



# Rockstone

## Research

31. März 2016

### Research #1

Diamanten in Kanada



Ursprung:  
Diavik Diamond Mines

## Arctic Star ist an etwas Grossem dran

Marc Davis von BNW News hat es glasklar zu verstehen gegeben in seinem vor kurzem auf Mineweb veröffentlichten Artikel *“Another World Class Diamond Discovery?”*. Ein grosser neuer Diamantenfund ist in Kanada tatsächlich längst überfällig, wobei sich Arctic Star mit dem Team von North Arrow Minerals Inc. zusammengetan hat, um die Exploration auf ihrem Redemption Projekt in der diamantenhaltigen Lac de Gras Region in den Northwest Territories zu finanzieren. Letzte Woche wurde der Start eines Bohr- und Geophysikprogramms angekündigt. Die Aktie von Arctic Star wird an der TSX Venture Börse rege gehandelt: >33 Mio. Stück bisher im März, wovon 11,5 Mio. gestern den Besitzer wechselten.

**Z**um jetzigen Zeitpunkt müsste die geophysikalische Untersuchung auf dem Redemption Grundstück abgeschlossen sein, wobei die Bohrungen bis Ende April abgeteuft sein sollen. Der Fokus liegt auf die Entdeckung der Diamantenquelle vom South Coppermine Indicator Mineral Train. Redemption befindet sich etwa 32 km südwestlich und 47 km westlich von den einzigen beiden produzierenden Diamantenminen in NWT: Ekati (mehrheitlich Dominion Diamond) und Diavik (Dominion/Rio Tinto Joint Venture).

Als aktueller Projektbetreiber exploriert North Arrow das Redemption Grundstück von Arctic Star gemäss einer Optionsvereinbarung, wonach sich North Arrow einen 55% Projektanteil mit dem Ausgeben von \$5 Mio. für die Exploration bis zum 1. Juli 2017 erarbeiten kann. Patrick Power (CEO von Arctic Star) kommentierte: *“Diese Vereinbarung wird es dem Team sofort ermöglichen, mit Explorationsbohrprogrammen auf dem Redemption Diamantengrundstück fortzufahren, und das ohne jegliche Auswirkungen auf die Barmittel von Arctic Star.”*

### Unternehmensdetails

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Aktien im Markt: 86'363'073

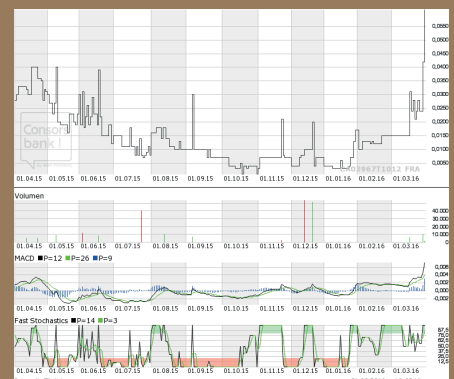


▲ Chart Kanada (TSX.V)

Kanada Symbol (TSX.V): ADD

Aktueller Kurs: \$0,075 CAD (30.03.2016)

Marktkapitalisierung: \$7 Mio. CAD



▲ Chart Germany (Frankfurt)

Deutschland Kürzel / WKN: 82A / A1JCQC

Aktueller Kurs: €0.042 EUR (Mar. 30, 2016)

Marktkapitalisierung: €4 Mio. EUR





# Another World Class Diamond Discovery?

**There have been no significant discoveries for a while.**

**By Marc Davis (BNW News) for [Mineweb.com](http://Mineweb.com) on March 28, 2016**

Finding a multi-billion dollar diamond discovery is something that geologist Buddy Doyle dreams of every day. For well over a decade, it's been his obsession.

But it would be foolish to dismiss him as a self-deluded wishful thinker. History bears testament to him being quite the opposite. Which is because he's done it all before, unearthing a rich diamond deposit — that became the Diavik mine — in Canada's far north, while still a relatively youthful up-and-comer. This is when he was exploration manager for Kennecott Canada Exploration Inc. — a subsidiary of the world's biggest mining company, Rio Tinto plc.

Within weeks, we'll know if Doyle can do it again. And he likes his odds, even though they're still a long shot at best. Now in his 50s, he's far shrewder and scientifically savvier than the first time around, he points out. He also has the benefit of vastly improved diamond-hunting technology, as well as the collaboration of one of the world's top diamond-hunting gurus, Dr. Chris Jennings.

Even though his last claim to fame was a generation ago, Doyle hasn't exactly been idle since. In fact, his latest shot at glory has been over a decade in the making. During this time, his dogged pursuit of a new diamond discovery has seen him traverse much of the frigid vastness of the Northwest Territories (NWT).

Though he's drilled without success elsewhere in recent years, he's learned invaluable lessons each time. Now we're about to see if he's amassed enough geological savoir faire to pull off a masterstroke in the sunset of his 30-year-plus career.

A modest man by nature, Doyle's



confidence doesn't seem to be over-inflated. After all, he has the support and encouragement of some important players in the diamond exploration business. They include world-famous diamond hunter, Dr. Jennings, who helped select the best drill targets on Arctic Star's property, which is called Redemption.

Dr. Jennings also played a key preliminary role in the discovery of the rich Diavik diamond deposit in 1992. (The NWT's other diamond mine, Ekati, was discovered a year earlier).

It was Dr. Jennings who originally found the right locality in the NWT to zero-in on Ekati's hidden treasures. And that was quite an achievement considering that the NWT is bigger than Germany, France and Spain combined. And it was Doyle who next figured out the correct spot to drill in order to reveal the exact whereabouts of Ekati's huge bounty all those years ago.

Now Dr. Jennings is putting his money where his mouth is. He's committed close to a million dollars of his own funds for this drill project, largely because he really likes what he sees — in terms of all the physical clues that a new multi-billion dollar discovery may be within reach. (More on this in a moment).

In recent years, Doyle has been doing his geological sleuthing work at the helm of a small exploration company, Arctic Star (TSX.V: ADD) — a TSX Venture Exchange publicly-traded company.

Ironically, Doyle's long, circuitous search for diamonds has finally led him to a locality that's within a 50-kilometer radius of both the Ekati and Diavik mines. And that may be a good thing. Which is because the rock formations that often host diamonds — known as kimberlite pipes — typically occur in clusters that resemble a shotgun blast spread out over an area in diameter of up to 100 kilometers. So when one of them is located, geologists know that other potentially diamond-rich kimberlite pipes are likely nearby.

That said, Arctic Star's ten or so top-priority targets were selected primarily because of their excellent geochemistry. This means they're ideally located at the head of a prolific "dispersion train" of diamond indicator minerals (significantly, one that also includes tiny diamonds).

In other words, an approximately 40-kilometre-long indicator mineral trail comes to an abrupt end in the immediate vicinity of Arctic Star's drill



targets. This situation is comparable to a trail of crumbs leading back to a loaf of bread.

Even though Arctic Star's drill program — which started late last week — will cost up to a million dollars, it may end up being a small price to pay. And it's Arctic's joint venture partner, North Arrow Minerals, that's footing the bill (along with Dr. Jennings). It can earn up to a 55% stake in the joint-ventured project by spending as much as CDN \$5 million on exploration work by July of 2017.

In fact, an economic discovery would make both these upstart companies the toast of Canada's mining investment community. After all, these diamond fields have already yielded unimaginable buried wealth. Consider this: the NWT's two diamond mines have collectively produced over US \$25 billion worth of high-quality gems so far.

There are historic precedents for the kind of stratospheric success that shareholders of Arctic Star and North Arrow dream of. In fact, several other mining juniors have hit the geological jackpot since the early 90s. And of course, they include Dia Met Minerals, which discovered the Ekati mine. This fabulous find propelled the company's share price from mere pennies in 1991 to over \$67 the following year.

However, a new discovery is long overdue — especially because Canada's supplies are already dwindling.

In fact, there's only been one economic diamond discovery in Canada in well over a decade. And that was De Beers' Victor pipe in Ontario.

It's the only diamond mine outside of the NWT (though another mine — Gahcho Kué — which has been in development for a long time, is expected to come on-stream in the NWT later this year.)

Nonetheless, Doyle remains convinced that the NWT has at least one more dazzling secret to give up.

But why does Arctic Star believe it can beat the odds when so many other diamond exploration mining juniors have failed? It's all about the "exceptional" geochemistry that has led him to Arctic Star's high-priority drill targets at Redemption, Doyle says.

"The abundant indicator minerals in the South Coppermine mineral train have the same unique chemistry as ones that co-exist with diamonds. In other words, they must have been formed under the exact same conditions that create diamonds," he explains. "This makes it probable that the source of these trace elements is diamondiferous." Scientific advancement is also on Arctic Star's side, he adds.

"The depth of experience and level of sophistication that we have in finding diamond pipes has come a long way since the Diavik and Ekati diamond mines were found," Doyle says.

"Whereas these past discoveries were largely reliant on using one particular exploration tool or another, we're now using all the tools in the tool kit."

"And these exploration techniques that we've used to identify our best drill targets each corroborate one other. Which is very exciting."

Drill results are expected by the end of April.

*Disclaimer: Marc Davis does not directly or indirectly have any stock positions in any of the companies mentioned in this article.*







# Arctic Star And North Arrow Announce Drilling At Redemption Diamond Project

By Greg Klein for [ResourceClips.com](http://ResourceClips.com)  
on March 22, 2016

Angular and coated grains among the indicator minerals suggest a shorter distance to their source.

Located in the Northwest Territories' diamondiferous Lac de Gras region, the Redemption project now has ground geophysics and drilling underway. Announced March 22 by **Arctic Star Exploration TSXV:ADD** and **North Arrow Minerals TSXV:NAR**, the program calls for a week of geophysics, while the rig's expected to be busy until late April.

The companies hope to find the source of the South Coppermine indicator mineral train.

