

## ASX Announcement

10 October 2019

# HEXAGON ENTERS US-BASED RARE EARTHS DOWNSTREAM PROCESSING INDUSTRY

## KEY POINTS

Hexagon Resources Limited (ASX:HXG) (**Hexagon** or the **Company**) has executed a binding Investment agreement whereby Hexagon has secured an option to acquire a 49% interest in an advanced, downstream rare-earth elements separation technology from Innovation Metals Corp. (**IMC**). IMC's proprietary RapidSX™ separation technology will enable current and future rare-earth producers outside of China to serve US, European, Japanese and Korean markets, mitigating the current extreme concentration of rare-earth supply and separation capability in China. The rare-earth processing business meshes well with Hexagon's build-out of downstream processing of energy materials and is well covered by the US team that the company has already assembled.

- IMC and Hexagon's wholly owned US-based subsidiary, Energy Materials of America, LLC to form an incorporated joint venture, American Innovation Metals Inc. (**AIM**) with IMC contributing the RapidSX technology IP for rare-earth separation, as illustrated in Figure 1 below. Hexagon investing US\$2 million into the construction of a Commercial Demonstration Plant and paying US\$4 million to IMC as Deferred Consideration, payable from Hexagon's share of future AIM cash flows.



**Figure 1: The Hexagon-IMC joint-venture structure.**

- Hexagon will seek shareholder approval to exercise the option through its investment at its Annual General Meeting scheduled for 22 November 2019.

- The RapidSX™ technology is a proven, de-risked solvent-extraction approach, ready to be commercialised, representing a very exciting energy-materials business opportunity to Hexagon.
- The United States Department of Defense contributed US\$1.8 million to an IMC program which led to the development of the RapidSX approach; a unique process to produce commercial-grade separated rare-earth-oxide materials at pilot scale.
- Competitive advantages of RapidSX technology for rare earths include:
  - Low capital costs: due to significantly reduced size and number of separation stages and resulting physical plant footprint, compared to conventional solvent-extraction approaches;
  - Low operating costs: due to reduced separation times (days compared to weeks), reduced reagent and power consumption, reduced manpower requirements and reduced in-process metal inventories;
  - All equipment and construction materials are readily commercially available; and
  - The RapidSX technology is modular and scalable, capable of entering into a grossly under-served US market without the risks of oversupply.
- The Commercial Demonstration Plant is planned to have a production capacity of 60,000 to 80,000 kg of rare-earth oxides per year from a site in North America.
- The Commercial Demonstration Plant is expected to take approximately 6 months to construct and commission, and operations are anticipated to commence in Q3 of 2020.
- AIM paves the way for construction and operation of an independent, full-scale RapidSX-based rare-earth separation plant in the USA.
- Commercialisation base case is to licence the RapidSX technology for fixed and revenue-based fee structures. Preceding those agreements, clients will utilise the Commercial Demonstration Plant to test their mixed rare-earth concentrates, whilst covering the plant operating costs.
- The Commercial Demonstration Plant will be used to conduct staged scoping to feasibility level studies on the performance, capital and operating costs of a full-scale rare-earth separation plant.
- Following Hexagon's initial investment, AIM could potentially be self-funding through to commercialisation with operating costs covered via client projects; however, AIM may also qualify for US federal government grants and incentives.

## COMMENTARY

Hexagon will acquire a 49% interest in American Innovation Metals Inc. (**AIM**) which has a downstream rare-earth element (**REE**) separation process that is ready to commercialise, following pilot-scale testwork initially funded by the federal government of the United States via the US Department of Defense's (**US DoD**) Army Research Laboratory (**ARL**). IMC will retain a 51% interest in AIM.

This transaction, subject to shareholder approval, creates value for Hexagon shareholders as their company holds the near-term potential to make a major contribution to addressing the global crisis affecting the long-term supply of REEs – outside of China – essential to the continued growth and uptake of electric vehicles (**EVs**), renewable energy and a wide range of technical and electronic devices, as well as critical military and defence applications. These end-uses are complementary to the Company's graphite focus and participation in AIM is part of Hexagon's expanded 'energy-material' strategy reported previously.

