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Strategic, Critical, & Specialty Metals: What Should a Junior Resource Company Do?

Resource Investors Forum

St. Johns's, September 18, 2012

Michael S. (Mickey) Fulp, M.Sc., C.P.G.



What are "Strategic Elements"?

- Electric Metals
- Doping Agents
- Technology Metals
- Critical Metals
- Rare Metals
- Strategic Metals
- Specialty or Minor Metals

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What Makes a Metal Critical?

- Essential Role : Modern Industrial Applications
- Major Tonnage : Mined, Processed, & Used
- Trades on World Open Market or
- Trades as Bulk Dry Commodity



What are the "Critical Metals"?

- Iron
- Aluminum
- Copper
- Ferrous Alloys: Ti, Cr, Mn, Ni, Mo
- Zinc, Lead, Tin
- Uranium

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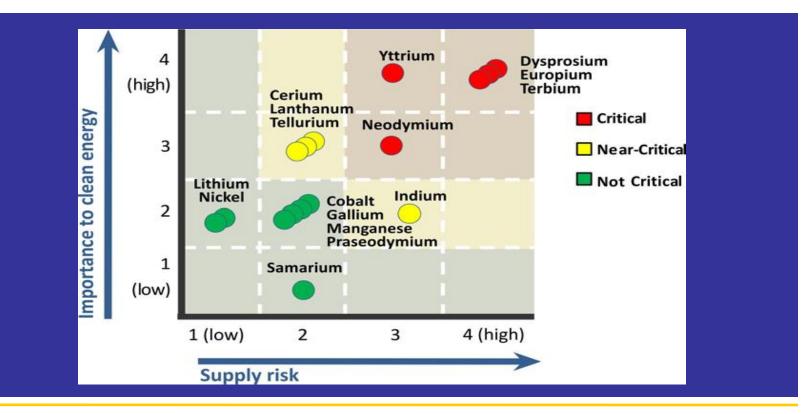
Critical Metals (Red)

1 H Hydrogen 1.00794																	2 He Helium 4.00260
3 Lithium 6.941	4 Be 8eryllium 9.01218											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Neon 20.180
11 Na Sodium 22.9898	12 Mg Magnesium 24.305											13 Al Aluminum 26.9815	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.9559	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.9059	40 Zr Zirconium 91.224	41 Nb Niobium 92.9064	42 Mo Malybdenum 95.94	43 TC Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Gadmium 112.411	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	62 Te Tellurium 127.60	53 Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.33		72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.078	79 Au Gold 196.967	80 Hg Mercury 200.59	81 TI Thailium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium (226)		•										-				
Lanthanides 57 58 59 60 61 62 63 64 65 66 67 Lanthanum Carium Praseodymium Nod Promethium Samarium Europium Samarium Europium Gadelinium Terbium Dysprosium Holmium 138,906 140.116 140.116 140.24 (145) 151.96 157.25 158.93 164.93							68 Er Erbium 167.26	69 Tm Thulium 168,93	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97							
	Actir	(1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000	Ac	Th Thorium F	Pa Pa Protactinium 231.036	U	Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	Bk	Cf	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)

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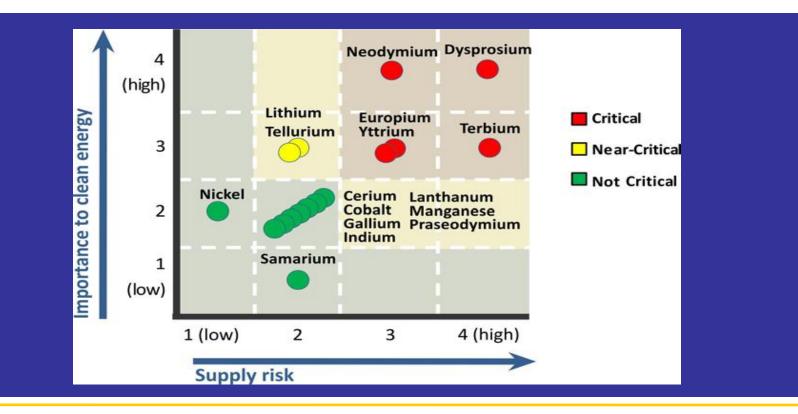
DOE Critical Metals 2011 - 2015



