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Afghanistan's Mineral Resource Potential: A Boon or Bane?

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Abstract

Afghanistan faces many problems including terrorism, instability, corruption, weak institutions, poor governance and lack of revenue sources. Keeping in view the recent political and economic history of the country, Afghanistan is likely to suffer from continued instability and chaos. The discovery of mineral resources worth nearly three trillion dollars has the potential to bring prosperity to the country and ultimately be a source of stability. However, any mishandling of these minerals can become a currency for greater civil war. On the other hand, if peace returns, these minerals can bring an economic revolution not only in Afghanistan, but the entire region as well. The United States Geology Survey and the Afghan Geological Survey discovered 24 'Areas of Interest (AoI)' where a variety of minerals, including rare earth elements (REE), industrial and energy minerals. While this mineral wealth can turn the country into an economic powerhouse, decades of war has made this an uphill task. An economically developed and politically peaceful Afghanistan offers the promise of supplementing Pakistan's steel industry, subject to good relations between the two neighbours. This paper provides a summary of some of important areas of interest, and highlights concerns about the extraction of minerals in Afghanistan during the post-2014 era.

Key words: Minerals, Afghanistan, Investment, Conflict.

Introduction

Natural resources are important for the development of any country. Agriculture is the backbone of the Afghan economy with nearly 80 per cent of the Afghan population depending on it.[1] The country produced a variety of fruits, dry fruits and vegetables which were exported to other countries, including Pakistan and Central Asian States (formerly

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[1] Central Statistics Organization (CSO), *Agriculture Development*, Afghanistan Statistical Yearbook 2009-10 (Afghanistan Government, 2009), cso.gov.af/Content/files/Agriculture.pdf.

Soviet states).[2] Other exports also included natural gas, rugs, and carpets. After the People's Democratic Party of Afghanistan (PDPA) – a pro-Communist party - took over the government in Afghanistan, it gave greater share in terms of trade to the former Soviet Union, than to non-communist states.[3] Pakistan is Afghanistan's largest export trading partner of carpets and textile floor coverings, cumin seeds, sesame seeds etc (at 33.3 per cent).[4] The country also imports 24 items from Pakistan including rice, leather goods, pharmaceutical products, petroleum products etc.[5]

The negative impacts of the decades long conflicts have been affecting Afghan agriculture since 1979 when the Soviet Forces invaded the country. During this period, cultivation of poppy expanded as Afghan warlords searched for ways to buy ammunition against the occupation forces. After the Soviet Forces withdrew from Afghanistan, opium became a major export commodity for Afghanistan. Illegal production and export of opium has created a lot of problems for the rest of the world, including Pakistan. It is the only source which can generate more income than traditional commodities like fruits and carpets.

During the Cold War era, some minerals were discovered in Afghanistan, but given the cost involved in mining, focus centred around opium production. In fact, mineral exploration dates back to the 1930s, when Germany began to explore minerals in Paktia province. Similarly, Afghanistan sent a group of students to Japan in 1936 to study mining.[6] The first rare metal extraction in Afghanistan was carried out between 1950 and 1960 in the pegmatite fields of Dara-i-Nur where 130 tonnes of beryl was produced by open-cast mining.[7] Similarly, another area where beryl exploration started was at the Dara-i-Pech pegmatite field between 1963 and 1964; with large pegmatite fields identified nearby at Nilwa and Parun.[8] So far, these minerals have not been exploited since more investment is needed to extract them. Other than metallic minerals, Afghanistan also has an abundance of non-metallic minerals like gemstones and several other industrial minerals. Its significant mineral deposits include copper, gold, aluminium, iron ore, niobium, cobalt, silver and molybdenum as well as

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[2] Afghan Chamber of Commerce, www.afghanchamber.com/about/Exports.htm.
[3] Ibid.
[4] World Integrated Trade Solution, "Afghanistan," http://wits.worldbank.org/CountryProfile/en/Country/AFG/Year/2014/Summary.
[5] Pakistan Institute of Legislative Development And Transparency, "Pak-Afghan Trade" (paper, PILDAT, Islamabad, 2011), www.pildat.org/publications/publication/FP/Pak-AfghanTrade-DiscussionPaperDec2011.pdf.
[6] Peter Marsden, *Afghanistan, Aid, Armies & Empire* (London: I.B. Tauris, 2009), 29-30.
[7] "Minerals in Afghanistan" Afghanistan Geological Survey.
[8] Ibid.