REEs cannot be effectively substituted in many of these applications and with a highly concentrated supply dynamic dominated by China, the manipulated market prices are not accurately reflecting the urgent demand and criticality of these materials. This awareness is belatedly but surely emerging through governments and business and Hexagon has an opportunity to be at the forefront of this in the USA.

The technical risk is significantly reduced given the level of testing and piloting, and because the RapidSX approach is based on the time-proven chemistry of solvent extraction (**SX**), a well-established separation technology for metals from dilute solutions. All commercial separation of REEs today relies on SX. The same scientific principles which underpin SX form the basis of the RapidSX approach, but with a mechanical 'intervention' to 'supercharge' the extraction process.

Hexagon is very excited to be working with the highly credentialled IMC team to bring the RapidSX technology to commercial production. In its due diligence, Hexagon was particularly impressed with how IMC completed the US DoD-funded program on time, on budget and as an outstanding technical success.

Hexagon's Managing Director, Mike Rosenstreich said, *"The lack of US-based downstream REE separation capacity presents a serious vulnerability to US national security and the security of its allies, as REEs are critical for defence technologies and US economic growth plans. REEs are also vital non-substitutable components of renewable-energy supply chains, critical to meeting America's future economic, energy and environmental goals. Without downstream capacity to separate and purify REEs, the USA is unprepared for potential supply disruptions, price spikes and trade disagreements related to REEs. It is our intention to remedy this situation with the successful commercialisation of the RapidSX approach to REEs."*

*"REE supply is very topical amid the US-China trade tensions,"* explained Mr. Rosenstreich. *"Whilst casting a useful spotlight on this supply-side crisis, this is not a 'supply bubble' triggered by politics, that is merely a backdrop to a more fundamental issue of declining Chinese supply and processing."*

IMC's Chairman and CEO, Dr. Gareth Hatch commented, *"In the past few years, the authorities in China have been more strictly enforcing environmental protection and pollution-control measures, leading to the closure of non-conforming industrial plants and facilities. The REE industry is no exception, and these steps have led to a gradual reduction in REE production capacity, tightening supply. AIM will bring a proven technical solution to the challenge of cost-effective REE separation for the REE supply chain and is poised to make a major contribution to serving increased demand from geographically varied sources of supply."*

*"Since the US Congressional hearings in May 2019,"* Dr. Hatch added, *"and widely reported indications that China could potentially use its REE supply as a bargaining chip in US-China trade negotiations, we have received numerous inquiries from companies with current and near-*

*term mixed REE chemical-concentrate production. We are now in active discussions with these and other companies. Through AIM, IMC looks forward to working with the Hexagon team, which contributes deep experience in other energy materials, as well as marketing and financing experience, to enable us to focus on the realisation of our objectives.”*

## **INNOVATION METALS CORP.**

As developers of the RapidSX technology, IMC is a highly credentialled and regarded private technical research company, incorporated in Canada and based in the greater Toronto area. It utilises a test work facility at the Process Research Ortech Inc. compound in Ontario, Canada. IMC was set up to provide low-cost separation and purification processes to the REE industry, based on commercially scalable processes and materials. To that end, the primary focus has been on SX, with the most advanced work focused on the extraction, separation and purification of REEs, the separation and purification of cobalt (**Co**) and nickel (**Ni**), and the extraction and purification of lithium (**Li**) from brines.

The principals of IMC include Chairman & CEO, Dr. Gareth Hatch, and President & COO, Mr. Patrick Wong:

- Dr. Hatch, who was recently engaged as a Senior Strategic Technical Advisor to Hexagon, is co-founder of IMC. He is Managing Director of Strategic Materials Advisors, oversees business development at Adamas Intelligence and was a co-founder of Technology Metals Research, consulting firms operating in the critical-materials sector. He was previously Interim CEO and Director of Alabama Graphite, and Director of Technology at Dexter Magnetic Technologies. Dr. Hatch holds five US patents on various inventions. He has a BEng (Hons) in materials science & technology and a PhD in metallurgy & materials, both from the University of Birmingham. He is a Fellow of the Institute of Materials, Minerals & Mining, a Fellow of the Institution of Engineering & Technology and is a Chartered Engineer through the UK Engineering Council. Dr. Hatch is a member of a NATO STO strategy team on REEs, Advisory Board Chair for the Rare Earth Industry Association and is a member of the Canadian ISO TC/298 Mirror Committee on standards for REEs.
- Mr. Wong is co-founder of IMC. He was previously co-founder and Chief Investment Officer of Dacha Strategic Metals, a TSX.V-listed public company that invested in, traded and stored physical REEs with a strategic view to their future demand for green-tech applications. Prior to that, he was President of RiverRidge Energy Corp, a natural-gas trading company that created models to trade physical gas, with a view to the projected growth in demand for electric vehicles and electrification infrastructure. Previously, Mr. Wong worked as a portfolio manager for various investment firms. He holds an Honours BA from the Richard Ivey School of Business at the University of Western Ontario.

The balance of the IMC Board comprises non-executive directors;

- Furkhat Faizulla is a founding partner of Advanced Material of Japan Corporation, one of the largest traders of rare metals in the world. Mr. Faizulla is currently head of AMJC's overseas trading department and specialises in trading REEs as well as other critical metals.

- John Veltheer has been a director and officer of various North American private and public companies since 1998. Dr. Veltheer has a BSc (Hons) in chemistry from Queen's University and a PhD in inorganic chemistry from the University of British Columbia.

IMC contributes high-level technical skills and commercial contacts associated with REEs on a global scale.

## THE RAPIDSX APPROACH

### *Current technological status of REE separation*

The dominant processing technology currently employed to separate REEs into individual elements is SX.

SX is a liquid-liquid separation technique used to selectively transfer metals from an aqueous phase to an immiscible 'organic' liquid phase, containing specific extractant reagents designed to pluck specific metals or groups of metals from the aqueous phase. Due to the immiscible relationship between the liquids (oil-and-water effect), a key rate-determining aspect of the separation is the surface area of the interface between the aqueous and organic liquids, which affects the metal exchanges from relatively dilute solutions. Agitated tank systems known as mixer-settler units, are set up in circuits, with specific configurations to match the relative REE concentrations to undertake the separation.

There are complex physical and chemical relationships which drive the efficiency of conventional SX operations, which for REE separations currently requires several hundred mixer-settler stages to be deployed, in standard light REE (**LREE**) or heavy REE (**HREE**) separation facilities. This involves very high capital expenditure for sufficient land and equipping of so many mixer-settler units and support services. This conventional set up also requires high levels of metals in inventory, as well as significant power and labour costs associated with running so many units on such a large plant footprint.

### *RapidSX Separation*

The RapidSX approach to REE separation has been piloted to prove that its enhanced separation kinetics cuts the number of stages required for separation by up to 90%, with significantly faster flow-through rates for the metals, while maintaining commercial-level recoveries and product purities. This offers major capital and operating cost savings.

IMC developed the RapidSX approach to REE separation through a highly successful REE separation test program in Canada, with the assistance of US\$1.8 million in funding from the US DoD. The process circuits utilise proprietary column-based reactors, with similar unit operations within each circuit as those used for conventional SX, but with far fewer separation stages.

Since 2016, when the RapidSX approach was initially demonstrated, additional applications such as the separation and purification of Ni and Co, and the direct extraction of Li from brines, further demonstrated a robust technology with wide applications. IP protection in the form of patent applications will be finalised on the technology, on formation of the joint-venture company.

Hexagon undertook due diligence of RapidSX and alternative emerging REE separation technologies, supported by an independent metallurgical engineering firm. An important

consideration for Hexagon's investment decision was that the RapidSX approach is based on well-established and demonstrated science – namely SX, albeit a significantly enhanced and unique version of it. This is not a new theory or process concept; it is an innovative evolution of an existing technology.

At a high level the comparative advantages offered by the RapidSX approach to REE separation compared to conventional SX and emerging technologies, include:

- Proven approach – successfully developed and piloted with financial assistance from the US DoD.
- Robust process capable of taking LREE-rich, HREE-rich and even blends of REE feedstocks.
- Low capital costs – due to the significantly reduced size and number of separation stages and resulting physical plant footprint, compared to conventional SX approaches.
- Low operating costs due to reduced separation times (days compared to weeks), reduced reagent and power consumption, reduced manpower requirements and reduced in-process metal inventories.
- All construction materials and equipment are readily available with no high-specification engineering or 'black-box' technology.
- The process lines are modular and scalable.

