

Marchese of Texas Mineral Resources on the 'extremely lucrative returns' to extract scandium from coal

August 11, 2016 – [Texas Mineral Resources Corp.](#) (OTCQX: TMRC) is an exploration-stage mining company with its flagship property, Round Top Mountain, near Sierra Blanca in Hudspeth County, Texas. The Texas Bureau of Economic Geology first recognized the unique geology of Round Top Mountain some 25 years ago. But few uses existed then for the rare earth elements found in the mountain. Now times have changed and one example of the grave security importance of rare earth elements is the 920lbs of rare earths used in each F-35 Joint Strike Fighter jet.

In recent developments, Texas Mineral Resources Corp. has announced

- That it has successfully completed a demonstration-of-concept project to separate and refine specific high-purity rare earth elements for the United States Defense Logistics Agency's Strategic Materials Division in conjunction with its joint venture partner K-Technologies, Inc.
- That it had signed a memorandum of understanding with a well-established privately-held Pennsylvania coal company. The MOU gives TMRC a six-month period of time to further evaluate the potential to finance, recover and produce scandium and other rare earth byproducts from their properties.

In this interview with InvestorIntel reporter Fred Cowans, Texas Mineral Resources Chairman Anthony Marchese discusses:

- His company's new strategies.
- How the plan to extract scandium from the overburden of a coal project, as well as the fly ash after the coal is burned, could provide extremely lucrative returns.
- How Round Top Mountain offers the lowest capex rare earths project in the world.
- Why a big mistake is being made by the U.S. in not developing own rare earth supply. (He believes such development is only a question of time.)

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InvestorIntel Report: Galaxy a lithium star; Nevada Zinc bullish; Coal defies critics



Only a very small percentage of lithium exploration companies will actually ever get to the stage of having something that represents a potential commercial resources – not my words but those of Tim Richards of the Perth office of global accounting firm Deloitte. That comment came as part of a special report compiled for the annual Diggers and Dealers shindig (Australia's more modest version of PDAC) that opened Monday in Kalgoorlie, the West Australian gold mining centre.

Before we get to Richard's comments, we should note the mention in the report compiled for Diggers and Dealers

concerning InvestorIntel member [Galaxy Resources](#) (ASX: GXY): it came in top of all West Australian mining stocks for share price growth in the year to June 30. GXY stock rose 1,555%, taking its market capitalization over the 12 month period from A\$40 million to A\$662 million.

Deloitte said it was no surprise that Galaxy took out their high growth award, as the company owns the Mt Cattlin spodumene-tantalite mine in the state. It also has the Sal de Vida lithium and potash brine project in Argentina and the James Bay lithium pegmatite deposit in Quebec.

In his general comments on lithium, Tim Richards makes it clear that he is not totally sold on the more bullish forecasts for lithium demand growth. "Only time will tell whether the take up of the EV is more or less than forecast," he writes. "The potential for 'more' is certainly creating high expectations. Again, while it remains uncertain, these expectations are not without some foundation as the world looks to the use of clean energy."

He cites the following examples of developments:

- In late 2015 a requirement was set in China that all new residential buildings with parking spaces be fitted with charging stations for electric vehicles. Large parking buildings and parking lots are similarly to be equipped.
- The continuing speculation in China about a air pollution levy to narrow the cost between EVs and traditional vehicles.
- In June Norway proposed new laws to ban sales of petrol and diesel vehicles by 2025. This legislation is expected to be enacted by the Norwegian parliament now the major parties have reached agreement.
- In April Germany announced a €1.2 billion incentive package to boost EV sales, offering consumers up to €4,000 in rebates.
- The U.S. government offers rebates for EV purchases of

between \$7,500 and \$10,000.

Zinc bound for better times?

Speaking of vehicles, the Chinese news agency Xinhua reported last week that a record number of cars had been recalled in the first half of the year – 8.8 million of them, in fact. While airbag defects was the major problem area, [Nevada Zinc Corp.](#) (TSXV: NZN) informs us in its latest presentation that low zinc use in automobiles made in China is causing recalls. Zinc is used to galvanize steel on those parts of car bodies that are prone to corrosion. The average car made in America consumes 37lb of zinc. China clearly has to follow suit.

