

WORLD EXPLORATION TRENDS

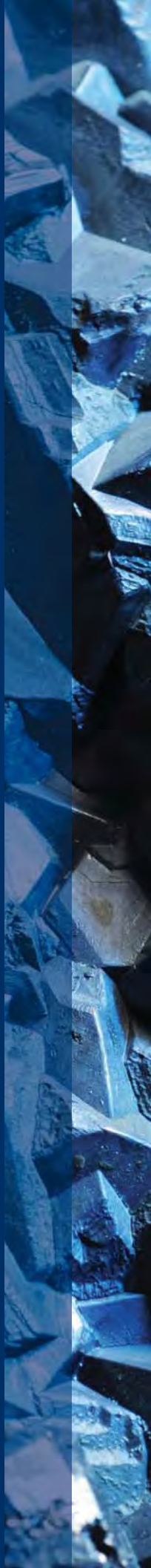
2011

A Special Report from Metals Economics Group
for the PDAC International Convention



MEG

Metals Economics Group



WORLDWIDE EXPLORATION TRENDS

Nonferrous exploration rebounds 45% to second-highest total on record

Responding to rising metals prices and more stable markets, most mining companies increased their exploration budgets in 2010. The result was a 45% increase in estimated worldwide nonferrous metals exploration spending¹ compared with 2009.

Metals Economics Group's (MEG) 21st edition of *Corporate Exploration Strategies* (CES) reports a 2010 exploration budget total of \$11.2 billion. The industry restored almost two-thirds of the \$5.5 billion that was cut from exploration in 2009 in response to the global financial crisis. The speed and the strength of the 2010 rebound were a welcome surprise to many, given the severity of the downturn and widespread forecasts of a deep and protracted recession.

Regionally, Latin America (led by Mexico, Peru, Chile, Brazil, and Argentina) was the top exploration destination in 2010—a position it has held for the better part of two decades—while Canada was the top country overall. Gold was the leading target, attracting more than half the global exploration budget total, with copper a distant second.

When uranium allocations are added to the \$11.2 billion nonferrous total, 2010 planned exploration spending rises to more than \$12.1 billion, a 44% increase from the 2009 total including uranium.

¹ MEG's CES series of studies includes many diversified companies, but specifically excludes exploration budgets for iron ore, coal, aluminum, oil and gas, most industrial minerals, and, until 2007, uranium. Because the 2007-10 budget figures including uranium do not allow meaningful year-on-year comparisons with earlier years' data that excluded uranium, figures used throughout this Special Report exclude uranium unless otherwise specified.

(All figures are reported in U.S. dollars; all historical exploration figures throughout this report represent dollars of the day and have not been inflation adjusted.)

The PDAC is pleased to partner with Metals Economics Group in making this special report on global exploration and industry trends available to our members and Convention 2011 delegates. The PDAC continues to utilize Metals Economics Group's services as an essential means of obtaining information on global exploration trends and strategies. Metals Economics Group is acknowledged as the leader in providing comprehensive information, expertise, and analysis to the mining industry, and is the premier source for exploration statistics worldwide.

— **Tony Andrews, Executive Director, PDAC**



BASIS FOR MEG’S ESTIMATED NONFERROUS EXPLORATION TOTAL

MEG’s 2010 exploration estimate is based on information collected from more than 3,200 mining and exploration companies worldwide, of which almost 2,100 had exploration budgets reported in the *Corporate Exploration Strategies* (CES) study. These companies (each budgeting at least \$100,000) together budgeted \$10.68 billion for nonferrous exploration, which we estimate covers about 95% of worldwide commercially oriented nonferrous exploration budgets. Adding our estimates of budgets that we could not obtain, the 2010 worldwide exploration budget total reached more than \$11.2 billion.