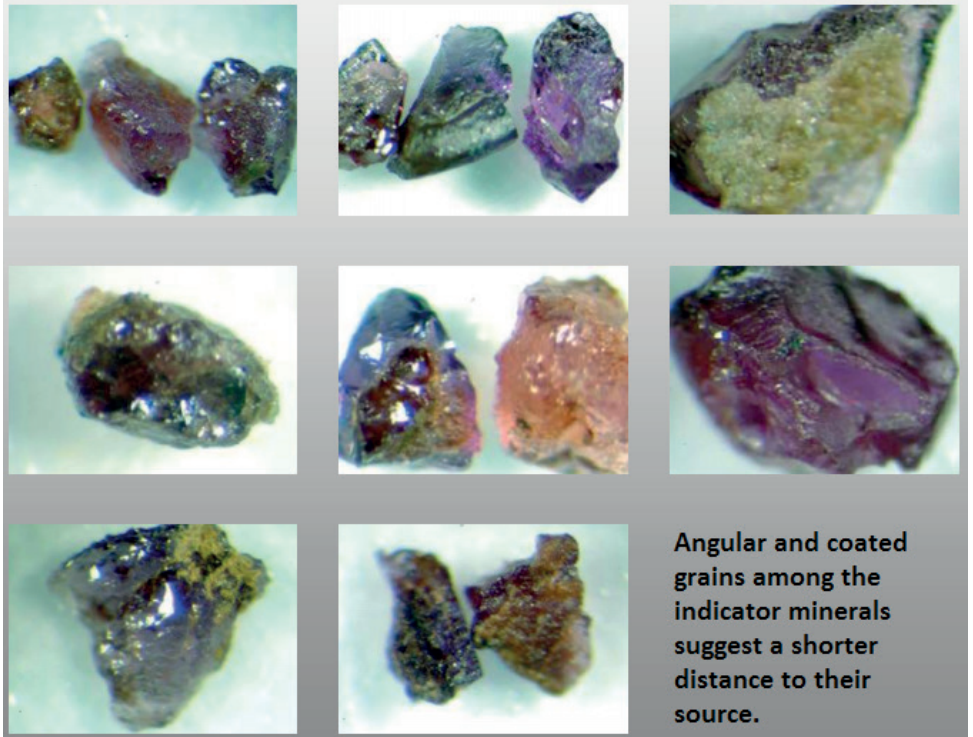
Previous work has included electromagnetics, gravity and sonar surveys, as well as 350 till samples. Diamonds have been found among the indicator minerals.

Other encouraging signs include pyropes with high chrome, ilmenite, chromite and eclogitic garnet. Angular stones, as opposed to smoother shapes, suggest shorter transport from the source.

Redemption lies about 32 kilometres southwest and 47 kilometres west of the NWT's two currently operating diamond mines, **Dominion Diamond's (TSX:DDC)** majority-held Ekati and the **Dominion/Rio Tinto NYE:RIO** 40%/60% JV at Diavik.

**North Arrow** funds the Redemption program and acts as operator under a 55% earn-in which would require \$5 million of work by July 1, 2017.

**North Arrow's** portfolio includes a majority stake in the Pikoo diamond project in Saskatchewan, where drilling began last month. **Arctic Star** also holds the T-Rex and Triceratops kimberlite clusters northwest of Ekati, and the Stein property in Nunavut.



*"Studies of the indicator minerals from the South Coppermine train, some of which are imaged to the right, show very angular habits, some with soft alteration rims, (kelpyite for pyrope and lucoxene for ilmenite), all evidence for close proximity to source. Mineral grains lose their coats and become rounded as they travel down ice in the glacier. The angular/coated grains were most abundant at the head of the South Coppermine train. One grain with kimberlite attached was also noted." ([source](#))*

**Excerpt from Greg Klein's previous article "[North Arrow Deal To Fund Drilling On Arctic Star Diamond Project](#)" (01/25/16):**

Arctic Star Exploration's (TSXV:ADD) Redemption diamond project stands to gain from a royalty sale by North Arrow Minerals TSXV:NAR.

With an option to earn 55% of the project, North Arrow has signed a deal with Umgeni Holdings International to sell part of its share of royalties on the property for \$800,000.

The money would help fund drill programs at North Arrow's Pikoo diamond project in Saskatchewan as well as the Redemption project in the Northwest Territories' diamondiferous Lac de Gras region.

Pikoo has drilling scheduled to begin in mid-February, with Redemption following in about a month.

North Arrow's Redemption option requires the company to fund \$800,000 in exploration by August.

The full 55% calls for North Arrow to spend \$5 million by July 2017. Subject to approvals, the \$800,000 sale gives Umgeni a 1.5% gross overriding royalty on diamonds and a 1.5% NSR on base and precious metals for three claims held 100% by North Arrow, as well as a 1.25% GOR and 1.25% NSR on 12 claims and five mining leases now under option from Arctic Star.

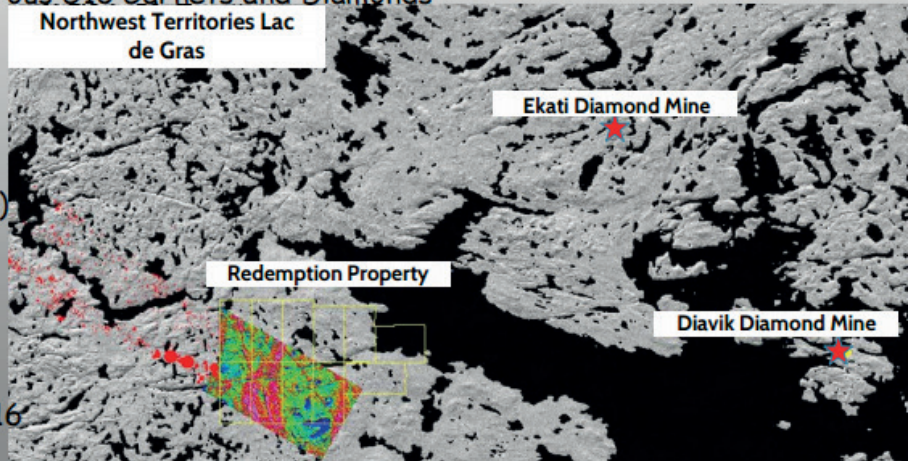
North Arrow holds sole responsibility for paying the royalties.





## REDEMPTION KEY POINTS

- Property is 32 km from Ekati Diamond Mine and 47km from Diavik Diamond Mine
- Joint Venture with North Arrow Minerals Inc. 55% TSXV: NAR and Arctic Star Exploration TSXV: ADD 45%
- Multiple Indicator Mineral Trains. Diamonds were found in the till samples proving the source is mineralized with diamonds
- Good Diamond Chemistry with Numerous G10 Garnets and Diamonds
- Electro Magnetic Survey Complete
- Gravity Survey Complete
- Bathymetry Survey Complete (Sonar)
- 350 New Till Samples
- 32 Isolated Gravity Anomalies
- Drill program scheduled for March, 16



## Regional Indicator Mineral Dispersion Trains

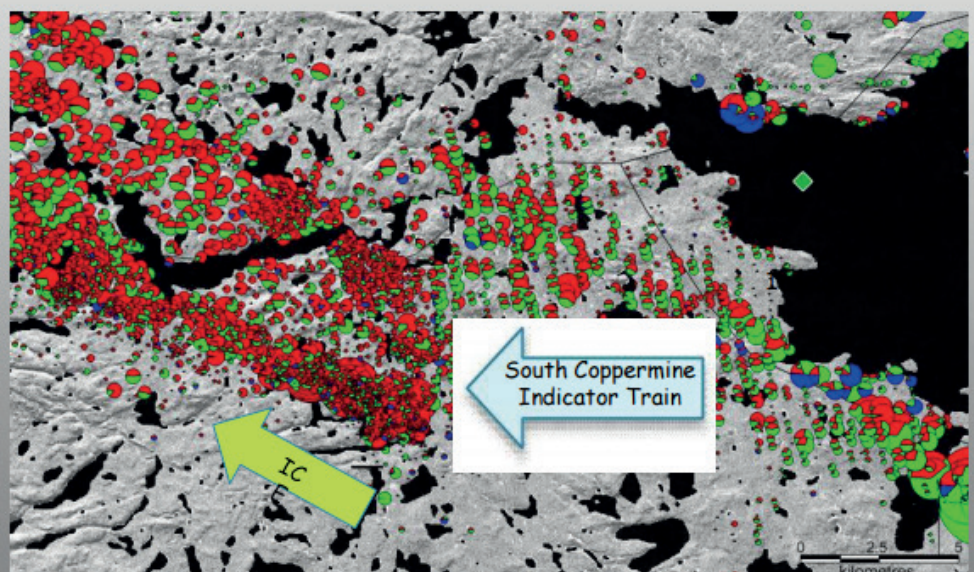
Pie charts below on the map represent samples with indicator minerals. Different colours, red for Pyrope, blue Ilmenite, green Chrome Diopside.

### Indicator Minerals

- Pyrope
- Ilmenite
- Chrome Diopside

**Note** how the trains are parallel following the Northwest trending ice direction

**Note** other indicator mineral trains without known source are present



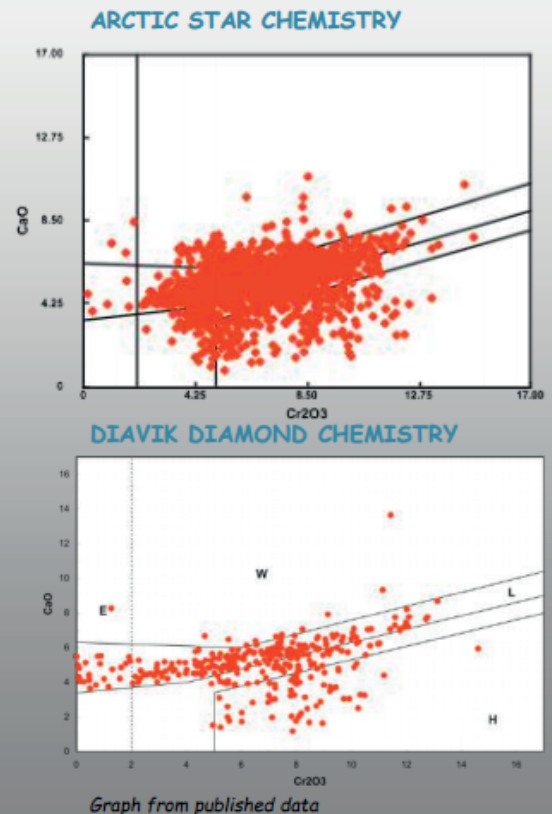




# Indicator Mineral Train Chemistry

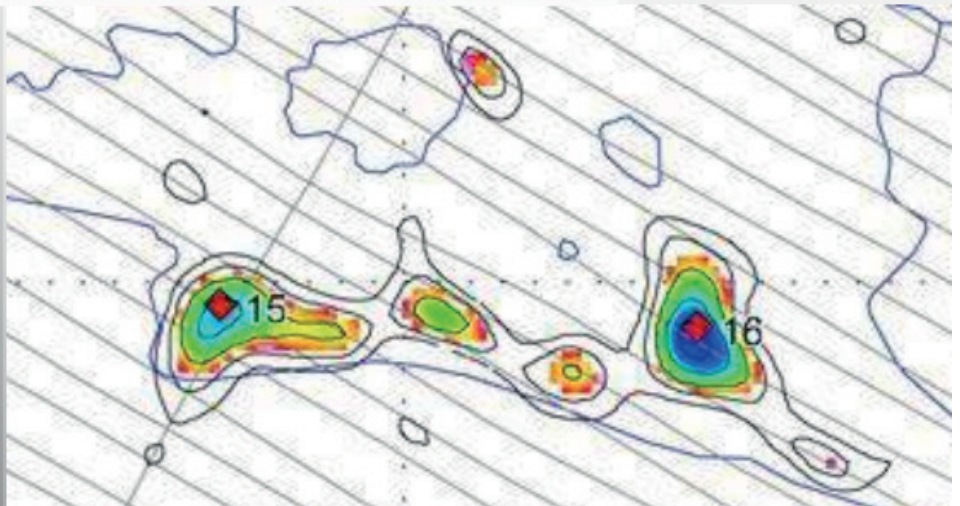
The pyrope garnet chemistry from the South Coppermine indicator mineral train is shown to the right, in a Chrome vs. Calcium, oxide "Sobolev", plot. For comparison the same plot is given from the pyrope retrieved from the Diavik project. (see below). Both plots have numerous Pyropes that plot in "H", Harzburgite or "G10" field (bottom right) considered to indicate good diamond potential.