Hexagon has completed a review of the existing SX and alternative technologies and concluded that the RapidSX approach is the most advanced, proven process technology and is ready for commercialisation with the construction of a Commercial Demonstration Plant (**CDP**).

The CDP will be operated at a site in North America, with a final location yet to be determined with a planned production capacity of 60,000 to 80,000 kg of rare-earth oxides (**REOs**) per year, representing a conservative scale up of approximately 3-5-times compared to the pilot circuit previously developed. The CDP is expected to take approximately 6 months to construct and can be scaled up with the addition of new lines.

## **THE IMC-HEXAGON INCORPORATED JOINT VENTURE**

The objective of this transaction is to combine the relative skills of the two parties to commercialise RapidSX for REEs.

The binding Investment Agreement (**IA**) provides for Hexagon to earn a 49% interest in the application of the RapidSX technology for REE separation via equity in AIM, the US incorporated joint venture

The total consideration is US\$6.0 million, comprising an upfront payment of US\$2.0 million to fund the construction of the CDP and to complete the process of protecting the associated IP via worldwide patent applications; and US\$4.0 million in Deferred Consideration, payable to IMC from Hexagon's future AIM cash flows. Hexagon has also agreed to make an additional US\$0.5 million available, if required, to meet any cost overruns which will be deducted from the Deferred Consideration component. Note, there is no recourse to Hexagon if the cash flow distributions from AIM are insufficient to meet the Deferred Consideration and Hexagon will be entitled to



retain its 49% joint venture interest. The CDP essentially comprises pipes, tanks, pumps and electrical components assembled in an existing building. It can easily be placed on care and maintenance at little cost if there are no clients to utilise the facility.

The acquisition is structured as an option which provides Hexagon up to 12 months to pay the US\$2.0 million to enable commencement of construction. The investment decision by Hexagon is subject to shareholder approval under ASX Listing Rule 11.1.2, which will be sought on 22 November 2019 at the Company's Annual General Meeting. Hexagon may exercise the option at any time prior to the date that is 9 October 2020 after it has satisfied the expenditure commitment, provided that it will not commit funding to satisfaction of the expenditure commitment unless and until shareholder approval has been obtained. A summary of the key terms of the IA is attached in Appendix 1.

Upon exercise of the option, the parties will enter into a shareholders' deed, which is designed to ensure protection of minority shareholder rights in decision making as well as standard provisions relating to management, reporting obligations and divestment of joint-venture interests, amongst other matters.

## **COMMERCIALISATION PROCESS**

Hexagon considers that its forthcoming acquisition of 49% of AIM is a significantly de-risked, technically advanced opportunity to fill a complete void in the REE downstream supply chain in the USA, and potentially across the globe.

During Hexagon's due diligence process, it identified the greatest risk as being availability of feedstock concentrates. Most REE concentrates are produced in China and an objective of this technology and the US base is to diversify that supply risk. There are REE mineral and chemical concentrate producers in South America, the US, Australia and other countries; several of whom have expressed interest in RapidSX and executed Confidentiality Agreements to advance discussions on testing and possible commercial agreements.

AIM's success will also depend, in part, on its ability to obtain and maintain intellectual property protection through patent protection. Hexagon has investigated the patentability of the RapidSX technology and is confident that this will be achievable in order for it to successfully commercialise the RapidSX technology in order for Hexagon to recoup its investment in AIM.

There is strong interest and a sound understanding in North American markets that REE availability is not simply being 'squeezed' but is in crisis. Governments are supportive and key agencies are providing significant current and potential future financial support. IMC recently responded to a 'Request for Information' (RFI) from the US Air Force Research Laboratory (USAFRL) on LREE and HREE separation, as part of US Government efforts to take action on the recent Presidential Determinations on REEs, in the context of the US Defense Production Act (DPA). Hexagon and IMC anticipate a subsequent Request for Proposals (RFP) from the USAFRL relating to potential DPA funding. Through AIM, the parties will respond to such an RFP in the context of constructing an independent, full-scale RapidSX-based REE separation plant in the USA.

