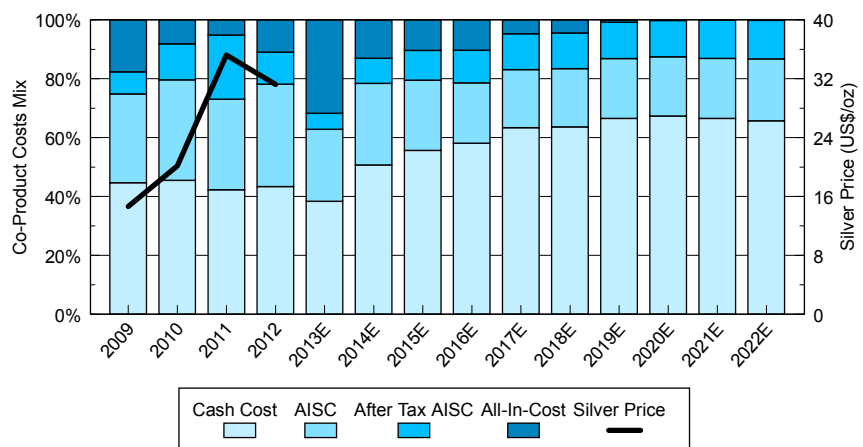


Source: BMO Capital Markets

Fig 21: BMO Research Co-Product All-In-Cost Mix Analysis

BMO Research forecasts a decline in the capital outlay beyond 2013E.

Resurrection of a number of delayed projects could affect this trend.



Source: BMO Capital Markets

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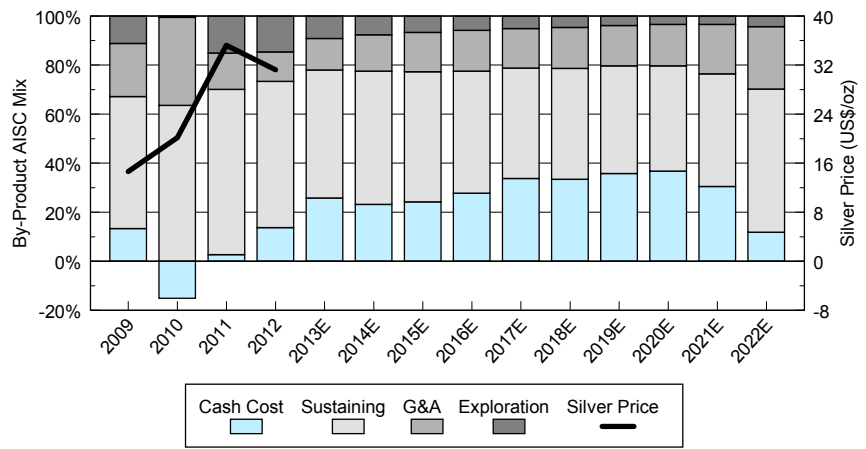
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### Shift Away From Expensed Cash Costs Through Time

Unlike the gold sector, where producers have moved expensed costs toward sustaining costs, All-In-Sustaining-Costs in the silver sector have remained largely the same.

The most significant change has been a decline in corporate G&A with a several percent increase in sustaining capital.

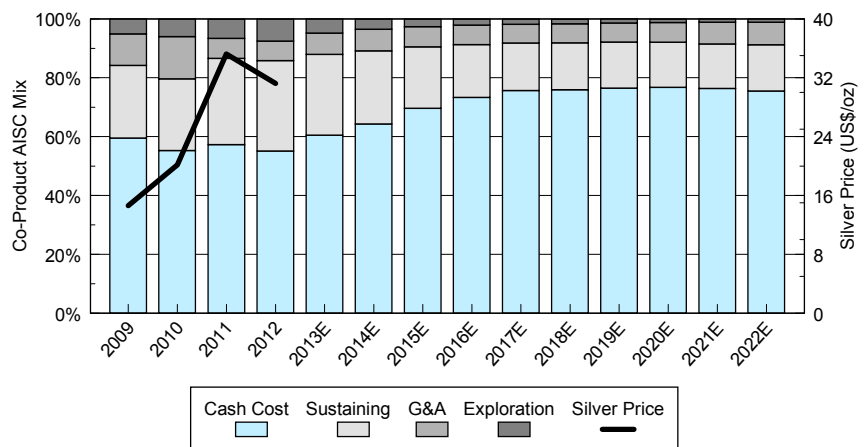
Fig 22: BMO Research By-Product All-In-Sustaining-Cost Mix Analysis



The AISC composition for the silver sector is largely unchanged over the last several years.

Source: BMO Capital Markets

Fig 23: BMO Research Co-Product All-In-Sustaining-Cost Mix Analysis



The most significant change has been a decline in corporate G&A with a several percent increase in sustaining capital.

Source: BMO Capital Markets

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### Cost Curves Display a Wide Range of Costs

The cash cost curves highlight the wide range of costs within the BMO Research silver stock universe.

The 2013E by-product cost averages are US\$4.20/oz cash costs, US\$16.17/oz AISC, US\$18.84/oz AT-AISC and US\$34.36/oz AIC, while the AIC ranges from a low of US\$15.56/oz for Fresnillo to a high of US\$83.34/oz for Silver Wheaton owing to the recent Vale transaction.

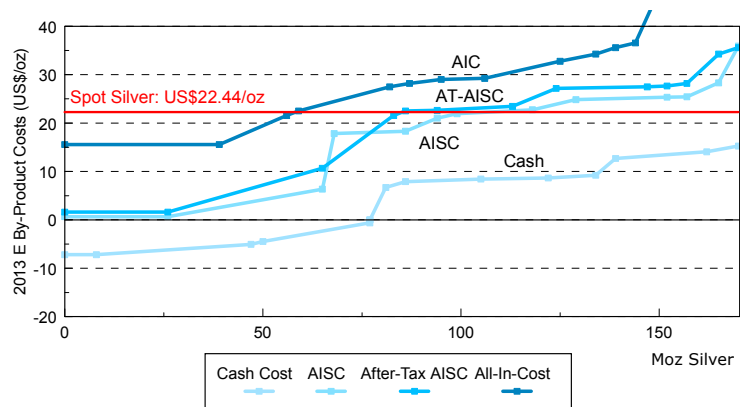
The 2013E co-product cost averages are US\$11.63/oz cash costs, US\$19.05/oz AISC, US\$20.70/oz AT-AISC and US\$30.31/oz AIC, while the AIC ranges from a low of US\$19.65/oz for Fresnillo to a high of US\$70.61/oz for Silver Wheaton.

**Alarmingly only Fresnillo has 2013E All-In-Costs below spot.**

At prevailing metal prices, the BMO Research silver stocks have 2013E costs below spot for ~100% using cash costs, <42% using AISC, and alarmingly, only Fresnillo using All-In-Costs (using a co-product basis).

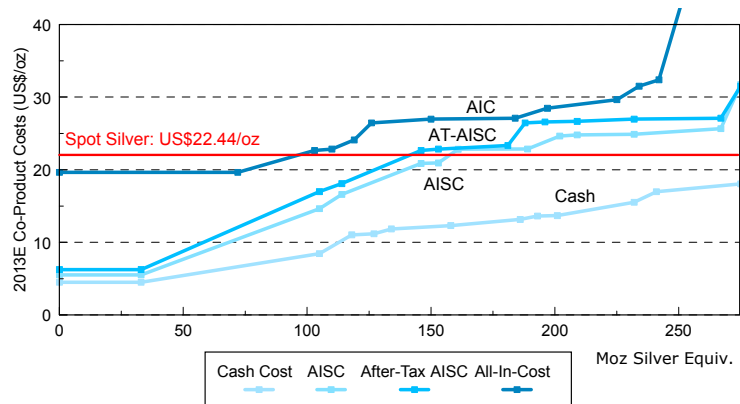
**The 2013E by-product cost averages are**  
 +US\$4.20/oz cash costs,  
 +US\$16.17/oz AISC,  
 +US\$18.84/oz AT-AISC and  
 +US\$34.36/oz AIC.

Fig 24: BMO Research By-Product Cost Curves for 2013E



Source: BMO Capital Markets

Fig 25: BMO Research Co-Product Cost Curves for 2013E



Source: BMO Capital Markets

**The 2013E co-product cost averages are**  
 +US\$11.63/oz cash costs,  
 +US\$19.05/oz AISC,  
 +US\$20.70/oz AT-AISC and  
 +US\$30.31/oz AIC.

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### Cost Curves Generally Improve From 2013E to 2015E

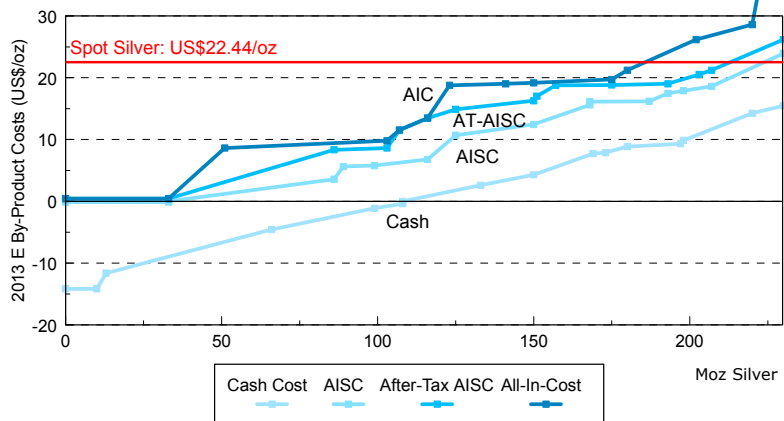
The 2015E by-product cost averages are US\$2.39/oz cash costs, US\$9.90/oz AISC, US\$13.09/oz AT-AISC and US\$16.33/oz AIC, while the AIC ranges from a low of US(\$0.11)/oz for Silver Wheaton to a high of US\$23.95/oz Pan American Silver.

The 2015E co-product cost averages are US\$10.30/oz cash costs, US\$14.73/oz AISC, US\$16.60/oz AT-AISC and US\$18.52/oz AIC, while the AIC ranges from a low of US\$5.51/oz for Silver Wheaton to a high of US\$4,085/oz for Pan American Silver.

At prevailing metal prices, the BMO Research silver stocks have 2015E costs below spot for 100% using cash costs, 100% using AISC, and <66% using All-In-Costs (using a co-product basis).