Recent editions of the CES study also include uranium exploration budgets. The 2010 edition covers uranium budgets totaling almost \$830 million. Including uranium, the number of companies covered by the study increased to more than 2,200, and the aggregate exploration budget (including the \$10.68 billion nonferrous total above) increased to \$11.5 billion. Including estimates for budgets MEG could not obtain, worldwide nonferrous planned exploration expenditures, including uranium allocations, totaled more than \$12.1 billion in 2010.

The granular uranium budget data required to make meaningful year-on-year comparisons in all figures throughout this report is not available. As a result, most of the analysis throughout the remainder of this report discusses comparable figures excluding uranium.

SUMMARY OF OVERALL TRENDS

Riding the wave of rising metals prices, worldwide nonferrous exploration allocations increased for six consecutive years to an all-time high of \$13.2 billion in 2008 (excluding uranium). The mining industry’s boom years came to an abrupt halt in September 2008, however, as the world fell into the worst economic and financial downturn in decades. Widespread forecasts of a deep and protracted global recession painted a grim outlook for near-term global commodities demand, pushing most metals prices into steep decline and forcing companies to slash their 2009 exploration plans—some by choice and others to survive. The resulting 42% drop (about \$5.5 billion) in worldwide nonferrous exploration budgets from the 2008 high was the largest year-on-year decline (in both dollar and percentage terms) since MEG began the CES series in 1989.

After bottoming in early 2009, the industry recovered much more quickly than most would have dared predict. Although the recovery remained fragile, the global economy improved markedly over the course of 2009 and into 2010. Metals prices improved steadily since bottoming in early 2009, and were again well above their long-term trends through most of 2010. Responding to rising prices and more stable market conditions, most companies increased their exploration budgets in 2010, resulting in a 45% increase (\$3.5 billion) in our estimated exploration budget total for 2010, restoring almost two-thirds of 2009’s estimated \$5.5 billion cut.

OTHER EXPLORATION METRICS: TRENDS ARE MIXED

In cutting their 2009 exploration budgets, many companies also reduced both the number of projects they were actively exploring² and their drilling plans in order to cut costs and conserve cash for high-priority assets. Unsurprisingly, given the sharp rebound in 2010,

² As part of its annual exploration survey, MEG asks companies to quantify a number of exploration metrics, including: the number of geoscientists/geologists employed by their exploration department; the number of projects being explored, the approximate area held for exploration; and the amount of drilling planned for the year. While the response rate to this part of our survey is relatively low and for certain groups may be skewed towards companies focusing on a particular commodity (i.e., most comparable majors are focused on base metals; most comparable intermediates are gold-focused), the results do allow us to make year-on-year generalizations among the different company classifications.

Worldwide Exploration Budget Totals, 2010 (US\$ billion)

Excluding Uranium

| | |
|---|---------|
| Worldwide Nonferrous Exploration Total* (2,089 companies) | \$10.68 |
| Estimated Worldwide Nonferrous Exploration Total** | \$11.2 |

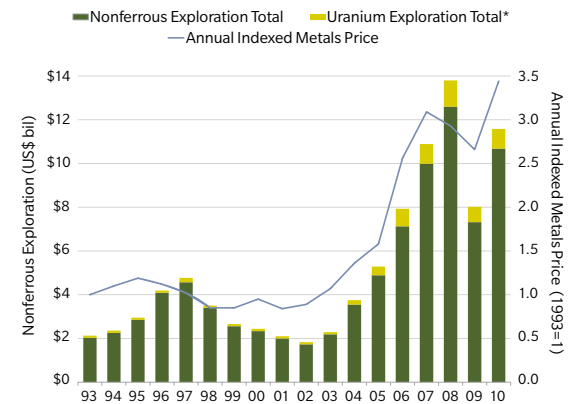
Including Uranium

| | |
|---|---------|
| Worldwide Nonferrous Exploration Total* (2,213 companies) | \$11.51 |
| Estimated Worldwide Nonferrous Exploration Total** | \$12.1 |

* MEG estimates that the companies covered by the CES account for about 95% of nonferrous exploration budgets.