resources of fluorspar, beryllium and lithium.[9] In 2010, an Afghan official told the BBC that Afghanistan will become 'self-sufficient' in mineral resources in ten years, if the resources are exploited properly. According to his calculations this wealth is worth nearly $3 trillion.[10] The relatively recent discovery of Afghan mineral wealth of about $1-3 trillion (approx.)[11] can be a boon or bane, because some among them like lithium are strategically important for the West.[12]

There is a dire need of improving infrastructure to ensure smooth transportation of these mineral resources to the processing sites. The processing units also require upgradation. Nonetheless, the main issue remains extraction and management of these mineral resources. According to a 2010 press release by the Afghanistan Chamber of Commerce and Industries (ACCI), Afghanistan opened bidding on the huge Hajigak iron ore deposit (the biggest in Asia) and the oil blocks in the Afghan-Tajik basin in early 2011. It is estimated that the basin contains about 1.6 billion barrels of oil.[13] A consortium of six Indian companies, led by the Steel Authority of India, won the concession for three iron ore mines in the Hajigak region in 2011, with investment worth $10.8 billion for setting up steel and power plants, besides mining the deposit.[14] However, given U.S. troop withdrawal and a recession hit industry, work on this has been slow.[15] It may take decades for Afghanistan to fully utilise its mineral wealth, and considerable foreign assistance and investment will be needed to develop the industry. China and India are competing against each other to obtain contracts from the Afghan government to develop these resources.

Afghanistan has about 24 different mining areas which need to be developed, but if the state and non-state actors do not agree to a future governance set-up, these minerals might turn into a curse for the Afghan people and used to fuel internal strife in the region.

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[9] ACCI, "Mining in Afghanistan," Afghanistan Chamber of Commerce & Industries, accessed October 31, 2016 http://www.acci.org.af/index.php?option=com_content&view=article&id=138&Itemid=12 ; James Risen, "U.S. Identifies Vast Mineral Riches in Afghanistan," *New York Times*, June 13, 2010, *http://www.nytimes.com/2010/06/14/world/asia/14minerals.html?_r=0.*

[10] "Afghan Minerals Mean 'Self-Sufficiency' in 10 Years," *BBC.com*, June 25, 2010, http://www.bbc.com/news/10412085.

[11] ACCI, "Mining in Afghanistan;" Risen, "U.S. Identifies Vast Mineral Riches in Afghanistan."

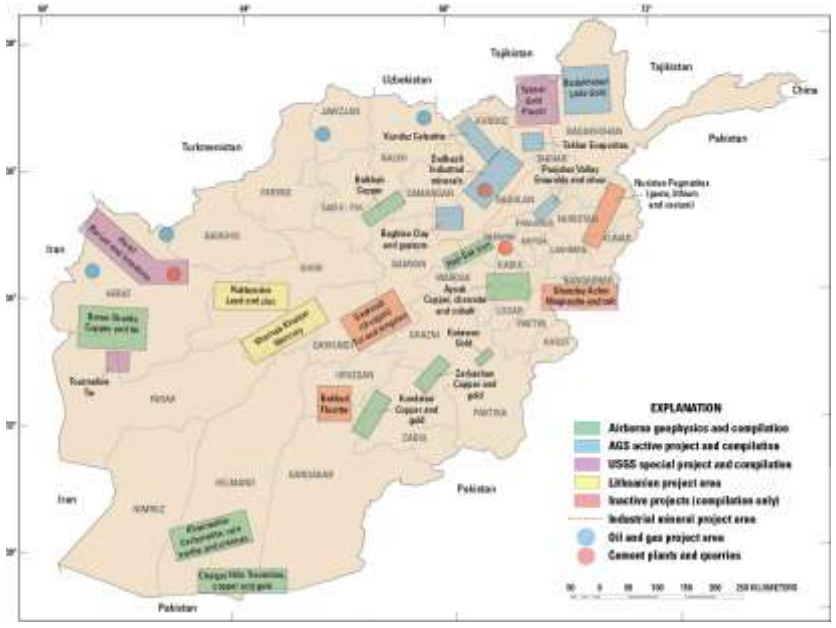
[12] Donald G. McNeil Jr., "Next for Afghanistan, the Curse of Plenty?" *New York Times*, June 18, 2010, www.nytimes.com/2010/06/20/weekinreview/20mcneil.html?tntemail0=y.

