World Exploration Trends

A Special Report from S&P Global Market Intelligence
for the PDAC International Convention

March 2018

S&P Global
Market Intelligence

World Exploration Trends

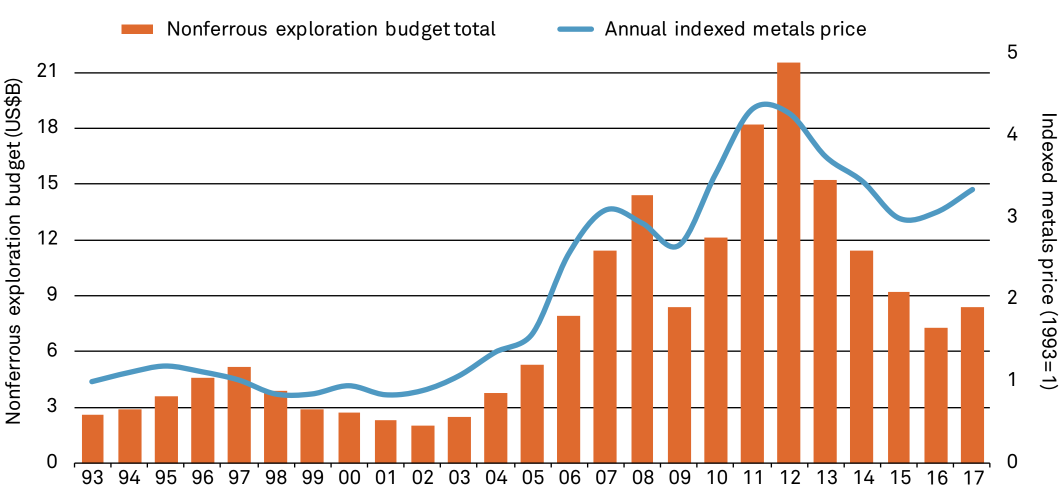
Things are looking up for the exploration sector: global spending on the search for nonferrous metals rose to an estimated US$8.4 billion in 2017, compared with US$7.3 billion in 2016. This represented the first annual increase in exploration spending after four consecutive years of declining investment in the search for nonferrous metals.

This annual exploration analysis by S&P Global Market Intelligence is contained in our Corporate Exploration Strategies series[1] of reports, now in its 28th year. The total exploration figure is based on an underlying survey of more than 3,000 companies, of which 1,535 recorded an aggregate budget of US$7.95 billion in 2017, compared with US$6.95 billion allocated in 2016.

To the survey amount, we add an estimate of budgets for companies that could not be obtained, companies with annual budgets under US$100,000 and private companies. Although an improvement, the 2017 total is far short of the record high US$21.5 billion estimated budget in 2012, indicating that there is still room for improvement.

US$8.4 billion
nonferrous exploration budget for 2017

Global nonferrous exploration budgets



Date as of January 31, 2018.
Source: S&P Global Market Intelligence

3,000+
companies surveyed for 2017 exploration budgets

[1] S&P Global Market Intelligence obtains the data used in its Corporate Exploration Strategies series through the generous cooperation of the surveyed companies. The individual nonferrous exploration budgets covered by the study include planned spending for gold, silver, base metals, platinum group metals, diamonds, uranium, rare earths, battery materials and potash. They specifically exclude exploration budgets for aluminum, coal, iron ore, oil and gas, and many industrial minerals.

Note that all historical exploration budget amounts throughout this report represent dollars of the day and have not been adjusted for inflation.

Confirming the more robust exploration spending planned for 2017, our research[2] documented a general strengthening of exploration activity throughout the year. Improved equity market support for explorers — including many that were dormant during the downturn — allowed companies to launch or resume drill programs on their most promising projects. Although the main focus was on gold, exploration targeting base metals assets also rebounded in the second half of the year. As a result, our measure of exploration sector activity reached levels not seen since early 2013.