**Includes the additional 5% of planned expenditures MEG could not obtain.

Figure 1: Estimated Worldwide Exploration Budget Totals, 1993–2010



* 1993–2006 uranium totals are MEG estimates based on totals reported in the OECD 2007 Red Book; 2007–2010 uranium totals are based on figures compiled as part of the CES studies.

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most companies with comparable figures planned significantly more drilling—a 48% increase in the aggregate planned drilling by a group of juniors with comparable data, a 20% aggregate increase among majors, and a 14% increase by intermediate companies. However, despite the strong recovery in exploration budgets and planned drill programs, the aggregate number of projects being explored by the group of junior companies dropped 10% in 2010 after falling 20% in 2009, while majors and intermediates reported declines of 6% and 16% respectively. In step with these trends, the total amount of ground held for exploration by comparable juniors declined 6% in 2010 (on top of a 45% cut in 2009), compared with a one-third increase in the area held for exploration by the group of majors (following their own 45% drop in 2009). Intermediate companies maintained their landholdings at about the same level year on year. While these trends are generalized, the data suggests that a number of juniors are focusing substantially more drilling on relatively few high-priority projects, while the one-third increase in area held for exploration by the majors suggests that at least some may have taken advantage of the 2009 dip in exploration activity to expand their exploration footprint, either through staking or acquisitions.

Companies with comparable figures also reduced their exploration departments in 2009, reporting an aggregate decrease of 16% in exploration geoscientists. As budgets rebounded in 2010, these companies made no net staffing change year on year. Junior and intermediate companies with comparable figures increased their exploration staffs by 10% and 8% respectively, but the majors continued to retrench, reporting 12% fewer geoscientists in 2010 on top of a 5% drop in 2009. Despite the apparent decrease over the past two years, concerns over a looming skills shortage the industry faced prior to mid-2008 are re-emerging as industry growth recovers; as a result, we expect to see an increase in the number of geoscientists employed by all industry groups in 2011.

EXPLORATION SPENDING INCREASED IN ALL REGIONS, REVERSING THE 2009 DECLINE

Planned exploration spending increased in all regions³ of the world in 2010, and one—the Pacific/Southeast Asia region—exceeded its previous high, set in 2008.

Latin America drew the largest share of allocations, attracting 27% of global spending in 2010, and has been the most popular exploration destination since 1994. Five countries—Mexico, Peru, Chile, Brazil, and Argentina—traditionally attract the vast majority of exploration spending in Latin America, and 2010 was no exception. Just 17% of planned 2010 exploration in Latin America was targeted outside the borders of these five countries. Base metals exploration outpaced gold in Peru, Chile, and Brazil, while gold led the way in Mexico and Argentina.

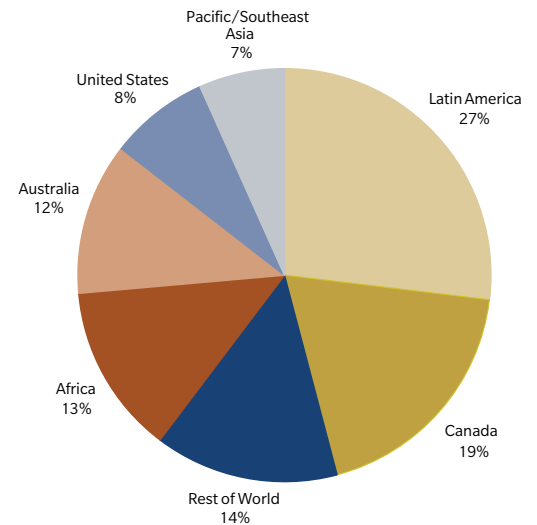
Canada was also a big draw in 2010, with planned spending rebounding 73%. This allowed Canada to regain the second spot, which was claimed by MEG’s ‘rest-of-world’ region in 2009. The provinces of Ontario, Quebec, Saskatchewan, and British Columbia attracted about two-thirds of total Canadian allocations. Planned expenditures for gold exploration in Canada increased dramatically to capture 54% of total spending.

