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# All-in Sustaining Cost Analysis

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# All-in Sustaining Cost Analysis

by

Asseu Gilbert Yapo

A publishable paper submitted in partial fulfillment of the  
requirements for the degree of

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## **Abstract**

Cost reporting has focused on the direct cost of mining and processing ore which was summarized in the non-GAAP cash cost developed by the Gold Institute in 1996. In 2013, a group of mining companies, working with the World Gold Council, developed a more inclusive approach to reporting costs designed to solve the dilemma of showing a more comprehensive reflection of recurring costs involved in producing gold, without discouraging investors.

**Keywords:** All-in Sustaining Cost; All-in Cost; Cash Cost; World Gold Council

## **List of Acronyms / Abbreviations**

AIC: All-in Cost

AISC: All-in Sustaining Cost

CSA: Canada Securities Administrators

GAAP: General Accepted Accounting Principles

G & A: General and Administrative costs

IFRS: International Financial Reporting Standard

Non-GAAP: Non General Accepted Accounting Principles

SEC: US Security Exchange Commission

WGC: World Gold Council

## **Dedication**

I dedicate this paper to my Lord and personal savior for His grace that has always been sufficient and the Baptist Student Union (2013-2015), as well as my parents in the Ivory Coast, for their prayers and support throughout this project.

## **Acknowledgements**

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## 1. Introduction

Modern mining did not start as an exact and explicit science. At the beginning of our civilization, the 'first human' used rocks as weapons and tools. The application of the rock, at that time, depended mostly on its shape and size.

Mining today plays a key role in the development of our civilization (Camm, 2014):

- Producer of jobs;
- Source of essential raw material and provider of essential fuels and;
- Factor in support of the international balance of monetary payment.

It is thus necessary to form and train professionals to help locate, develop, design and manage ore deposits in an environmentally safe and profitable manner.

The basic academic requirement or popular training to go through in order to be a mine engineer is a bachelor degree in the English system (4-year of education). As mineral deposits become increasingly scarce, more and varied training is needed to meet the required skill set in exploring new challenges. The last 10 to 15 years have seen an increasing interest for masters and PhD programs to meet the skill set required for these challenges.

The current research trend is to find techniques to mine deep underground and develop tools to explore deep under sea. Operations are safer today than before as companies understand better their work environment and the importance of mining responsibly. In spite of these progresses, an area of the industry which has long been underestimated is bringing bad publicity among investors: the costs and selling price of the ore. At this time it is impossible for most mining companies to control the price of their commodities; all they can do is to work on lowering the cost of production, which, they are all continually striving to achieve.

An attempt to bring light and clarity on the cost of their business will give a better idea to investors on the true profitability of the mining business. This last part is particularly true for gold mine producers as they are seen as underperformers for the last decade among the investment community (Hill, 2013). In order to have better control on their production costs, leading gold producers through their alliance inside the World Gold Council (WGC), worked on the adoption of a new cost framework: the All-in Sustaining Cost (AISC) and All-in Cost (AIC).

Since 1996, the traditional cash cost reporting has focused only on the mining and processing costs incurred in mining an ounce of gold, which included the costs of goods sold (labor, energy, and consumables costs) and royalties (Table 1). But cash cost reporting ignores many important aspects, like sustaining capital, general and administrative expenses, and site rehabilitation at the end of the mine life (Whelan, 2013). The cash cost was used to attract many investors into the business. In fact the high gross margin (sales minus cash costs) has been promoted the past decades by the industry instead of the net or operating margin. As a result, even when the gold price was really high, nearly \$1900 per ounce in August 2011, gold producers were not reporting excessive profits in their cash flow / income statements to the big disappointment and incomprehension of investors (Milstead, 2014). The truth was simply that the other costs omitted in the traditional cash cost were reducing the apparent profits.



**Table 1: Basic Layout of Cash Cost and Total cash Cost.** (PwC, 2007)

<b>Formal Definition</b>	<b>Per Ounce of Gold</b>
Direct mining expenses	\$ XXX
Stripping and mine development adjustments	XXX
Third-party smelting, refining and transport costs	XXX
By-product credits (deduct)	(XXX)
Other	XXX
<b>Cash Operating Costs</b>	<b>XXX</b>
Royalties (not-profit based)	XXX
Production taxes	XXX
<b>Total Cash Costs</b>	<b>XXX</b>
Depreciation	XXX
Depletion & Amortization	XXX
Reclamation & mine closure	XXX
<b>Total Production Costs</b>	<b>XXX</b>

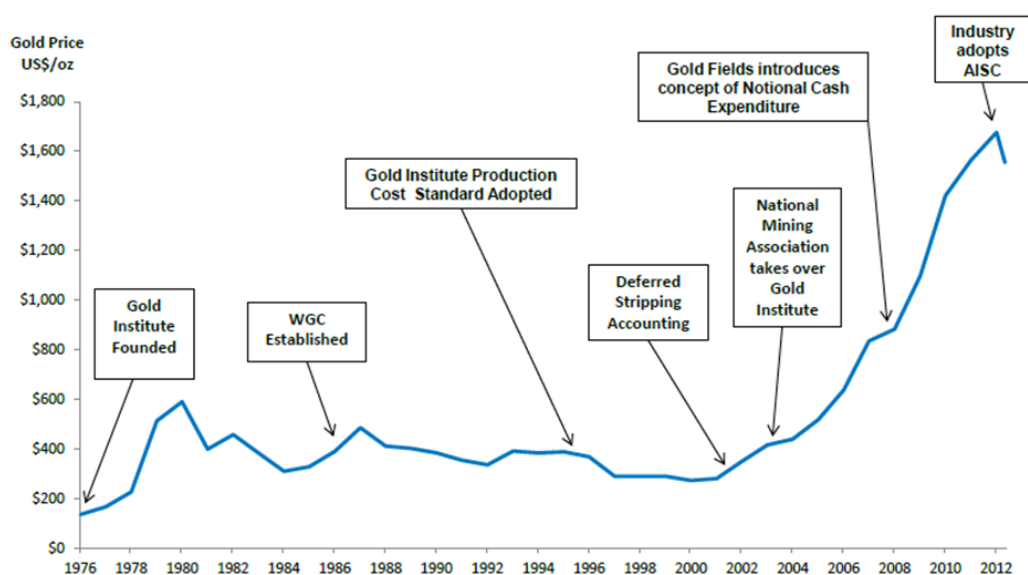
The disconnect led to a need for more accurate cost reporting in order to win back investor confidence and provide better understanding of gold mining economics. In 2012, the senior gold mining companies, including Goldfields, Barrick Gold Corp., and Newmont Mining Corporation, worked with the WGC to develop a new measure. This resulted in the publication, June 2013, of the new framework All-in Sustaining Cost (AISC) and All-in Cost (AIC), which has been widely embraced by the sector since January 1, 2014 (WGC, 2013).

The adoption of the new cost template would have the dilemma of showing the real profitability of gold mine properties, which might alleviate taxes from governments and legislators, but it might also scare off investors towards more lucrative industries if not winning back their confidence.