Fig 26: BMO Research By-Product Cost Curves for 2015E

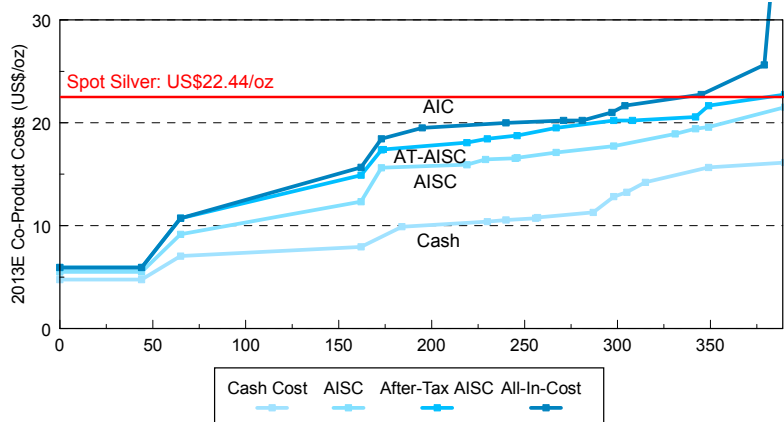
**The 2015E by-product cost averages are**  
**+US\$2.39/oz cash costs,**  
**+US\$9.90/oz AISC,**  
**+US\$13.09/oz AT-AISC and**  
**+US\$16.33/oz AIC.**



Source: BMO Capital Markets

Fig 27: BMO Research Co-Product Cost Curves for 2015E

**The 2015E co-product cost averages are**  
**+US\$10.30/oz cash costs,**  
**+US\$14.73/oz AISC,**  
**+US\$16.60/oz AT-AISC and**  
**+US\$18.52/oz AIC.**



Source: BMO Capital Markets

## Silver Industry Costs

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### Variance Between AISC and Cash Costs

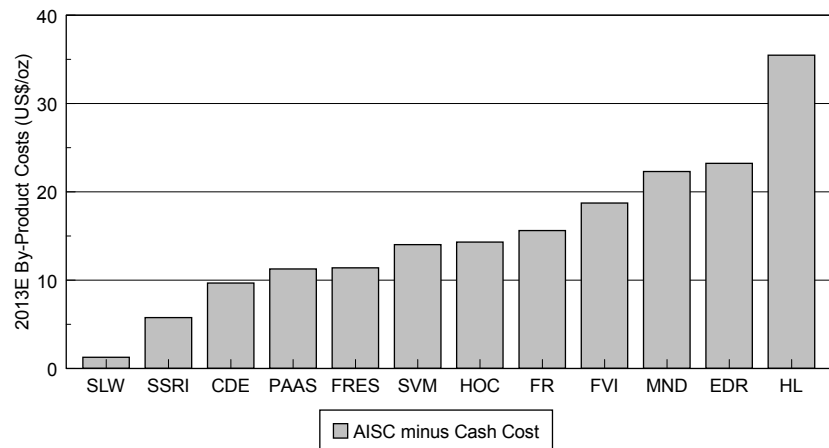
The difference between the co-product Total Cash costs and AISC for 2013E ranges between US\$1.01/oz for Silver Wheaton to US\$14.76/oz for Endeavour Silver, with sustaining capital the largest proportion of the variation.

Companies with the greatest uplift in AISC over cash costs include Endeavour Silver, First Majestic and Hecla.

Companies with the lowest increase of AISC over cash costs include Silver Wheaton, Coeur Mining and Silver Standard.

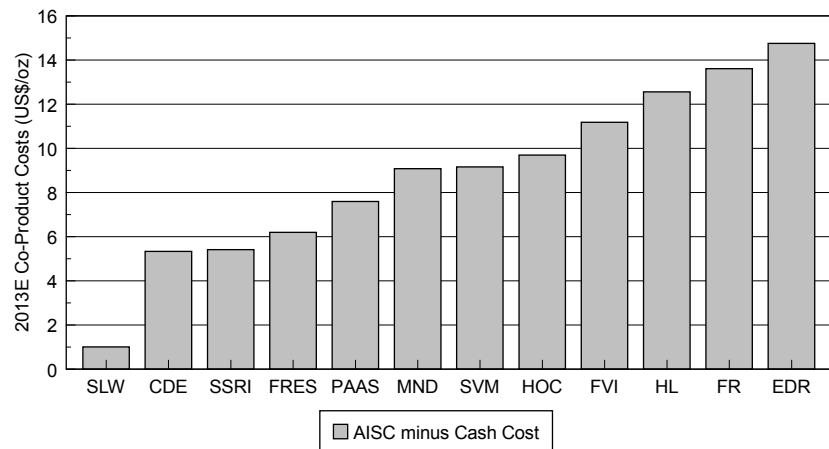
Companies with the greatest uplift in AISC over cash costs include Endeavour Silver, First Majestic and Hecla.

Fig 28: BMO Research By-Product AISC versus Cash Costs for 2013E



Source: BMO Capital Markets

Fig 29: BMO Research Co-Product AISC versus Cash Costs for 2013E



Companies with the lowest increase of AISC over cash costs include Silver Wheaton, Coeur Mining and Silver Standard.

Source: BMO Capital Markets



## Silver Industry Costs

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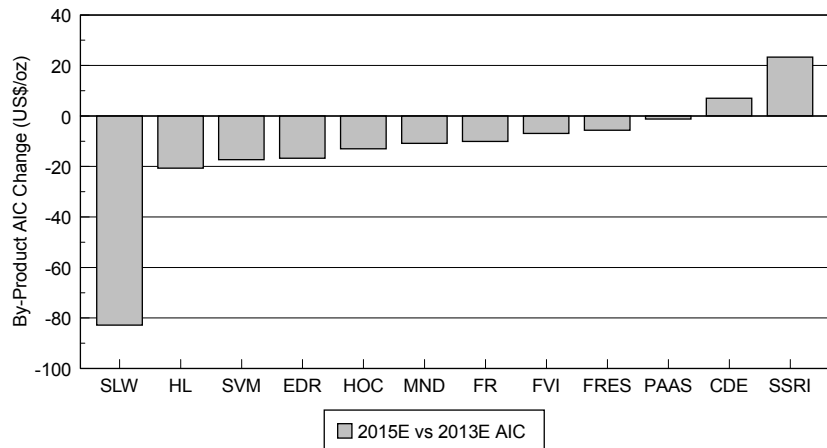
### AIC is Expected to Decrease from 2013E to 2015E

All-In-Costs are forecast to reduce significantly from 2013E to 2015E mostly due to reduced brownfield and greenfield capital expenditure.

By-product AIC is expected to reduce from US\$34.38/oz in 2013E to US\$17.76/oz in 2015. Co-product AIC is forecast to decline from US\$30.14/oz in 2013E to US\$19.30/oz in 2015E.

Companies undertaking significant capital expenditure (mostly greenfield) display the greatest lift in AIC, while those companies completing the capital expenditure phase show the most reduction in AIC.

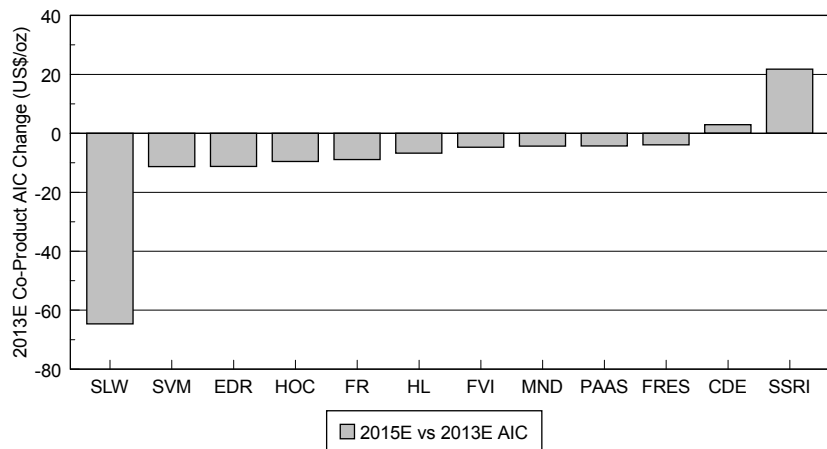
Fig 30: BMO Research By-Product AIC 2013E versus 2015E



Companies with the greatest reduction in AIC are Silver Wheaton and Hecla.

Source: BMO Capital Markets

Fig 31: BMO Research Co-Product AIC 2013E versus 2015E



Companies with an increase in AIC include Silver Standard and Coeur Mining owing to their respective development strategies.

Source: BMO Capital Markets

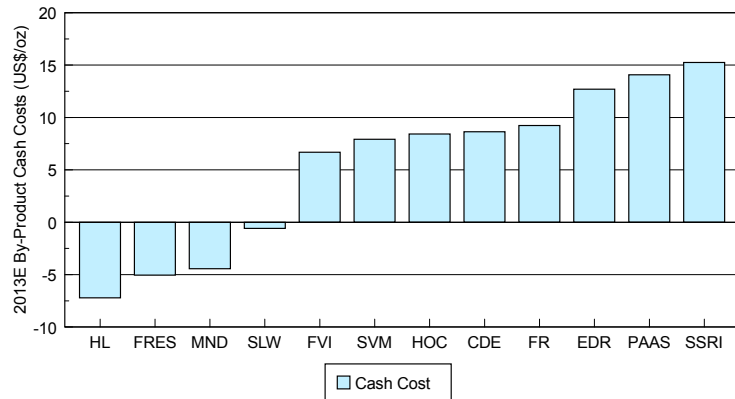
## Silver Industry Costs

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Post the Aurizon acquisition, Hecla is projected to have the lowest by-product cash costs while Silver Standard has the highest.

### BMO Research Cash Costs for 2013E

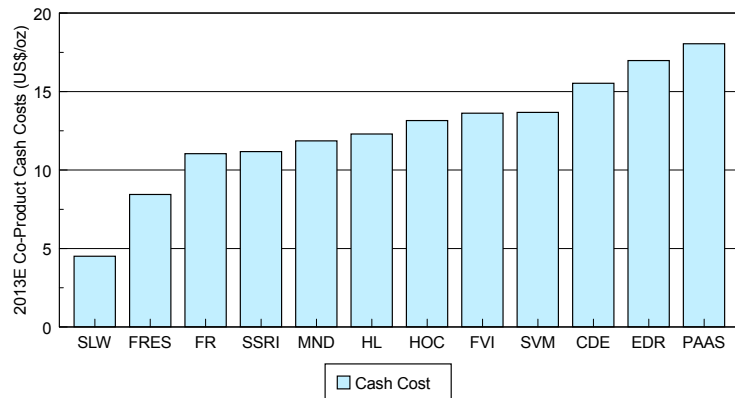
Fig 32: BMO Research By-Product Cash Costs for 2013E



Source: BMO Capital Markets

Silver Wheaton has the lowest co-product cash costs while Pan American Silver has the highest.