After a year in second position, MEG’s ‘rest of world’ region (covering countries in Europe, mainland Asia, and the Middle East) fell back to third. China outpaced Russia for the first time as the top exploration destination in this region, and together the two countries accounted for half the region’s 2010 total. Gold was the leading target in the region, attracting 49% of recorded budgets.

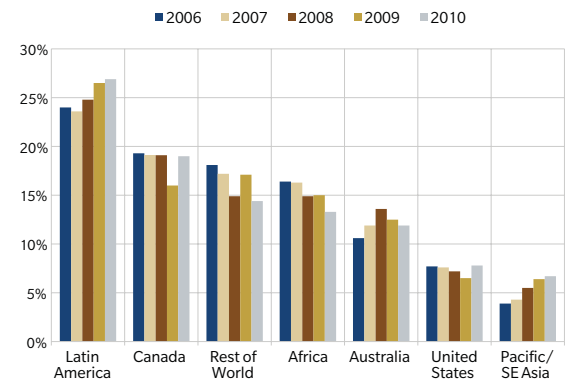
Africa continued to attract more exploration spending than Australia, accounting for 13% of 2010’s global budgets compared with Australia’s 12%. Planned spending in Africa

Figure 2: Worldwide Nonferrous Exploration Budgets by Region

Exploration Budgets by Region, 2010
(2,089 companies’ budgets totaling \$10.68 billion)



Exploration Budgets by Region, 2006-10
(as a percentage of annual exploration totals)



³ The annual budget totals for Canada, Australia, and the United States are typically much larger than for most other countries; as a result, MEG also treats these countries as regions in its CES studies.

was heavily weighted towards five countries: Democratic Republic of Congo, South Africa, Zambia, and Burkina Faso, which together accounted for almost half the region's total. In Australia, three states—Western Australia, Queensland, and New South Wales—together accounted for three-quarters of the region's total allocations. Gold was the top exploration target in both Africa and Australia.

The United States region remains firmly entrenched in sixth place. Nevertheless, it boasts the largest year-on-year increase in planned exploration spending in 2010, rising 75% from 2009 and increasing its share of worldwide spending to 8% from 6.5%. Gold allocations in Nevada and Alaska account for a large portion of the total; however, base metals exploration in Arizona and Minnesota also contributed to the increased activity.

Planned exploration in the Pacific/Southeast Asia region also increased substantially in 2010. While its share of worldwide exploration increased in recent years to almost 7% in 2010, it remains well below the 10%-12% range reached in the mid-to-late-1990s. The traditional big three destinations—Indonesia, Papua New Guinea, and the Philippines—attracted 75% of the region's total allocations in 2010.

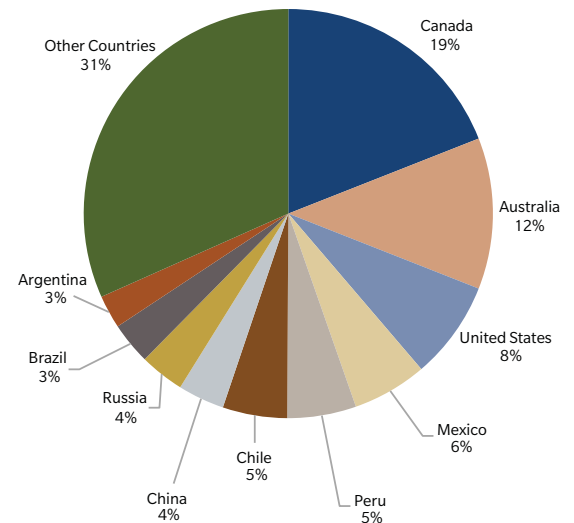
In most years, the bulk of global exploration spending is carried out by Canada- and Australia-based companies; however, resource-hungry China is also becoming an increasingly important investor in mineral exploration worldwide. In 2010, Chinese companies accounted for about 11% of the global exploration total, with about 31% of their budgets allocated outside China's borders—primarily targeting Canada, Africa, and Pacific/Southeast Asia regions.