[13] Ibid.

[14] Indrani Dutta, "Hajigak Project Not Stuck Due on Security Concerns: Afghan Envoy," *Hindu*, February 23, 2015, http://www.thehindu.com/business/Industry/hajigak-project-not-stuck-due-on-security-concerns-afghan-envoy/article6925943.ece.

[15] Ibid.

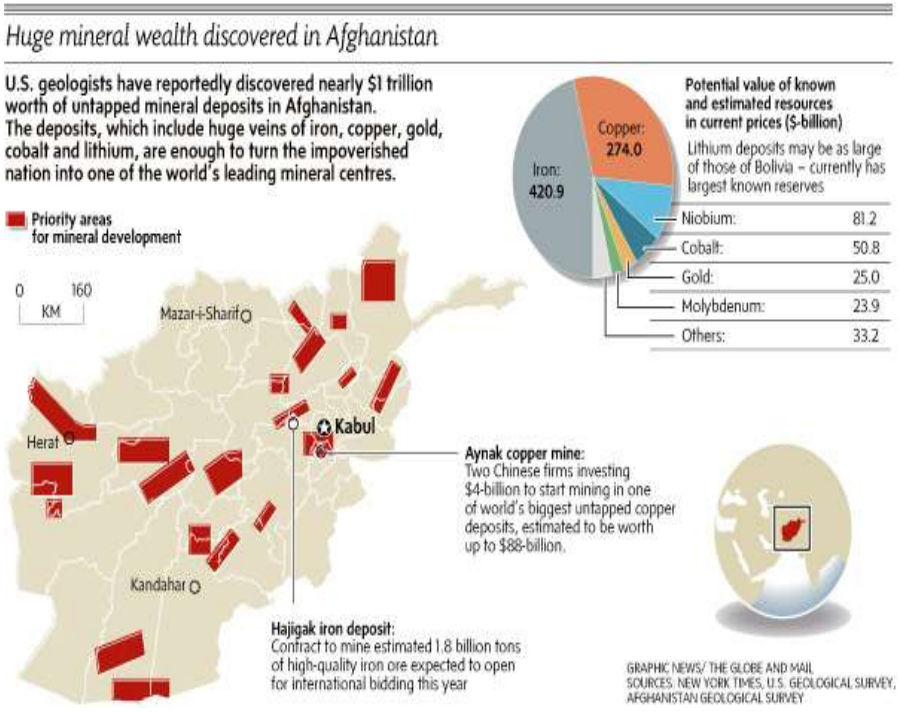
Figure-1
Afghan Mineral Areas of Interest (AoI)



Source: United States Geological Survey.

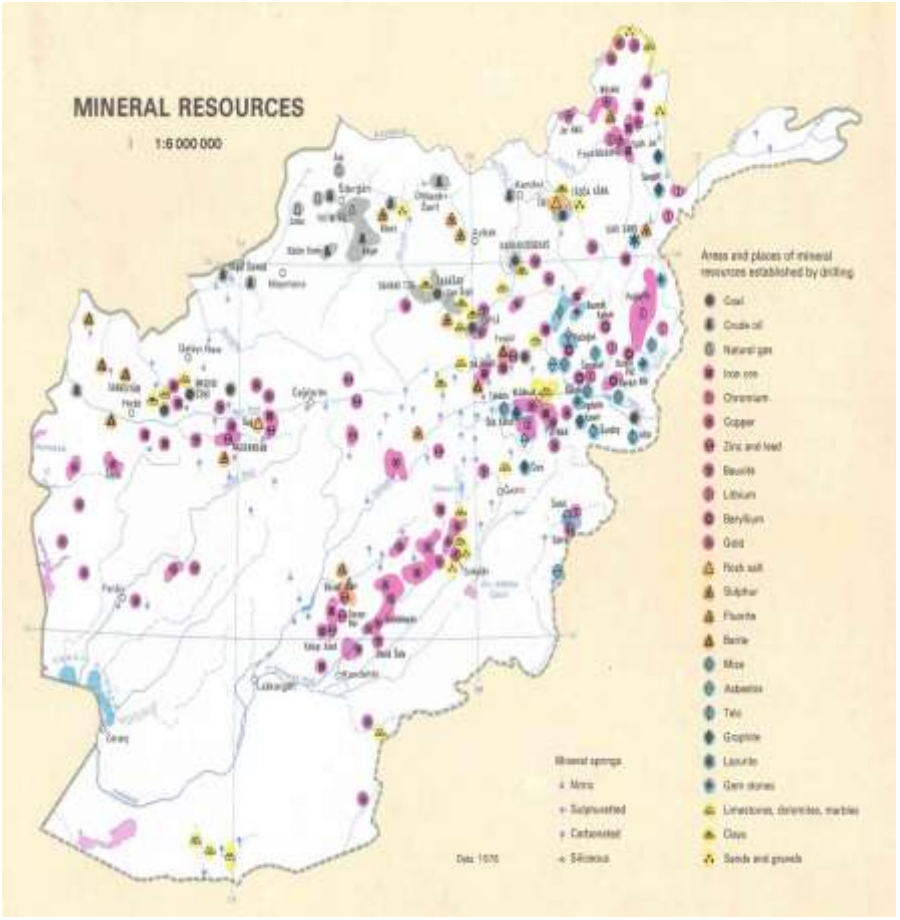
Figure 1 shows the complete details of 24 Areas of Interest (AOI) where different minerals including gold, silver, copper and rare earth elements have been discovered.