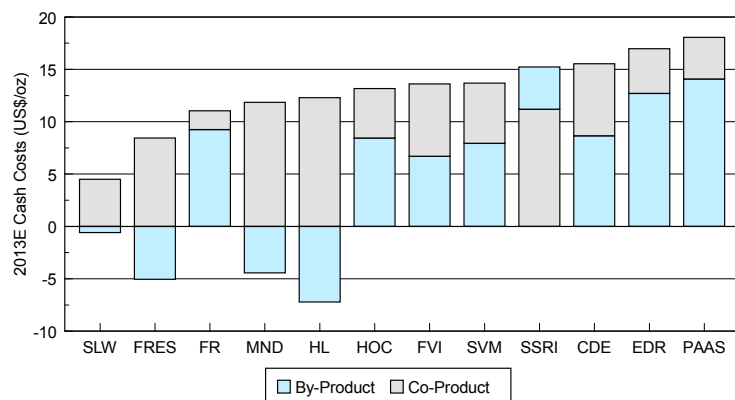
Fig 33: BMO Research Co-Product Cash Costs for 2013E



Source: BMO Capital Markets

Hecla and Mandalay have the greatest variance between by-product and co-product cash costs.

Fig 34: BMO Research By- & Co-Product Cash Costs for 2013E



Source: BMO Capital Markets

## Silver Industry Costs

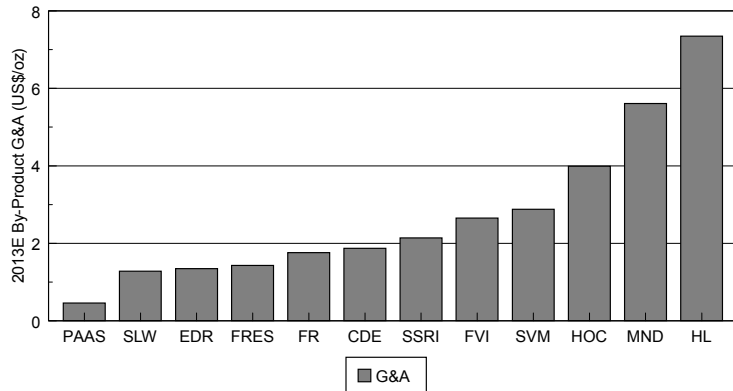
June 6, 2013

### BMO Research Corporate G&A for 2013E

Fig 35: BMO Research By-Product Corporate G&A for 2013E

Pan American has the lowest by-product G&A while Hecla has the highest owing to M&A costs related to the Aurizon acquisition.

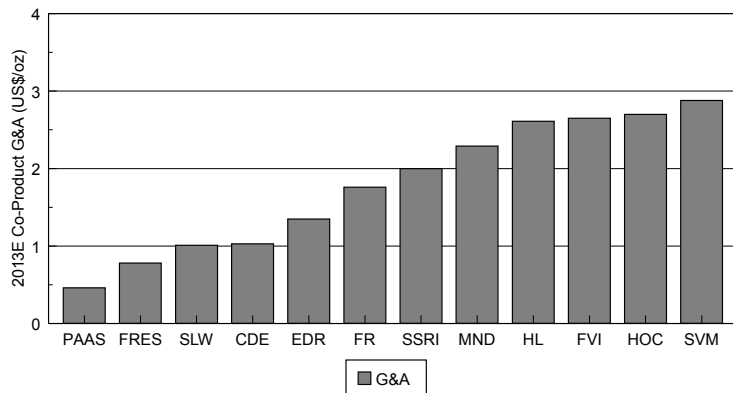
By-product G&A costs are higher than the co-product costs due to the smaller denominator of silver compared to silver equivalent.



Source: BMO Capital Markets

Fig 36: BMO Research Co-Product Corporate G&A for 2013E

Pan American has the lowest co-product G&A while Silvercorp has the highest.

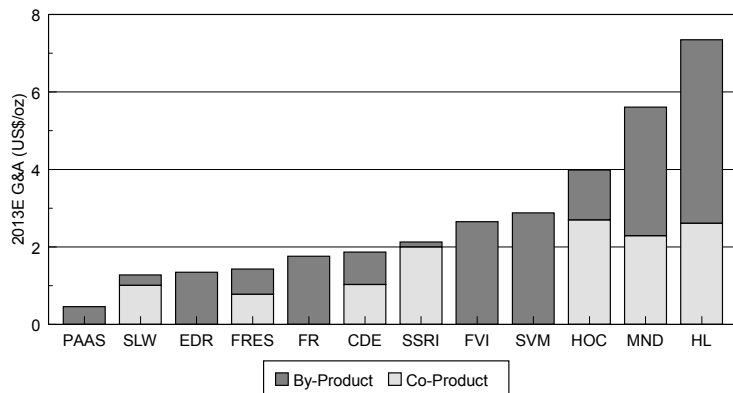


Source: BMO Capital Markets

Fig 37: BMO Research By- & Co-Product Corporate G&A for 2013E

The lowest G&A costs are:  
 + Pan American,  
 + Silver Wheaton,  
 + Endeavour Silver

The highest G&A costs are:  
 + Hecla,  
 + Mandalay,  
 + Hochschild



Source: BMO Capital Markets

## Silver Industry Costs

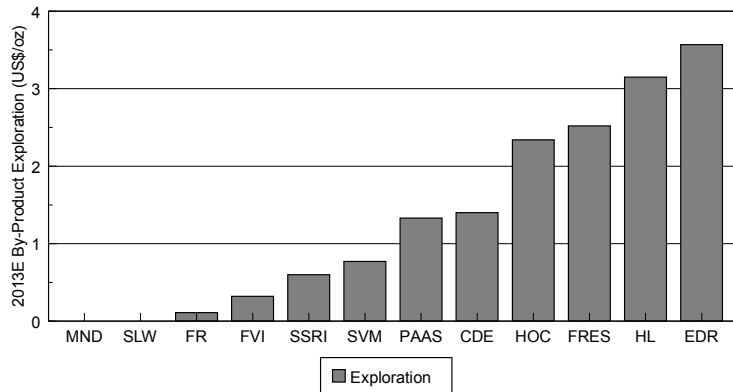
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Mandalay has the lowest by-product exploration while Endeavour has the highest.

HL and EDR expense exploration costs unlike the majority of their peers.

### BMO Research Exploration Expense for 2013E

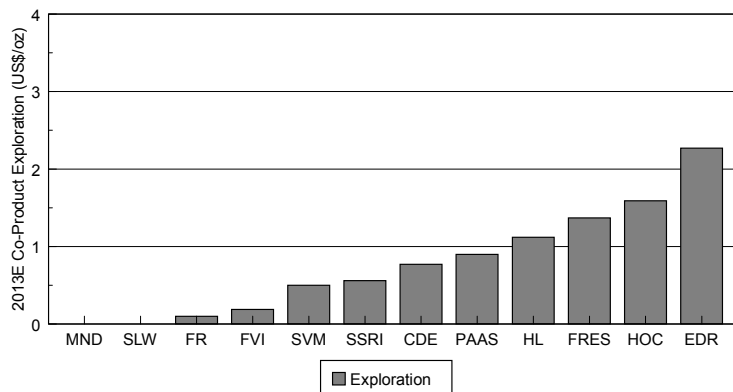
Fig 38: BMO Research By-Product Exploration Expense for 2013E



Source: BMO Capital Markets

Mandalay has the lowest co-product exploration while Endeavour has the highest.

Fig 39: BMO Research Co-Product Exploration Expense for 2013E

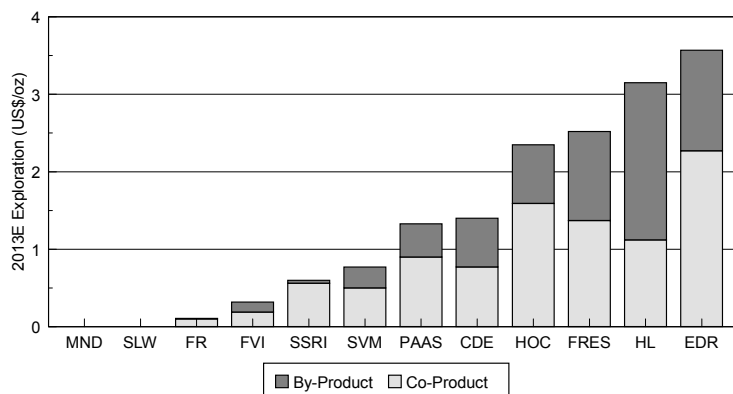


Source: BMO Capital Markets

Companies with the lowest exploration expenses are:  
+ Mandalay and  
+ Silver Wheaton.

Companies with the highest exploration expenses are:  
+ Endeavour and  
+ Hecla.

Fig 40: BMO Research By- & Co-Product Exploration Expense for 2013E



Source: BMO Capital Markets

## Silver Industry Costs

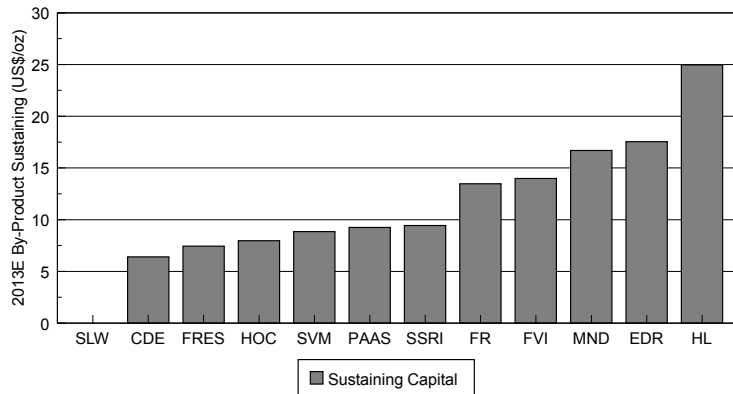
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### BMO Research Sustaining Capital for 2013E

Fig 41: BMO Research By-Product Sustaining Capital for 2013E

Silver Wheaton has the lowest by-product sustaining capital while Hecla has the highest.

BMO Research considers all capital expenditure at existing operations (i.e., brownfield) as sustaining capital.