It is too early to assign any financials around this investment other than to note the strong market demand for a demonstrated, low-risk, low-cost separation capability to produce REOs. In

the context of the published prices for selected REOs of interest to AIM, on a US\$/kg basis this is potentially a significant, large-scale enterprise (refer Table 1). Ultimately profitability will depend on the mix of the respective REOs recovered, operating margins and the business models used. However, the RapidSX approach is already highlighting the potential for significant cost savings compared to existing and emerging technologies.

The 'base-case' commercialisation model for AIM will be licencing of the RapidSX approach to REE concentrate producers. Each agreement would be tailored to the client's production and suite of available REEs to be recovered and based on extensive testwork undertaken by AIM in collaboration with the client, utilising the CDP whilst covering the costs for doing so.

Typical technology licencing structures comprise a mixture of fixed or percentage-based fees linked to revenues, but this will be negotiated with each client.

In the course of its operation the CDP will be used to conduct staged scoping- to feasibility-level studies on the performance, capital and operating costs of full-scale REE separation plants based on the RapidSX technology, plants that would be specifically configured to meet the needs of the particular feedstocks that will be processed, their particular LREE / HREE content, and desired REO outputs.

There is keen interest from several existing REE producers and advanced emerging REE project developers. The objective is to be testing client samples as soon as commissioning of the CDP is completed – planned for Q3 of 2020. At that time, the plant and AIM should become self-funding through cost-sharing arrangements with the clients submitting mixed REE concentrates for testing and then hopefully leading to resultant licence agreements. AIM will also consider purchasing its own mixed REE concentrate feedstocks to process and to sell.

AIM's commercial outlook with respect to the licence agreements is flexible; it wants to offer clients alternative, lower-cost downstream processing options for their mixed REE concentrates and to contribute to making the USA and other countries more self-reliant and secure with respect to REE production. Every new testwork client and each new licencing agreement, notwithstanding the potential of any additional US government funding, will create and build significant value for AIM's shareholders. With several Confidentiality Agreements already signed and discussions commenced, early, strong momentum and results look promising.

## **NEXT STEPS**

AIM plans to have the CDP built and ready for large-scale samples in Q3 of 2020, subject to financing. It is currently in early discussions with several REE producers which will hopefully progress to agreed test and licencing terms, to be closed subject to successful CDP performance.

The time line is quite short with the construction of the CDP, likely in established facilities, estimated to take 6 months from ordering of materials to commissioning and ready to test client material. IMC has estimated the capital cost to complete the CDP at US\$1.5 million based on their previous experience of building the larger, conventional SX plant and the RapidSX pilot plant. A US\$0.5 million program to gain worldwide patent protection will also be initiated at this time. Hexagon has agreed to provide an additional US\$0.5 million if there are any cost overruns to complete either activity.



Preliminary work has been undertaken to assess a suitable site for the CDP. Key considerations include sites with existing permitting – though no onerous permitting requirements are anticipated – logistics, connections for feedstocks and reagent supply, and access to labour. Several site options are being assessed in North America.

Hexagon is advancing this process as quickly as possible and subject to shareholder approval is keen to exercise the option and commence the build-out of the CDP.

## BACKGROUND

### *What is the significance of rare-earth elements?*

REEs are metals which are largely non-substitutable and critical components for many high-growth aspects of our modern lives.

These metals are used in hundreds of products, including many that are critical to defence applications such as precision-guided munitions, aircraft, electronic counter-measures, radar systems, sonar, lasers, computers, satellite- and ground-based communications, coatings, optical equipment, night-vision goggles, and displays.

The REEs as a group comprise the lanthanoid series on the periodic table of elements (atomic numbers 57 to 71), along with scandium and yttrium.