Arctic Star's indicator mineral train has more pyropes with high chrome (>10%), these ultra-depleted pyropes, have a superior diamond association. (see Grutter 2004). This coupled with the presence of the entire indicator suite, ilmenite, chromite (rare) and eclogitic garnet, **with diamonds also reported**, is strong evidence the source of the train will be well mineralised.



## AIRBORNE GRAVITY GRADIOMETER

- Gravity is a contrast used to measure rock density
- Kimberlites show a low contrast of 2.5 (GDD) (E) while Granite shows a high contrast of 2.65 (GDD) (E)
- The red shows higher density data while the blue shows lower density data



### HIGHLIGHTS

- Close to 2 world-class diamond mines: Ekati and Diavik.
- Experienced management who lead a team that helped discover the Diavik Mine.
- Approximately \$20 million spent following Indicator Mineral Trains that are as good as Diavik's Indicator Mineral Train.
- Arctic Star's Indicator Mineral Train contains not only G10 chemistry but diamonds!
- New technology (airborne gravity survey), has identified a new cluster of anomalies at the head of the mineral train. A recent major discovery has been made in the area using this new technology, which impacted its share price dramatically!
- Redemption Project funded by Arctic Star's joint venture partner North Arrow.
- 250,000 acres newly staked (100% owned by Arctic Star).



# Dominion Diamond Completes Sable Pre-Feas, Construction to Begin Next Year



The Ekati Diamond Mines (Source: [Mining.com](http://Mining.com))

By Greg Klein for [ResourceClips.com](http://ResourceClips.com)  
on February 22, 2016

Now boasting a 10.1-million-carat reserve, Dominion Diamond's (TSX:DDC) Sable pipe could begin production in 2019 and continue to 2027, helping keep the company's Ekati plant at full capacity until 2033. Dominion released pre-feasibility highlights on February 22 for an open pit 17 kilometres north of Ekati's existing infrastructure in the Northwest Territories' Lac de Gras region. Dominion Diamond completes Sable pre-feas, construction to begin next year Dominion holds an 88.9% interest in Ekati's Core zone, which includes Sable. The company has a 65.3% stake in the adjacent Buffer zone and its Jay pipe, with Archon Minerals TSXV:ACS holding the remaining 34.7%. Jay's January 2015 pre-feas envisioned that pipe as a standalone operation. But in September Dominion decided to defer Jay production to give Sable higher priority. Using a one-millimetre cutoff, Sable's

pre-feas shows a probable reserve of 12 million tonnes averaging 0.8 carats per tonne for 10.1 million carats. The resource estimate used a 0.5-millimetre cutoff, with rounded numbers showing:

- **indicated:** 15.4 million tonnes averaging 0.9 ct/t for **14 million carats**
- **inferred:** 300,000 tonnes averaging 0.9 ct/t for **300,000 carats**

The study provides all dollar amounts in U.S. currency based on a 2015 exchange rate of C\$1.33. With a 7% discount rate, Dominion's share of the post-tax net present value comes to \$137 million and the post-tax internal rate of return comes to 16.2%. The study assumed a base case diamond price of \$140, \$50 less than last September's PEA. The lower price results from a re-evaluation of size frequency and price per size, weaker diamond prices and additional recovery of smaller stones, Dominion stated. Total capital expenditures would reach \$55 million in

fiscal 2017, \$72 million in 2018 and \$15 million in 2019, with another \$85 million for pre-stripping, which would mostly take place in 2019. The company plans to begin building the fully permitted mine in fiscal 2017 without a full feasibility study. Production would begin in 2019. Dominion stated it "plans to re-evaluate and further optimize the Sable mining and processing schedule based on the results of the Jay feasibility study, which is currently underway." Jay's probable reserve contains 84.6 million carats. The company has previously stated that Jay could potentially extend Ekati's mining life by at least 10 years beyond 2020. Ekati's Misery Main pipe, with a reserve of 14 million carats, has production scheduled to begin in H1. The world's third-largest rough producer by value, Dominion also holds the smaller portion of a 40/60 joint venture with Rio Tinto NYE:RIO in Diavik, another Lac de Gras operation. The mine's fourth pipe, the 10-million-carat A21, has production scheduled for H2 2018.





# Rio Tinto Finds Massive Canadian Diamond

By [SBS.com.au](https://www.sbs.com.au) on December 3, 2015

Rio Tinto has unearthed one of Canada's largest-ever, gem-quality rough diamonds at its Diavik diamond mine in the remote Northwest Territories, a 187.7-carat stone called the Diavik Foxfire.

The gem, now being showcased at Kensington Palace in London, will later be assessed at Rio Tinto's diamond sales and marketing hub in Antwerp.

Rio Tinto, which expects the stone to produce at least a 50-carat polished diamond, did not estimate the gem's value. Discovered in August, the diamond is the second or third largest rough diamond mined in Canada and the largest ever for a Rio Tinto diamond mine, a spokeswoman said.

Rio Tinto operates the mine and owns a 60-per-cent share, with Dominion Diamond Corp holding the remainder. Late last year, Rio approved the \$US350 million (\$A477.5 million) expansion at Diavik, with production expected to start in late 2018.

Two weeks ago, a small Canadian diamond miner found the world's second-biggest gem quality diamond at its mine in Botswana. The 1111-carat stone, slightly smaller than a tennis ball, could sell for more than \$US60 million, the chief executive of Lucara Diamond Corp has said.

One day later, the company announced the recovery of an 813-carat and 374-carat stone from its Karowe mine in Botswana.

The world's biggest ever gem-quality diamond is the Cullinan, a 3106-carat stone found in 1905 at the Premier mine in South Africa.

It was cut into several polished gems, the two largest of which are part of Britain's crown jewels.

[Media Release from Rio Tinto on 12/02/15:](#)



## Rio Tinto unveils 187.7 carat Canadian diamond

Rio Tinto has unveiled one of the largest diamonds ever discovered in Canada.

The 187.7 carat gem-quality rough diamond, known as The Diavik Foxfire, was discovered at the Diavik Diamond Mine in the remote Northwest Territories of Canada, 220km south of the Arctic Circle.

The Diavik Foxfire diamond was showcased during an exclusive preview at Kensington Palace in London.

Rio Tinto Diamonds managing director Jean-Marc Lieberherr said "We are delighted to showcase this exceptional, two billion-year-old Canadian diamond. Its ancient beginnings, together with the fortitude, finesse and innovative technology required to unearth a diamond in the challenging sub-arctic environment, make it a true miracle of nature."

The Diavik Foxfire has also been bestowed an indigenous name, Noieh Kwe which references the strong ties to the land and its legacy. Grand Chief Edward Erasmus from the Tlicho government said "I am very pleased that this has been named to honour the area of the caribou crossing, as this has been important to the Tlicho since time immemorial."

Local communities have been widely consulted about the operation and impact of the Diavik mine, with this engagement leading to considerable employment, training and capacity building opportunities. Diavik Diamond Mines president and chief operating officer Marc Cameron said "In a landscape so pristine and precious to traditional lifestyles, we have seen and continue to see an inspired collaboration between local indigenous people and a modern mining company."

The Diavik Foxfire will be showcased in London before returning to Antwerp for careful assessment and planning for the next stage of its journey. It is likely that the 187.7 carat rough diamond will yield at least one very large polished diamond with, its ultimate destiny in an exclusive heirloom piece of jewellery.

Rio Tinto owns a 60 per cent interest in, and operates, the Diavik Diamond Mine in Canada's remote Northwest Territories. Diavik commenced production in 2003 and has an annual production of some 6-7 million carats of predominantly large, white gem-quality diamonds.

Diavik is a significant contributor to Canada's northern economy, since 2000, Diavik has spent C\$4.8 billion with local businesses and C\$2.5 billion of this with northern Aboriginal businesses and their joint ventures.



THE POWER OF **INSIGHT**

BY CHRIS BERRY (@CBERRY1)

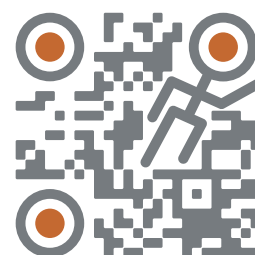
## DIAMOND INDUSTRY OVERVIEW:

What is the Future for the  
“Tears of the Gods”?

- Aside from perhaps gold, no other hard asset maintains such a high emotional appeal as diamonds.
- The diamond market is akin to an oligopoly with De Beers, ALROSA, and Rio Tinto combining for 66% of global production in 2014. Additionally, three countries were responsible for 59% of production in 2014.
- 125 million carats worth \$14.5 billion USD were produced in 2014. ALROSA forecasts a supply CAGR of 1% between 2015 and 2024 and a demand CAGR of 5% to 2024 driven by emerging markets such as China and India and supportive demand from the United States.
- Aside from a global economic slowdown, the production of synthetic diamonds is arguably the biggest long term threat to the natural diamond business. Approximately 3.5 million carats of synthetic diamonds were produced last year.
- With no major diamond discoveries since 2004 (Rio Tinto's Bunder in India), having “the goods”, a high quality and long lived deposit, ought to place any incumbent favorably amongst the major diamond producers.

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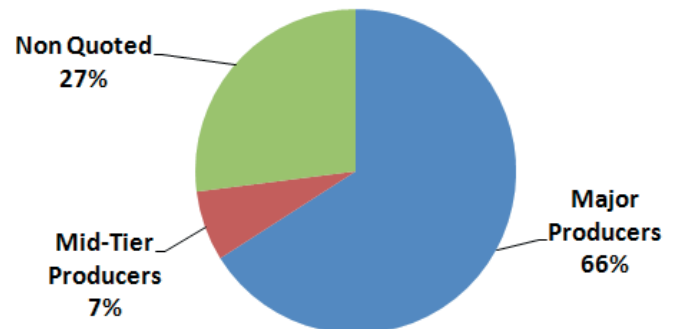
## INTRODUCTION

PERHAPS NO OTHER COMMODITY BESIDES GOLD HAS SUCH A STRONG EMOTIONAL APPEAL AS DIAMONDS. ADDITIONALLY, PERHAPS NO OTHER COMMODITY IS AS SHROUDED IN MYSTERY AS ARE DIAMONDS, THOUGH THIS HAS CHANGED IN RECENT YEARS OWING TO A HOST OF FACTORS. DESPITE THE PERPETUAL APPEAL OF THESE “TEARS OF THE GODS”, THE INDUSTRY IS STILL SUBJECT TO LAWS OF SUPPLY AND DEMAND UNDERPINNED BY CONSUMER TASTES AND PREFERENCES.