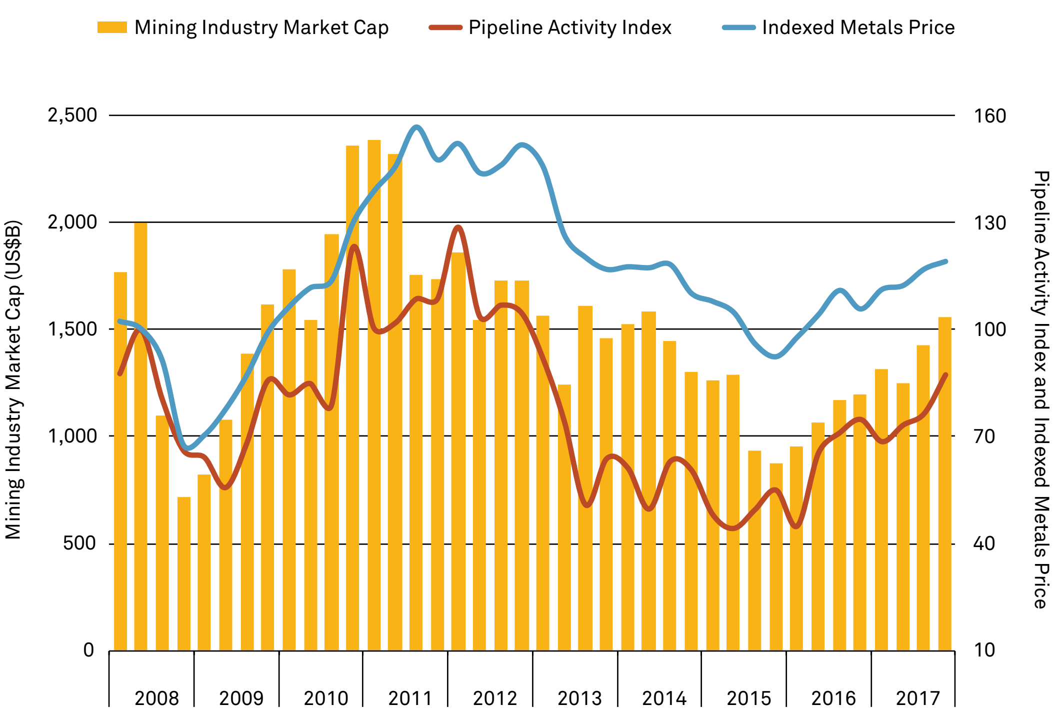
In the last quarter of 2017 there was a sharp increase in reported drill results, and financings closed the year on a high note.

With the generally positive trend in metals prices extending into early 2018, we expect the global exploration budget for 2018 to increase by a further 15% to 20% year over year — hopefully with more emphasis on early-stage efforts. There are some potential headwinds, however, such as ongoing instability in global and national politics, and emerging market volatility, that could have a negative impact — not just on exploration budgets but on the mining sector in general.

15% - 20%

exploration spending increase forecast for 2018

Pipeline activity index and industry market cap



Date as of January 31, 2018.
Source: S&P Global Market Intelligence

5 years

exploration index highest since 2013

US$1.56 trillion

mining industry market capitalization at the end of 2017

[2] Our monthly research series on the exploration sector measures the level and direction of overall exploration activity in the supply pipeline by monitoring drilling activity, initial resource announcements, financings and project development milestones.

Global conditions strengthening

Marking a second year of improvement, 2017 was positive for mining. While 2016 was generally good for the industry, markets were unsettled by the U.K.'s vote to leave the E.U., and the U.S. presidential election. Investment increased in 2017, despite concerns over North Korea.

Caterpillar Inc. is a bellwether for global economic growth, and the construction sector in particular. The heavy equipment manufacturer recently beat fourth-quarter earnings expectations, and sees sales growth continuing in 2018. Chief executive Jim Umpleby said, "after four challenging years, many key markets improved in 2017" and "there are positive economic indicators across most of the world."+

As we head into 2018, the global economic environment appears relatively strong. Buoyed by synchronized growth across many of the key economies and a strengthening U.S. economy, S&P Global is forecasting global GDP growth of 3.8% (ppp-adjusted basis) for 2018. At the World Economic Forum in January, Vice Chairman of S&P Global, Paul Sheard, stated that he believes "the U.S. is going to be a key contributor to the global growth."

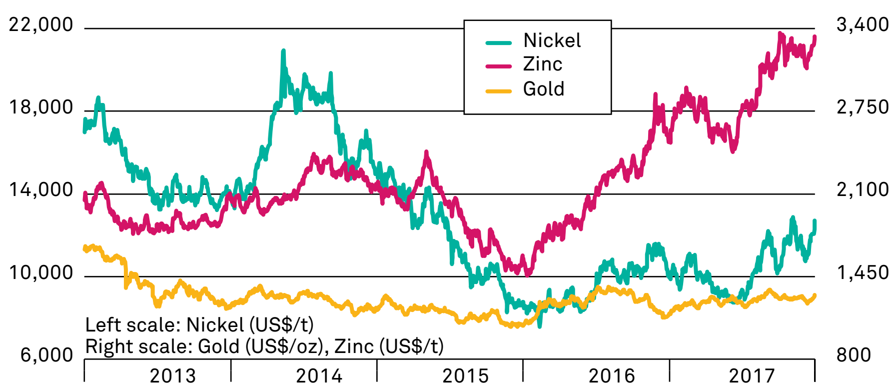
For the first time since 2010, the world economy is outperforming most predictions, and we are among many analytical companies that expect this strength to continue. Following China's Party Congress last year, the challenge for President Xi Jinping's government will be to implement reforms while maintaining sustainable growth rates under tightening credit conditions. S&P Global is forecasting slightly slower growth of 6.5% for 2018, down from the 6.8% forecast for 2017.