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DOE Critical Metals 2015 - 2025



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DOE "Critical Metals"

- 2011 2025: 5 7 REEs, Te, <u>+</u> Li
- Growth of "Clean Energy" Applications
- Wind Turbines, EVs, PVs, Efficient Lighting
- Government Solution: Interagency Coordination
- Studies, Research, Plans, International Workshops



Homeland Security "Strategic Metals"

- National & Economic Security
- Public Health & Safety

- Titanium, Chromium, Manganese, Cobalt
- Germanium
- Niobium, REEs, Tungsten

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2011 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS

Commodity	Percent	Major Import Sources (2007-10) ¹
ARSENIC (trioxide)	100	Morocco, China, Belgium
ASBESTOS	100	Canada, Zimbabwe
BAUXITE and ALUMINA	100	Jamaica, Brazil, Guinea, Australia
CESIUM	100	Canada
FLUORSPAR	100	Mexico, China, South Africa, Mongolia
GRAPHITE (natural)	100	China, Mexico, Canada, Brazil
INDIUM	100	China, Canada, Japan, Belgium
MANGANESE	100	South Africa, Gabon, China, Australia
MICA, sheet (natural)	100	China, Brazil, Belgium, India
NIOBIUM (columbium)	100	Brazil, Canada, Germany, Russia
QUARTZ CRYSTAL (industrial)	100	China, Japan, Russia
RARE EARTHS	100	China, France, Estonia, Japan
RUBIDIUM	100	Canada
SCANDIUM	100	China
STRONTIUM	100	Mexico, Germany
TANTALUM	100	China, Germany, Kazakhstan, Australia
THALLIUM	100	Russia, Germany, Kazakhstan
THORIUM	100	France, India, Canada, United Kingdom
YTTRIUM	100	China, Japan, France, United Kingdom
GALLIUM	99	Germany, Canada, United Kingdom, China
IODINE	99	Chile, Japan
GEMSTONES	98	Israel, India, Belgium, South Africa
GERMANIUM	90	China, Belgium, Russia, Germany
BISMUTH	89	China, Belgium, United Kingdom,
DIAMOND (dust, grit and powder)	89	China, Ireland, Republic of Korea, Russia
PLATINUM	88	Germany, South Africa, United Kingdom, Canada
ANTIMONY	87	China, Mexico, Belgium
RHENIUM	87	Chile, Netherlands, Germany
STONE (dimension)	85	Brazil, China, Italy, Turkey
POTASH	83	Canada, Belarus, Russia
VANADIUM	80	Rep. of Korea, Canada, Austria, Czech Republic

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BARITE	78		China, India
SILICON CARBIDE	76		China, Brazil, Vietnam, Norway
TIN	76		Peru, Bolivia, Indonesia, China
COBALT	75		China, Norway, Russia, Canada
SILVER	75		Mexico, Canada, Peru, Chile
ZINC	73		Canada, Peru, Mexico, Ireland
TITANIUM (sponge)	69		Kazakhstan, Japan, China, Russia
TITANIUM MINERAL CONCENTRATE	ES 68		South Africa, Australia, Canada, Mozambique
PEAT	63		Canada
CHROMIUM	60		South Africa, Kazakhstan, Russia, China
PALLADIUM	56		Russia, South Africa, United Kingdom, Norway
MAGNESIUM COMPOUNDS	53		China, Canada, Brazil, Austria
NICKEL	47		Canada, Russia, Australia, Norway
SILICON (ferrosilicon)	42		China, Russia, Venezuela, Canada
NITROGEN (fixed), AMMONIA	41		Trinidad and Tobago, Russia, Canada, Ukraine
GARNET (industrial)	39		India, Australia, China, Canada
GOLD	36		Mexico, Canada, Colombia, Peru
TUNGSTEN	36		China, Bolivia, Canada, Germany
COPPER	35		Chile, Canada, Peru, Mexico
MAGNESIUM METAL	35		Israel, Canada, China
PERLITE	27		Greece
SULFUR	24		Canada, Mexico, Venezuela
SALT	22		Canada, Chile, Mexico, The Bahamas
BERYLLIUM	21		Russia, Kazakhstan, Japan, Russia
MICA, scrap and flake (natural)	20		Canada, China, India
VERMICULITE	20		China, South Africa, Australia, Brazil
ALUMINUM	13		Canada, Russia, China, Mexico
GYPSUM	13		Canada, Mexico, Spain
PHOSPHATE ROCK	13		Morocco, Peru
IRON and STEEL	9		Canada, European Union, China, Mexico
IRON and STEEL SLAG	8		Japan, Canada, South Africa, Italy
CEMENT	6		Canada, China, Republic of Korea, Mexico
PUMICE	5		Greece, Mexico, Iceland, Montserrat
DIAMOND (natural industrial stone)	3		Botswana, South Africa, Russia, Namibia
LIME	1	r	Canada, Mexico
STONE (crushed)	1		Canada, Mexico Canada, Mexico, The Bahamas
o rome (crushed)			a Ganada, Mexico, The Dahamas