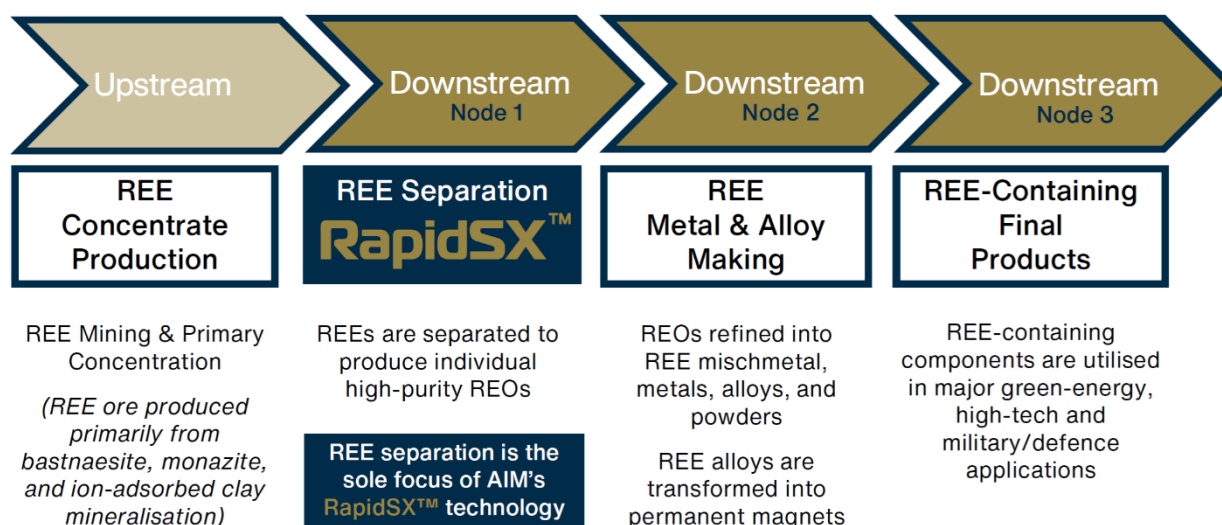
The REEs are further categorised into light REEs (**LREEs**) and heavy REEs (**HREEs**) as shown in Figure 2 below. HREEs tend to be significantly less common than the LREEs and attract higher prices. REEs are vital constituents of high-performance permanent magnets, thermal-barrier coatings, high-performance ceramics, phosphor materials, pigments and glazes, glass polishing, and other applications.

<b>LREEs</b>	21 <b>Sc</b> Scandium 44.955908	57 <b>La</b> Lanthanum 138.90547	58 <b>Ce</b> Cerium 140.116	59 <b>Pr</b> Praseodymium 140.90766	60 <b>Nd</b> Neodymium 144.242	62 <b>Sm</b> Samarium 150.36	63 <b>Eu</b> Europium 151.964	64 <b>Gd</b> Gadolinium 157.25
<b>HREEs</b>	39 <b>Y</b> Yttrium 88.90584	65 <b>Tb</b> Terbium 158.92535	66 <b>Dy</b> Dysprosium 162.500	67 <b>Ho</b> Holmium 164.93033	68 <b>Er</b> Erbium 167.259	69 <b>Tm</b> Thulium 168.93422	70 <b>Yb</b> Ytterbium 173.045	71 <b>Lu</b> Lutetium 174.9668

**Figure 2: The rare-earth elements in the periodic table of elements.**

### **The REE Supply Chain**

The primary REE supply chain starts with the mining and beneficiation of REE ores into mineral concentrates, comprising a mixture of all the HREE and LREEs present in the primary ore. The composition of the mineral concentrate will vary depending on the presence of particular REE-bearing mineral(s) (such as bastnaesite, monazite, xenotime, and ion-adsorbed clays) as well as between different deposits of the same type.



**Figure 3: REE – REO Generalised Supply Chain**

Once produced, the REE mineral concentrate is ‘cracked’, typically using acids and heat to leach the REEs and other metals into an aqueous solution. Following initial purification of the leach solution, a mixed REE chemical concentrate is produced. This is then processed via a number of SX circuits to separate the REEs into individual, high-purity solutions, from which REOs and other compounds can be produced. SX is the dominant commercial method for the separation of REEs.