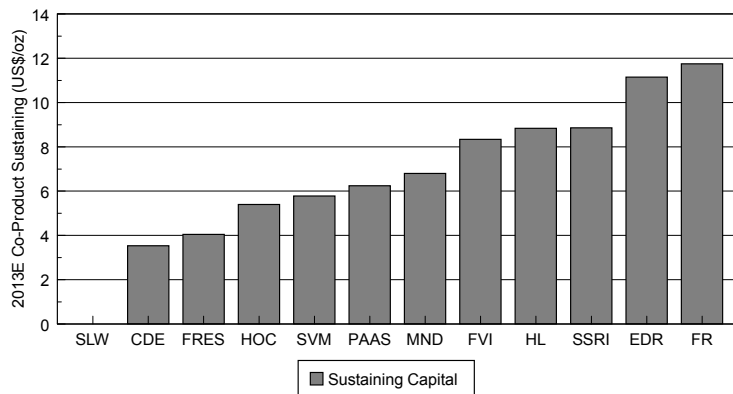


Source: BMO Capital Markets

Fig 42: BMO Research Co-Product Sustaining Capital for 2013E

Silver Wheaton has the lowest co-product sustaining capital while First Majestic has the highest.

First Majestic has a substantial commitment to continued development of Del Toro and La Parrilla.

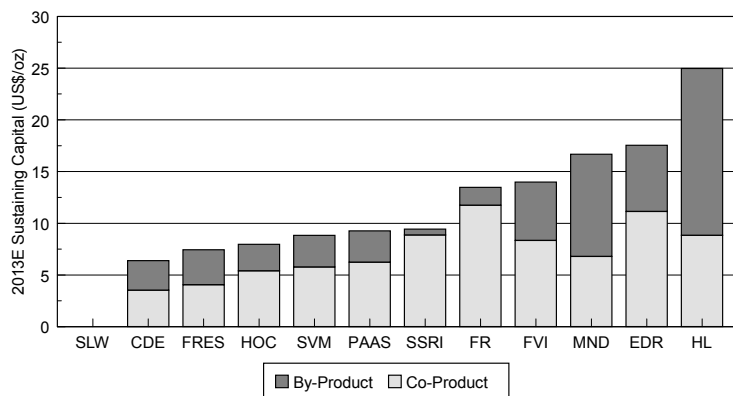


Source: BMO Capital Markets

Fig 43: BMO Research By- & Co-Product Sustaining Capital for 2013E

The lowest sustaining are:  
+ Silver Wheaton and  
+ Coeur

The highest sustaining are:  
+ Hecla and  
+ Endeavour



Source: BMO Capital Markets

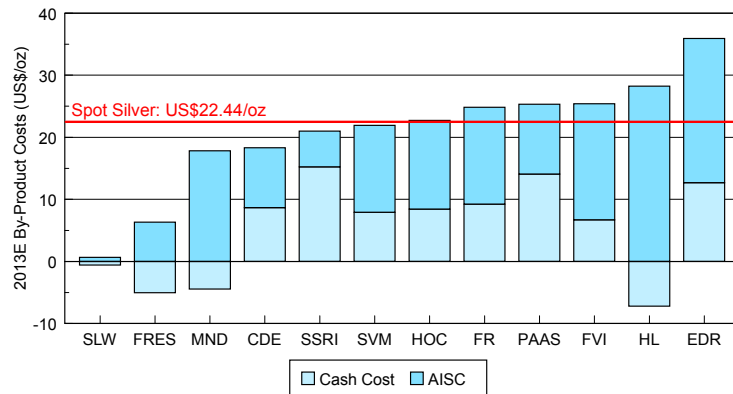
## Silver Industry Costs

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Silver Wheaton has the lowest by-product AISC while Endeavour has the highest.

### BMO Research All-In-Sustaining-Costs for 2013E

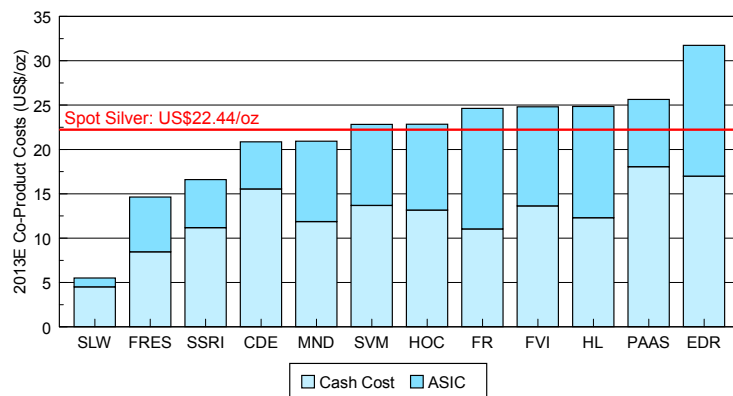
Fig 44: BMO Research By-Product All-In-Sustaining-Costs for 2013E



Source: BMO Capital Markets

Silver Wheaton has the lowest co-product AISC while Endeavour has the highest.

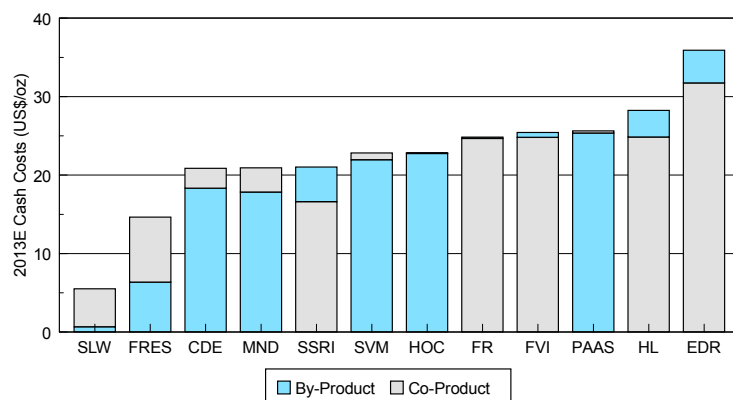
Fig 45: BMO Research Co-Product All-In-Sustaining-Costs for 2013E



Source: BMO Capital Markets

Fresnillo has the greatest variance between by-product and co-product AISC.

Fig 46: BMO Research By- & Co-Product All-In-Sustaining-Costs for 2013E



Source: BMO Capital Markets

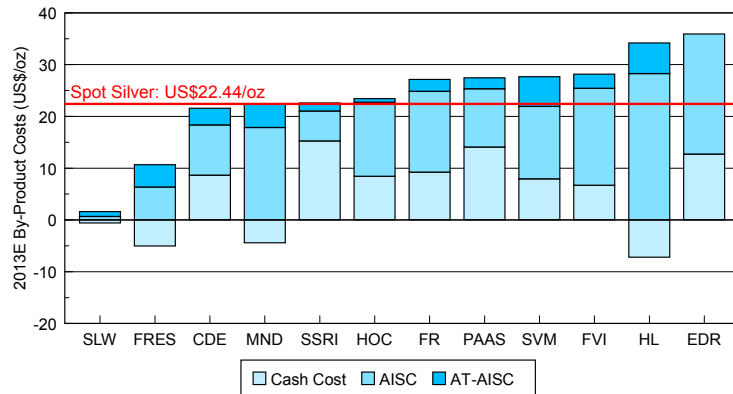
## Silver Industry Costs

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### BMO Research After-Tax-AISC for 2013E

Fig 47: BMO Research By-Product After-Tax-AISC for 2013E

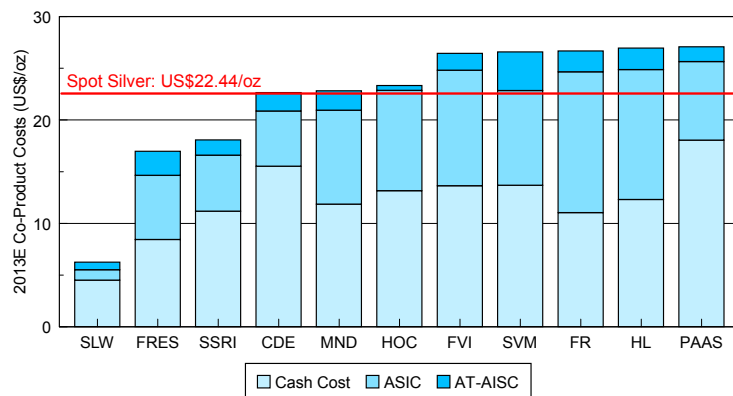
Silver Wheaton has the lowest by-product AT-AISC while Endeavour has the highest.



Source: BMO Capital Markets

Fig 48: BMO Research Co-Product After-Tax-AISC for 2013E

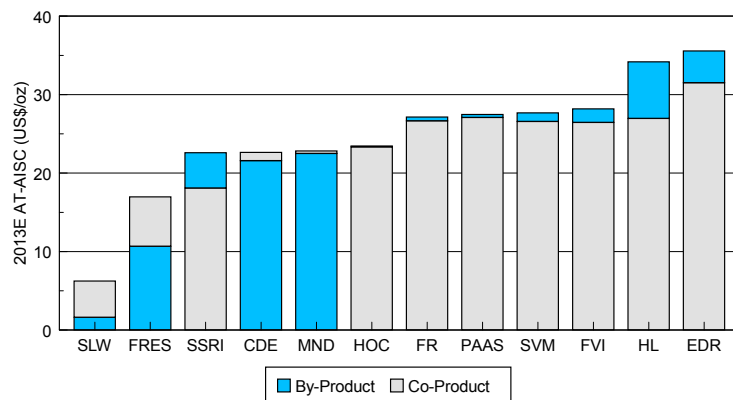
Silver Wheaton has the lowest co-product AT-AISC while Pan American has the highest.



Source: BMO Capital Markets

Fig 49: BMO Research By- & Co-Product After-Tax-AISC for 2013E

Fresnillo has the greatest variance between by-product and co-product AT-AISC.