Though there is some vertical integration in the diamond business, it generally remains dispersed amongst explorers, producers, polishers, and retail outlets who generally, but not always, focus on their specific niche. While the mining segment of this industry produced approximately 125 million carats of rough diamonds in 2014 worth USD \$14.5 billion, the entire industry is estimated to be USD \$80 billion per year in size. For the sake of perspective, the all time high in production was 176 million carats in 2005 leading some to believe we’ve hit “peak” diamonds.

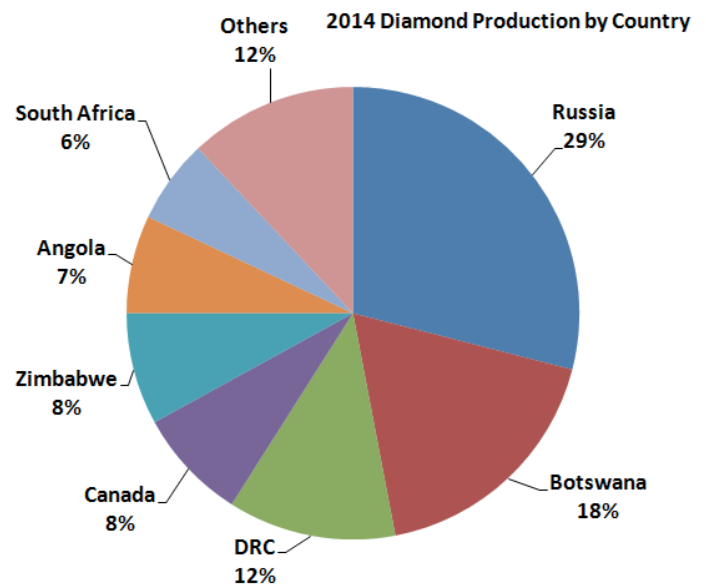
The diamond mining business can loosely be thought of as an oligopoly with De Beers, which AngloAmerican (AAL: LON) owns 85% of, AK ALROSA PAO (ALRS:MCX), and Rio Tinto (RIO:LON) as the “big three” with several Mid-tier producers including Petra Diamonds (PDL:LON), Lucara Diamonds (LUC:TSX), Dominion Diamond Corp (DDC:NYSE), and Gem Diamonds (GEMD:LON) contributing the remainder of supply alongside various privately held entities.

## 2014 Diamond Production by Volume



Source: Company Documents, Kimberly Process Statistics

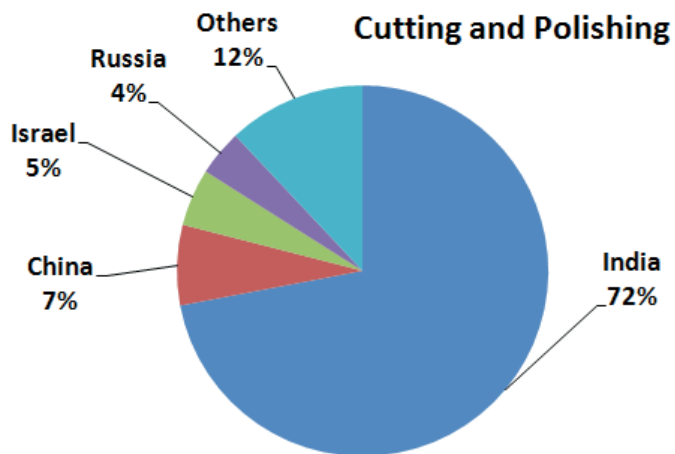
Diamond production is also reasonably geographically concentrated with 59% of supply originating in three countries:



Source: Company Documents, Kimberly Process Statistics

The cutting and polishing segment of the diamond value chain is concentrated in India but is extraordinarily diverse with thousands of companies and multiple business models catering to a diverse client base, according to De Beers.





Source: ALROSA

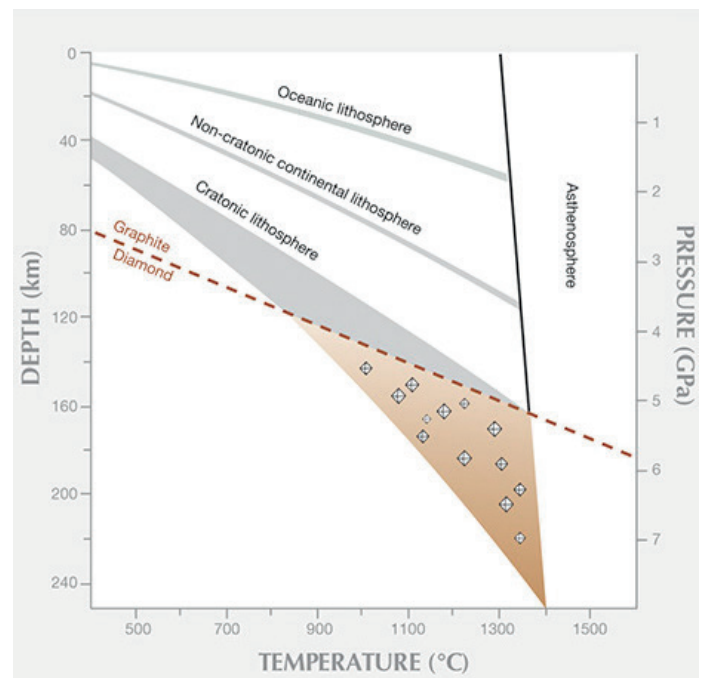
Given that mining costs are increasing owing to the fact that producers must “dig deeper” in existing mines, it is anticipated that the cost inflation here will filter throughout the value chain in the coming years. This will also pressure “middle market” margins and require this segment of the market to search for unique financing strategies to function properly.

Finally, despite the relatively small size of the global diamond market, the importance of diamond mining to the long term health of certain economies cannot be understated. As an example, Botswana, with a GDP of \$14.78 billion counts diamond production by value as 26% of its GDP (2013).

No other commodity besides gold has such a strong emotional appeal as diamonds.

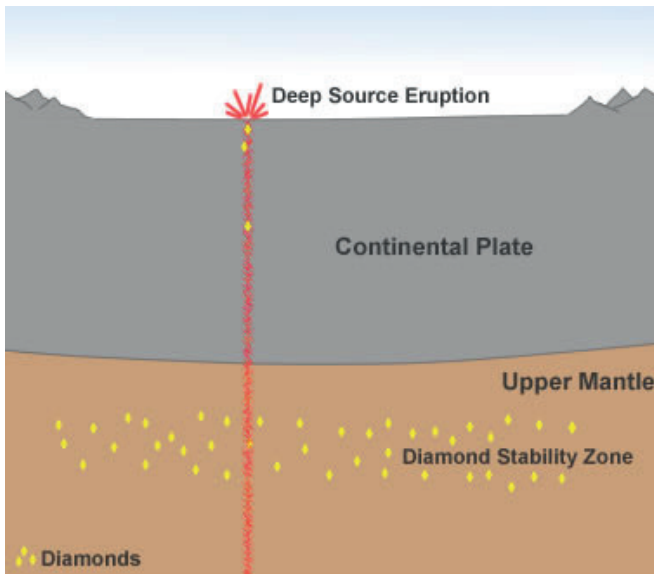
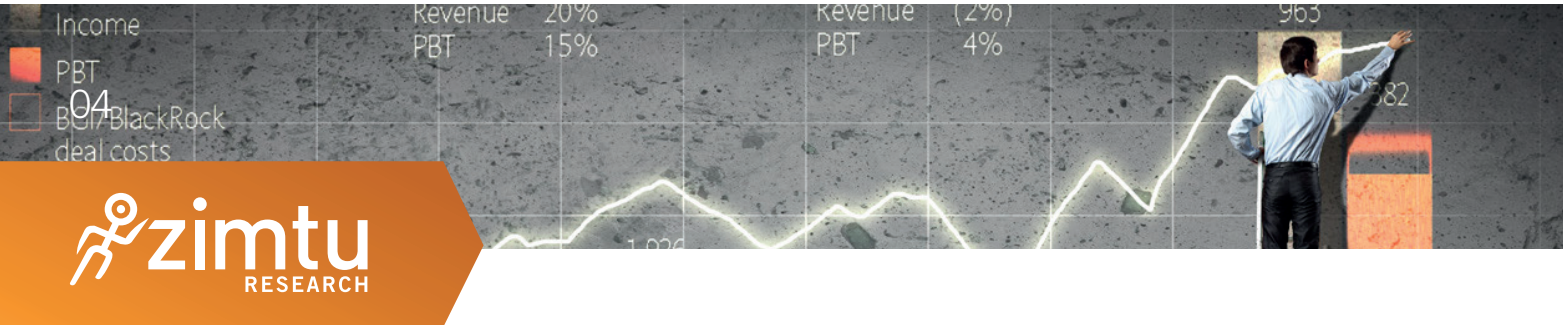
## GEOLOGY

Diamonds are typically formed deep in the Earth's crust (at approximately 250 km depth) under Archean cratons. The extreme pressure at this depth, coupled with temperatures in the range of 900 to 1,200 degrees centigrade, provides the ideal environment for diamond formation.