The REE products can be sold for direct applications into a variety of end-uses; conversion of certain REOs such as neodymium oxide ( $\text{Nd}_2\text{O}_3$ ), praseodymium oxide ( $\text{Pr}_6\text{O}_{11}$ ), samarium oxide ( $\text{Sm}_2\text{O}_3$ ), terbium oxide ( $\text{Tb}_4\text{O}_7$ ), and dysprosium oxide ( $\text{Dy}_2\text{O}_3$ ) into metals is required to utilise these REEs in various high-performance permanent magnets.

### REE Market Issues

The REE market outside of China currently comprises relatively few upstream producers and even fewer downstream separation processors, metal refiners and magnet producers. These numbers increase significantly for end-user manufacturers incorporating REE-based products into industrial equipment, turbines, jet fighters, EVs, smart phones, specialty alloys and the like; however, these end users are largely reliant on Chinese REE input supply.

Adamas Intelligence forecasts that total REO demand will grow from an estimated 155,000 t in 2018 to 220,000 t in 2025 and to 275,000 t in 2030. Growth in demand for permanent-magnet REOs will more than double in the period 2018-2030.

There are two key factors which affect the entire REE supply chain;

- **Supply Concentration** – China produces ~70% of the world’s REE concentrates from domestic mines and because of its huge downstream separating industry, imports additional feedstocks to produce ~85% of the world’s finished REE materials.

- *Critical nature of REEs* – in terms of comparable performance there are few opportunities to substitute for REEs and in many cases, such as EV motors, smart-device screens and advanced military applications, there are no substitutes.

Adding to these long-term factors are the more recent issues of declining Chinese production in response to the implementation of higher safety and environmental standards, as well as US-China trade tensions.

In 2010, China withheld REE supply to Japanese industry to solve a territorial dispute. In the USA there is a heightened sense of fear that similar measures could again be employed, threatening its defence and technology sectors. In July 2019, President Trump issued Presidential Determinations on the requirement for domestic REE supply-chain capability including the separation of LREEs and HREEs. There is currently no commercial-scale separation of REEs in the USA and this is clearly a government priority.

The IMC – Hexagon joint venture is in a very favourable position – initially establishing its CDP in North America, potentially followed by the establishment of full-scale REE separation in the USA specifically. This endeavour will fill a vital void in downstream processing capacity, with major increases in EV manufacturing capacity currently being built in the southern United States and in a political environment that recognises the supply crisis and is funding several initiatives to foster a domestic separation capability. Furthermore, REE separation capability would further strengthen the supply chain in the USA by encouraging increased domestic metal, alloy and magnet production.

### **REO Prices**

REOs are generally sold under long-term fixed price committed contracts. International trade consists mainly of the purchase of REE mineral and chemical concentrates by Chinese processors, and export sales of REOs not utilised by Chinese manufacturing. Further, market features such as misreporting of prices and market manipulation also add to the opaque nature of the REE market. In structuring potential licence arrangements for the utilisation of RapidSX, it is possible that fees will be charged through fixed fees and/or a percentage of REO sales revenue.

Current indicative US\$ prices for selected REOs of interest to the IMC-Hexagon joint venture are outlined in Table 1 below.

**Table 1: Indicative Prices for Selected Commercial-Grade REOs of Interest to the IMC-Hexagon Joint Venture in October 2019 (Source: BAI INFO).**

REO	Molecular Formula	Current Indicative Pricing (US\$)
Neodymium oxide	Nd <sub>2</sub> O <sub>3</sub>	\$45/kg
Praseodymium oxide	Pr <sub>6</sub> O <sub>11</sub>	\$54/kg
Terbium oxide	Tb <sub>4</sub> O <sub>7</sub>	\$546/kg
Dysprosium oxide	Dy <sub>2</sub> O <sub>3</sub>	\$263/kg

Recent analysis from Adamas Intelligence forecasts indicates that medium- and long-term REO price trends are positive, due to increased demand and clear constraints on the supply side, particularly with respect to separation capacity.