Source: BMO Capital Markets

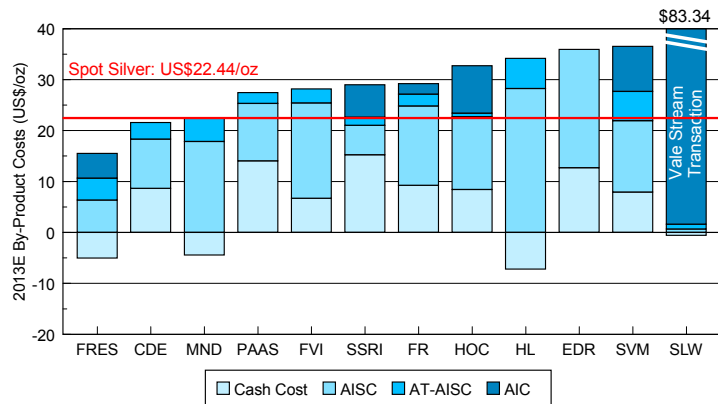
## Silver Industry Costs

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### BMO Research All-In-Costs for 2013E

Fig 50: BMO Research By-Product All-In-Costs for 2013E

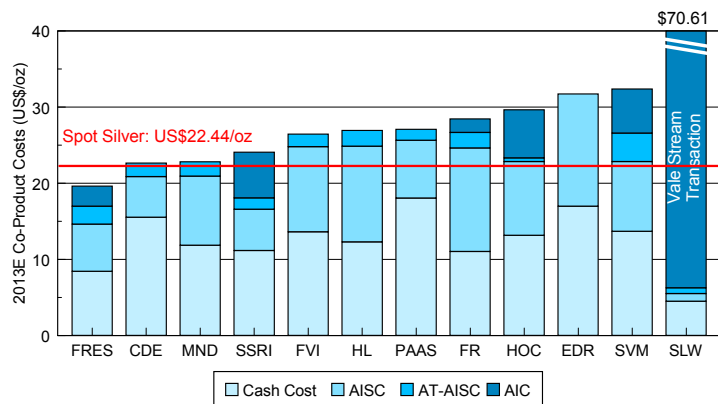
Fresnillo has the lowest by-product AIC while Silver Wheaton the highest (due to the Vale transaction).



Source: BMO Capital Markets

Fig 51: BMO Research Co-Product All-In-Costs for 2013E

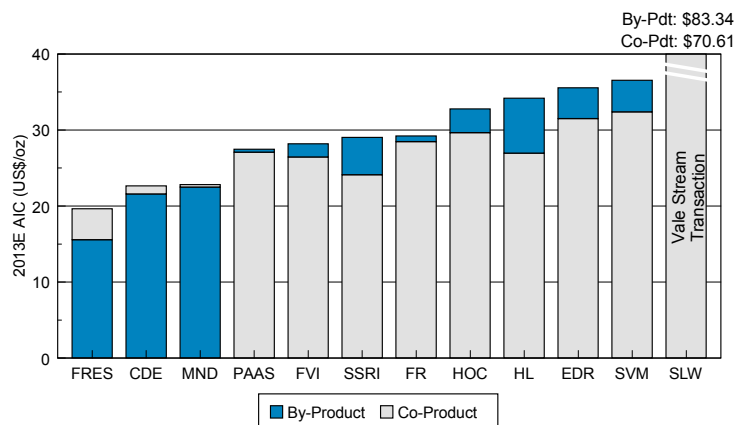
Fresnillo has the lowest co-product AIC while Silver Wheaton the highest (due to the Vale transaction).



Source: BMO Capital Markets

Fig 52: BMO Research By- & Co-Product All-In-Costs for 2013E

Silver Wheaton has the greatest variance between by-product and co-product AIC.



Source: BMO Capital Markets



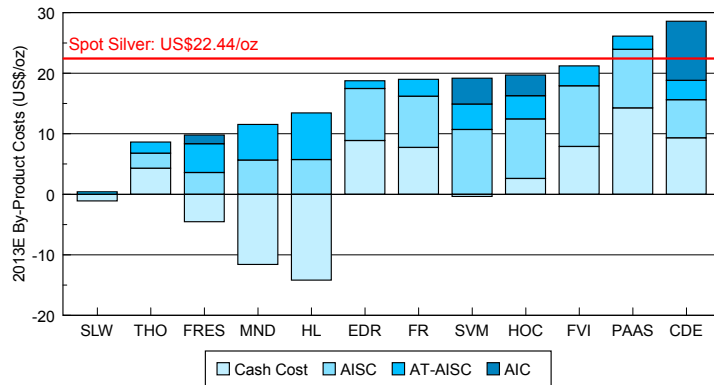
## Silver Industry Costs

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### BMO Research All-In-Costs for 2015E

Fig 53: BMO Research By-Product All-In-Costs for 2015E

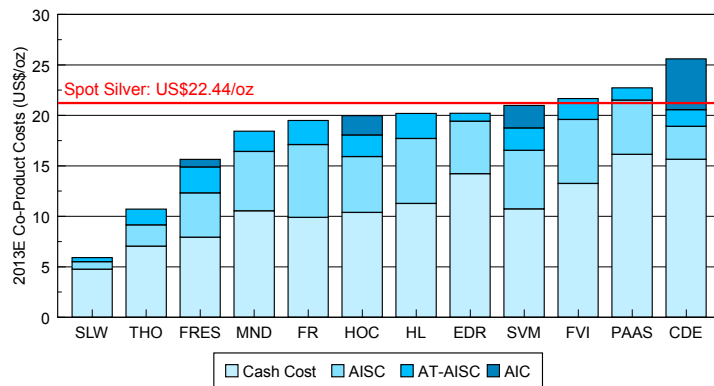
Silver Wheaton has the lowest by-product AIC while Coeur has the highest.



Source: BMO Capital Markets

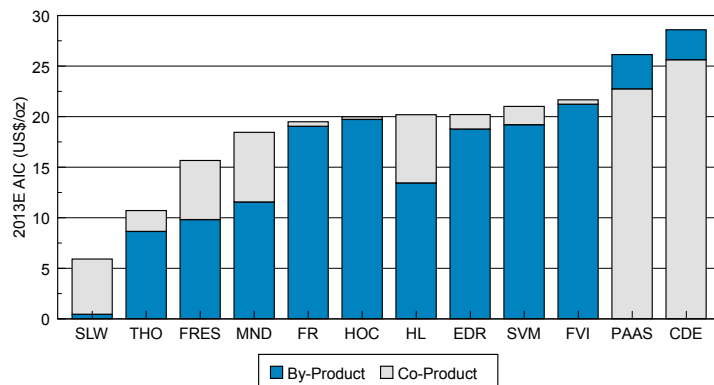
Fig 54: BMO Research Co-Product All-In-Costs for 2015E

Silver Wheaton has the lowest co-product AIC while Coeur has the highest.



Source: BMO Capital Markets

Fig 55: BMO Research By- & Co-Product All-In-Costs for 2015E



Source: BMO Capital Markets

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## Silver Industry Costs

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### 4. Appendix

**Silver Industry Costs**

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Fig 56: BMO Research By-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2012

		2012									
		By-Product Costs									
Ticker	Stock	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest & Tax	AT-AISC	Greenfield	AIC
		Moz	Costs	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz
<b>BMO Research Average</b>			<b>\$2.47</b>	<b>\$2.17</b>	<b>\$2.63</b>	<b>\$10.71</b>	<b>\$17.89</b>	<b>\$4.85</b>	<b>\$22.74</b>	<b>\$4.86</b>	<b>\$27.59</b>
BCM	Bear Creek Mining										
CDE	Coeur D'Alene Mining	18,069	\$9.20	\$1.45	\$1.45	\$6.40	\$18.50	\$5.25	\$23.75	\$0.60	\$24.35
EDR	Endeavour Silver	4,612	\$7.68	\$1.43	\$2.36	\$14.35	\$26.40	\$3.90	\$30.29	\$0.00	\$30.29
FR	First Majestic	8,371	\$8.96	\$2.34	\$0.00	\$15.60	\$27.09	\$2.91	\$30.00	\$8.20	\$38.20
FRES	Fresnillo	35,937	-\$14.30	\$1.48	\$6.50	\$16.65	\$10.33	\$8.05	\$18.38	\$0.00	\$18.38
FVI	Fortuna Silver	3,922	\$3.04	\$3.07	\$0.20	\$11.71	\$19.75	\$3.65	\$23.40	\$0.00	\$23.40
HL	Hecla Mining	5,430	\$5.72	\$12.97	\$5.86	\$22.04	\$46.59	\$2.08	\$48.68	\$0.00	\$48.68
HOC	Hochschild Mining	18,929	\$4.36	\$3.86	\$3.41	\$17.00	\$28.63	\$7.88	\$36.51	\$0.00	\$36.51
MAG	MAG Silver										
MND	Mandalay Resources	2,766	-\$3.42	\$5.53	\$0.00	\$16.45	\$18.56	\$3.15	\$21.71	\$0.00	\$21.71
MSV	Minco Silver										
PAAS	Pan American Silver	22,967	\$10.89	\$0.50	\$1.60	\$7.64	\$20.80	\$4.42	\$25.22	\$0.00	\$25.22
SLW	Silver Wheaton	25,037	\$1.56	\$0.98	\$0.00	\$0.00	\$2.54	\$0.59	\$3.13	\$25.46	\$28.59
SSRI	Silver Standard	8,589	\$23.96	\$2.00	\$1.48	\$6.90	\$29.94	\$0.55	\$30.49	\$4.40	\$34.89
SVM	Silvercorp	5,614	\$3.82	\$3.24	\$0.66	\$6.89	\$16.21	\$8.14	\$24.34	\$4.13	\$28.48
THO	Tahoe Resources										

Source: BMO Capital Markets

Fig 57: BMO Research Co-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2012

		2012									
		Co-Product Costs									
Ticker	Stock	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest & Tax	AT-AISC	Greenfield	AIC
		Equivalent	Costs	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz
		Moz AuEq	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz	US\$/oz
<b>BMO Research Average</b>			<b>\$13.22</b>	<b>\$1.59</b>	<b>\$1.81</b>	<b>\$7.36</b>	<b>\$23.83</b>	<b>\$3.33</b>	<b>\$27.16</b>	<b>\$3.34</b>	<b>\$30.50</b>
BCM	Bear Creek Mining										
CDE	Coeur D'Alene Mining	29,586	\$18.24	\$0.89	\$0.89	\$3.91	\$23.92	\$3.20	\$27.12	\$0.37	\$27.49
EDR	Endeavour Silver	6,469	\$14.48	\$1.43	\$1.68	\$10.23	\$27.83	\$2.78	\$30.61	\$0.00	\$30.61
FR	First Majestic	9,078	\$10.75	\$2.34	\$0.00	\$14.38	\$27.46	\$2.69	\$30.15	\$7.56	\$37.71
FRES	Fresnillo	61,210	\$11.26	\$0.87	\$3.82	\$9.78	\$25.72	\$4.73	\$30.44	\$0.00	\$30.44
FVI	Fortuna Silver	6,132	\$13.40	\$3.07	\$0.13	\$7.49	\$24.09	\$2.34	\$26.42	\$0.00	\$26.42
HL	Hecla Mining	11,514	\$21.30	\$6.12	\$2.76	\$10.39	\$40.57	\$0.98	\$41.55	\$0.00	\$41.55
HOC	Hochschild Mining	27,515	\$12.44	\$2.65	\$2.35	\$11.70	\$29.13	\$5.42	\$34.56	\$0.00	\$34.56
MAG	MAG Silver										
MND	Mandalay Resources	5,721	\$13.38	\$2.67	\$0.00	\$7.95	\$24.01	\$1.52	\$25.53	\$0.00	\$25.53
MSV	Minco Silver										
PAAS	Pan American Silver	31,193	\$17.44	\$0.50	\$1.18	\$5.62	\$24.74	\$3.25	\$27.99	\$0.00	\$27.99
SLW	Silver Wheaton	27,519	\$4.27	\$0.89	\$0.00	\$0.00	\$5.16	\$0.54	\$5.69	\$23.17	\$28.86
SSRI	Silver Standard	8,820	\$17.05	\$1.95	\$1.44	\$6.72	\$22.87	\$0.54	\$23.41	\$4.29	\$27.69
SVM	Silvercorp	8,390	\$12.56	\$3.24	\$0.44	\$4.61	\$20.85	\$5.44	\$26.29	\$2.77	\$29.06
THO	Tahoe Resources										