Figure-2
Afghan Mineral Deposits and their Potential Mining Areas



Source: Nikolai Malishevski, "The Pentagon's Map on Afghanistan: The Eldorado of Mineral Wealth and Natural Resources" Global Research Centre for Research on Globalization, March 14, 2014, globalresearch.ca/globalresearch.org.

Figure-3
Areas and Places of Mineral Resources established by Drilling



Source: Michel Chossudovsky, "'The War is Worth Waging'," Afghanistan's Vast Reserve of Minerals and Natural Gas," Global Research Centre for Research on Globalization, June 19, 2010.

Mineral Wealth of Afghanistan: Brief Overview

Afghanistan, undoubtedly, has a huge mineral resource base. Major powers have shown keen interest in the development of these mineral resources which can bring considerable and much needed foreign direct investment, which will bring new technology, resulting in job creation, capital formation and income generation. All this would play vital role in bringing peace and stability to this war-torn country. However, while financial assistance is needed to tap these resources, if the people of Afghanistan do not get their due share, it can lead to more disharmony and fragmentation.

There are also other challenges: corruption and areas under the control of the Taliban.

The USGS has identified 24 AOIs (Area of Interests) which require further study; many areas have the potential for artisan mining.[16] This joint study was conducted from 2009-2011 by the U.S. Geological Survey (USGS), the U.S. Department of Defense Task Force for Business and Stability Operations (TFBSO), and the Ministry of Mine's (MOM) Afghanistan Geological Survey (AGS).[17]

Another 2010 study shows that the country has significant mineral resources including copper, iron ore, marble, lapis lazuli, emeralds, rubies, oil, natural gas and number of rare earth minerals.[18] Mossotti identified 11 Areas of Interest (AOI) for industrial minerals including (16B) cement; (17A) Baghlan Clay-Gypsum; (18A) Bakhud Fluorite; (19A) Dudkash industrial minerals; (20A) Ghunday-Achin Magnesite-Talc; (21A) Khanneshin Carbonatite; (22A) Kunduz Celestite; (23A) North Herat Barium-Limestone; (24A) Nuristan Pegmatite; (25A) South Helmand Travertine; and (26A) Takhar Evaporite. These AOI include minerals like barite, bauxite and carbonatite as well as industrial metallic minerals like titanium and aluminum.[19] Khanneshin carbonatite contains different metals including phosphate, barite, nepheline, rare-earth elements, zirconium, copper, niobium, fluorspar and other minerals. But this area has been poorly explored since it is located in Southern Afghanistan.[20] The entire Khanneshin carbonatite contains a variety of minerals including thorium, uranium and lithium, but it has been estimated that it contains 6.2 million tonnes of phosphate; 1.4 million tonnes of rare-earth elements and 3.5 million tonnes of niobium.[21] Other than non-fueled minerals, Afghanistan also has fueled minerals including hydrocarbons like oil and gas. There are four proven basins in Afghanistan which contain oil and gas (i) Amu Darya; (ii) Afghan-Tajik; (iii) Tirpul; and (iv)Kushka. It has been estimated that

[16] Stephen G. Peters et al., introduction to *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, eds., S.G. Peters et al., U.S. Geological Survey Open-File Report 2011–1204 (Reston: U.S. Geological Survey, 2011), http://pubs.usgs.gov/of/2011/1204/pdf/01.pdf.