TOP TEN COUNTRIES SHOW INCREASED EMPHASIS ON UNITED STATES AND MEXICO

As one would expect in a year in which exploration spending jumped 45%, most countries saw year-on-year increases in allocations (the 2010 CES study documents exploration allocations in 123 individual countries; 125 when uranium is included). The top ten individual countries in 2010 accounted for 69% of the overall budget. Although their relative positions shifted, the top nine countries were the same as in 2009. Canada and Australia continued to head the list in 2010, with Canada's lead over Australia increasing from about \$260 million in 2009 to \$755 million. The United States and Mexico moved

Figure 3: Exploration Budgets for the Top Ten Countries, 2010

(top ten countries account for 69% of total budgets)



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Figure 4: Exploration Budgets for the Top Ten Countries, 2010



113 other countries 31%

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ahead of Peru to take third and fourth spots, putting the U.S. back among the traditional big three. Peru dropped from third to fifth place, while Chile rose from seventh to sixth. China rose from eighth to seventh place, Russia dropped from fifth to eighth, Brazil remained in ninth place, and Argentina replaced South Africa in tenth place.

Despite increases in most countries, the industry’s overall appetite for risk did not return to levels seen prior to the economic downturn. Companies continue to face the threat of resource nationalism, as more countries openly consider or enact windfall and resource rent taxes, increase royalties, or impose other controls on foreign companies such as revoking or freezing licenses for review. As a result, exploration in a number of countries considered to be high risk continued to fall in 2010, while other countries with elevated risk profiles showed only modest increases far below the global average. Early-stage exploration, which is the most mobile and tends to be cut first when risk levels rise (or tolerance for risk declines), has all but dried up in many high-risk countries; the explorers that remain are focused on advanced projects and mines that are difficult to abandon.

GOLD ATTRACTS RECORD EXPLORATION

Following steep declines in exploration allocations in 2009, budgets for all targets covered by the CES study resumed their upward trend in 2010, with the exception of diamonds, which dropped 9% year on year.

In 2010, global economic fundamentals kept the spotlight on gold, and historically high prices prompted gold explorers to increase their aggregate budget by \$1.9 billion. This increase lifted planned spending on the yellow metal to \$5.4 billion and its share of total budgets to 51%—the first time since 1999 that gold accounted for more than half of total planned spending and the highest dollar total in the history of the CES. Ten countries—Canada, Australia, United States, Mexico, Russia, China, Peru, Colombia, Brazil, and Chile—accounted for two-thirds of the 2010 gold exploration budget total.

Overall, base metals exploration budgets (aggregating copper, nickel, and zinc) also bounced back in 2010, but did not exceed their 2008 peak of more than \$5 billion. As a percentage of global exploration activity, base metals accounted for 33%—the second consecutive decline since a high of almost 41% of global exploration in 2008. Latin America consistently accounts for the largest share of worldwide base metals budgets, topping 33% in 2010—the region’s largest share since 2003.