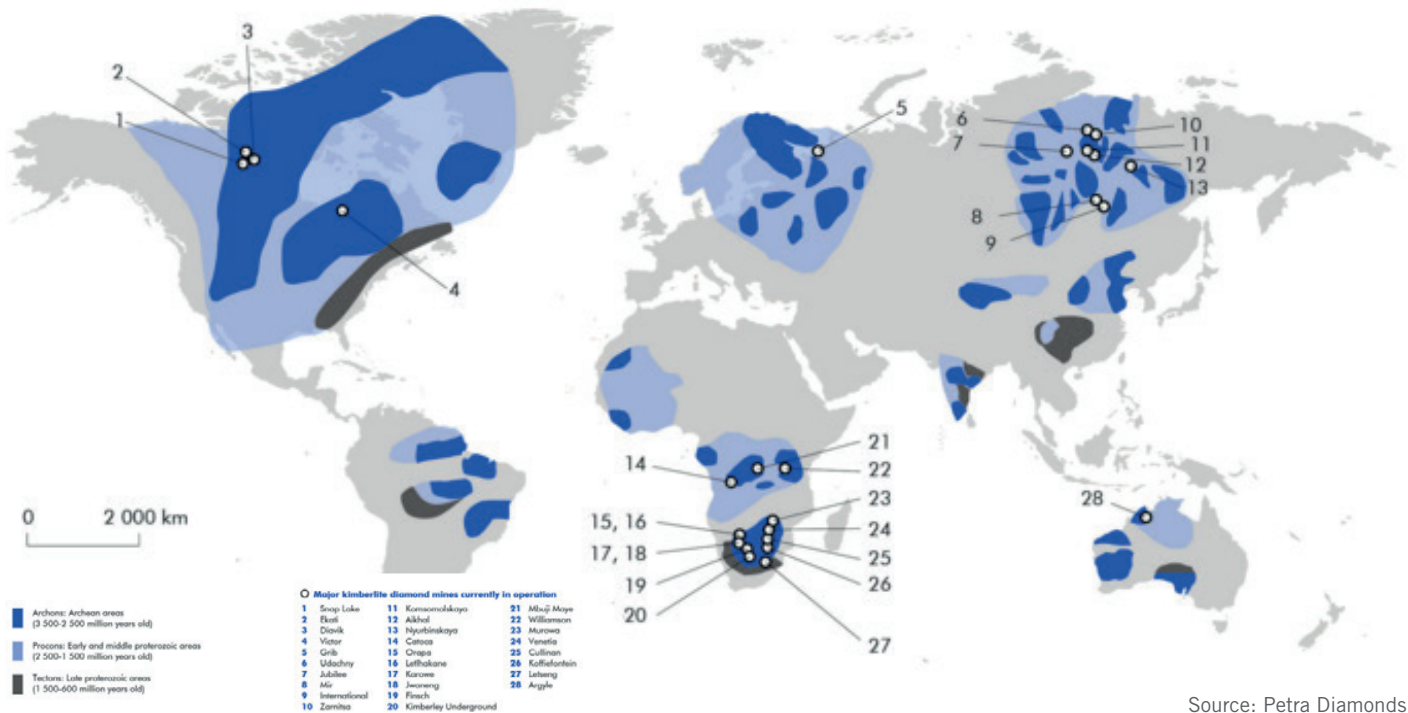
Source: gia.edu

Volcanic activity serves as the conduit by which diamonds emerge on or near the surface of the Earth. The entire process is believed to take from 1 billion to 3 billion years and as the magma which acts as the transport mechanism for the diamonds cools, it forms an igneous rock known as a kimberlite. Other types of magma which can host diamonds are lamproite and lamprophyre. More broadly, “kimberlite” refers to a kimberlite “pipe” or a vertical igneous structure which is known to host diamonds. Kimberlite became part of the popular lexicon during a diamond staking rush in South Africa in the 1860s.



Source: Geology.com

A schematic of the kimberlite diamond mines in existence today is shown below:



Source: Petra Diamonds

As you can see, the most prolific of the world's diamond mines are located in Russia, Southern Africa, and Canada though exploration occurs in many other parts of the world.

### SUPPLY, DEMAND, AND PRICING

As demand for natural diamonds is based primarily on lifestyle choices (engagements, anniversaries), the demand trends ought to be reasonably predictable and track GDP and personal income growth. The main engine of demand will come from emerging markets in the coming years supported by steady demand from western economies. The International Monetary Fund forecasts GDP growth in advanced economies for 2015 and 2016 at 2% and 2.2%. Developing economies are forecast to grow at a rate of 4% and 4.5% in 2015 and 2016. Though this forecast is short term, it does validate the idea that despite the global slowdown, the developing world will lead global growth prospects and diamond demand along with it.



Deposit Name	Owner(s)	Year of Discovery	Country	Status	Est. First Production	Avg Annual Production (Mcts)
Grib	Lukoil Oil Company	1997	Russia	Development	2014	4
Botuobinskaya	ALROSA	1994	Russia	Development	2015	2
Karpinsky-1	ALROSA	1982	Russia	Development	2015	1
Gahcho Kue	De Beers/Mountain Province	1995	Canada	Permitting	2016	5
Renard	Stornoway/Newmont	2001	Canada	Permitting	2017	2
Star-Orion South	Shore Gold	1988	Canada	Feasibility	2017+	2
Bunder	Rio Tinto	2004	India	Pre-feasibility	2017+	2
Ghaghoo	Gem Diamonds	1981	Botswana	Construction	2014	0.4

Source: DeBeers; Data as of May 2014

A current threat to diamond demand growth concerns China. As Chinese authorities have cracked down on corruption and ostentatious shows of wealth, diamond demand has moderated. Watching this dynamic closely will be key to accurate forecasting. The damage is already apparent in financial earnings reports released by publicly traded diamond producers. As an example, Dominion Diamond recently reported a 31% decrease in sales in volume terms and a 25% decrease in the average price per carat during the third quarter. The blame was placed on slower than anticipated Chinese demand. Other producers have voiced similar sentiments.

Nonetheless, ALROSA has offered a view of the diamond market to 2024, with supply forecast to increase by a CAGR of 1% between 2015 and 2024, with a 3% CAGR to 2019 due to increased production from mines in Russia, Australia, and Canada and a 2% decline in production from 2019 to 2024 due to mine depletions in Australia and Canada. This generally flat production profile is contrasted with a forecast 5% demand CAGR between 2015 and 2024.

One's view of the diamond market should take into account current and looming supply on the market. With the market balanced currently, we find it interesting to note that diamond exploration spending today is approximately half of what it was in 2007, then approximately \$1B. According to De Beers, \$7 billion has been spent on diamond exploration since 2000. Given the forecast decrease in production commencing around 2019, the dearth of exploration

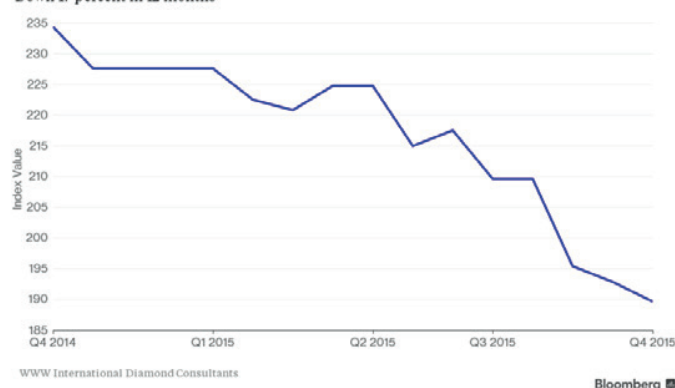
funding and long lead times necessary to build new mines dictate that higher diamond prices may loom in the future.

According to De Beers, here is the pipeline of diamond projects, forecast to add over 18 M carats of supply to the market in the coming years.

The twin headwinds of excess supply and muted demand show up in the diamond price in 2015, down approximately 19%.

#### Dropping Diamond Prices

Down 17 percent in 12 months



As is the case with many other commodities, those diamond deposits with the lowest cost of production can survive and thrive in the current pricing environment. Gem quality diamonds command a premium price and so those deposits which can demonstrate superior economics based on a long mine life of gem quality stones hold out the potential



for positive returns. Obviously, lower diamond prices will affect all parts of the supply chain and this must factor into your capital allocation decision.

## SWOT ANALYSIS

While SWOT analyses can be valuable, they can also be slightly dangerous as one individual may see a strength as a weakness and vice versa. Nonetheless, we include a brief analysis of the diamond industry:

<b>Strengths</b> <ul style="list-style-type: none"> <li>Longstanding emotional appeal</li> <li>Well developed industry and supply chain</li> <li>Demand growth in line with global GDP and personal income growth</li> </ul>	<b>Weaknesses</b> <ul style="list-style-type: none"> <li>Lack of pricing transparency</li> <li>Current excess supply</li> <li>Lack of avenues of demand</li> </ul>
<b>Opportunities</b> <ul style="list-style-type: none"> <li>Lack of new discoveries</li> <li>Rising living standards in Emerging Markets</li> <li>Social awareness</li> </ul>	<b>Threats</b> <ul style="list-style-type: none"> <li>Synthetic diamonds</li> <li>Resource nationalism</li> <li>Crackdown in China on excessive consumption</li> <li>Rising mining costs</li> <li>Stagnant economic growth</li> </ul>

Lower diamond prices will affect all parts of the supply chain and this must factor into your capital allocation decision.

## INDUSTRY PARTICIPANTS

As is the case with any commodity, the diamond industry maintains its own value chain with diamond exploration/developers, diamond producers, wholesalers, polishers, and commercial outlets each playing their own role. A search we conducted on Bloomberg showed over 200 distinct deposits owned by numerous diamond mining and exploration plays

Select diamond producers with most recent six months results:

Company	Ticker	Market Cap	Carats Produced	EBITDA	EBITDA/Carat
De Beers	N/A	N/A	15,628,000	792,000,000	£50.68
ALROSA	ALRS	371.93 B RUB	18,000,000	70,500,000,000	3,916.67
Rio Tinto	RIO	37.71 B GBP	8,851,000	413,000,000	\$46.66
Petra Diamonds	PDL	339.03 M GBP	1,601,069	214,800,000	\$134.16
Lucara Diamonds	LUC	820.27 M CAD	175,791	28,400,000	\$161.56
Dominion Diamonds	DDC	706.39 M USD	3,183,000	121,200,000	\$38.08
Gem Diamonds	GEMD	142.38 M GBP	85,302	46,100,000	£540.43

Data as of Dec 7, 2015; Source: Bloomberg, Company Documents

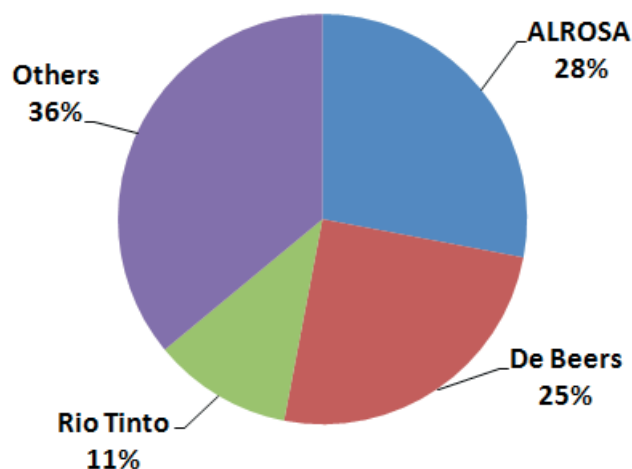


around the world. This may seem like a lot, but given the slim margin for success in the diamond business, the steady demand, and the need for existing producers to “replace mined carats”, this seems about right.

While diamond prices have been under pressure recently, this obviously lays bare the need to consider multiple parts of the value chain when deploying capital as low prices will affect different parts of the value chain more than others. As is the case with any capital allocation decision, the balance between risk and return is crucial. Here is an abbreviated list of the diamond industry producers and developers.

As De Beers is not a publicly traded entity, determining a valuation is a challenging exercise. Nonetheless, the recent struggles faced by Anglo American, who owns 85% of the company, have laid bare the possibility of monetizing its stake in De Beers through an IPO or other means. A recent article from Bloomberg quoted an HSBC analysis which calculates Anglo's stake in De Beers at \$10 billion meaning a full market value of De Beers would be just under \$12 billion.