Given the generally positive circumstances, why has core inflation remained so low? A large and persistent drag from earlier weakness in import and commodity prices is partly to blame. According to Goldman Sachs these effects are expected to diminish in 2018, leading to a gradual increase in global core inflation. Interest rates will probably rise, but that is unlikely to dampen economic growth.

S&P Global sees politics as the bigger near-term risk to the economic outlook, ranging from the future of the North American Free Trade Agreement through Chinese market reforms to the risk of military conflict on the Korean Peninsula.

3.8%
Global GDP predicted for 2018

5-year commodity prices graph



Data as of January 31, 2018.
Source: S&P Global Market Intelligence

+ Source: Deerfield, III, January 25, 2018, PRNewswire "Caterpillar Reports Fourth-Quarter and Full-Year 2017 Results; Provides Outlook for 2018"

Metals prices up

Metals prices have benefited from the improved global economy and from a recently weaker U.S. dollar, in which most commodities are valued: in January 2018, the dollar's trade-weighted value was the lowest since December 2014.

The S&P GSCI reached a two-year high on January 26, 2018, and extended the gains since December 6th to almost 12%. Comments by U.S. Treasury Secretary Steven Mnuchin that a weaker dollar is "good for trade"[+] added to the bullish sentiment for natural resources.

Gold has benefited the most. The precious metal started 2017 at US$1,157/oz, ended the year at US$1,303/oz and traded at US$1,359/oz on January 25, 2018 — its highest price since August 2016 .

Copper, the next most important exploration target after gold, has also shown improvement. Prices averaged US$6,200/t in 2017, and our analysts expect the LME three-month contract to average US$6,563/t in 2018.

The higher copper prices are partly due to tightness in supply and partly to changes in economic growth. Mined production was 20.2 Mt in 2016, and we expect lower 2017 production at 19.9 Mt. We forecast an increase to 20.4 Mt this year, however, led by production in Africa and Latin America.

Iron ore is also sensitive to changes in economic growth, with the price averaging US$58.4/t (62% Fe) in 2016, reaching a high of US$75/t in late December 2017 and averaging US$71.3/t for the year.

Iron ore mined production was 2,082 Mt in 2016, and our analysts expect output of 2,160 Mt in 2017, rising to 2,220 Mt this year.

Average LME three-month nickel prices rose from US$9,638/t in 2016 to US$10,434/t in 2017. We estimate a 2018 average price of US$11,206/t, with softening in 2019. This optimism is based on robust near-term demand and a restrained increase in supply. Mined nickel production is expected to rise from 1.99 Mt in 2016 to an estimated 2.10 Mt in 2017, and to increase slightly to 2.12 Mt in 2018.

The average LME three-month zinc price jumped from US$2,102/t in 2016 to US$2,890/t in 2017, and traded in late January 2018 at US$3,460/t — its highest level since August 2007. Prices have been helped by the weaker U.S. dollar and stronger supply/demand fundamentals. We expect mined production of 12.39 Mt in 2017, rising to 13.22 Mt this year. Despite this higher production, we anticipate an average 2018 price of US$3,336/t.