## 2. Evolution of gold cost reporting standard and move to AISC

### 2.1. Evolution of gold cost reporting standard

In 1976, the Gold Institute was established to promote the common business interests of the gold industry by providing statistical data and other relevant information to its members, the media, and the public, while also acting as an industry spokesperson. At that time, the gold price averaged \$176 per troy ounce (Figure 1). The Gold Institute ceased operations in 2002.



**Figure 1: Gold Cost Standard Evolution.** (Christie, 2013)

In 1996, in an attempt to standardize the cost reporting of gold, the Gold Institute published a guideline. It was basically the division of the costs of mining into cash and total costs. The cash costs are the regular direct costs involved in the mining and processing of the ore. The definition varies between companies and may include smelting, refining and any by-product benefit but generally excludes taxes, exploration, depreciation, depletion and financing.

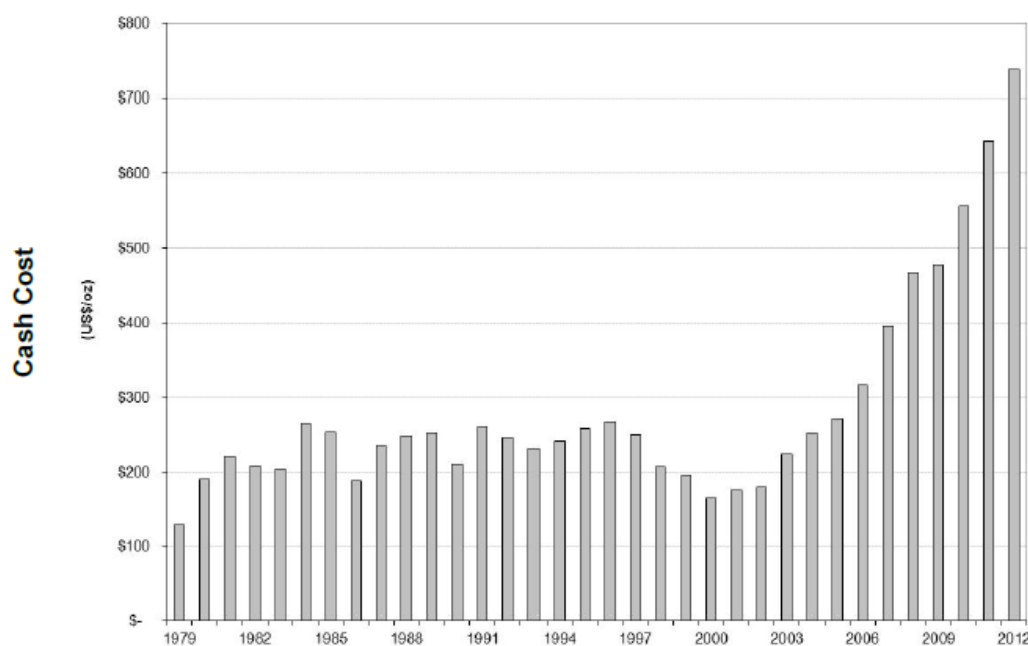
The total costs includes (depreciation, amortization, reclamation, etc.) and reflects what a mine must achieve to sustain profitability in the long run. Table 1 displayed a standard layout of the cash costs concept. For example, in 2001, Barrick produced 6.1 million ounces of gold at an average cash cost of \$162 per ounce and total cost of \$247 per ounce (Barrick, 2001).

## **2.2. Move to AISC**

In 2008, when the price of gold reached \$800 per ounce (Figure 1), many companies already felt the need for an upgrade in the cost reporting system, as the basic cash costs globally did not reflect the true costs of producing an ounce of gold. In this attempt, Gold Fields introduced the concept of Notional Cash Expenditure (NCE) per ounce in May of the same year. Notional cash expenditure (NCE) per ounce = cash costs plus capital expenditure, excluding minority interest in projects, divided by gold produced (Gold Fields, 2008). It was one of many attempts to include capital expenditures like exploration and study costs to the costs of producing an ounce of gold.

The need for an upgrade and consensual cost reporting was urgent. In fact, the gold price continued an almost vertical increase to \$1600 per ounce after 2008 while the traditional cash costs were between \$600 and \$850 per ounce (Figure 2). There was a problem: even as the price of gold reached its highest yearly average in history in 2012 for example (around \$1600 per ounce average); gold producers still had modest profits on their bottom lines. Barrick's net earnings in 2012 was negative \$ 538 million for 7.4 million ounces gold produced with an average cash cost \$463 per ounce and average realized price of \$ 1,669 per ounce (Barrick, 2012). That very same year 2012, Kinross earnings dropped by 2% ( Kinross, 2012) while Newmont's bottom line showed \$2.1B for 5.6 million ounce gold produced at a cash cost of

\$677 per ounce and a realized selling price of \$1,662 per ounce (Newmont, 2012). It was clear therefore that cash costs reporting left out several expenses, from the costs of running the company to annual spending on equipment.



**Figure 2: Evolution of the traditional cash costs.** (Christie, 2013)

Barrick former CEO Jamie Sokalsky said at a January 29, 2013 conference in Toronto: “The costs of running this business are higher than it looks and that’s how we need to manage this business going forward” (Hill, 2013).

In reality, what is seen by investors as an underperformance from the gold industry the last couple years during the boom of the gold price is partly attributable to the confusing cost reporting. In fact, “the sector has reported on a cash-cost basis for some time but some people forget that there are other costs associated with running these businesses and sustaining capital is a big piece of that and so, the all-in [sustaining] cash cost will help clarify all that to people who

don't really dig into our financial results and understand the complexities in the entire set of costs that really impact the business on the bottom line" said Silver Standard former CEO, John Smith (Candy, 2013). Investors and analysts started calling for clarities on the gold production cost reporting and a greater industry-wide consistency definition and application, revealed a survey conducted by PwC (PwC, 2013).

It was, therefore, crucial for gold producers to report more accurately their costs and to start bringing light on the true costs of producing an ounce of gold.

### **2.3. Definition of the new cost metrics**

The World Gold Council (WGC) was established in 1987 as the market development organization for the gold industry. WGC works within the investment, jewelry and technology sectors, as well as engages with governments and central banks. The World Gold Council's main purpose is to provide industry leadership, while stimulating and sustaining demand for gold (WGC, 2015).

WGC, in collaboration with its 18 member group of lead gold producers (Barrick, Newmont, Gold Corp., etc.), established a new cost disclosure template and guideline aimed to provide more transparency into the costs associated with producing an ounce of gold. All-in Sustaining Costs (AISC) and All-in Costs (AIC) are both non-GAAP (Generally Accepted Accounting Principles) measures. According to Terry Heymann, Managing Director Gold at WGC, "these new metrics have been developed to help provide greater clarity and to improve investor understanding..." (WGC, 2013).

The layout of the AISC and AIC is displayed in Table 2 below. In this new metric, section one Sub-Total (Adjusted Operating Costs) represents the traditional cash costs. Below

section one, WGC added costs related to corporate general and administrative, reclamation & remediation of current sites, amortization, sustaining exploration and studies, and other capital costs (stripping or development depending on the type of operations). The addition of all these costs gives the AISC for that operation. The sum of the AISC and other similar expenses not sustaining (i.e. growth) the current operation gives the AIC. Basically, the World Gold Council attempts to standardize the notion of sustaining production costs and non-sustaining (growth) costs. WGC guideline classifies as sustaining cost all the costs necessary to maintain the current assets production capacity and carry out the current production plan. While non-sustaining costs are those capital costs targeting the increase of the production capacity or increased of the mine life. It also includes costs that help maintain the company social license not related to current production.