**2014 Market Share**

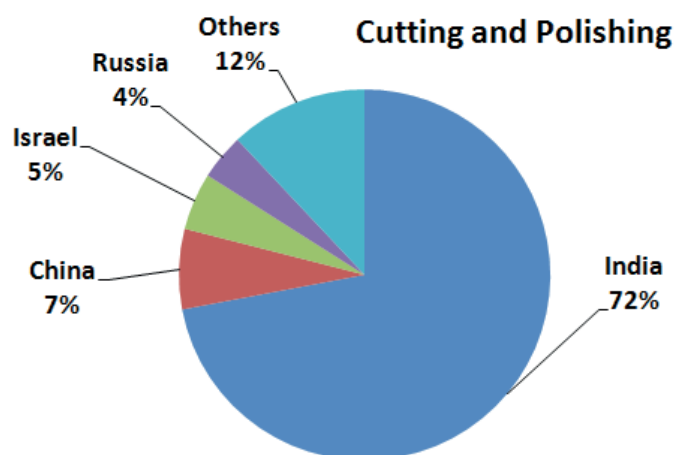


### Select exploration and development companies:

	Ticker	Market Cap
Arctic Star Exploration	ADD	1,300,000 CAD
Dunedin Ventures	DVI	2,350,000 CAD
Tango Mining	TGV	1,530,000 CAD
Firestone Diamonds	FDI	51,420,000 GBP
Kennady Diamonds	KDI	128,530,000 CAD
Shore Gold	SGF	51,830,000 CAD
Peregrine Diamonds	PGD	40,990,000 CAD
Mountain Province	MPV	429,050,000 USD
Stornoway Diamonds	SWY	549,230,000 CAD

Data as of Dec 7, 2015; Source: Bloomberg, Company Documents

There also exists an entire cutting and polishing industry mentioned earlier in this report. The breakdown globally:



Source: ALROSA

The final piece of the diamond value chain is the retail sector and includes dozens of names including Tiffany & Co (TIF:NYSE) however a more extensive list is out of the scope of this report as hundreds of retail outlets exist to satisfy varied customer tastes. Much of the \$80 billion valuation of the diamond industry exists here.

## CONCLUSION

Diamonds aren't immune from the forces of supply and demand, but the asset class does stand out somewhat relative to other commodities with respect to its emotional appeal. While the major producers are under pricing pressure due to slack demand, this may not always be the case and therein exists an opportunity along the diamond supply chain. Additionally, mining costs are on the increase generally which means that new diamond mines may not come online as expected. As demand for gem quality diamonds remains steady over the next several years, a lack of funding for exploration to replace mined carats is supportive of higher prices.

As demand for gem quality diamonds remains steady over the next several years, a lack of funding for exploration to replace mined carats is supportive of higher prices.

In the current pricing environment for diamonds, prudence dictates that one should focus only on what they can control. For this reason, lowest production cost or finding costs arguably offer the best value in the diamond space until prices recover. Put another way, those explorers or producers with "the goods", high quality long-lived deposits, will be well positioned to benefit from any future turnaround in the diamond market.

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# Global Diamond Production Forecasted at 137M Cts in 2016

By Paul Zimnisky on February 1, 2016,  
on [PaulZimnisky.com](http://PaulZimnisky.com)

A concerted effort by De Beers and Rio Tinto (LSE: RIO) to limit global diamond supply is forecast to be offset by stable Russian production, new mines, and production increases by Dominion Diamond Corp (TSX: DDC) and Petra Diamonds (LSE: PDL).

Despite De Beers and Rio's efforts, 2016 global diamond production by-volume is forecast to be 137 million (M) carats, or +1.3% over 2015 estimates. However, the impact of strategic production cuts are more apparent on a value-produced basis, as curtailments at De Beers' high-value mines in particular, and lower diamond price offerings across the industry, reduce global diamond production by-value forecasts to \$12.6 billion in 2016, or -10.0% relative to 2015 estimates.

## De Beers

Industry leader De Beers, representing >30% of global marketshare, strategically reduced production at multiple mines in 2015 and completely suspended production at others, cutting total production by approximately 7% in 2015 to 29M carats.

Tailings operations offer the greatest operating flexibility, and De Beers strategically reduced tailings production at Orapa in Botswana last year before subsequently reducing production at Venetia in South Africa, off-shore operations in Namibia, and putting Snap Lake in Canada and Damtshaa in Botswana on care and maintenance, in an effort to balance global diamond supply/demand. De Beers also sold its South African Kimberly tailings mine and related operations in December for \$7.2M to a joint venture between Ekapa mining (private) and Petra diamonds. De Beers is targeting 26-28M carats in 2016, compared to 29M in 2015, and 33M in 2014, -6.9% and -18.2%, respectively.



*Haul truck at De Beers' Jwaneng mine in Botswana, the most valuable diamond mine in the world. Source: De Beers Group*



*Underground at ALROSA's International mine, Russia. Source: ALROSA*





## ALROSA/LUKoil

While De Beers cut production, ALROSA (RTS: ALRS), which has a similar marketshare, actually increased production in 2015 to 38M carats, +6% YoY. Instead of reducing production, ALROSA instead held back supply by only selling 78% of 2015 production.

Incremental production from ALROSA primarily came from new mine Botuobinskaya and ramping-up sophomore mine Karpinskogo-1 to full-production.

In addition, production at the company's largest mine, Jubilee, which represents ~25% of the company's output, increased 3.1% as higher grade was achieved at the ore body's central lobe. Production decreased at the company's second largest mine Nyurbinskaya as the mine's processing plant was shared with ore from the Botuobinskaya mine and the Nyurbinskaya placer operations.

ALROSA has indicated that they do not plan to reduce production unless market conditions get substantially worse. The company is targeting production growth going forward, with average production of ~40M carats annually over the next 10 years.

Also in Russia, LUKoil (RTS: LKOH) sold 2.3M carats in 2015 from its Grib mine, which commenced production in June 2014. With a reserve of 75M carats and full production ramping up to 4.5M carats annually, starting in 2016, the life of mine is 15-17 years.

It seemed likely that the Grib mine would have been sold by now, as the „oil major“ indicated interest in selling the non-core asset during development, however, the company has since indicated that the most likely suitor, ALROSA, has not been willing to pay what they perceive as fair value for the mine.

## Rio Tinto

Rio's Argyle mine in Australia, the world's largest diamond mine by production volume, realized a >45% YoY production increase in 2015 after completion of a multi-year underground mine development project. This was despite strategically halting processing



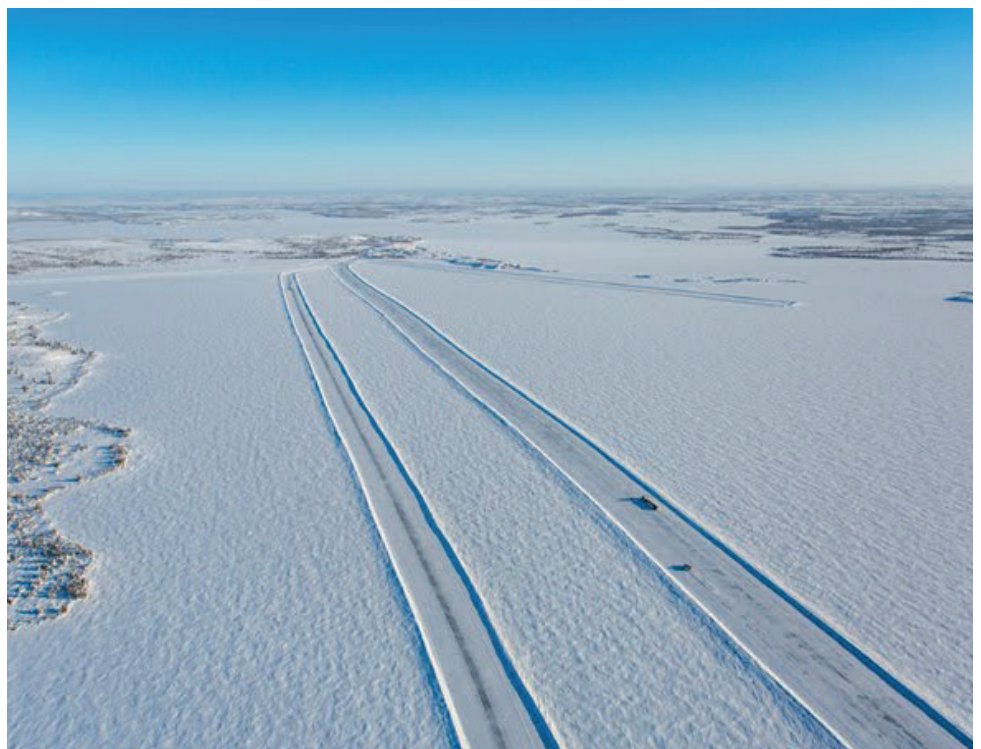
*Rough diamonds from LUKoil's Grib Mine, Russia. Source: Grib Diamonds*

in December in an effort to “manage inventory levels” amidst a softer global diamond market. Argyle produced 13.5M carats in 2015 versus 9.2M carats in 2014.

In June 2015, Rio sold its 78% stake in the Murowa mine in Zimbabwe to partner RioZim (ZSE: RIOZ), which now owns 100% of the mine. A new diamond mining tax structure in

Zimbabwe and concerns of forced government consolidation of the country's diamond miners most likely influenced the company's decision to leave the country.

Rio now only holds two operating diamond mines, 100% of Argyle and 60% of Diavik in Canada. The company is targeting 21M carats in 2016.



*Lockhart Lake ice road, Diavik mine, North West Territories, Canada.*

*Source: Rio Tinto*





## Dominion Diamond

Dominion Diamond is Rio's 40/60 partner in the Diavik mine which has 4 pipes, 3 of which are in operation. The 4th pipe, A-21, has 10M carat reserve and is being developed for \$400M, with first production slated for late 2018.

In 2015, Diavik produced 6.4M carats, which was down 11.5% YoY due to processing plant pauses in the fourth quarter and the absence of stockpiled ore relative to 2014. Dominion's second asset, its ~89% owned Ekati mine, produced an estimated 3.0 million carats in 2015, a 6.3% decrease over 2014, as the company transitioned the mine plan to focus on the Misery Main pipe.

Misery Main is a 14M carat reserve with first production expected in 1H 2016, estimated to contribute 4M carats this year, which would substantially increase the mine's production by 70% to an estimated 5.1M carats in 2016.

Looking further ahead, Ekati's Jay pipe, which is an 85M carat reserve, currently in feasibility study stage, would come online in 2020.

The Pigeon pipe, a 3M carat reserve (10M carat resource) which began production in 2015, would fill the mine's production gap between Misery Main and Jay in 2018 and 2019.

## Petra Diamonds

In calendar 2015, Petra produced 3.2M carats, a 5.3% increase YoY.

The Finsch mine which currently represents >60% of Petra's production by volume, and >40% by value, realized improved production efficiency and higher grades in 2015.

Petra plans to ramp-up company-wide production to 5 million carats by FY 2019 (which ends calendar 2H 2018), led by the Cullinan plant expansion project, which will overtake Finsch as the company's primary producing asset over the next 3 years, as well as expansion plans to double production at both Kofflefontein and Williamson by 2017.