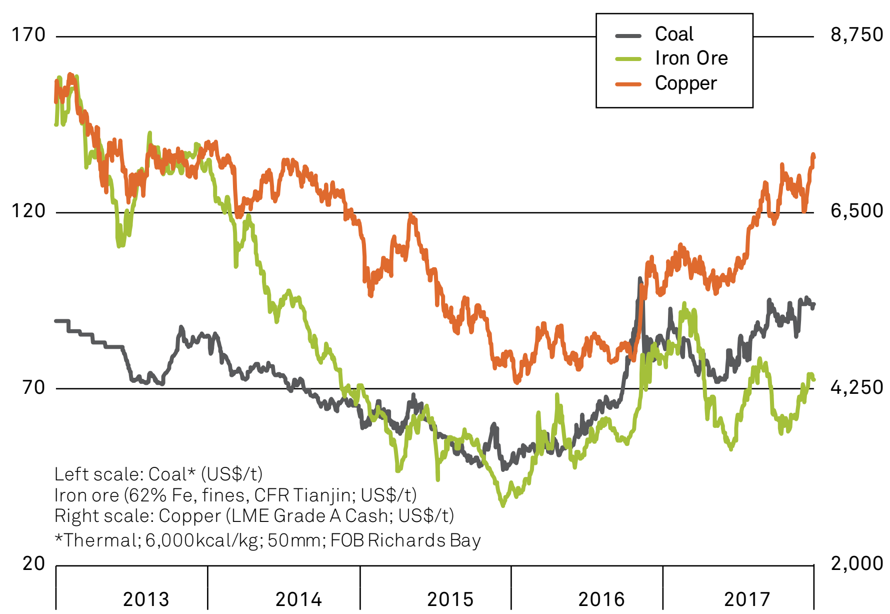
67%

copper price increase since Feb. 2016 low

US$3,460/t

zinc price hits >10-year high in early 2018

5-year commodity prices graph (continued)



Data as of January 31, 2018.
Source: S&P Global Market Intelligence

[+] Source: Chris Giles, January 24, 2018, Financial Times "Mnuchin says weaker dollar 'good' for U.S. trade, opportunities"

The search for metals heats up

After four years of depressed exploration spending, the mining industry showed signs of life in 2017, with an aggregate nonferrous exploration budget of US$7.95 billion by surveyed companies — a 14% increase over 2016. Reflecting funding challenges faced by many junior companies, the number of explorers with spending plans declined slightly, by 3% year over year to 1,535 companies. The combination of a higher budget and fewer companies increased the mean average budget to US$5.2 million and the median budget to US$1.1 million.

14%

increase in nonferrous budgets in 2017

US$3.4 billion

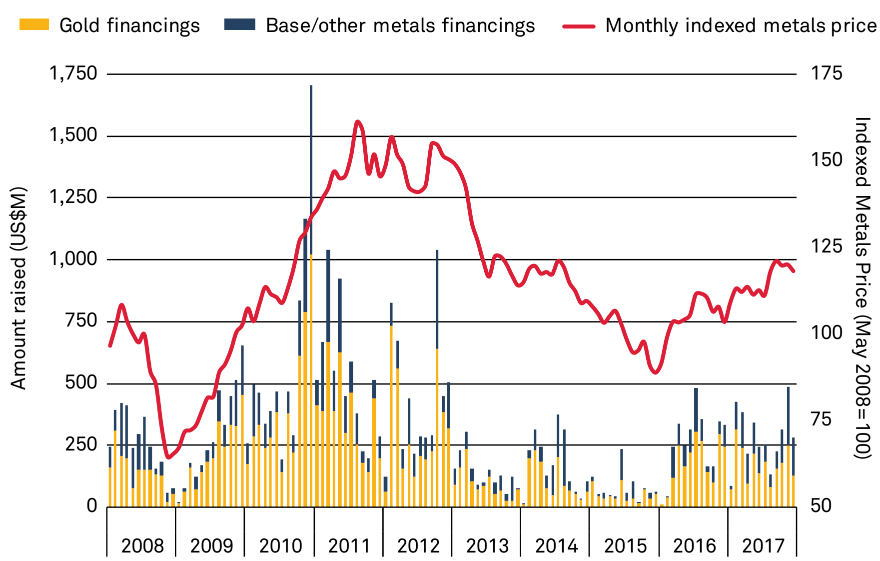
raised primarily for exploration in 2017

Two significant positive signs appeared in early 2016. Metals prices began to rebound, providing more free cash flow for producers searching for new reserves; and financings, which fuel most junior company exploration, gained traction and injected fresh hope into the depressed exploration sector. However, these positive developments did not come in time for many explorers to increase their budgets for the year; as a result, the global exploration budget fell 21% year over year in 2016 to US$6.95 billion.

Junior and intermediate companies were more consistently able to raise funds for their efforts after March 2016.

Capital offerings primarily for exploration purposes in 2017 remained on par with 2016 levels, with the totals for both years returning to 2012 levels when equity markets were just beginning to shun the industry. As metal prices are not expected to weaken through 2018, we expect market conditions to remain strong for the junior sector this year, while also improving producers' bottom lines.