Source: BMO Capital Markets

**Silver Industry Costs**

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Fig 58: BMO Research By-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2013E

		2013E									
		By-Product Costs									
Ticker	Stock	Silver Moz	Total Cash Costs US\$/oz	G&A US\$/oz	Exploration US\$/oz	Brownfield Capital US\$/oz	AISC US\$/oz	Interest & Tax US\$/oz	AT-AISC US\$/oz	Greenfield Capital US\$/oz	AIC US\$/oz
<b>BMO Research Average</b>			<b>\$4.63</b>	<b>\$2.03</b>	<b>\$1.47</b>	<b>\$8.17</b>	<b>\$16.12</b>	<b>\$2.56</b>	<b>\$18.68</b>	<b>\$15.73</b>	<b>\$34.41</b>
BCM	Bear Creek Mining										
CDE	Coeur D'Alene Mining	17,311	\$8.73	\$1.87	\$1.40	\$6.41	\$18.41	\$3.22	\$21.63	\$0.00	\$21.63
EDR	Endeavour Silver	5,256	\$12.77	\$1.34	\$3.57	\$17.55	\$36.00	-\$0.43	\$35.57	\$0.00	\$35.57
FR	First Majestic	11,056	\$9.23	\$1.75	\$0.11	\$13.49	\$24.85	\$2.26	\$27.11	\$2.07	\$29.17
FRES	Fresnillo	39,039	-\$4.91	\$1.43	\$2.52	\$7.45	\$6.49	\$4.25	\$10.74	\$4.88	\$15.63
FVI	Fortuna Silver	4,251	\$6.83	\$2.64	\$0.32	\$13.99	\$25.57	\$2.65	\$28.22	\$0.00	\$28.22
HL	Hecla Mining	8,412	-\$6.95	\$7.35	\$3.15	\$24.98	\$28.53	\$5.76	\$34.29	\$0.00	\$34.29
HOC	Hochschild Mining	19,193	\$8.48	\$3.99	\$2.34	\$7.98	\$22.80	\$0.60	\$23.40	\$9.33	\$32.72
MAG	MAG Silver										
MND	Mandalay Resources	2,862	-\$4.33	\$5.61	\$0.00	\$16.69	\$17.97	\$4.57	\$22.54	\$0.00	\$22.54
MSV	Minco Silver										
PAAS	Pan American Silver	23,068	\$14.16	\$0.46	\$1.33	\$9.26	\$25.44	\$2.08	\$27.52	\$0.00	\$27.52
SLW	Silver Wheaton	26,319	-\$0.56	\$1.28	\$0.00	\$0.00	\$0.72	\$0.95	\$1.66	\$81.71	\$83.38
SSRI	Silver Standard	8,447	\$15.22	\$2.14	\$0.60	\$9.45	\$21.01	\$1.59	\$22.60	\$6.41	\$29.01
SVM	Silvercorp	5,104	\$7.92	\$2.88	\$0.77	\$8.85	\$21.94	\$5.74	\$27.68	\$8.88	\$36.55
THO	Tahoe Resources										

Source: BMO Capital Markets

Fig 59: BMO Research Co-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2013E

			2013E									
			Co-Product Costs									
Ticker	Stock	Category	Silver Equivalent Moz AuEq	Total Cash Costs US\$/oz	G&A US\$/oz	Exploration US\$/oz	Brownfield Capital US\$/oz	AISC US\$/oz	Interest & Tax US\$/oz	AT-AISC US\$/oz	Greenfield Capital US\$/oz	AIC US\$/oz
<b>BMO Research Average</b>				<b>\$11.75</b>	<b>\$1.37</b>	<b>\$0.93</b>	<b>\$5.11</b>	<b>\$18.94</b>	<b>\$1.60</b>	<b>\$20.54</b>	<b>\$9.54</b>	<b>\$30.07</b>
BCM	Bear Creek Mining											
CDE	Coeur D'Alene Mining		31,432	\$15.49	\$1.03	\$0.77	\$3.53	\$20.82	\$1.77	\$22.59	\$0.00	\$22.59
EDR	Endeavour Silver		8,284	\$16.96	\$1.34	\$2.26	\$11.14	\$31.70	-\$0.27	\$31.43	\$0.00	\$31.43
FR	First Majestic		12,684	\$11.03	\$1.75	\$0.10	\$11.76	\$24.64	\$1.97	\$26.61	\$1.80	\$28.41
FRES	Fresnillo		71,909	\$8.44	\$0.78	\$1.37	\$4.04	\$14.63	\$2.31	\$16.94	\$2.65	\$19.59
FVI	Fortuna Silver		7,126	\$13.62	\$2.64	\$0.19	\$8.35	\$24.80	\$1.58	\$26.38	\$0.00	\$26.38
HL	Hecla Mining		23,788	\$12.26	\$2.60	\$1.11	\$8.83	\$24.81	\$2.04	\$26.85	\$0.00	\$26.85
HOC	Hochschild Mining		28,383	\$13.14	\$2.70	\$1.59	\$5.40	\$22.82	\$0.40	\$23.23	\$6.31	\$29.53
MAG	MAG Silver											
MND	Mandalay Resources		7,047	\$11.82	\$2.28	\$0.00	\$6.78	\$20.88	\$1.85	\$22.73	\$0.00	\$22.73
MSV	Minco Silver											
PAAS	Pan American Silver		34,260	\$18.04	\$0.46	\$0.89	\$6.24	\$25.64	\$1.40	\$27.04	\$0.00	\$27.04
SLW	Silver Wheaton		33,446	\$4.51	\$1.01	\$0.00	\$0.00	\$5.51	\$0.75	\$6.26	\$64.30	\$70.56
SSRI	Silver Standard		9,007	\$11.19	\$2.00	\$0.56	\$8.87	\$16.61	\$1.50	\$18.11	\$6.01	\$24.12
SVM	Silvercorp		7,815	\$13.68	\$2.88	\$0.50	\$5.78	\$22.83	\$3.75	\$26.58	\$5.80	\$32.38
THO	Tahoe Resources											

Source: BMO Capital Markets

**Silver Industry Costs**

June 6, 2013

Fig 60: BMO Research By-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2014E

		2014E									
		By-Product Costs									
Ticker	Stock	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest &	AT-AISC	Greenfield	AIC
		Moz	Costs	US\$/oz	US\$/oz	Capital	US\$/oz	Tax	US\$/oz	Capital	US\$/oz
			US\$/oz			US\$/oz		US\$/oz		US\$/oz	
<b>BMO Research Average</b>			<b>\$3.46</b>	<b>\$1.77</b>	<b>\$0.99</b>	<b>\$6.84</b>	<b>\$13.07</b>	<b>\$2.76</b>	<b>\$15.83</b>	<b>\$4.82</b>	<b>\$20.65</b>
BCM	Bear Creek Mining										
CDE	Coeur D'Alene Mining	19,280	\$9.08	\$1.50	\$1.20	\$3.85	\$15.64	\$2.88	\$18.51	\$0.52	\$19.03
EDR	Endeavour Silver	6,376	\$7.75	\$1.07	\$3.14	\$6.15	\$18.78	\$0.93	\$19.72	\$0.00	\$19.72
FR	First Majestic	15,615	\$7.86	\$1.21	\$0.11	\$5.11	\$14.51	\$3.12	\$17.63	\$4.80	\$22.43
FRES	Fresnillo	44,165	-\$5.29	\$1.27	\$1.28	\$7.49	\$4.74	\$5.24	\$9.99	\$6.99	\$16.98
FVI	Fortuna Silver	4,586	\$8.77	\$2.60	\$0.35	\$5.53	\$18.76	\$2.97	\$21.73	\$0.00	\$21.73
HL	Hecla Mining	9,778	-\$12.53	\$6.45	\$1.15	\$15.95	\$11.02	\$6.24	\$17.27	\$0.00	\$17.27
HOC	Hochschild Mining	21,181	\$5.89	\$3.62	\$1.37	\$6.53	\$17.41	\$1.42	\$18.83	\$7.55	\$26.38
MAG	MAG Silver										
MND	Mandalay Resources	3,359	-\$3.68	\$4.78	\$0.00	\$19.53	\$20.63	\$4.75	\$25.38	\$0.00	\$25.38
MSV	Minco Silver										
PAAS	Pan American Silver	21,800	\$14.31	\$0.47	\$1.47	\$12.58	\$29.10	\$1.26	\$30.37	\$0.00	\$30.37
SLW	Silver Wheaton	28,276	-\$1.54	\$1.19	\$0.00	\$0.00	-\$0.34	\$1.05	\$0.70	\$0.00	\$0.70
SSRI	Silver Standard	9,018	\$13.06	\$2.00	\$0.67	\$3.43	\$16.33	\$0.98	\$17.31	\$37.98	\$55.29
SVM	Silvercorp	5,994	\$1.56	\$2.04	\$0.42	\$14.45	\$20.19	\$3.87	\$24.05	\$0.50	\$24.55
THO	Tahoe Resources	12,964	\$5.04	\$1.35	\$0.62	\$4.56	\$11.57	\$1.90	\$13.47	\$0.00	\$13.47

Source: BMO Capital Markets

Fig 61: BMO Research Co-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2014E