Zinc hit \$2,243/tonne on Friday at the London Metal Exchange. The zinc price has risen more than 50% since its January low following several mine closures. The zinc squeeze is a result of the low level of zinc exploration for several decades; this means there have not been enough projects ready to go as older, worked out mines closed. China's MMG is seeking to acquire zinc deposits in Peru to help meet the projected shortages. Goldman Sachs is projecting a 360,000 tonne global shortage in 2017.

The Lisbon-based International Lead and Zinc Study Group has reported a zinc deficit of 64,000 tonnes for the January-May period.

At present about 6% of steel produced in China is galvanized compared with 19% in the U.S. and China's catch-up is expected to boost demand for the metal. As Nevada Zinc points out, zinc consumption is expected to grow annually around 4% until 2020.

Refined zinc imports by China have been falling of late; this thought to be due to reluctance to pay the higher prices now demanded by producers. But Shanghai-based stocks have been falling since the beginning of June. Capital Economics thinks the recent decline in zinc ore imports is more a symptom of declining mine supply globally rather than weaker Chinese

demand.

Nevada Zinc's 100% owned Lone Mountain project is located within close proximity to Eureka, Nevada. Nevada Zinc's 218 claims at Lone Mountain include the historic Mountain View zinc mine that, between 1942 and 1968, produced more than five million pounds of zinc, 650,000 pounds of lead and 4,000 oz. of silver were mined.

[Last week Nevada Zinc reported](#) assays from new holes at Lone Mountain, one returning 12.38% zinc-lead over 12.19 metres.

Australia, China, Peru, Mexico and the U.S. have the largest zinc reserves and together accounted for 152 million tonnes, or 74.5% of the global total as of January 2016, although zinc ore deposits are found in more than 50 countries.

Coal not quite finished

In the metals and mining business, it always pays to regard forecasts with a little scepticism.

Remember the "coal is finished" gloom-mongering? Well, it seems that China's efforts to reduce overcapacity in its own coal sector, and close uneconomic mines, has seen a boost in the country's imports. Thermal coal prices have been supported by a weaker U.S. dollar and a 25% gain in oil prices since the beginning of the year, according to the Melbourne-based ANZ Bank.

The Australian benchmark thermal coal price has bounced 20% since January to \$61/tonne.

Nuclear energy plans in Japan and China to boost uranium prices in 2014

☒ Uranium prices should improve considerably in 2014; certainly, there are all the prerequisites for a U308 'renaissance'. New reactors are being planned for construction and old ones slated for improvements. The uranium market has welcomed this week's announcement from the Japanese government that nuclear will continue to be included as an essential component of the country's energy mix. Since the Fukushima disaster, the price of uranium has experienced a severe 'correction'.

The spot market price for U308 has fallen to the USD\$ 35/lb. range, losing more than half its value over the past three years. In the medium and long term, Japan's return to the market is certainly reassuring for the future of uranium demand, even if Japanese energy companies are unlikely to rush to purchase beyond that they have already contracted or stockpiled. This suggests that the real demand boost will occur later rather than earlier in the decade. Nevertheless, China's uranium appetite is increasing rapidly. Japan plans to restart 17 reactors and almost half of those may resume activity in 2014 alone, as inspections clear them for safe usage. Meanwhile, China and Japan will inject by themselves, considerable demand into the uranium market. The United States, it may surprise some, also needs uranium imports because domestic supply is about one tenth of its current consumption and because the 1993 US-Russian 'Megatons to Megawatts Program', allowing the US to purchase surplus Russian enriched uranium from military stockpiles ended last year.

As of January 2014, Chinese uranium concentrate imports rose

22 % compared to the average monthly purchases in 2013. Importantly, in 2013, Chinese uranium imports reached a record of 18,968 tons of concentrate, exceeding the current needs of existing nuclear power plants, whose annual consumption is estimated at between 6,500 and 7,500 tonnes. Evidently, China is keen on accumulating uranium stocks and this should come as no surprise to observers of the energy sector. The Chinese government aims to install 50 GW of nuclear capacity by 2017; it now stands at 16.6 GW. Uranium production in China is still undermined by the poor quality of the available ore its slow development activity. Yet, the current price of uranium is too low and Chinese buyers have been exploiting the opportunity to buy and accumulate it at such low prices.