Significant exploration-related financings by junior and intermediate companies



Data as of January 31, 2018.
Source: S&P Global Market Intelligence

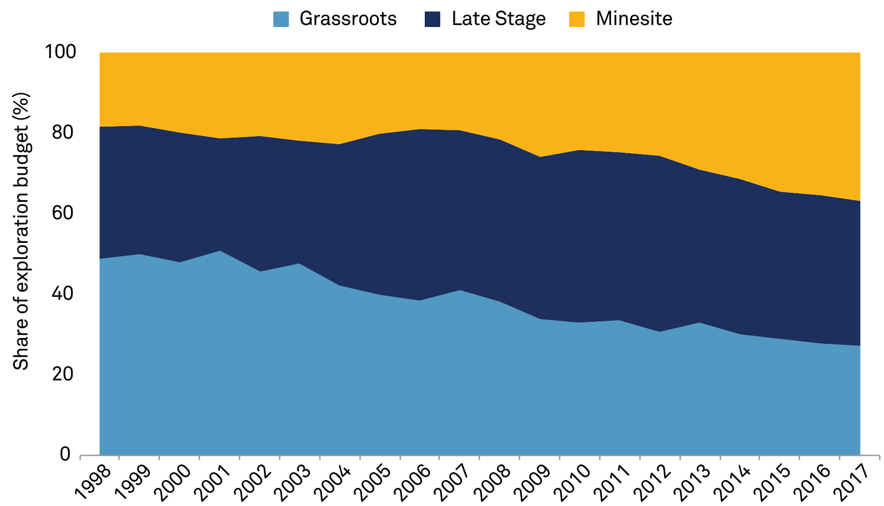
Notes: In this report, silver and PGM are included in the Base/Other Metals category to allow a clear picture of the unique trends in gold exploration.

Exploration-related financings include financings by junior and intermediate companies of US$2 million or more, where the company indicated that all or most of the proceeds were for exploration.

Riskier exploration still unattractive

Over the past few years, our research has shown industry exploration efforts to be increasingly focused at or near operating mines. A long-term swing away from grassroots exploration has been exacerbated since 2013 by a combination of scarce funding for junior explorers and spending cuts by the majors. Although improved market sentiment over the past 18 months seems to have slowed the decline in grassroots exploration's share of budgets in 2017, another year of increase in the minesite share reflects the near-term focus of many producers, as well as a persisting climate of risk aversion.

Exploration budgets by stage of development (%)



Data as of January 31, 2018.
Source: S&P Global Market Intelligence

Producers restrict exploration

Although the mining industry widely accepts that exploration is important for the sector's future, the major miners (revenues >US$1 billion) continue to allocate only a small proportion of their revenues to exploration efforts. From 2012 to 2016, these producers slashed exploration spending at a faster pace than their revenues declined, causing a fall in the group's ratio of exploration spend to revenue, from 3.2% in 2012 to a 12-year low of 1.8% in 2016. Although the group's exploration budgets for 2017 increased, rising revenues for the year will likely result in little change to the 2017 ratio.

Not surprisingly, the proportion spent on exploration varies according to industry cycles. During market downturns such as the recent one, miners quickly deem exploration to be surplus and slash exploration spending faster than revenues decline. When market sentiment turns positive, their exploration spending tends to ramp up faster than their revenues grow. Despite improving conditions since early 2016, we expect that producers will maintain relatively low ratios over the coming years, at levels well below that of 2012, let alone the 4% spent during the 1997 peak.

Looking at the proportion of revenues allocated for grassroots efforts reinforces the perception of an industry-wide shift away from early-stage exploration; the major miners allocated only 0.5% of their 2016 revenues, only one-quarter of the 2% of cash-flow they allocated in 1997. This is not to say that the top earners have completely abandoned generative exploration, but that most large producers have been increasingly focused on late-stage and minesite exploration, while others have supplemented their early- and late-stage exploration by acquiring interests in junior companies, which offer low-risk access to promising new projects.

20%

increase in 2017 budgets over 2016 exploration spending

1.8%

of 2016 major miners' revenues spent on exploration; expected to have been similar in 2017

Canada, Australia and U.S. continue to lead

The traditional top three destinations for exploration spending, Canada, Australia and the U.S., led again in 2017. With allocations totaling US$5.55 billion, the top 10 countries accounted for 70% of the US$7.95 billion global surveyed total. Budgets were recorded for 118 countries in 2017, on par with 119 in 2016.

Canada was first for the 16th consecutive year with 13.8% of the global budget; however, its lead over second-place Australia dwindled year over year to less than US$25 million. Ontario took 28% of Canada's total, followed by Quebec at 21%. With gold allocations up by an impressive 35% in 2017, the metal's share of the Canadian total jumped to 62% from 51% the year before.