WGC strongly encourages gold producers to use the new measures but does not expect that companies will disclose all individual costs items. WGC chose to exclude the following costs in the determination of AISC:

- Income tax.
- Working capital (except for adjustments to inventory on a sales basis).
- All financing charges (including capitalized interest).
- Costs related to business combinations, asset acquisitions and asset disposals.
- Items needed to normalize earnings, for example impairments on non-current assets and one-time material severance charges.

WGC does not provide an explanation as for why these costs items have been excluded from the template; but, a possible explanation might be the fact that the idea behind the new

framework is to capture the recurring costs involved in producing gold. The excluded expenses seem not to fall in that category.

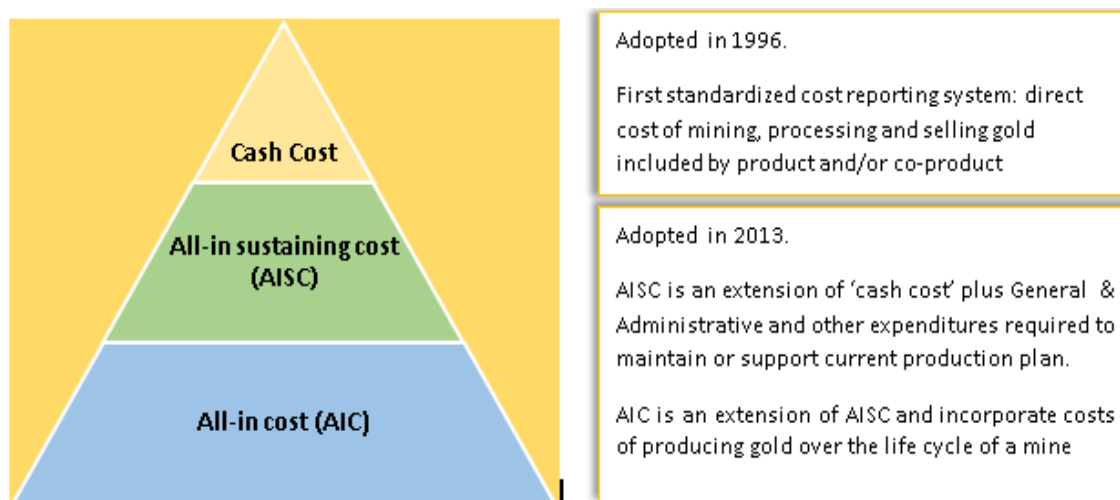
**Table 2: Guidance note on non-GAAP metrics- All-in Sustaining Costs and All-in Costs (WGC, 2013)**

		US \$/ gold ounces sold
On-Site Mining Costs (on a sales basis)	Income Statement	(a)
On-Site General & Administrative costs (G&A)	Income Statement	(b)
Royalties & Production Taxes	Income Statement	(c)
Realized Gains/Losses on Hedges due to operating costs	Income Statement	(d)
Community Costs related to current operations	Income Statement	(e)
Permitting Costs related to current operations	Income Statement	(f)
3rd party smelting, refining and transport costs	Income Statement	(g)
Non-Cash Remuneration (Site-Based)	Income Statement	(h)
Stock-piles / product inventory write down	Income Statement	(i)
Operational Stripping Costs	Income Statement	(j)
By-Product Credits	Income Statement	(k) Note: this will be a credit
Sub-Total (Adjusted Operating Costs)		(l) = (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)
Corporate General & Administrative costs (including share-based remuneration)	Income Statement	(m)
Reclamation & remediation – accretion & amortization (operating sites)	Income Statement	(n)
Exploration and study costs (sustaining)	Income Statement	(o)
Capital exploration (sustaining)	Cash Flow	(p)
Capitalized stripping & underground mine development (sustaining)	Cash Flow	(q)
Capital expenditure (sustaining)	Cash Flow	(r)
<b>All-in Sustaining Costs (AISC)</b>		(s) = (l) + (m) + (n) + (o) + (p) + (q) + (r)
Community Costs not related to current operations		(t)
Permitting Costs not related to current operations		(u)
Reclamation and remediation costs not related to current operations		(v)
Exploration and study costs (non-sustaining)		(w)
Capital exploration (non-sustaining)		(x)
Capitalized stripping & underground mine development (non-sustaining)		(y)
Capital expenditure (non-sustaining)		(z)
<b>All-in Costs (AIC)</b>		= (s) + (t) + (u) + (v) + (w) + (x) + (y) + (z)

Gold producers have voluntarily adopted all-in sustaining cost and all-in cost non-GAAP performance measures and believe that these costs provide a template that more fully defines the

total costs associated with producing gold; however, they acknowledge that its performance measures have no standardized meaning. Accordingly, it is intended to provide additional information and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with GAAP and/or International Financial Reporting Standards (IFRS).

Today, the investment community along with analysts and leading gold producers have realized that cash cost was only the visible part of what we called the iceberg of gold mine costs (Figure 3). The new cost framework helps to have a more complete picture of the cost involved in producing gold.



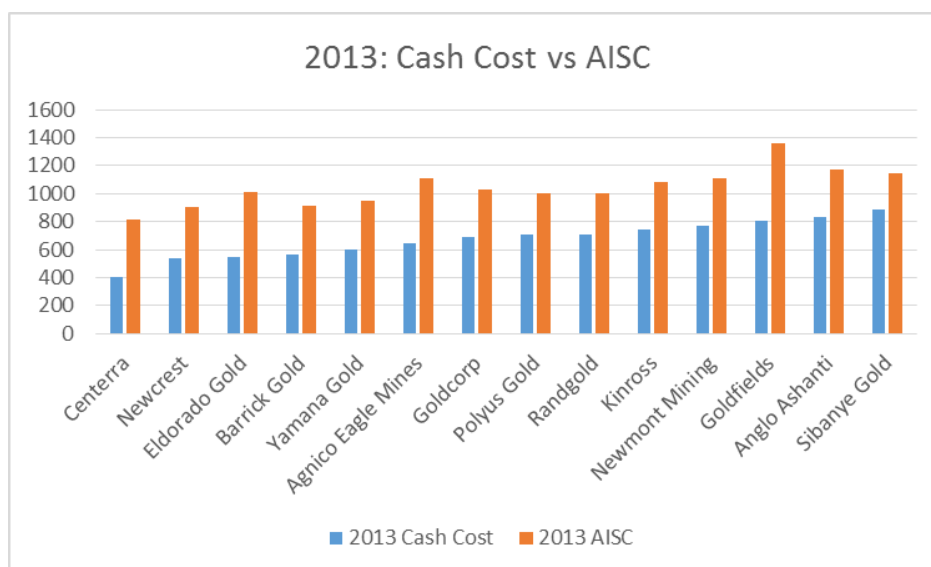
**Figure 3: Iceberg of gold mine costs**