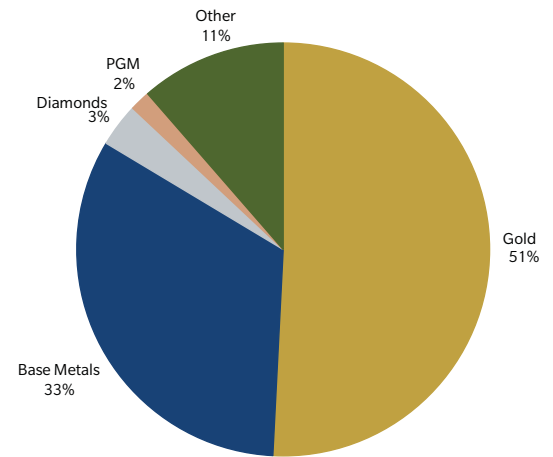
The 9% decline in diamond allocations in 2010 represented just 3% of worldwide exploration—a far cry from almost 15% in 2003 and the lowest share recorded in the 21-year history of the CES. Canada, Russia, and southern African countries continued to be the primary destinations for diamond exploration.

Compared with 2009, PGM exploration increased a relatively minor 13% in 2010. As a result, PGM’s share of worldwide spending slipped below 2%, continuing the steady erosion of its share of global spending since reaching 6% in 2002 and 2003. Almost half of PGM allocations were destined for Africa, with Canada receiving about a third.

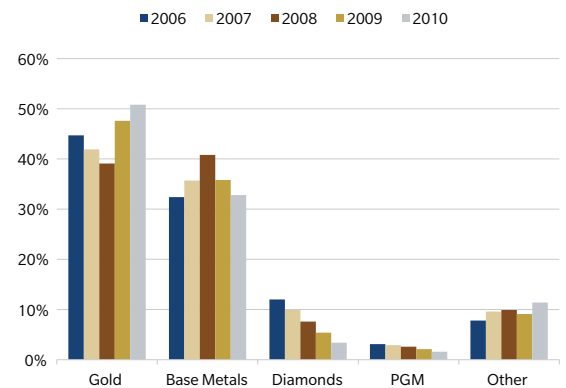
Budgets for the ‘other targets’ group of commodities almost doubled from 2009, but fell just shy of their 2008 peak of \$1.3 billion. Silver accounted for more than a third of the ‘other targets’ total; however, most silver exploration occurs in conjunction with the search for gold or base metals polymetallic deposits. Potash and phosphates—by far the most popular targets among the remaining ‘other targets’—attracted more than 20% of the group’s total. As market interest in lithium and rare earth elements continued to increase in 2010, exploration budgets for these commodities jumped to almost four times the amount spent in 2009. Nevertheless, they remain a relatively small part of the industry’s overall exploration effort, accounting for about 13% of the 2010 ‘other targets’ total.

Figure 5: Worldwide Exploration Budgets by Target

Exploration Budgets by Target, 2010
(2,089 companies’ budgets totaling \$10.68 billion)



Exploration Budgets by Target, 2006–10
(as a percentage of annual exploration totals)



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URANIUM EXPLORATION REBOUND WAS MUTED

The CES study began covering uranium budgets in 2007. Although specifically excluded from the figures used in this report⁴, the 2010 CES includes 272 companies reporting uranium allocations, with aggregate uranium budgets up 24% from 2009—well below the worldwide average increase for all commodities. Uranium spending represents more than 7% of the \$11.5 billion in worldwide exploration budgets covered when including uranium—a higher percentage than the allocation for diamonds for the third consecutive year.

EMPHASIS CONTINUES TO BE ON LATE-STAGE EXPLORATION

Planned spending for all stages of exploration increased in 2010, and the recent trend of increased emphasis on late-stage exploration continued. Late-stage budgets increased the most year on year (up 52% from 2009) to account for about 42% of the worldwide total, while the rise in grassroots budgets was on par with the worldwide increase, keeping its share of the overall total flat at just under 33%. Minesite budgets increased more modestly at 35% year on year, dropping its share of the global total to 25%.