			2014E									
			Co-Product Costs									
Ticker	Stock	Category	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest &	AT-AISC	Greenfield	AIC
			Equivalent	Costs	US\$/oz	US\$/oz	Capital	US\$/oz	Tax	US\$/oz	Capital	US\$/oz
			Moz AuEq	US\$/oz			US\$/oz		US\$/oz		US\$/oz	
<b>BMO Research Average</b>				<b>\$10.94</b>	<b>\$1.18</b>	<b>\$0.61</b>	<b>\$4.12</b>	<b>\$16.75</b>	<b>\$1.67</b>	<b>\$18.42</b>	<b>\$3.11</b>	<b>\$21.53</b>
BCM	Bear Creek Mining											
CDE	Coeur D'Alene Mining		34,510	\$14.86	\$0.84	\$0.67	\$2.15	\$18.52	\$1.61	\$20.13	\$0.29	\$20.42
EDR	Endeavour Silver		10,444	\$13.37	\$1.07	\$1.91	\$3.76	\$20.10	\$0.57	\$20.67	\$0.00	\$20.67
FR	First Majestic		18,356	\$10.00	\$1.21	\$0.10	\$4.34	\$15.65	\$2.65	\$18.30	\$4.09	\$22.39
FRES	Fresnillo		83,163	\$7.71	\$0.67	\$0.68	\$3.98	\$13.04	\$2.78	\$15.82	\$3.71	\$19.53
FVI	Fortuna Silver		7,252	\$13.70	\$2.60	\$0.22	\$3.50	\$20.01	\$1.88	\$21.89	\$0.00	\$21.89
HL	Hecla Mining		29,519	\$11.36	\$2.14	\$0.38	\$5.28	\$19.16	\$2.07	\$21.23	\$0.00	\$21.23
HOC	Hochschild Mining		31,605	\$11.58	\$2.43	\$0.92	\$4.37	\$19.30	\$0.95	\$20.25	\$5.06	\$25.31
MAG	MAG Silver											
MND	Mandalay Resources		8,016	\$10.99	\$2.00	\$0.00	\$8.18	\$21.18	\$1.99	\$23.17	\$0.00	\$23.17
MSV	Minco Silver											
PAAS	Pan American Silver		34,696	\$17.84	\$0.47	\$0.92	\$7.90	\$27.14	\$0.79	\$27.93	\$0.00	\$27.93
SLW	Silver Wheaton		38,395	\$4.71	\$0.88	\$0.00	\$0.00	\$5.59	\$0.77	\$6.36	\$0.00	\$6.36
SSRI	Silver Standard		9,698	\$9.65	\$1.86	\$0.62	\$3.19	\$12.69	\$0.91	\$13.60	\$35.32	\$48.92
SVM	Silvercorp		11,034	\$11.18	\$2.04	\$0.23	\$7.85	\$21.29	\$2.10	\$23.39	\$0.27	\$23.67
THO	Tahoe Resources		15,898	\$8.20	\$1.10	\$0.50	\$3.72	\$13.52	\$1.55	\$15.08	\$0.00	\$15.08

Source: BMO Capital Markets

**Silver Industry Costs**

June 6, 2013

Fig 62: BMO Research By-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2015E

		2015E									
		By-Product Costs									
Ticker	Stock	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest &	AT-AISC	Greenfield	AIC
		Moz	Costs	US\$/oz	US\$/oz	Capital	US\$/oz	Tax	US\$/oz	Capital	US\$/oz
			US\$/oz			US\$/oz		US\$/oz		US\$/oz	
<b>BMO Research Average</b>			<b>\$3.32</b>	<b>\$1.58</b>	<b>\$0.71</b>	<b>\$5.41</b>	<b>\$11.04</b>	<b>\$3.07</b>	<b>\$14.11</b>	<b>\$3.69</b>	<b>\$17.79</b>
BCM	Bear Creek Mining										
CDE	Coeur D'Alene Mining	17,385	\$9.43	\$1.74	\$0.76	\$3.81	\$15.73	\$3.15	\$18.88	\$9.78	\$28.66
EDR	Endeavour Silver	6,400	\$8.97	\$1.10	\$1.56	\$5.21	\$17.57	\$1.18	\$18.75	\$0.00	\$18.75
FR	First Majestic	18,423	\$7.73	\$1.08	\$0.08	\$7.13	\$16.20	\$2.74	\$18.94	\$0.00	\$18.94
FRES	Fresnillo	52,470	-\$4.37	\$1.12	\$1.14	\$5.90	\$3.78	\$4.68	\$8.46	\$1.45	\$9.91
FVI	Fortuna Silver	4,568	\$8.03	\$2.61	\$0.35	\$5.55	\$18.05	\$3.23	\$21.28	\$0.00	\$21.28
HL	Hecla Mining	9,778	-\$13.82	\$4.57	\$0.95	\$14.42	\$6.12	\$7.48	\$13.60	\$0.00	\$13.60
HOC	Hochschild Mining	25,559	\$2.71	\$3.15	\$0.74	\$5.96	\$12.56	\$3.64	\$16.20	\$3.42	\$19.62
MAG	MAG Silver										
MND	Mandalay Resources	3,642	-\$11.41	\$4.63	\$0.00	\$12.64	\$5.86	\$5.77	\$11.63	\$0.00	\$11.63
MSV	Minco Silver										
PAAS	Pan American Silver	22,542	\$14.39	\$0.41	\$1.04	\$7.91	\$24.08	\$2.11	\$26.19	\$0.00	\$26.19
SLW	Silver Wheaton	33,366	-\$1.06	\$1.01	\$0.00	\$0.00	-\$0.05	\$0.55	\$0.49	\$0.00	\$0.49
SSRI	Silver Standard	9,524	\$15.48	\$1.99	\$0.63	\$3.23	\$18.60	\$1.85	\$20.45	\$31.81	\$52.26
SVM	Silvercorp	8,405	-\$0.04	\$1.48	\$0.30	\$7.97	\$11.04	\$4.04	\$15.07	\$4.28	\$19.36
THO	Tahoe Resources	17,219	\$4.34	\$1.02	\$0.23	\$1.24	\$6.84	\$1.83	\$8.66	\$0.00	\$8.66

Source: BMO Capital Markets

Fig 63: BMO Research Co-Product Cash Cost, AISC, After-Tax-AISC & AIC for 2015E

			2015E									
			Co-Product Costs									
Ticker	Stock	Category	Silver	Total Cash	G&A	Exploration	Brownfield	AISC	Interest &	AT-AISC	Greenfield	AIC
			Equivalent	Costs	US\$/oz	US\$/oz	Capital	US\$/oz	Tax	US\$/oz	Capital	US\$/oz
			Moz AuEq	US\$/oz			US\$/oz		US\$/oz		US\$/oz	
<b>BMO Research Average</b>				<b>\$10.81</b>	<b>\$1.00</b>	<b>\$0.41</b>	<b>\$3.07</b>	<b>\$15.20</b>	<b>\$1.78</b>	<b>\$16.99</b>	<b>\$2.23</b>	<b>\$19.22</b>
BCM	Bear Creek Mining											
CDE	Coeur D'Alene Mining		33,724	\$15.60	\$0.90	\$0.39	\$1.96	\$18.85	\$1.62	\$20.48	\$5.04	\$25.52
EDR	Endeavour Silver		10,580	\$14.18	\$1.10	\$0.95	\$3.15	\$19.39	\$0.71	\$20.10	\$0.00	\$20.10
FR	First Majestic		21,644	\$9.87	\$1.08	\$0.07	\$6.07	\$17.09	\$2.33	\$19.42	\$0.00	\$19.42
FRES	Fresnillo		97,720	\$7.94	\$0.60	\$0.61	\$3.17	\$12.32	\$2.51	\$14.83	\$0.78	\$15.60
FVI	Fortuna Silver		7,225	\$13.23	\$2.61	\$0.22	\$3.51	\$19.57	\$2.04	\$21.61	\$0.00	\$21.61
HL	Hecla Mining		30,270	\$11.22	\$1.48	\$0.31	\$4.66	\$17.65	\$2.42	\$20.07	\$0.00	\$20.07
HOC	Hochschild Mining		45,661	\$10.36	\$1.76	\$0.42	\$3.34	\$15.88	\$2.04	\$17.92	\$1.92	\$19.83
MAG	MAG Silver											
MND	Mandalay Resources		10,744	\$10.50	\$1.57	\$0.00	\$4.28	\$16.36	\$1.96	\$18.31	\$0.00	\$18.31
MSV	Minco Silver											
PAAS	Pan American Silver		40,601	\$16.11	\$0.41	\$0.58	\$4.39	\$21.49	\$1.17	\$22.66	\$0.00	\$22.66
SLW	Silver Wheaton		44,500	\$4.75	\$0.76	\$0.00	\$0.00	\$5.51	\$0.41	\$5.92	\$0.00	\$5.92
SSRI	Silver Standard		10,615	\$12.82	\$1.78	\$0.57	\$2.90	\$15.62	\$1.66	\$17.28	\$28.54	\$48.83
SVM	Silvercorp		15,964	\$10.75	\$1.48	\$0.16	\$4.20	\$16.59	\$2.13	\$18.71	\$2.26	\$20.97
THO	Tahoe Resources		20,278	\$7.03	\$0.87	\$0.20	\$1.05	\$9.15	\$1.55	\$10.70	\$0.00	\$10.70

Source: BMO Capital Markets

## Silver Industry Costs

June 6, 2013

Fig 64: BMO Research Mining Sector Summary

Metals & Mining Sector Groups	Market Cap USDM	P/NPV BMO Assumpt.(2) %	Price to Earnings (x) BMO Assumpt.(3)		EV/EBITDA (x) BMO Assumpt.(4)		Dividend Yield (5) 2013E	Net Debt to Equity (6) %
			2013E	2014E	2013E	2014E		
<b>Diversifieds</b>	433,752	76%	10.3	9.0	5.7	5.0	4.0%	43%
<b>Copper</b>	39,607	77%	16.9	15.9	13.4	11.0	5.9%	81%
<b>Coal</b>	19,579	65%	45.6	23.2	10.4	6.5	1.3%	100%
<b>Iron Ore</b>	33,949	90%	9.9	8.0	6.1	4.8	3.6%	104%
<b>Uranium</b>	10,504	116%	18.4	17.3	13.5	10.4	1.5%	13%
<b>Aluminum</b>	11,490	124%	26.5	20.2	16.1	15.5	1.1%	43%
<b>Gold</b>	154,166	123%	14.6	10.0	7.2	5.1	2.5%	15%
<b>Silver</b>	31,719	149%	18.0	11.7	7.9	7.2	3.2%	-15%
<b>PGM</b>	20,575	293%	22.0	19.0	9.3	8.5	0.2%	2%
<b>Diamonds</b>	3,177	61%	21.7	20.1	4.9	3.1	0.0%	-21%
<b>Coverage Universe</b>	<b>758,519</b>	<b>96%</b>	<b>13.4</b>	<b>10.6</b>	<b>7.0</b>	<b>5.8</b>	<b>3.5%</b>	<b>39%</b>
<b>Sectors Details</b>								
<b>Gold</b>								
<b>Seniors</b>	109,851	132%	12.8	8.4	6.8	4.7	2.9%	23%
<b>Intermediates</b>	33,858	111%	20.3	15.0	8.5	6.7	1.8%	-5%
<b>Juniors</b>	10,457	61%	14.7	10.8	7.1	4.9	0.0%	-4%
<b>Silver</b>								
<b>Seniors</b>	24,322	168%	18.2	12.2	8.7	7.9	4.1%	-18%
<b>Intermediates</b>	3,477	80%	12.4	9.5	7.2	5.4	0.5%	-2%
<b>Juniors</b>	3,920	97%	21.5	11.1	4.0	4.9	0.0%	-12%

(1) Rating: Please see disclosure pages for rating keys for BMO Nesbitt Burns Inc., BMO Capital Markets Ltd., and BMO Capital Markets Corp.