### **3. What really changed with the new cost framework**

Gold Fields CEO noted “For decades, we have disguised our true costs to look better to providers of capital by focusing solely on cash costs, rather than reporting all the costs that go into mining. This created the impression that, even at present depressed prices, the industry is



making profits, when it is in fact, marginal” (Holland, 2013). Gold producers soon realized that cash cost does not give an exhaustive picture of what it costs to produce and maintain a long term sustainable mining operation. As a result of the new costs reporting guideline, the gold world investors realized that the average cost of producing an ounce of gold fell between \$1,000 and \$1,200 an ounce (Figure 4) in 2013, while the average gold price that year was \$1531 per ounce (Goldprices, 2015). The cost was between \$900 and \$1,000 an ounce in 2014 (Tables 3) and the average gold price that year was \$1265 an ounce (Goldprices, 2015). One can easily have a good feeling on how squeezed were the margins. A quick look at the current selling price of gold (\$1,134 per ounces 08/28/2015), shows how incredibly tight the margin will be if the price remains this low through the end of this year. Gold producers are striving to reduce costs and/or defer expansions. Some cost analysts believe the margin is even tighter as they claim that the AISC does not include all the real costs, and like almost any non-GAAP measure, they are open to interpretation (PwC, 2014a). Also the by product (and co- product accounting) is still confusing. We will discuss that part later when talking about the strength and weakness of these metrics.

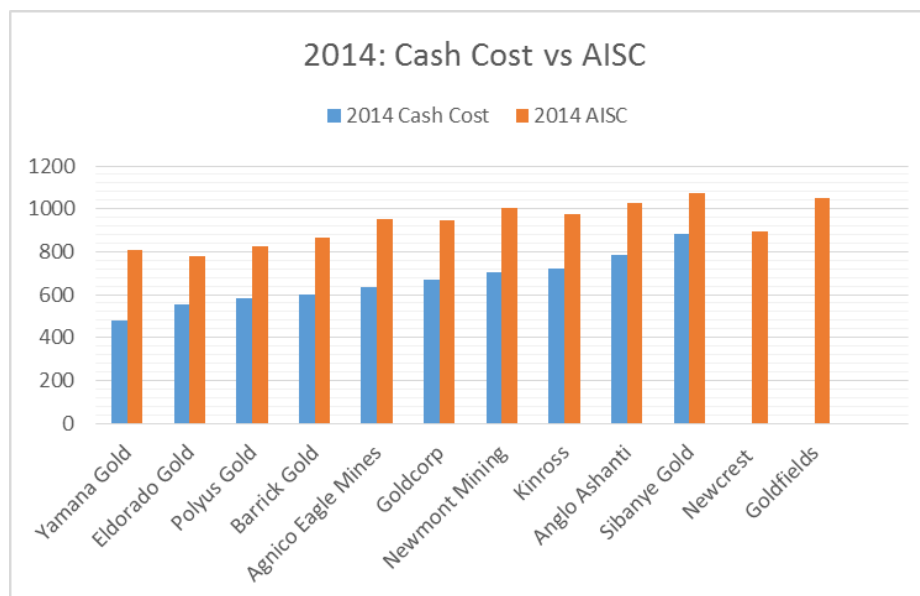


**Figure 4: Cash Costs vs AISC in 2013 for major gold producers** (Company's financial reports)  
Some companies, including Barrick Gold, Goldcorp and Newmont, have even restated historic costs back to 2011 on an AISC basis in their latest annual results. The new metric is starting to catch on.

**Tables 3: Cash Costs vs AISC in 2014 for major gold producers** (Company financial and annual reports)

Company	Market Capitalization US\$B Dec 31, 2014	2014 Production Mozs	2014 Cash Costs US\$/oz	2014 AISC US\$/oz
Goldcorp	14.94	2.9	668	949
Newmont Mining	9.40	5.2	706	1002
Newcrest	6.66	2.4	N/A	897
Barrick Gold	<b>12.32</b>	<b>6.2</b>	598	864
Polyus Gold	8.49	1.69	585	825
Randgold Resources	6.14	1.12	698	N/A
Agnico Eagle Mines	5.09	1.43	637	954
Anglo Ashanti	3.53	4.4	787	1026
Eldorado Gold	4.41	0.79	557	779
Goldfields	3.46	2.2	N/A	1053
Kinross	3.19	2.71	720	973
Yamana Gold	3.55	1.2	482*	807
Sibanye Gold		1.43	885	1071
<b>Average</b>			<b>666</b>	<b>934</b>

\*per GEO: GEO assumes gold plus the gold equivalent of silver using a ratio of 50:1 for all periods presented



**Figure 5: Cash Costs vs AISC in 2014 for major gold producers** (Company's financial reports)

Goldfields and Newcrest reported their 2014 AISC and not cash costs. Randgold does not report AISC in its 2014 year-end results but provides the company cash cost; however the company AISC in 2013 was around \$1,000 per ounce produced.

Gold producers are undertaking various cost reduction policies. AISC does not change dramatically companies ranking when moving from cash cost to AISC. The lowest cost producers under cash costs, among the companies we investigated, remain lower cost producers under AISC with some little shift depending on how successful the company is in its cost reduction initiative (Table 4 & 5). Polyus Gold improved costs reduction, for example, from 2013 to 2014 is mostly due to the devaluation of the Russian ruble and lower sustaining capital expenditures.

**Table 4: 2013 Cost Ranking Cash Cost vs AISC**

<b>2013 Ranking</b>		
Rank #	Lowest to highest Cash Cost	Lowest to highest AISC
1	Centerra Gold	Centerra Gold
2	Newcrest	Newcrest
3	Eldorado Gold	Barrick Gold
4	Barrick Gold	Yamana Gold
5	Yamana Gold	Randgold
6	Agnico Egales Mines	Polyus Gold
7	Goldcorporation	Eldorado Gold
8	Polyus Gold	Goldcorporation
9	Randgold	Kinross
10	kinross	Agnico Eagles Mines
11	Newmont Mining	Newmont Mining
12	Goldfields	Sibanye Gold
13	Anglo Ashanti	Anglo Ashanti
14	Sibanye gold	Goldfields

**Table 5: 2014 Cost Ranking Cash Cost vs AISC**

<b>2014 Ranking</b>		
Rank #	Lowest to highest Cash Cost	Lowest to highest AISC
1	Yamana Gold	Eldorado Gold
2	Eldorado Gold	Yamana Gold
3	Polyus Gold	Polyus Gold
4	Barrick Gold	Barrick Gold
5	Agnico Egales Mines	Goldcorporation
6	Goldcorporation	Agnico Eagles Mines
7	Newmont Mining	Kinross
8	kinross	Newmont Mining
9	Anglo Ashanti	Anglo Ashanti
10	Sibanye gold	Sibanye Gold

Since the AISC was introduced by the World Gold Council in June 2013, it has to date been adopted by all the major gold producers.

#### 4. Newmont Mining Corporation AISC reporting and interpretation

Newmont remains the major U.S.-based gold mining company. The company has a strong asset portfolio with 70 percent of its production derived from Australia, and the United States; and 90 percent of its revenues derived from gold. Newmont delivers an average annual production of five million ounces of gold. The company is member of WGC and actively participated in the elaboration of the new costs framework.