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## Appendix 1: Summary of key terms of binding Investment Agreement (IA) executed 9 October 2019

### Joint Venture Option and Shareholder Deed

<b>1. Parties</b>	<p>(a) Hexagon Resources Limited (ACN 099 098 192) or a 100% owned and controlled subsidiary entity (being Energy Materials of America Inc.) (<b>HXG</b>).</p> <p>(b) Innovation Metals Corp. (Corporation Number: BC0903804) (<b>IMC</b>).</p>
<b>2. Option</b>	<p>IMC has granted HXG an exclusive option to form and hold a 49% interest in an incorporated joint venture (<b>Joint Venture</b>) for the commercial development of IMC's RapidSX™ processing technology for the separation of rare earth elements (<b>Option</b>), in consideration for:</p> <p>(a) satisfaction of the Expenditure Commitment (defined in Item 5 below) by HXG; and</p> <p>(b) the Deferred Consideration (defined in Item 10 below),</p> <p>The incorporated joint venture is intended to be a private special purpose company, American Innovation Metals Inc (<b>AIM</b>).</p>
<b>3. Option Period</b>	12 months from 9 October 2019.
<b>4. Conditions to exercise of Option</b>	<p>Exercise of the Option is conditional on HXG contributing USD\$2,000,000 for funding the construction of a commercial demonstration-scale multi-circuit pilot plant for the separation of rare earth elements utilising RapidSX™ technology (<b>CDP</b>) and securing initial patent protections in the name of IMC for AIM use with respect to rare earth elements and development of RapidSX technology (<b>Patent IP Protections</b>) (<b>Expenditure Commitment</b>).</p> <p>HXG may exercise the Option at any time during the Option Period after it has satisfied the Expenditure Commitment, provided that HXG will not commit funding to satisfaction of the Expenditure Commitment unless and until shareholder approval has been obtained.</p> <p>There is a review event if the CDP has not been funded by 31 May 2020 and the Parties will review what steps are required in order to achieve that funding.</p>
<b>5. Joint Venture</b>	<p>Upon exercise of the Option, HXG and IMC will hold the following shareholdings in AIM:</p> <p>(a) IMC 51%.</p> <p>(b) HXG 49%.</p>
<b>6. DPP</b>	<p>The CDP will be owned and managed by AIM.</p> <p>Once the Option has been exercised, IMC will use all reasonable endeavours to complete construction of the CDP and obtain the Patent IP Protections as soon as reasonably practicable and will provide HXG with monthly reports on the status of such activities.</p>

<b>7. Additional Expenditure Commitment</b>	<p>To the extent additional funds are required (after the exercise of the Option by HXG) to obtain the Patent IP Protections and/or to complete construction of the CDP, upon HXG receipt of a written request from IMC, HXG will be required to contribute up to an additional USD\$500,000 for construction of the CDP and/or obtaining the Patent IP Protections (as applicable) (<b>Additional Expenditure Commitment</b>).</p> <p>Any Additional Expenditure Commitment will be offset against Deferred Consideration payments (per Item 10 below).</p>
<b>8. Licensing</b>	<p>Upon exercise of the Option, IMC will grant to AIM an exclusive worldwide licence to use the Patent IP Protections and IMC's RapidSX processing technology for the separation of rare earth elements including any associated intellectual property for the purposes of the Joint Venture at nil cost.</p> <p>Any new intellectual property developed by AIM as part of the Joint Venture including rare earth elements flowsheets, extractant combinations and re-utilisation of outputs will be owned by AIM with all associated patents for such new intellectual property assigned to AIM.</p>
<b>9. Deferred Consideration</b>	<p>After exercise of the Option, HXG USA will progressively pay to IMC a total of USD\$4,000,000 (<b>Deferred Consideration</b>) out of its proportionate share of AIM funds that are available for distribution, being funds that are not committed to Joint Venture activities including approved Joint Venture budgets and work programs.</p> <p>The amount of the Deferred Consideration will be reduced by the amount of any Additional Expenditure Commitment contributed by HXG after exercise of the Option.</p>
<b>10. Shareholder Deed</b>	<p>The binding IA includes terms for a shareholders' agreement (Shareholder Deed) reflecting a comprehensive addendum to the IA which is designed to ensure protection of minority shareholder rights in decision making as well as include standard provisions relating to management, reporting obligations and divestment of joint-venture interests, amongst other matters.</p>