In 2013, Chinese – and others – U308 buyers, were able to pay less than USD\$ 50/lb for the first time since 2006. Since that time, it is estimated that China has accumulated close to 60,000 tons of uranium, which is about the same amount as is mined in a year (overall) and enough to fuel eight years of energy generation at today's rates. It is important, therefore, as also noted by such as analysts as Stefan Ljubisavjevic at the Macquarie Group, that spot uranium prices start rising in order to halt the uranium stockpiling at bargain basement prices before the Chinese government decides that they have enough stockpile. In other words, the analysts suggest that uranium producers slow production rates in order to raise prices. Nevertheless, there are more reassuring statistics for uranium investors, which suggest that slowing down production may be a little drastic.

More than three-quarters of the primary energy consumed on earth still comes from fossil fuels (coal, oil and gas). Due to a sharp drop in prices and rising worldwide energy demand, coal consumption has burst, reaching 6 billion tons per year; the International Energy Agency (IEA) has even predicted that coal will be the world's most consumed fuel for energy in the world – even more so than petroleum. For those of you, in the

northeastern and Midwestern USA and eastern Canada, still concerned about 'global warming' – hit by the coldest winter in years – coal is blamed for producing nearly half of global CO2 energy related emissions, while oil generates 30 % and gas 20%. How many CO2 emissions does nuclear energy produce? A negligible amount. So, rather than browbeat us with warning of cataclysmic events, flooding apocalypses and the end of [skiing as we know it](#), governments should start to consider uranium as the true and effective energy source for the future.

Driven by global economic development, world energy consumption will only grow while renewable energy sources, which now account for just over 15% of world consumption, will be useful but will fulfill a complementary role because they are still a long way from being able to address the ever-increasing and unprecedented thirst for energy fueling economic growth in areas of the world with huge populations that have yet to even tap into the energy grid.

Energy generation will have to double at least over the next few decades 40 years. If you care about CO2 emissions, this increase will ensue only by using sources that do not produce it such as U308. For those who care about plain old soot and dirty air, smog, which lead to actual ailments, sickness and limit breathing, simply consider the current Chinese scenario. This past week, about 15% of China's territory, including the capital, Beijing was suffocating under record levels of pollution exacerbated by increased winter time use of coal. In Beijing, a thick layer of air pollution covered the city last week, prompting taunts and concerns on social networks and one citizen to actually sue the government. The U.S. Embassy in Beijing observed that, the density of soot particles to be 2.5 microns in diameter at a density of 400 micrograms per cubic meter in the capital, which is sixteen times higher than the limit of 25 micrograms recommended by the World Health Organization (WHO) in a twenty-four hours exposure. And note: this is while China is experiencing a supposed slow economic

growth period 6-7%, not the 11-12% of past seasons. Not surprisingly, the International Energy Agency suggests that up to 350 new nuclear reactors should be built worldwide by 2030 to address energy demand.

Experiments combining nuclear reactors with particle accelerators, as performed in Belgium, may lead to a process to incinerate radioactive waste in the long term, making nuclear energy even more 'palatable'. The scientists say that such a process will be operational in a decade, achieving a rapid neutron transmutation of elements contained in radioactive nuclear waste, reducing by a factor of 1000 for the period that these elements remain highly radioactive. This should remove one of the major obstacles is the source of opposition to a growing proportion of the public in the operation of this form of energy.

Last Wednesday, when the Japanese government formally announced its plans to continue using nuclear energy, shares of some of the main uranium producers did, in fact witnessed a welcome increase, including Denison Mines (TSX: DML) +10.8%, Cameco Corp (TSX: CCO) +4% and Energy Fuels (TSX: EFR) +4.6%. France's Areva (PA: AREVA), one of the largest uranium miners and reactor producers, suffered a bit but recovered on Friday, gaining 1.19%. The reason for the lower gains is unrelated to the uranium market and more closely tied to its risks in Niger and Mali.

China's Pollution Problem points to Growing Demand for

Rare Earths



Chinese authorities have not been able to reduce pollution in Beijing, which has reached record levels. The government has intervened with traffic controls, forced factory stops and other measures to no avail. People are demanding a 'Clean Air Act' even as they reach for the nearest hospital to get treatment for respiratory and cardiovascular ailments.