Before the new measure, Newmont Cost Applicable to Sale (CAS) per ounce was \$706; \$772; \$684 and \$591 in 2014; 2013; 2012 and 2011, respectively (Table 6).

Operating Margin (OM) per ounce is a non-GAAP financial measure. It is calculated by subtracting the costs applicable to sales per ounce of gold from the average realized gold price per ounce. Table 6 displays the gross operating margin for Newmont.

**Table 6: Newmont Operating Margin with CAS.** (Newmont 2013 and 2014 Annual Report)

	<b>Gold</b>			
	Year End December 31			
	2014	2013	2012	2011
Average realized price per ounce	\$ 1,258	\$ 1,393	\$ 1,662	\$ 1,562
Cost applicable to sales per ounce (CAS)	(706)	(772)	(684)	(591)
<b>Operating Margin with CAS</b>	<b>\$ 552</b>	<b>\$ 621</b>	<b>\$ 978</b>	<b>\$ 971</b>

Remember that CAS excludes Reclamation, Remediation, G&A, and other costs related to production. Newmont gross operating margin averaged \$780.5 per ounce over the last four years (2011-2014).

How this operating margin per ounce looks when the company applies the new costs framework and its own interpretation of these metrics is shown in Table 7.

On top of its regular CAS and in order to determine its AISC, Newmont adds (Annual Report, 2014, p.85):

- Remediation / reclamation Costs: it includes accretion expense related to asset retirement and the amortization of the related Asset Retirement cost.
- Advanced Projects and Exploration: it includes expenses related to projects that are designed to increase or enhance current gold production and gold exploration.
- General and Administrative (G&A): it includes cost related to administrative tasks not directly in connection with current gold production, but rather related to support the corporate structure and fulfilling its obligations to operate as a public company.
- Other Expense, net: it regroups costs related to regional administration and community development to support current gold production.
- Treatment and refining Costs: Includes costs paid to smelters for treatment and refining of concentrates to produce the salable precious metal. These costs are presented net as a reduction of sales.
- Sustaining Capital: the company defines it as the capital expenditures that are necessary to maintain current gold production and execute the current mine plan.

**Table 7: Newmont Operating Margin with AISC.** (Newmont 2013 and 2014 Annual report)

	<b>Gold</b>			
	Year End December 31			
	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>
Average realized price per ounce	\$ 1,258	\$ 1,393	\$ 1,662	\$ 1,562
All-in Sustaining Cost (AISC) per ounce	(1,002)	(1,113)	(1,177)	1,062
<b>Operating Margin with AISC</b>	<b>\$ 256</b>	<b>\$ 280</b>	<b>\$ 485</b>	<b>\$ 500</b>

Newmont's average gross operating margin drops from \$781 per ounce (average from 2011 to 2014) to \$380.25 per ounce using the new cost reporting measures. Which is almost a 50% (48.71%) reduction in the previous gross margin reported using the traditional cash cost. We can see the impact of the new costs reporting on Newmont's marginal profit, and this with an average realized gold price of \$1,469 per ounce from 2011 to 2014 (Table 6 and 7). The margin in 2014 only dropped 53.62% when the company uses AISC measures instead of Gold Institute reporting standard. The following Table 8 displays Newmont's non-GAAP cost reporting using the new template.

Newmont does not disclose individual cost items for the calculation of the company All-in cost.

**Table 8: Newmont 2014 AISC reporting (in \$ millions)**

<b>Newmont Corporation Reporting (Annual Report 2014, p.74)</b>	<b>2014</b>
<b>Cash Costs</b>	\$3,697
General & administrative costs	185
Remediation Costs	153
Advanced projects and Explo	320
Treatment and Refining Costs	26
Sustaining Capital	728
Other	143
<b>All-In Sustaining Costs</b>	\$5,252
<b>All-in costs*</b>	\$ -
<b>All-in sustaining costs per ounce</b>	<b>\$1,002</b>
<b>All-in costs per ounce*</b>	\$ -
*The company does not report cost items	

How does this margin look with current gold price (August 2015) around \$1,100 per ounce? The new cost reporting is a relief for managers and it produces improved clarity on the true profitability of gold operation (PwC, 2014a).

Chuck Jeannes, the president and CEO of Goldcorp said at a forum. “I think it (AISC) provides transparency that we need to show what it really costs to operate a mine...” (Milstead, 2014).

Newmont along with all the other gold producers are striving to reduce production costs in order to increase profitability (Goldberg, 2014). The company reduced its AISC by 10% between 2013 and 2014.

## 5. Barrick Gold Corporation AISC reporting and interpretation

Barrick is a major gold producer and a member of the World Gold Council. The company started using the new cost framework in its 2012 Annual Report. Before the new cost template, Barrick operating margin using the Gold Institute cost reporting system averages \$932.25 per ounce at an average realized price of \$1479.75 per ounce from 2011 to 2014.

This same margin drops down to \$576.25 (38% percent drops) per ounce when using the World Gold Council updated cost reporting system (Table 9 and Table 10). Barrick reduced its all-in sustaining cost by 6% between 2013 and 2014.

**Table 9: Barrick Operating Margin with CAS** (Barrick 2013 and 2014 Annual Report)

	<b>Gold</b>			
	Year End December 31			
	2014	2013	2012	2011
Average realized price per ounce	\$ 1,265	\$ 1,407	\$ 1,669	\$ 1,578
Cost applicable to sales per ounce (CAS)	(598)	(566)	(563)	(463)
<b>Operating Margin with CAS</b>	<b>\$ 667</b>	<b>\$ 841</b>	<b>\$ 1,106</b>	<b>\$ 1,115</b>



**Table 10: Barrick Operating Margin with AISC** (Barrick 2013 and 2014 Annual report)

	<b>Gold</b>			
	Year End December 31			
	2014	2013	2012	2011
Average realized price per ounce	\$ 1,265	\$ 1,407	\$ 1,669	\$ 1,578
All-in Sustaining Cost (AISC) per ounce	(864)	(915)	(1,014)	(821)
<b>Operating Margin with CAS</b>	<b>\$ 401</b>	<b>\$ 492</b>	<b>\$ 655</b>	<b>\$ 757</b>