Australia was a close second with 13.6% of the global budget. Western Australia, by far the most popular state, took 65% of the nation's total. Gold was again the top target, with a 24% year-over-year increase raising the metal's share of Australia's budget to 59% from 56% in 2016.

Budgets for gold and copper exploration in the U.S. maintained the country's third-place ranking with a 7.7% share. Nevada led with 47% of the U.S. total, and three states— Nevada, Arizona and Alaska— together accounted for 73%.

By region, Latin America remained the most popular, with six countries— Chile, Peru, Mexico, Brazil, Argentina and Colombia— accounting for 91% of the region's budget. Gold was the top target for the third year in a row, garnering 44% of regional spending.

Our Rest of World group of countries, covering Europe and most of mainland Asia, was led by China and Russia with allocations of US$387 million and US$336 million respectively. Gold was the region's top target for the third straight year.

Africa attracted 14% of the global budget, focused mainly on the Democratic Republic of Congo, Burkina Faso, Tanzania and South Africa. Continued interest in West Africa made gold the top target, with the metal's share of regional spending jumping to 61% from 51% in 2016.

27%

of exploration spending in 2 out of 118 countries, Canada and Australia

91%

of Latin American spending in 6 countries

Nonferrous exploration budgets, 2017 (%)

Other locations account for 2%.

Data as of November 15, 2017.
Source: S&P Global Market Intelligence

Gold drives spending increases

Gold led the way to a higher global budget in 2017, accounting for 73% of the year-over-year increase. The precious metal's US$4.05 billion allocation was 22% higher than 2016's US$3.32 billion, increasing its share by 3% to account for just over half of the global budget.

Base metals (copper, nickel and zinc-lead) were collectively a distant second with 30%, followed by our Other Targets category at 13%. Allocations for uranium and diamonds each accounted for around 3%, while platinum group metals accounted for less than 1%.

Battery metals exploration surges

Spurred by the growing demand for rechargeable batteries and a surge in battery metal prices, a number of junior companies shifted their exploration focus in 2017, dramatically increasing the spending on the search for cobalt and lithium. Our research identified 136 companies budgeting almost US$157 million for lithium exploration in 2017, more than double the 2016 total. Cobalt-focused exploration also increased strongly, with 52 companies allocating US$36 million in 2017, more than four times the 2016 budget.

Since the initial price surge in late 2015, many junior companies have been able to raise funds for lithium-focused exploration or acquisitions. Among all company types, the juniors posted the only lithium budget increase in 2017 — a fourfold jump to US$128 million, nearly doubling their share of the global lithium exploration budget year over year to 82%.

The world's largest cobalt producer, the Democratic Republic of Congo, received one-quarter of the global cobalt exploration budget in 2017.

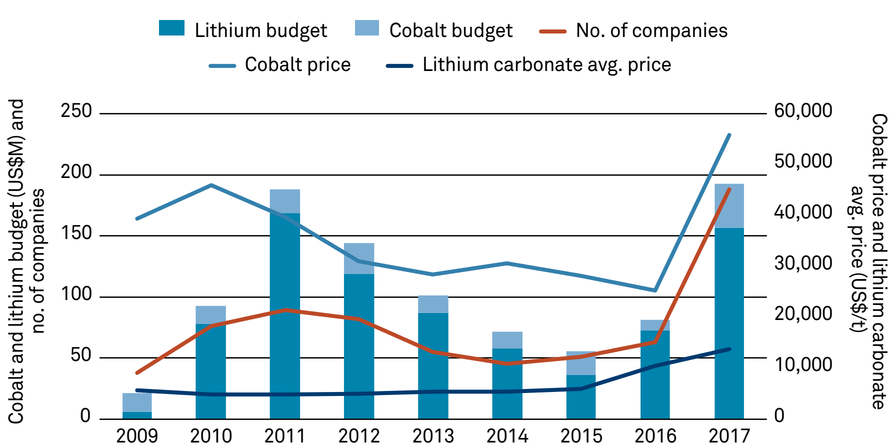
51%

of global total allocated for gold exploration

332%

increase in lithium budgets since 2005

Cobalt and lithium exploration budgets, 2009-2017



Data as of Jan. 30, 2018.
Source: S&P Global Market Intelligence

State of the industry

Our Pipeline Activity Index is a valuable measure of exploration and development activity in the mining industry. It incorporates data on the number of projects announcing significant drill results, exploration financings, initial resources and positive project milestones.

The health of the exploration sector improved markedly in Q4. Our Pipeline Activity Index jumped to 87 from 77 in Q3, the highest since Q1 2013, when the recent downturn was just beginning. Our Indexed Metals Price rose steadily, from 111 in Q1 to 119 in Q4, its highest value since Q3 2014.