(2) Price to NPV: The current share price divided by BMO NPV per share calculated using a 10% discount rate. Value greater than 100% is a premium (trading above its respective NPV per share) and value less than 100% is a discount (trading below its respective NPV per share).

(3) Price to Earnings (x): The current share price divided by adjusted earnings per share. For values of more than 50, the P/E multiple is capped at 50.0 and negative P/E values are displayed as "na".

(4) EV/EBITDA (x): Enterprise Value divided by EBITDA forecast. For values of more than 50, the EV/EBITDA multiple is capped at 50.0 and negative EV/EBITDA values are displayed as "na".

(5) Dividend Yield: Estimated common dividend divided by the current share price.

(6) Net Debt To Equity: The ratio of Net Debt (long-term debt + short-term debt - cash) to total shareholders equity.

Source: BMO Capital Markets, Bloomberg, Thomson Reuters Corp. Note: Averages are Weighted by Market Cap

## Silver Industry Costs

June 6, 2013

Fig 65: BMO Research Silver Pages

Company	Ticker	Share Price Local Currency 31-May	Rating (1)	Target	Market Cap USD\$M	0% Price to NPV BMO Assumpt.(2) 0%	10%	Price to Earnings (x) BMO Assumpt.(3) 2013E	2014E	EV/EBITDA (x) BMO Assumpt.(4) 2013E	2014E	Dividend Yield (5) 2013E	Net Debt to Equity (6) %	Analysts (note a)
<b>Senior Producers</b>														
Coeur D'Alene Mining	CDE	USD 14.19	Mkt	16.50	1,438	61%	122%	19.8	7.5	3.2	2.9	0.0%	-18.0%	Andrew Kaip
Fresnillo	FRES	GBP 11.53	Mkt	15.00	12,571	80%	156%	21.4	15.0	9.1	9.8	5.6%	-44.1%	Andrew Kaip
Hochschild Mining	HOC	GBP 2.54	OP	4.75	1,302	48%	90%	27.0	10.0	3.1	5.2	5.7%	-7.3%	Andrew Kaip
Pan American Silver	PAAS	USD 12.21	Mkt	19.50	1,850	101%	113%	17.8	13.6	3.3	4.0	4.1%	-16.4%	Andrew Kaip
Silver Wheaton	SLW	USD 24.36	OP	40.00	8,727	49%	234%	15.5	11.4	12.8	8.9	1.7%	18.0%	Andrew Kaip
<b>Senior Producers Total/Average</b>					25,887	68%	174%	19.4	13.0	9.3	8.5	3.9%	-17.9%	
<b>Intermediate Producers</b>														
First Majestic	FR	CDN 11.21	Mkt	18.00	1,271	56%	96%	12.2	7.3	8.9	7.0	0.0%	-4.0%	Andrew Kaip
Hecla Mining	HL	USD 3.83	Mkt	4.25	1,396	48%	102%	15.2	8.8	9.8	6.3	0.0%	20.6%	Andrew Kaip
Silver Standard	SSRI	USD 7.86	Mkt	12.00	635	13%	59%	>50	23.3	7.4	4.6	0.0%	-26.5%	Andrew Kaip
Silvercorp	SVM	CDN 3.24	Mkt(S)	4.75	534	34%	61%	13.5	7.7	2.5	4.5	3.1%	-28.0%	Andrew Kaip
<b>Intermediate Producers Total/Average</b>					3,835	43%	87%	13.7	10.5	8.1	6.0	0.4%	-2.1%	
<b>Emerging Producers</b>														
Bear Creek Mining	BCM	CDN 2.17	OP(S)	3.25	195	28%	84%	>50	>50	nap	nap	0.0%	-41.3%	Andrew Kaip
Endeavour Silver	EDR	CDN 4.65	Mkt	6.50	461	72%	143%	43.6	10.1	4.7	7.8	0.0%	5.7%	Andrew Kaip
Fortuna Silver	FVI	CDN 3.31	Mkt	4.50	405	91%	133%	14.2	10.2	4.8	5.1	0.0%	-19.4%	Andrew Kaip
MAG Silver	MAG	CDN 7.71	OP(S)	na	445	41%	83%	nap	nap	nap	nap	0.0%	-55.5%	John Hayes
Mandalay Resources Corp.	MND	USD 0.83	OP	1.40	295	68%	105%	6.3	4.2	2.9	2.1	0.0%	-16.6%	Andrew Kaip
Minco Silver	MSV	CDN 0.87	Und(S)	1.25	50	10%	21%	>50	>50	nap	nap	0.0%	-22.4%	Andrew Kaip
Tahoe Resources	THO	CDN 15.09	OP(S)	25.00	2,166	41%	91%	>50	12.6	nap	nap	0.0%	-2.4%	Andrew Kaip
<b>Emerging Producers Total/Average</b>					4,014	50%	100%	23.9	11.2	4.3	5.4	0.0%	-12.2%	

David Haughton (DH), John Hayes (JPH), Brian Quast (BQ) and Andrew Kaip (AK) are employed by BMO Nesbitt Burns Inc.; Andrew Breichmanas (AB) is employed by BMO Capital Markets Ltd. (UK).

See Page 58 for Notes (1) - (6)

Source: BMO Capital Markets



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**Silver Industry Costs**

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**Important Disclosures****Analyst's Certification**

Each analyst whose name appears on the front page of this report hereby certifies that the views expressed in this report accurately reflect the analyst's personal views about the subject securities or issuers. Each analyst also certifies that no part of his compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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**Sector Risk Disclosure**

In addition to the risks involved in investing in common stocks generally, we also highlight the following risks that pertain to the mining sector.

**Feasibility Study:** Mine plans, mining schedules and production are based on reserve and resource estimates. These plans involve inherent uncertainties. Resource estimates contain statistical computations and judgments by geologists. Reserve estimations and mine plans contain technical and commercial judgments by engineers that are optimized on the basis of estimates for mining costs, ore haulage costs, processing costs and recoveries, as well as gold price assumptions. Expected metal recoveries are based on test work carried out on representative samples of the ore and treatment processes at the laboratory, sometimes involving bench tests or pilot plant scales. It is not possible economically to obtain absolute certainty as to the representative nature of the sample or the laboratory results when applied to the full-scale operations. Mining and processing costs estimates are historically based and may change as a result of changed physical conditions, market conditions and transportation costs, or changed economic conditions in general.

**Technical:** Mining and processing may be affected by unexpected events, such as pit failures, dike failures or equipment breakdowns, which may result in significantly higher costs, revisions to mine plans, sterilization of reserves or ultimate closure of the mine.

**Operating:** Mining operations can be affected by a number of risk factors, including: unexpected geological conditions; unusual mining conditions, unexpected processing problems, unexpected metallurgical problems, shortages in skilled workforce; environmental issues and a lack of availability of support infrastructure.

**Permits and Approvals:** Operations and development activities are contingent on the receipt and maintenance of various permits and approvals from appropriate governmental authorities. There is no guarantee that any company will be successful in obtaining the necessary permits or acceptances for its planned development, or that it will be successful in obtaining renewals of existing permits and approvals on a timely basis or at all.

**Litigation / Political risk:** Mining operations are exposed to various levels of political risks and uncertainties. Changes, if any, in mining or investment policies or shifts in the political landscape may adversely affect any mining company's operations or profitability. Operations may be affected in varying degrees by government regulations or unanticipated changes to regulations with respect to, but not limited to, restrictions on production, income taxes, royalties, maintenance of claims, environmental legislation, land use, land claims of local people, water use and mine safety. Failure to comply with applicable laws and regulations could result in financial losses, litigation, revocation of permits or other negative consequences. The occurrence of these or other various factors and uncertainties cannot be accurately predicted and could have an adverse effect on any mining company's operations or profitability.

**Metal Prices:** Any reduction in the price of copper, gold, or silver could adversely affect any mining company's share price performance. There are no guarantees that future metals prices will be sustained at levels that enable any mining company to operate its planned operations at a profit. The company's cash flows are exposed, among other things, to fluctuations in the gold and silver prices.

**Financing:** Any mining company could require additional funding for future operations. Funding of operations or projects could take the form of debt and/or equity financing. There are no guarantees that debt or equity for the project will be available, arranged, or offered on terms acceptable to any mining company.

**Company Specific Disclosure**

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**Distribution of Ratings (March 31, 2013)**

Rating Category	BMO Rating	BMOCM US Universe*	BMOCM US IB Clients**	BMOCM US IB Clients***	BMOCM Universe****	BMOCM IB Clients*****	Starmine Universe
Buy	Outperform	37.3%	16.5%	53.8%	38.2%	51.3%	53.2%
Hold	Market Perform	58.0%	8.8%	44.6%	56.8%	47.7%	41.1%
Sell	Underperform	4.7%	3.7%	1.5%	4.9%	1.0%	5.7%

\* Reflects rating distribution of all companies covered by BMO Capital Markets Corp. equity research analysts.

\*\* Reflects rating distribution of all companies from which BMO Capital Markets Corp. has received compensation for Investment Banking services as percentage within ratings category.

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**Rating and Sector Key (as of April 5, 2013)**

We use the following ratings system definitions:

We use the following ratings system definitions:

OP = Outperform - Forecast to outperform the analyst's coverage universe on a total return basis;

Mkt = Market Perform - Forecast to perform roughly in line with the analyst's coverage universe on a total return basis;

Und = Underperform - Forecast to underperform the analyst's coverage universe on a total return basis;

(S) = Speculative investment;

NR = No rating at this time; and

R = Restricted - Dissemination of research is currently restricted.

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