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Specialty or Minor Metals

- Non Essential to World Economic Health
- Small Tonnages & Total Value
- Large Mines: By-product or Co-product
- Small Mines: Concentrating, Processing, Refining



Specialty or Minor Metals

- Sales & Market Opacity
- Do Not Trade on Open Markets
- Off take or Spot Contracts
- Monopoly or Oligopoly
- Country, Company, or Deposit



Specialty Metals (Green)

1 H Hydrogen 1.00794												5	6	7	8	9	2 He Helium 4.00260
Lithium 6.941	Be Beryllium 9.01218											Boron 10.811	C Carbon 12.011	N Nitrogen 14.0067	O Oxygen 15.9994	F Fluorine 18.9984	Ne Neon 20.180
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La	Lanthanides 57 58 59 60 61 62 63 64 55 66 67 68 69 70 Lanthanim Cerium Prasedymium Neotymium Promethium Samarium Europium Gadolinium Terbium 64 55 66 67 68 69 70 Vision 138.906 Cerium 140.116 140.424 Promethium Samarium Europium 64 65 66 67 68 69 70 Yb Vision 140.116 140.908 144.24 150.36 151.96 157.25 158.93 152.50 164.93 164.93 167.96 Pm Thulum 173.04									Yb Ytterbium	71 Lu Lutetium 174.97						
Actinides Actinium Thorium Thorium Protectinium Uranium Neptunium											103 Lr Lawrencium (262)						

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Specialty or Minor Metals

- Li, Be
- Sc, V, Co, Ga, Ge
- Zr, Nb, Cd, In, Sb, Te
- Hf, Ta, W, Re, Hg, Bi
- Y & Lanthanides (REEs)
- Mercenary Musings Radio w/ Rob Graham

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Juniors, Metals, & Projects

- The Good, The Bad, & the Butt Ugly
- Metal, Deposit Type / Size, Supply / Demand
- Butt Ugly: Most Specialty Metals
- Good: REEs, Sb, W, (Graphite)
- Rules of Thumb: Always Exceptions
- Specific Be & Nb companies

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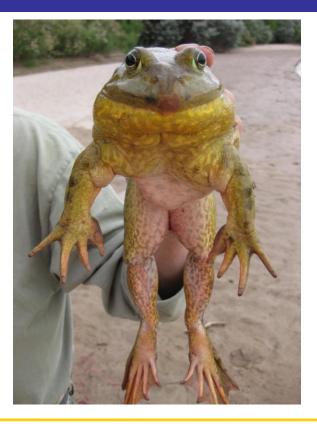


Due Diligence Checklist

- Share Structure, People, Projects; Undervalue to Peers
- Every Good Geologist Knows that Grade is King
- Junior Resource Companies Mining the Stock Market
- "A Mine is a Hole in the Ground with a Liar Beside It"
- A Day without Learning is a Day Wasted



Beware of Frogs Masquerading as Princes



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Monday Morning Musings from Mickey the Mercenary Geologist





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