The problem reached a peak this past week and a third of all cars were ordered to stay off the roads – even while the number of cars has doubled in the past five years alone, with a similar jump predicted to occur before the end of this decade, meaning that such measures have little to no effect whatsoever. To make a dent in pollution, authorities have suggested shutting down over a hundred factories, but even this will have very little impact: the Chinese Ministry of the Environment said that has the heavy smog now spread over an area of 1.3 million square kilometers, or 13 percent of China itself (the size of Central Europe), too large an area to control to affect the current air quality index values. The Air Quality Index (AQI – based on pollutants in the air with negative effects to health including Nox, CO, sulfur compounds and any number of particulates) in Beijing is said to be hovering at 200 according to the US Embassy with average levels in 2012 of 145. To understand just how high this is, consider that major North American cities like NY City or Toronto typically range in the low twenties or below. Children, elderly and the sick were advised not to go outside.

The reason for this pollution is that China is the world's largest consumer of coal-by far, using 50% of the world's total production. More than 70% of China's energy derives from coal generated power. Coal consumption had increased annually by an average of nine percent for the past decade.

Nevertheless, there is increasing pressure for change at all levels of society. The 'China Daily' newspaper has called for action; coal has powered China's tremendous economic growth, but if such growth levels are to be sustained, energy production must change. This change should affect the global production and distribution of rare earths. The government cannot hold back any longer on addressing environmental degradation of which air pollution is one of its most notable effects. China will have to devote more resources to innovation to address the problem because it has become a major issue of social and political concern. Chinese citizens are no longer content to be 'mute'; they have taken quite well to protesting to express discontent and demand for changes. Many of the recent protests have addressed environmental degradation and the lack of standards.

Chinese authorities have certainly become concerned by the events known as 'the Arab Spring' and they seem well aware that if political and democratic rights are denied, they will have to take action. Demand for environmental protection – a phenomenon contributing in no small part to the closure of Chinese REE production last October – and higher wages can only point to the inevitability of China losing its low-cost wage advantage and the price of its export goods will increase in accordance – no doubt leading to the emergence of new cheap labor workshop countries and, more likely, a gradual increase of the prices of many consumer goods. Xi Jinping, China's new leader clearly outlined that one of his government's priorities will be to tackle environmental degradation. The recent crackdown on illicit rare earth miners has reflected this trend, sending a signal to the West that it is becoming risky for China to absorb the environmental and socio-economic risks associated with low cost industrial practices.

China itself have to change and become less price competitive with the unavoidable rise of labor and regulatory costs, resulting from stricter emissions, tougher industry entry

obligations or even energy consumption. China has already started to address the coal problem and in the period from now to 2020, it will vastly expand its nuclear power generation. Electric vehicles are also going to be promoted to mitigate the smog effects from the steady increase in car sales. All of this suggests that China should see a surge in internal demand for green technology solutions. This means that China will need more rare earths, despite the lower output [numbers](#) reported by such Chinese rare earth producers as the Baotou Group (IMBREHT). The lower production of rare earths in the past year, caused by consumer reluctance and global economic uncertainty – in China as elsewhere – should soon start reversing in a more bullish direction.

The kind of cars that China will be needing to address the politically and environmentally risky problem of pollution, hybrids or full electric, need dysprosium, neodymium and lanthanum, to mention a few of the rare earths. While domestic production fell in 2012, demand for rare earths will increase to the point where China will soon start to import these minerals. About 90 percent of all currently mined rare earths come from China. With its pricing policy, the country has displaced almost all competitors from the market. The USA, Canada and Australia have been challenging this market dominance, and new mines and processing facilities are being developed. There is no risk of market saturation because when the new mines come on line, China's experience with coal suggests that it will become a major importer of rare earths.

China used to be a major exporter – as well as user – of coal. However, with the tremendous pace of its industrialization, domestic consumption limited the amount of coal available for export, as the mineral was needed to fuel steel plants and power generation. It has not taken long for China to become one of the largest importers of coal in the world. Rare earths may well meet the same fate – and one that is approaching at rapid pace. Domestic concerns – environmental ones in

particular – will boost internal demand, limiting the amounts available for export. Ten years ago, China has consumed about 25% of domestically produced rare earths; even in the slower growth scenario of 201, China's domestic rare earth consumption has risen to 65%. Today, 80 percent of the magnets, and 70 percent of the world's manufactured phosphors originate from China. Domestic supplies of rare earths will not be sufficient to sustain such a rhythm of production and Chinese government agencies will have to seek other products to maintain this dominance, forcing it to seek supplies elsewhere. China's pollution is encouraging news for the newly emerging rare earth plays.