[17] Ibid.

[18] Nathaniel Fick and Clare Lockhart, "The Economic Imperative: Stabilizing Afghanistan through Economic Growth" (policy brief, Center for a New American Security, 2010), www.cnas.org.

[19] Victor G. Mossotti, 16A-Introduction to Industrial Minerals to *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan,* U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/16A.pdf.

[20] Stephen G. Peters, Greta J. Orris and Jared Abraham, "Deposits Related to Alkaline Intrusions," *United States Geological Survey* (USGS), 2007, https://pubs.usgs.gov/of/2007/1214/PDF/3.0-carbonatite-FINAL.pdf.

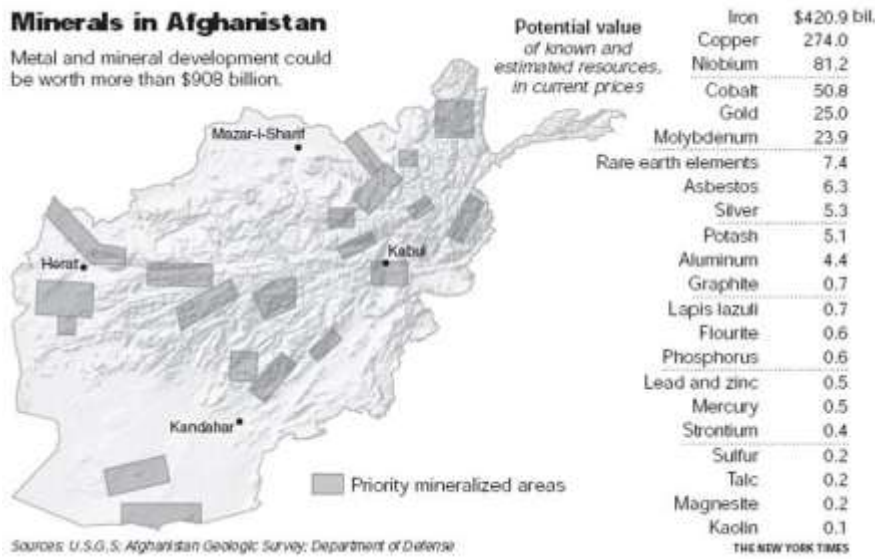
[21] Ibid.

this area contains 1.6-3.4 billion barrels of petroleum liquids, 16 trillion cubic feet of natural gas and 0.50 billion barrels of natural liquid gas.[22] Most of the unexplored oil and natural gas occurs in the Afghan-Tajik basin and Amu Darya basin. These two basins have a total covered area of about 515,000 square kilometres.[23] The third area, Tirpul basin has a total covered area of approximately 26,000 square kilometres; this oil basin is located to the west in Herat province.[24]

According to the New York Times, the total value of iron ore is $420 billion; and copper, niobium valued at $274 billion and $81 billion each. Other minerals have value between $0.1 billion to 50.8 billion, but the most important mineral resources which have been discovered are the Rare Earth Elements (REE) worth nearly $7.4 billion. These are the most important elements used in making high-tech products like superconductor alloys, supercondutor magnets, lasers, TV picture tubes and batteries for mobile phones, laptops and desktop computers. Some of these minerals are even found in other mines, like gold, silver, copper, lead and iron; similarly, uranium was discovered in the Badakshan gold mine, Haji-Gak, Daykundi mines, Dusar-Shaida mines and also in Khanneshin carbonatite.[25] Barium, thorium, rare earth elements, tin, lithium, tantalum and niobium are found in mines of Nuristan. These minerals are very important for advanced nations like the United States, Britain and France. According to the U.S. Geological Survey's estimate nearly 1 million tonnes of rare earth elements have been discovered in Khanashin carbonatites in southern Helmand province of Afghanistan.[26]

[22] Ministry of Mines, "Afghanistan Oil and Gas Resources" (Afghanistan Government, 2011), www.mom.gov.af.
[23] Ibid.
[24] Ibid.
[25] Peters et al., introduction.
[26] Lalit K. Jha "Huge Rare-Earth Material in Helmand: USGS," *Rawa News*, September 15, 2011, www.rawa.org/temp/runews/2011/09/15/huge-rare-earth-material-in-helmand-usgs.html.