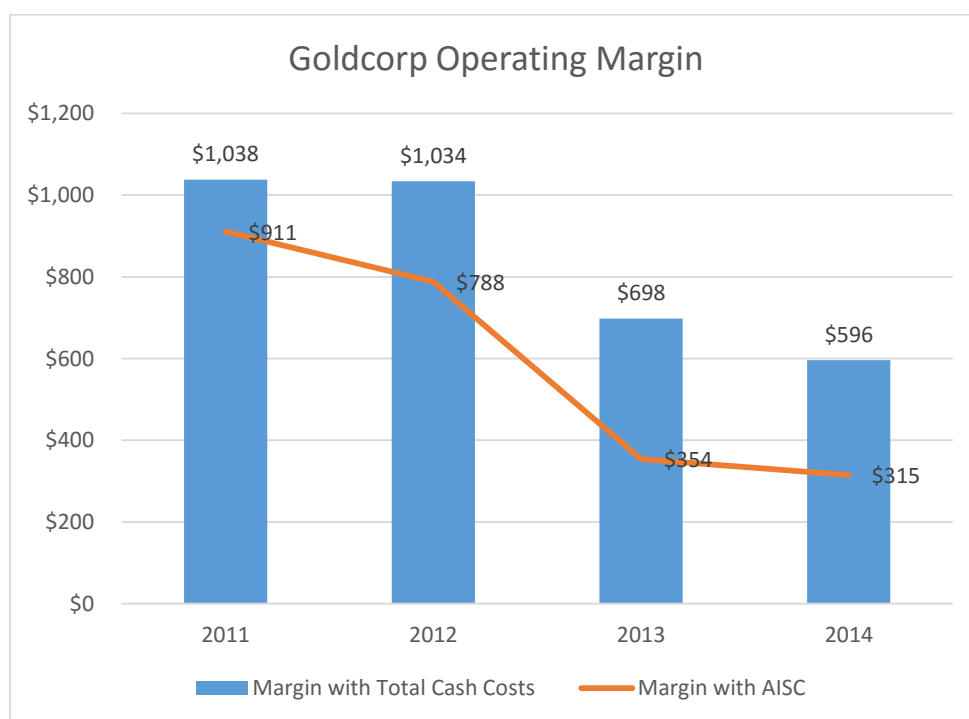
Barrick calculation of all-in sustaining / all-in cost reporting is displayed in Table 11. A quick look at this table reveals similarities in Barrick AISC/AIC reporting with Kinross Gold reporting (Kinross Gold, 2014, MDA57). Both companies identify element costs for the determination of their All-in costs.

**Table 11: Barrick Gold AISC reporting, 2014 (in \$ millions)**

<b>Barrick Reporting (Annual Report MDA79)</b>	<b>2014</b>
<b>Cash Costs</b>	\$3,754
General & administrative costs	300
Rehabilitation – accretion and amortization (operating sites)	127
Mine on-site exploration and evaluation costs	20
Mine development expenditures	655
Sustaining capital expenditures	569
<b>All-in sustaining costs*</b>	\$5,425
Community relations costs not related to current operations	35
Rehabilitation – accretion and amortization not related to current operations	12
Exploration and evaluation costs (non-sustaining)	153
Non-sustaining capital expenditures	530
Other	43
<b>All-in costs*</b>	\$6,198
<b>All-in sustaining costs per ounce</b>	<b>\$884</b>
<b>All-in costs per ounce</b>	<b>\$1,006</b>
*Total amount may slightly varies due to roundings on individual cost items	

## 6. Goldcorp AISC reporting and interpretation

Goldcorp Inc. is North America's largest gold producer by market value and a member of the World Gold Council. The company started reporting AISC data in its 2013 annual report. Goldcorp's average margin from 2011 to 2014 drops from \$842 per ounce to \$592 per ounce with an average realized gold price of \$1473 per ounce, which is a 30% drop in the company average margin only by the application of the cost template (Figure 6). The company, similar to Barrick and Newmont, worked on reducing its all-in sustaining costs. From 2013 to 2014, Goldcorp reduced its AISC by 8%.



**Figure 6: Goldcorp operating Margin Total Cash Cost vs AISC (Gold Corp Annual Report 2013 and 2014)**

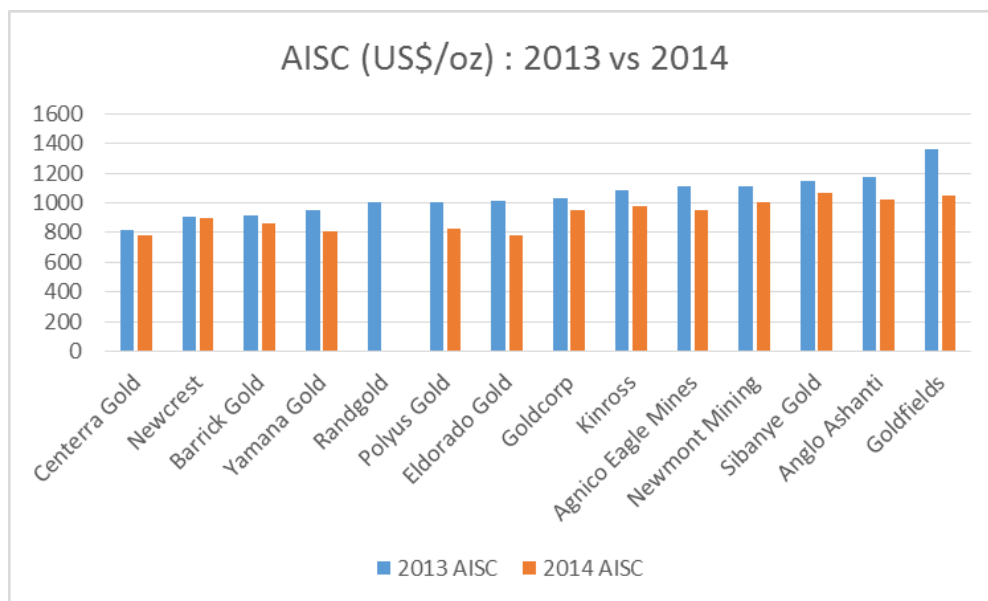
Goldcorp AISC/AIC is similar to Newmont reporting. Both companies chose not to disclose their all-in cost calculation. Table 12 below showed Goldcorp AISC reporting,

Table 12: Goldcorp AISC reporting, 2014 (in \$ millions)

<b>Goldcorporation (Annual Report p.57)</b>	<b>2014</b>
<b>Cash Costs</b>	<b>\$1,370</b>
Corporate administration	247
Reclamation cost accretion and amortization	60
Exploration and evaluation costs	41
Sustaining capital expenditures	731
Other	
<b>All-In Sustaining Costs*</b>	<b>\$2,536</b>
Including discount. Op (Wharf and Marigold)	
<b>All-in sustaining costs per ounce</b>	<b>\$949</b>
*Total amount may slightly varies due to roundings on individual cost items	

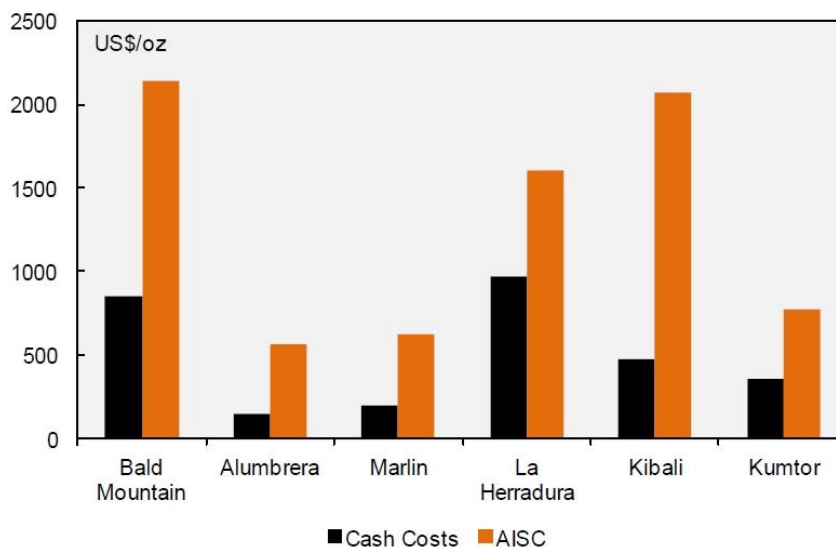
## 7. Impact of AISC reporting on selected operations

The reported cost for mining an ounce of gold has indeed increased by applying the new costs framework. Gold producers dealing with the dropping price of gold are striving to reduce the cost of production. Some seem to be on a good slope in that initiative, while others like Yamana Gold and Newcrest are still struggling. Figure 7 shows a comparison between major gold producers AISC report in 2013 and 2014.