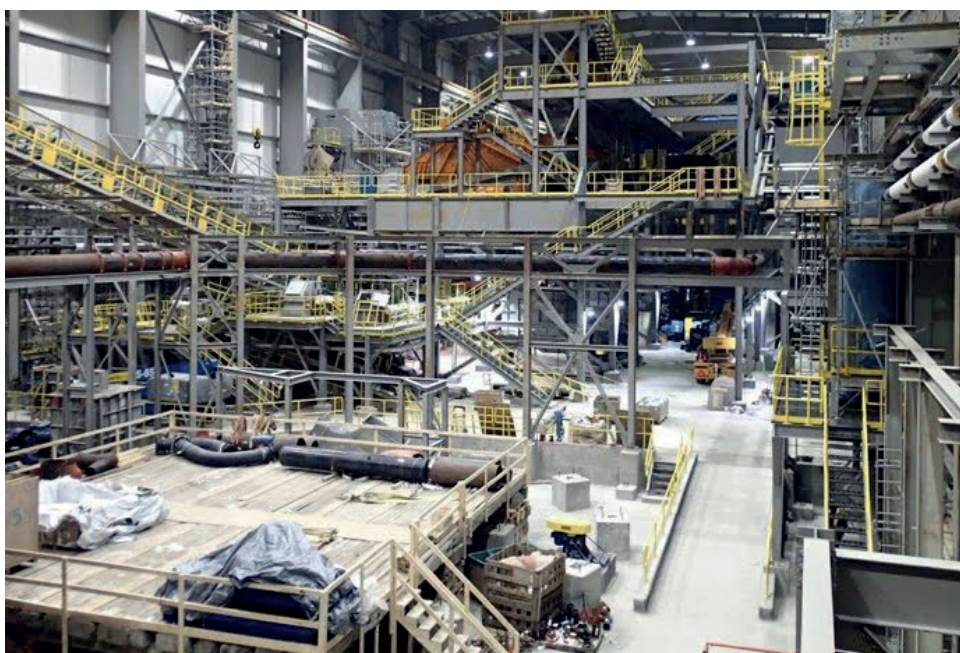
*The Cullinan mine in South Africa. Source: Petra Diamonds*

## Marange and Artisanal Production

The Marange fields in Zimbabwe were at one point one of the largest commercial alluvial diamond mining operations in the world, peaking with production of approximately 12 million carats in 2012. However, production has rapidly fallen since as most of the easily minable gravel has been depleted, leaving harder conglomerate rock which requires substantial capital investment to produce. Production in 2015 was an estimated 4.5 to 5 million carats, with production estimated to further con-

tract in 2016 as the operators have yet to commit the capital necessary maintain output levels of previous years.

The Democratic Republic of Congo continues to represent the world's largest source of artisanal diamond production by volume, representing an estimated >5% of global output, however the diamonds continue to be the lowest valued in the world at <\$10/ct. Angola remains the second largest source of artisanal production representing 2-4% of global output by volume, but at a much higher average price-per-carat than the DRC at >\$100/ct.



*Processing plant progress at Gahcho Kué project, North West Territories, Canada. Source: Mountain Province Diamonds*





## New Mines and Development Projects

In Canada, Gahcho Kué (51% De Beers/49% Mountain Province Diamonds, TSX: MPV), the world's largest new diamond mine, is on pace to commence production in Q3 2016.

As of December, construction was over 80% complete, with the focus over the next 6 months on commissioning the primary crusher and plant. Overburden mining has also begun. 100 skilled workers were hired for the project from Snap Lake after the mine was put on care and maintenance in December.

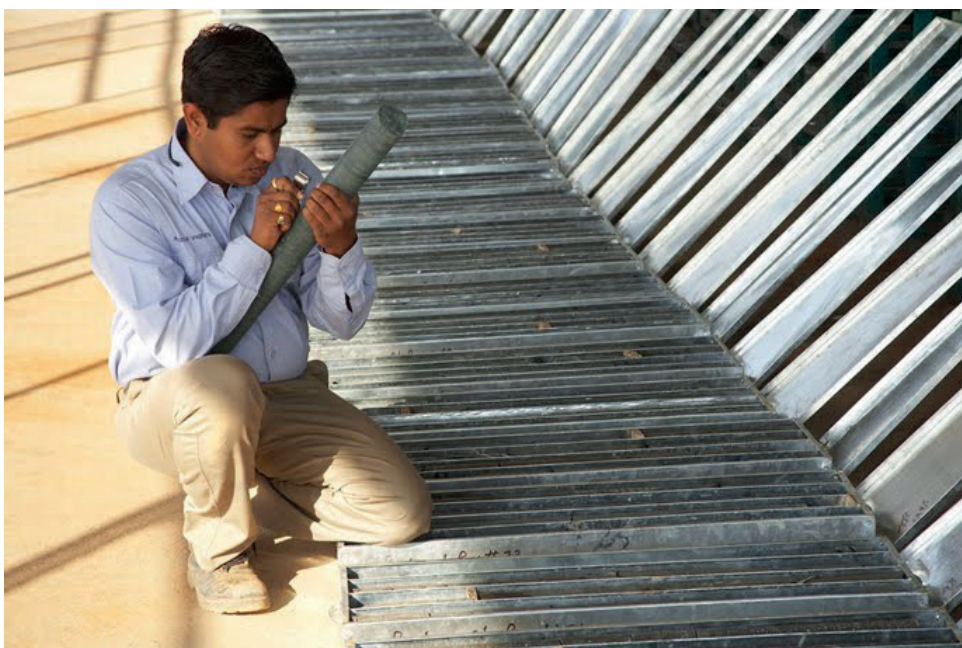
Also in Canada, Stornoway's (TSX: SWY) wholly owned Renard project is ahead of schedule with commissioning on pace to begin in the second half of 2016, with commercial production set for Q2 2017.

Production at Firestone Diamond's (LSE: FDI) Liqobong mine is expected in Q4 2016, slightly behind original schedule, due to weather and overburden challenges. The project is fully financed through production ramp-up in 2017, when production is estimated to reach 1M carats a year. Liqobong was discovered by De Beers in the 1950's.

At Kimberley Diamonds' (ASX: KDL) Lerala mine, tailings dam construction has commenced, and first production is scheduled for April 2016. Lerala will target production of ~400,000 carats per year. The asset was acquired by Kimberly Diamonds in February 2014 through the acquisition of Mantle Diamonds Ltd. Initial geological work at the property was done by De Beers and later DiamonEx, with trial mining done by Mantle Diamonds.

DiamondCorp's (LSE: DCP) Lace mine is expected to ramp up to full production in the second half of 2016. The mine is estimated to produce a half-million carats annually until 2040, with peak production hitting 540,000 carats. 7,500 carats were produced through end of last year's commissioning, with a standout 22-carat, H-color diamond that will be cut into an 8-carat emerald, selling for \$110,000.

Rio Tinto's Bunder project in India is a \$500M capex project, currently pending



*Drill core from Rio Tinto's Bunder project, Madhya Pradesh, India. Source: Rio Tinto*

construction permits, of which India is notoriously slow for granting. India has a very early history of diamond mining but currently is only involved in the mid-stream segment of the industry, where it represents over 80% of global market share by volume of the segment. In 2015, Paragon Diamonds (LSE: PRG) was actively seeking financing to bring it's Lemphane project in Lesotho into production and also to close a pending acquisition of Lucara's (TSX: LUC) Mothae asset. However, Paragon's failure to secure financing by the end of last year resulted in the official termination of its agreement with Lucara, and further delayed the progression of Lemphane, which has an estimated 10 year mine life based on annual production of <50,000 carats.

### Notes:

Projects highlighted in blue are not yet in production, and are sorted by estimated production commencement date.

**(A):** Denotes alluvial deposit

**C&M:** Denotes mine is currently under care and maintenance and production is suspended

**Project Name:** Name of project

**Project Location:** Location of project by country

**Production Carats:** 2016 estimated production for project in terms of carats produced

**Production US\$ MM:** 2016 estimated production for project in terms of millions of U.S. dollars generated. Calculated as (estimated production in carats \* estimated average carat price), represented in millions of dollars (i.e \$1,877 = \$1,877,000,000)

**LOM Years:** Life of mine in years of remaining production. Calculated as (estimated reserve / estimated annual production)

**MOR:** Middle Orange River, South Africa

**LOR:** Lower Orange River, South Africa/Namibia

**Project Ownership:** Number corresponding with detail of project ownership below:

- [1] De Beers (50%), govt. of Botswana (50%)
- [2] ALROSA (100%)
- [3] RioTinto(60%), DominionDiamondCorp(40%)
- [4] De Beers (50%), govt. of Botswana (50%)
- [5] De Beers (50%), govt. of Namibia (50%)
- [6] Govt. of Angola (32.8%), ALROSA (32.8%), LLI (18%), Odebrecht (16.4%)
- [7] Dominion Diamond Corp (88.9% of Core Zone, 65.3% of Buffer Zone), Stewart Blusson (11.1% of Core Zone), Archon Minerals Ltd (34.7% of Buffer Zone)
- [8] LUKoil (100%)
- [9] Rio Tinto (100%)
- [10] ALROSA (100%)
- [11] ALROSA (100%)
- [12] ALROSA (100%)
- [13] ALROSA (100%)
- [14] ALROSA (100%)
- [15] GemDiamondsLtd(70%),govt.ofLesotho(30%)
- [16] De Beers (100%)
- [17] De Beers (74%), Ponahalo Investments (26%)
- [18] ALROSA (100%)
- [19] Lucara Diamond Corp (100%)
- [20] ALROSA (100%)
- [21] ALROSA (100%)
- [22] Petra Diamonds Ltd (74%), Senakha (21%), Petra Employee Trust (5%)
- [23] Various owners, see detail here
- [24] De Beers (51%), Mountain Province Diamonds (49%)





- [25] ALROSA (100%)  
 [26] ALROSA (Severalmaz) (100%)  
 [27] De Beers (50%), govt. of Namibia (50%)  
 [28] De Beers (50%), govt. of Namibia (50%)  
 [29] Beny Steinmetz Group/OCTÉA Ltd (100%)  
 [30] De Beers (74%), Ponahalo Investments (26%)  
 [31] ALROSA (Severalmaz) (100%)  
 [32] Ekapa Mining (50.1%), Petra Diamonds (49.9%)  
 [33] Petra Diamonds Ltd (74%), Thembinkosi Mining Investments (14%), Petra Employee Trust (12%)  
 [34] ALROSA (100%)  
 [35] De Beers (50%), govt. of Botswana (50%)  
 [36] Trans Hex (100%)  
 [37] Petra Diamonds Ltd (74%), Sedibeng (26%)  
 [38] Rockwell Diamonds Inc & various owners  
 [39] Petra Diamonds Ltd (75%), govt. of Tanzania (25%)  
 [40] Namakwa Diamonds (62.5%), govt. of Lesotho (25%), local investors (12.5%)  
 [41] Endiama (39%), Trans Hex (33%), local investors (28%)  
 [42] DiamondCorp (74%), Sphere (13%), Shanduka (13%)  
 [43] De Beers (50%), govt. of Namibia (50%)  
 [44] Lucapa Diamond Co (40%) Endiama (60%)  
 [45] Gem Diamonds Ltd. (100%)  
 [46] RioZim (100%)  
 [47] ALROSA (100%)  
 [48] Petra Diamonds Ltd (74%), Re-Tang (26%)  
 [49] Firestone Diamonds (75%), govt. of Lesotho (25%)  
 [50] ALROSA (100%)  
 [51] Kimberley Diamonds Ltd 100%  
 [52] ALROSA (100%)  
 [53] Diamcor Mining (70%), Nozala Investments (30%)  
 [54] De Beers (100%)  
 [55] De Beers (50%), govt. of Botswana (50%)  
 [56] Lucara Diamond Corp (75%)\*, govt. of Lesotho (25%) \*Pending sale to Paragon  
 [57] Trans Hex (100%)  
 [58] Mwana Africa Plc (65%), Naka Diamond Mining (35%)  
 [59] Petra Diamonds Ltd (74%), Sedibeng (26%)  
 [60] Firestone Diamonds (90%), local investors (10%)  
 [61] Stornoway Diamond Corp (100%)  
 [62] ALROSA (100%)  
 [63] Rio Tinto (100%)  
 [64] Star: Shore Gold (100%); Orion: Shore Gold (67%), Newmont Mining Corp (33%)  
 [65] Peregrine Diamonds Ltd (100%)  
 [66] Merlin Diamonds (100%)  
 [67] Paragon Diamonds (80%), govt. of Lesotho (20%)

**Note: De Beers is 85% owned by Anglo American plc (LSE: AAL) and 15% owned by the Government of the Republic of Botswana.**

This article was published in the [London Mining Journal](#).