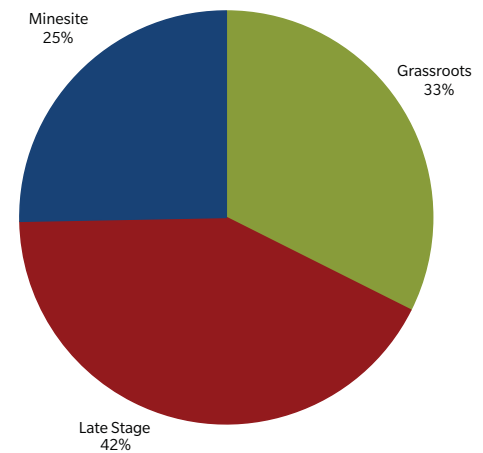
Late-stage spending outweighed grassroots spending for the past six years. Grassroots’ percentage of budgets has generally declined since the mid-1990s, and dropped an average of 2.5% annually from a recent high of 52% in 2001 to a record low of about 33% in 2009 and 2010. This decline correlates with the upward trend in late-stage budgets, as companies spend more on late-stage projects to move them towards production or make them attractive for acquisition in the metals price environment of the past six years. Similarly, minesite’s share of overall spending increased in recent years as producers view it as a more economical and less risky means of replacing and adding to reserves.

The stabilization in grassroots’ overall percentage in 2010 at least temporarily halted the erosion of its share of the worldwide total; however, the proportional shift away from grassroots spending over the past cycle could put pressure on future production. With companies of all types focusing less on grassroots work, there is some concern that many companies, and perhaps the industry in general, may be sacrificing long-term project pipelines in favor of short-term growth.

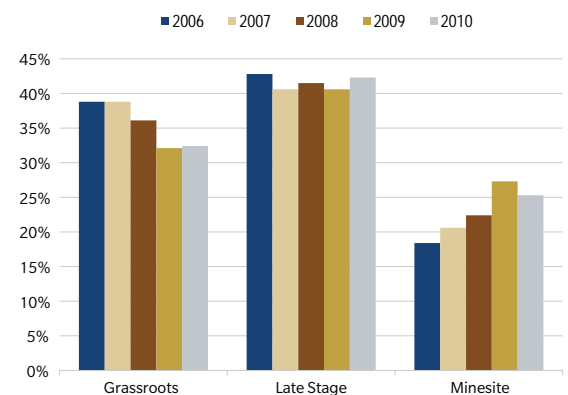
4 Since the granular uranium budget data required to make meaningful year-on-year comparison with earlier years’ data is unavailable, uranium allocations are excluded from most figures used in this report.

Figure 6: Worldwide Exploration Budgets by Stage of Development

Exploration Budgets by Stage of Development, 2010
(2,089 companies’ budgets totaling \$10.68 billion)



Exploration Budgets by Stage of Development, 2006-10
(as a percentage of annual exploration totals)



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LOOKING FORWARD

Since bottoming in early 2009, metals prices, and the mining and exploration industry as a whole, have recovered much more quickly than most had predicted. Many mines and projects that were stalled in 2008-09 are back on track, and exploration spending rebounded strongly in 2010.

Looking ahead, resource-hungry emerging and developing economies are projected to continue to lead global GDP growth and demand for metals over the next few years. On the supply side, many of the

limitations the industry faced prior to the 2008 decline remain in effect. The lack of exploration and mine development in the late 1990s and early 2000s, as well as declining head grades, power shortages, industrial actions, government and NGO interruptions, and operational failures at existing mines, constrained meaningful increases in the production of most metals, and many of these factors will continue to do so in the near term.

Based on the above, most analysts agree that metals prices—the primary driver of

exploration spending—will remain strong or continue to rise in 2011, at least in U.S. dollar terms. In addition, we expect the cost of exploration to continue rising in 2011, as increased activity leads to greater competition for services, and other input costs grow. As a result, we expect another healthy increase in the 2011 exploration budget total relative to 2010, rising to set a new high-water mark for worldwide nonferrous exploration spending.



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Metals Economics Group
Suite 300, 1718 Argyle Street
Halifax, Nova Scotia
B3J 3N6, Canada
Phone +1 902-429-2880
Fax +1 902-429-6593

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