**Figure 7: AISC, 2013-2014** (Company's Annual Report 2013 and 2014)

Figure 5 displayed the impact of the new cost framework on the company as a whole. The same analysis, comparison between AISC and cash cost, is shown on selected operations of junior to major gold producers (Figure 8): Bald mountain mine in Nevada, USA (1.4 million oz of gold in reserve as of Dec. 31, 2014), is operating by Barrick Gold Corporation; Glencore is owner of the Alumbreira mine in northwestern Argentina (AISC \$565/oz in 2013); Marlin gold mine is located in Mexico along with La Herradura mine owned by Fresnillo plc.. We will also look at Randgold Resources' Kibali gold mine in DRC and finally Kumtor gold mine located in Central Asia and owned by Centerragold.



**Figure 8: Operations with significant differences between Cash Costs and AISC in 2013** (AME Group, 2015)

The relative differences between cash costs and AISC reflects the stage of the mining process and life cycle of the mine. For some operations, the difference between cash costs and AISC is relatively small. Unfortunately others, Bald Mountain for instance, are profitable under the traditional cash costs but seem to be losing or producing at a loss when they follow the new cost guidelines with the 2013 gold price.

- Barrick Gold decided not to develop new pits due to low gold price (p.7; Annual report 2013). In fact the operation was profitable under the traditional cash costs (\$894 per ounce); now, the company is obliged to include the costs of stripping not direct to current production costs therefore excluded from the traditional cost but included with AISC as important to sustain future production. The new cost of the operation (AISC) is now estimated to be \$2,182 per ounce well above the gold price (p. 42; Annual report 2014).

- Glencore (50% ownership) saw its Alumbrera mine costs increase. In fact, the limited mine life generated a relative increase in the reclamation costs which are included in the assessment of the AISC not under the conventional cash cost.
- La Herradura costs increased due to exploration and sustaining capital expenditures.
- Similar increase in the operation costs at Kibali, Kumtor and Marlin gold mine.

## **8. Comparison of AISC/AIC reporting and interpretation**

The World Gold Council non-GAAP guideline is an attempt to update and standardize the cost reporting process in the gold industry. “All companies using this guidance are encouraged to disclose both their all-in sustaining costs and all-in costs and reconcile these metrics to their GAAP reporting” (WGC, 2013). However a quick look on the annual reporting of lead gold producers shows some discrepancies in the application of the guideline. For instance Newmont and Goldcorp do not report all-in cost items (growth expenditures) while Barrick and Kinross are better followers of the guideline by disclosing both their AISC and AIC cost items. The short term goal is to determine the costs of the mine on a per unit of output basis for the current production which is captured by AISC alone. As a mere extension of Cash costs, All-in sustaining cost provides analysts and investors with:

- An indicator of a mine rank on the cost curve;
- A tool to benchmark an operation against others in terms of cost efficiency and;
- A quick picture on a mine ability to generate free cash flow at different commodity prices.

## 9. Strengths / Weakness of AISC reporting

The new cost reporting system has the advantage to better represent the total recurring costs associated with producing gold. Due to the cyclic and unique aspect of the gold business, current GAAP measures in use such as cost of goods sold, do not capture all the expenditures incurred to discover, develop, and sustain gold production (Newmont, 2014). It was therefore important to develop specific (non-GAAP) reporting standards that will embrace the uniqueness of this industry by providing clarity, in this case, to its cost reporting template. In fact, "...good corporate reporting is not purely about following the rules. It requires management teams to think specifically about how they can best meet the needs of the investment community" (PwC, 2013, p.18). All-in sustaining cost, by providing a better picture of gold production costs, provides clarity on the true margins of a gold mine

However, the new framework still has some inherent confusion. One of the big weaknesses of AISC/AIC is the absence of clear definition or demarcation between sustaining costs and growth costs. The World Gold Council (WGC) classifies as non-sustaining or growth costs, costs "incurred at new operations and costs related to 'major projects' at existing operations where these projects will materially increase production; and, all other costs related to existing operations are considered sustaining" (WGC, 2013). This definition is subject to diverse interpretations depending on how one will interpret 'materially increase production'. For instance, if the construction of an additional shaft to increase production is obviously a growth cost; the demarcation is more complex when it comes to exploration capital. Newmont qualifies as sustaining, exploration expenditures that help replenish its reserve (Newmont, 2014, p.73), meaning finding additional ore bodies within the mining area and therefore increasing the life of the mine which can be argued as a growth cost. Some consider those costs as sustaining only if

they help enhance the known reserve. While others consider sustaining any exploration activities as long as they are within the mining permit boundary (PwC, 2014a). The absence of clear definition opens the road for various interpretations and makes benchmarking difficult. Many leading producers like Barrick and Kinross choose simply not to define their cost line items like Newmont does, and simply report the broad definition which makes it more difficult to identify items classified as sustaining by nature or not. Consistency and transparency in cost item definition across producers reporting is a real challenge for the new template.

Another weakness of the new reporting is the authority of the World Gold Council. In fact, it is neither a regulatory agency nor a known standard setter and even two of its lead members, Goldfields (lead instigator of the new cost template) and AngloGold Ashanti recently relinquished their membership for internal cost reduction purposes. Also, WGC encourages gold producers to reconcile the new metrics with current GAAP or IFRS standards with no guidelines on how to do so. The new metric did not address the already confusing and controversial by product/co-product reporting that existed with the former cash costs.

Finally, the new metrics generate additional costs for companies willing to comply. In fact, PwC found that there is currently no IT system or finance process to track and measure sustaining expenditures (PwC, 2014a).

## **10. Reconciliation between AISC reporting and IFRS (GAAP)**

The Sarbanes-Oxley Act of 2002 (SOX) passed by U.S. Congress is a salutary attempt to protect the investment community and, by extension, analysts against deceitful or forged accounting activities by a corporation. SOX, basically, holds responsible corporate executives for their company's financial reporting. Companies are therefore 'encouraged' by this to use and



follow GAAP and IFRS standards while reporting their financial metrics. However, the uniqueness of the financial reporting process in the gold industry and by extension mining business in general, forced management to use some specific non-GAAP to provide supplemental information, deemed relevant, to investors. Earnings before interest and tax (EBIT) and earnings before interests, tax, depreciation and amortization (EBITDA) are the most common non-GAAP (not only for mining). EBITDA is used as an indicator of a company's profitability while adjusted EBITDA assesses the company's liquidity (PwC, 2014b). In the same way, gold producers felt that reporting the cost of their production on a unit per output basis, meaning on a per ounce produced (US\$/oz, AUD/oz, etc.), would be more meaningful to investors. Since, current standards not only do not allow this kind of reporting, but also do not give an exhaustive picture of their production costs; they felt an urge to use non-GAAP measures to communicate fully these costs. This led to the adoption of the cash costs non-GAAP metric in 1996, which was updated/upgraded later in June 2013 into all-in sustaining cost (AISC) and all-in cost (AIC). The U.S. Securities and Exchange Commission (SEC) considers as a non-GAAP financial measure "a numerical measure of past or future financial performance, financial position or cash flows that includes amounts that are excluded from the most directly comparable GAAP measure or excludes amounts that are included in the most directly comparable GAAP measure" (Smetanka, 2012). Basically any measure not ascertained or specified in IFRS is regarded as a non-GAAP measure.