As of February 1, 2016

Mine	Location	LOM	Owner	Est. Production in 2016	
				Carats	US\$ Millions
Jwaneng	Botswana	16	[1]	10,500,000	^\$2,048
Jubilee	Russia	10	[2]	9,200,000	\$966
Diavik	Canada	7	[3]	7,000,000	\$805
Orapa	Botswana	19	[4]	8,000,000	\$760
Debmarmine Namibia	Namibia (Offshore)	10	[5]	1,400,000	\$700
Catoca	Angola	30	[6]	6,500,000	\$553
Ekati	Canada	15	[7]	5,100,000	\$520
Grib	Russia	17	[8]	4,500,000	\$450
Argyle	Australia	8	[9]	16,800,000	\$420
Nyurbinskaya	Russia	9	[10]	4,500,000	\$405
Almazay-Anabara Placers (A)	Russia	6	[11]	4,400,000	\$396
Udachnaya (Pit & UG)	Russia	31	[12]	4,000,000	\$360
International	Russia	8	[13]	4,000,000	\$360
Aikhal	Russia	9	[14]	3,300,000	\$297
Letšeng	Lesotho	16	[15]	110,000	\$249
Victor	Canada	5	[16]	550,000	\$248
Venetia	South Africa	>35	[17]	2,000,000	\$240
Nizhne-Lenskoye Placers (A)	Russia	N/A	[18]	2,600,000	\$234
Karowe	Botswana	15	[19]	350,000	\$221
Mir	Russia	>35	[20]	2,200,000	\$198
Nyurba Placers (A)	Russia	9	[21]	2,200,000	\$198
Finsch	South Africa	22	[22]	2,400,000	\$185
Marange (A)	Zimbabwe	1	[23]	3,500,000	\$158
Gahcho Kue	Canada	17	[24]	1,000,000	\$149
Botubinskaya	Russia	>35	[25]	1,500,000	\$135
Karpinskogo-1	Russia	22	[26]	1,200,000	\$108
Mining Area 1 LOR	Namibia	4	[27]	180,000	\$96
Elizabeth Bay	Namibia	2	[28]	180,000	\$96
Koidu	Sierra Leone	23	[29]	300,000	\$90
Voorspoed	South Africa	12	[30]	650,000	\$78
Arkangelskaya	Russia	>35	[31]	750,000	\$68
Kimberly (Tailings)	South Africa	4	[32]	700,000	\$67
Cullinan	South Africa	>35	[33]	580,000	\$63
Mirny Placers (A)	Russia	N/A	[34]	630,000	\$56
Letlhakane	Botswana	11	[35]	500,000	\$48
Baken + Other LOR (A)	South Africa	12	[36]	50,000	\$46
Kimberly (Underground)	South Africa	11	[37]	200,000	\$45
MOR Properties (A)	South Africa	10	[38]	<50,000	\$44
Williamson	Tanzania	23	[39]	170,000	\$41
Kao	Lesotho	1	[40]	80,000	\$37
Somilua (A)	Angola	>35	[41]	100,000	\$30
Lace	South Africa	25	[42]	230,000	\$29
Orange River	Namibia	8	[43]	50,000	\$28
Lulo (A)	Angola	N/A	[44]	<50,000	\$27
Ghaghoo	Botswana	34	[45]	150,000	\$25
Murowa	Zimbabwe	16	[46]	200,000	\$18
Zarnitsa	Russia	>35	[47]	200,000	\$18
Koffiefontein	South Africa	20	[48]	57,000	\$18
Liqhobong	Lesotho	15	[49]	100,000	\$16
Komsomolskaya	Russia	11	[50]	150,000	\$14
Lerala	Botswana	10	[51]	100,000	\$7
Udachniy Placers (A)	Russia	N/A	[52]	50,000	\$5
Krone-Endora (A)	South Africa	10	[53]	<50,000	\$4
Snap Lake	Canada	12	[54]	C&M	C&M
Damtshaa	Botswana	18	[55]	C&M	C&M
Mothae	Lesotho	N/A	[56]	C&M	C&M
Namaqualand	South Africa	N/A	[57]	C&M	C&M
Klipspringer	South Africa	N/A	[58]	C&M	C&M
Helam	South Africa	N/A	[59]	C&M	C&M
BK11	Botswana	N/A	[60]	C&M	C&M

Development Projects				Anticipated Production	Start Date
Renard	Canada	26	[61]	1,700,000	Q2 2017
Verkhne-Munskoye	Russia	20	[62]	1,050,000	2019
Bunder	India	39	[63]	700,000	TBD
Star-Orion South	Canada	20	[64]	1,700,000	TBD
Chidliak	Canada	N/A	[65]	1,000,000	TBD
Merlin	Australia	11	[66]	<50,000	TBD
Lemphane	Lesotho	10	[67]	<50,000	TBD

**2016 Global Est. Production (Carats):** **137,200,000**  
**YoY Difference (2016/15):** **+1.3%**

**2016 Global Est. Production (Value):** **\$12,600,000,000**  
**YoY Difference (2016/15):** **-10.0%**

**2016 Est. Global Average Price Per Carat:** **\$92**

\*Mines itemized above are estimated to represent 84% of global supply by volume, "Global Est. Production" figures are adjusted to account for 100% of global supply.

Source: Company data, Government data, Kimberly Process, Paul Zimnisky analysis. Please read disclosure below.



# Mining's Intangibles: The NWT tries to gauge social impacts of its largest industry

By Greg Klein for [ResourceClips.com](http://ResourceClips.com)  
on March 18, 2016

Does diamond mining affect rates of STDs? Tuberculosis, family violence, teen pregnancy or suicide? The Northwest Territories government actually [tried to find answers](#) to those questions and others.

An exercise that arose out of socio-economic agreements with the territory's diamond miners, many of its results were—not surprisingly—inconclusive. Even so, the report offers perspective on mining-related issues that are often overlooked.

Two diamond operations comprise the sum total of NWT mining now that a third, De Beers' Snap Lake, went on care and maintenance last December. That shutdown followed **North American Tungsten's (TSXV:NTC)** C&M decision for its Cantung mine. But during the last fiscal year, the three diamond mines paid taxes of \$44 million to the territory, an 11% increase over the previous year. Miners also pay the territory royalties.

Up to 2013 the territory diverted \$39 million in diamond royalties to three native governments with settled land claims, according to figures supplied by the NWT and Nunavut Chamber of Mines. In 2015, the NWT shared nearly \$6.3 million with nine native groups that signed the devolution agreement. The territory says it collected \$63 million in diamond royalties in 2014 to 2015, half of which went to the feds.

In 2014 diamond mines created over 3,200 person-years of employment and paid more than \$653 million to northern businesses, about 33% of which were aboriginal-owned. Those outcomes can be quantified. What's harder to assess are changes for better or worse on individuals, communities and culture

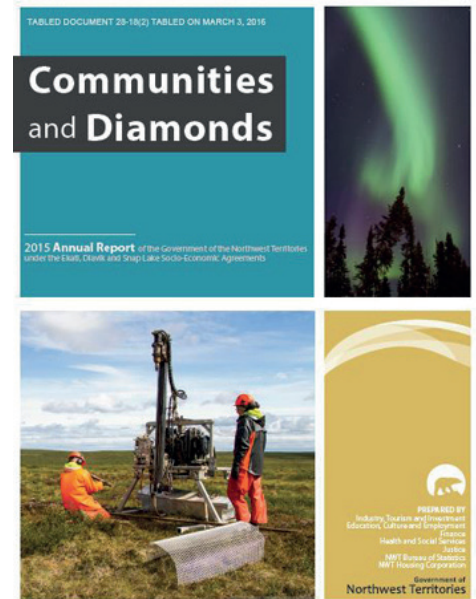
since diamond mining started in 1998. Nevertheless, the NWT tried, looking at a range of factors affecting Yellowknife and seven small communities, all roughly 250 kilometres southwest of the Lac de Gras diamond camp.

We read about the use of aboriginal languages (declining in the smaller communities but showing a slight increase in Yellowknife and elsewhere), suicide (especially difficult to track on numerical trends), teen births (declining), sexually transmitted infections (increasing in the smaller communities but not Yellowknife), TB (little change), family violence (a series of spikes and declines in the smaller communities, relatively flat in Yellowknife), school achievement (significant improvement) and so on. Again and again, the report concedes that it can't link those issues with mining.

So what's the point of the study? If anything, it demonstrates that communities expect mining to provide intangible benefits as well as material rewards.

Those communities also show concern about how a large industrial operation might affect their society. Although mining's by far the territorial economy's largest private sector driver, companies can't betray complacency about their importance.

That too was demonstrated by statements miners made during their environmental assessments. In addition to singing the praises of their proposals, companies acknowledged potential disadvantages, for example the possibility of "increasing stress and related alcohol abuse, by alienating people from traditional lifestyles and by increasing the pace of change in communities."



[2015 Annual Report of the Government of the Northwest Territories: "Communities and Diamonds"](#)

That comment came from BHP Billiton, which later sold its share of Canada's first diamond mine to **Dominion Diamond TSX:DDC**. Holding a majority stake in Ekati and 40% of a JV with **Rio Tinto NYE:RIO** in Diavik, the company looms large over NWT mining. With pre-feas complete on [Ekati's Sable kimberlite](#), the pipe's scheduled to begin mine construction next year and possible production in 2019. Diavik's fourth pipe, meanwhile, has production slated for 2018.

But the biggest diamond development story in the NWT, and indeed the world, is Gahcho Kué. The 51%/49% De Beers/**Mountain Province Diamonds TSX:MPV** JV has surpassed 87% completion, staying on schedule for production in H2 this year. Barring a drastic decline in demand, diamonds will likely remain the jewels of the NWT economy.





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