The number of projects reporting drill results rose by 14% quarter over quarter, with minor base metals increasing the most, tripling to 18 from six — 14 of them for cobalt. Nickel and zinc-lead increased by 50% and 35% respectively, gold rose 10% and copper remained flat. Drill activity at specialty metals projects is worthy of note, with 32 of the 59 active projects in Q4 exploring for lithium.

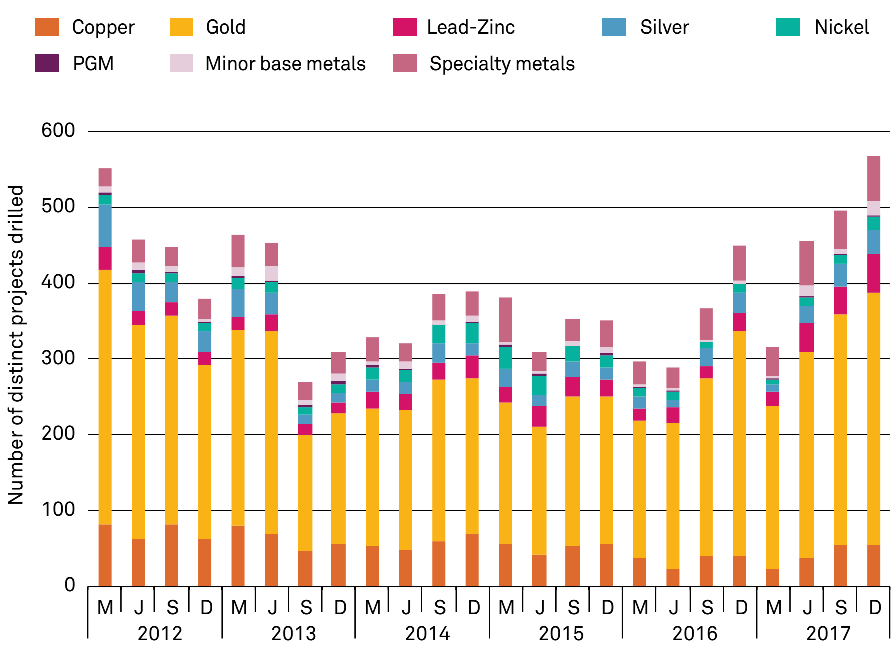
The number of significant (>US$2 million) gold and base/other metals financings jumped to 164 from 125 in the previous quarter, and their total value edged up to US$1.51 billion from US$1.46 billion. Base metals financings rose to 73 from 59 and their value more than doubled to US$824 million from US$395 million. Gold financings jumped to 91 from 66 but their value dropped to US$682 million from US$1.07 billion in the previous quarter.

Growth in the industry's market capitalization reflected the improved performance in 2017. The year-end aggregate market cap of 2,431 qualifying companies hit a 40-month high of US$1.56 trillion, compared with only US$1.20 trillion at the end of 2016 and less than US$900 billion two years previously (see p3).

40-month

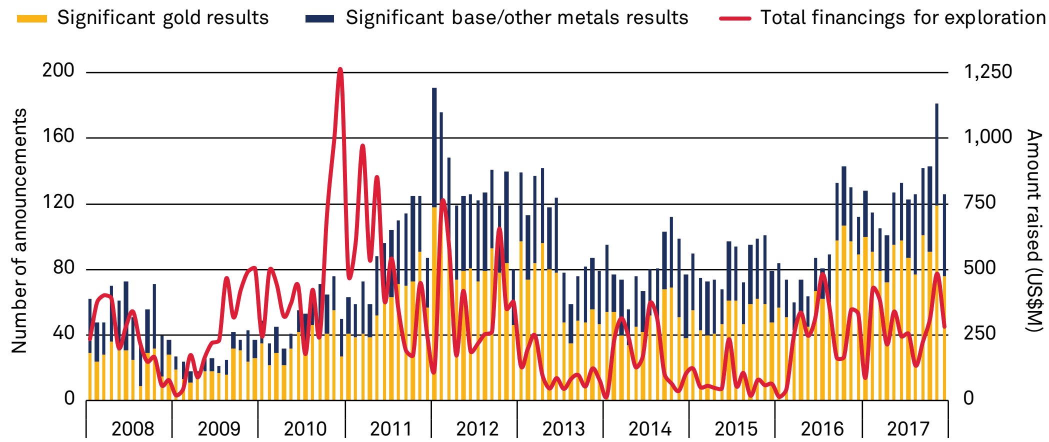
high industry market cap reflecting improved metals market