In the spirit of SOX and in an attempt to regulate the use of non-GAAP measures, the SEC recommended through its 'Regulation G' that the use of non-GAAP be followed or accompanied by its most directly comparable GAAP financial measure and a reconciliation of the disclosed non-GAAP to the most directly comparable GAAP financial measure (SEC, 2003).

The Canadian equivalent of SEC, the Canada Securities Administrators (CSA) recommends, in addition to the reconciliation, that non-GAAP be clearly defined and its relevance explained (CSA, 2012).

A look at some gold companies' financial report shows two trends in reporting the reconciliation between this non-GAAP metric and IFRS standard. While some producers like Barrick and Agnico Eagle have tables reconciling the two metrics, others report them separately (Table 13 and Figure 9).

**Table 13: Reconciliation AISC vs IFRS in gold production costs reporting (in million \$US)**

		AISC	IFRS_Costs	± IFRS	
Barrick Gold	p.79	\$5,425	\$5,021	-8.05%	*
Newmont	pp. 74 & 99	\$5,252	\$4,926	-6.62%	**
Golcorp	pp. 19 & 82	\$2,274	\$2,832	19.70%	**
Polyus Gold	pp. 40 & 43	\$1,394	\$1,194	-16.75%	**
Eldorado gold	pp. 41 & 59	\$603	\$686	12.02%	**
Newcrest	p. 56	\$2,566	\$2,747	6.60%	*
Iamgold	pp. 36 & 43	\$828	\$893	7.23%	**
Kinross	MDA56 & FS4	\$2,832	\$2,845	0.49%	**
Goldfields	pp. 8 & 67	\$2,234	\$2,334	4.30%	**
Yamana Gold	pp. 52 & 119	\$1,064	\$1,549	31.31%	**
Sybanie Gold	pp. 16 & 167	\$1,701	\$1,623	-4.81%	**
Anglogold Ash.	pp. 46 & 66	\$4,551	\$4,190	-8.62%	**
Centerra gold	pp.17 & 19	\$524	\$785	33.21%	**
AgnicoEagle	p.51	\$0.1364	\$0.1004	-35.86%	*

\* Reconciliation: Companies provide a table reconciling AISC with IFRS costs standard

\*\* Costs is calculated using companies information: IFRS costs = Cost of sales + depreciation + amortization +depletion

Source : Companies 2014 Annual Report except Newcrest 2015, Annual Report

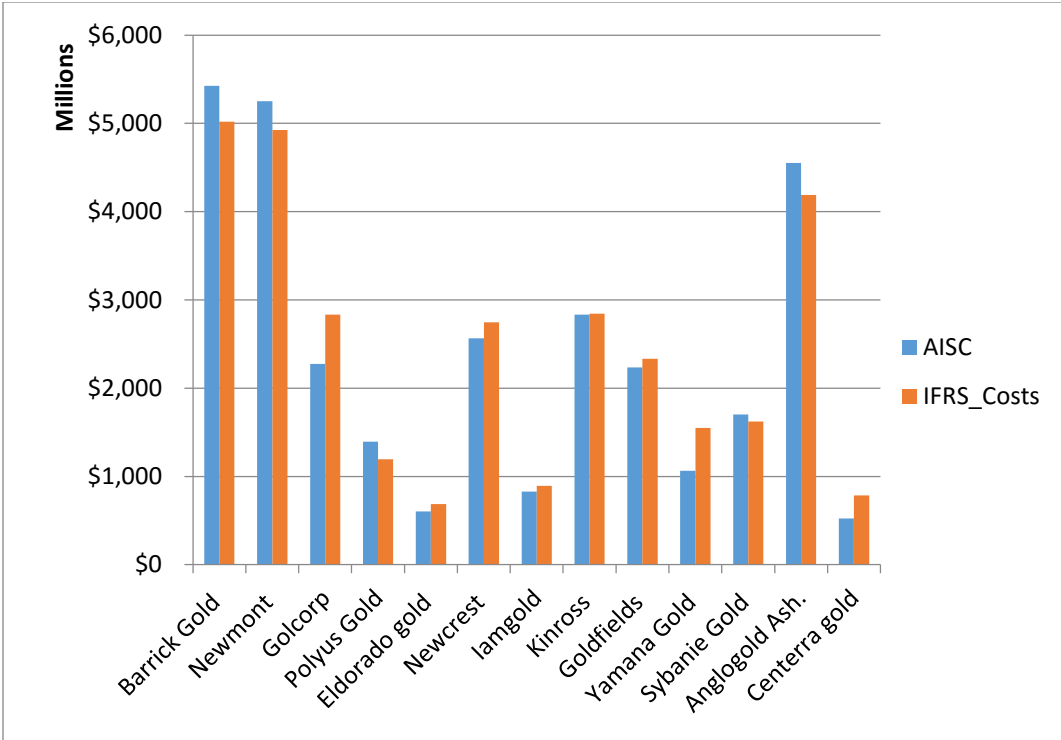


Figure 9: AISC vs IFRS gold cost reporting in 2014

The new cost reporting template has the advantage of reducing considerably the gap between non-GAAP cost of production reporting (AISC) and the IFRS standard.

## Conclusion

The need for clarity in the cost reporting of gold companies has led the World Gold Council and its members to design a new cost framework: All-In Sustaining Costs (AISC) and All-In Costs (AIC). All-in sustaining costs is an extension of the previous non-GAAP cash cost developed by the Gold Institute in 1996 and is designed to give, according to WGC, an exhaustive picture of the recurring costs involved in producing gold. In fact, the uniqueness of the gold industry and, by extension, the mining business forces management to adopt some non-GAAP metrics that provide clarity and help them better in telling the story of their operations. In the spirit of Sarbanes-Oxley Act, the U.S. Securities and Exchange Commission has recommended through its Regulation G that non-GAAP metrics should be reconciled with its most direct comparable GAAP. The majority of the world's large gold producers have already included AISC in their annual results. Costs on an AISC basis are always higher than under conventional cash cost metrics.

Far from being perfect, AISC is a step in the right direction of providing shareholders and governments a realistic appreciation of the true profitability of a gold mine. Also, as all non-GAAP measures its interpretation may vary from one company to another which at times can be misleading. The measure excludes income tax and other financing charges that can be argued as recurring in gold production.

AISC also opens a door for controversy among gold producers since a few see it as a way to scare off investors. What does it really cost to mine an ounce of gold? What are the real risks of disclosing the true costs of a mining operation? These questions are still unanswered...

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