Global drill activity



Data as of January 31, 2018.
Source: S&P Global Market Intelligence

Significant drill results and financings

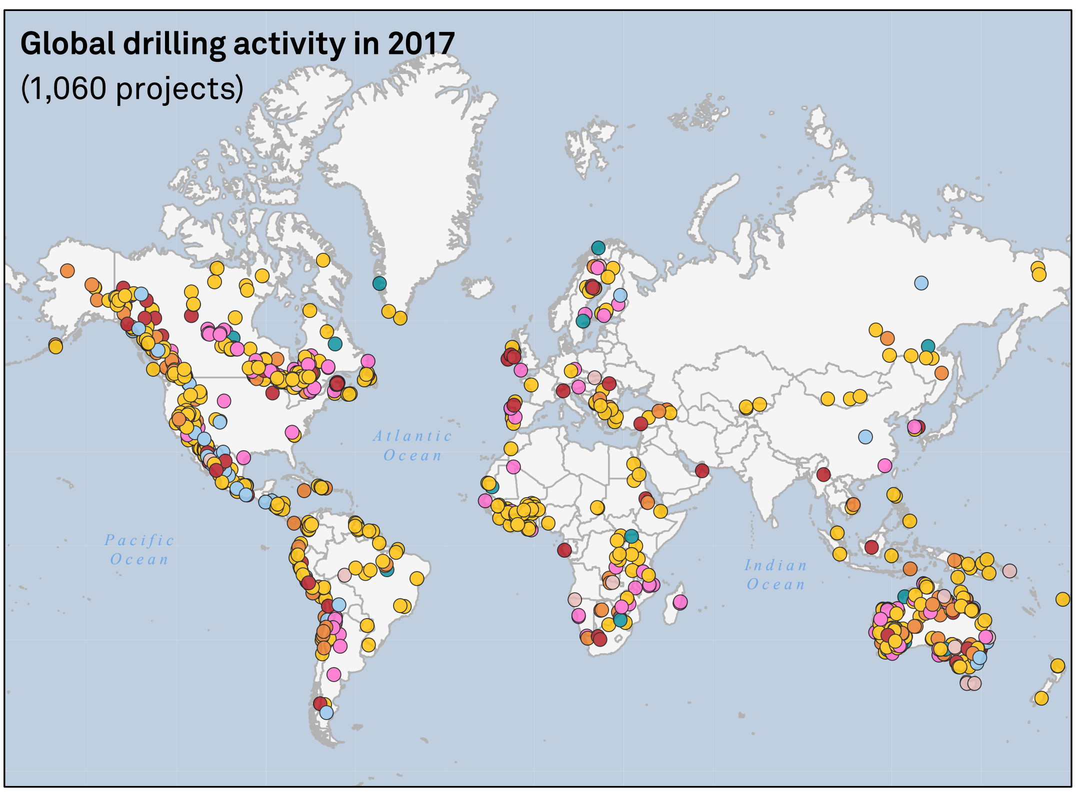


Note: Significant drilling includes initial finds, new zones or satellite deposits, and extensions to existing mineralization—essentially any drilling that adds to the resource potential of a particular project or deposit.

Data as of January 31, 2018.
Source: S&P Global Market Intelligence

November 2017

drilling activity surged to early 2012 levels



Primary commodity

Copper, Gold, Lead-Zinc, Minor Base Metals, Nickel, PGM, Silver, Specialty Metals

Data as of January 31, 2018.
Source: S&P Global Market Intelligence

300

projects drilled in Canada in 2017

278

projects drilled in Australia in 2017

About S&P Global Market Intelligence

S&P Global Market Intelligence integrates financial and industry data, research, and news into tools that help track performance, generate alpha, identify investment ideas, understand competitive and industry dynamics, perform valuation, and assess risk. Our metals & mining solution provides a comprehensive source of global exploration budgets, reserves replacement analysis and in-depth asset level metrics for mining properties, projects, companies and mines worldwide. From worldwide exploration, development, production and mine-cost analysis, our unbiased research provides insightful perspectives to act with conviction. Get the essential insights you need for acquisitions, commodity market forecasts, and credit risk assessments for well-informed mining investment decisions.

CONTACT US

The Americas
+1 877 863 1306

Latin Americas
+1-646-599-8087

Europe, Middle East & Africa
+44 (0) 20 7176 1234

Asia-Pacific
+852 2533 3565

This is a special report for the Prospectors & Developers Association of Canada (PDAC) International Convention, Trade Show & Investors Exchange.

spglobal.com/marketintelligence

0218 | SPGMI 195