Figure-4
Potential Value of Afghan Minerals



Source: Risen, "U.S. Identifies Vast Mineral Riches in Afghanistan."

These mines are highly important for the development of Afghanistan, but it might be years before they become operational and bring economic prosperity to the Afghan nation.

Aynak Copper (Logar Chromite)

Aynak copper mine contains both major and minor minerals including copper, cobalt and silver; and minor minerals like marble, chromite, asbestos, talc etc. Its reserves are found in Aynak, Jawhar and Darband. Aynak copper, cobalt and chromium AOI contains copper-cobalt and several chromium, talc-Magnesite, and asbestos target zones located in Southern Kabul, Northern Logar and Wardak provinces.[27] The total area of Aynak AOI is 3,439.37 square kilometres, which contains five subareas, four of the subareas include Kelaghey-Kakhay (27 square kilometres);

[27] Cliff D. Taylor, Stephen G. Peters and David M. Sutphin "2A-Summary of the Aynak Copper, Cobalt and Chromium Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://www.researchgate.net/publication/274252997_Chapter_2A_Summary_of_the_Aynak_Copper_Cobalt_and_Chromium_Area_of_Interest_Contribution_by_Cliff_D_Taylor_Stephen_G_Peters_and_David_M_Sutphin.

Bakhel Charwaz (40 square kilometres); Yagah-Darra Gul-Darra (57 square kilometres); and Kharuti Dawrankhel (66 square kilometres) as prospective for copper-cobalt deposits. But the fifth subarea, in Logar Valley (1,013 square kilometres), contains chromite and possibly platinum group element deposits.[28] Aynak copper mine is a worldclass mine, its contract was given to the China Metallurgical Group in December 2007, with a total investment of $4.4 billion.[29]

Badakshan Gold

Badakhshan gold mine contains minerals like gold, iron ore, silver, copper, bismuth, mercury, tungsten, arsenic, copper and rare earth elements. This mine is located in Badakhshan in northern Afghanistan. It also contains uranium which is an important fuel for nuclear power plants. The Badakshan Area of Interest (AOI) is 6,501.42 square kilometres.[30] Badakshan Gold AOI is regarded as the best known area for gold reserves. It also contains nearly 80 million metric tonnes of ore which contains 50-68 per cent iron.[31]

Balkhab Copper

The Balkhab copper mine contains nearly fourteen different kinds of minerals which include iron, copper, silver, gold, magnesium, arsenic, tin, zinc, titanium, molybdenum, bismuth, lead and barium.[32] This mine also contains coal, aluminum, calcium, potassium and silicon which are an important resource for heavy industries.[33]

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[28] Ibid.

[29] Jalil Jumriany, "Mineral Resources of Afghanistan" (presentation, HSBC Global Natural Resources Conference, Singapore, 26-27 September 2011), https://mom.gov.af/Content/files/Afghan%20Presentation%20-%20Sg%20Conf_Consolidated%20v1.pdf.

[30] Stephen G. Peters, "3A-Summary of the Badakshan Gold Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/03A.pdf.

[31] Ibid.

[32] Stephen G. Peters, Robert D. Tucker, Abdul Gaffar and Bernard E. Hubbard "4A-Summary of the Balkhab Copper Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011).

[33] Ibid.

Daykundi Tin, Tungsten and Lithium

Daykundi mines contains tin, lithium, tungsten, copper, lead and zinc. These minerals are important for producing copper wires and batteries for laptops, smart and mobile phones. Daykundi AOI (Area of Interest) consists of three mineralised zones which include the (i) Taghawlor Lithium Pegmatite Field; (ii) Nili-Chak Tungsten Area; and (iii) Oruzgan Ore District (Kunak, Charkh and Sheng-Eskan). These zones contain different metals such as tungsten, mica, tin, lithium, zinc and beryllium.[34] Lithium is used in both civil and military applications, including air treatment, ceramics, glasses, thermoplastics, electric and electronics, especially batteries used in laptops, flashlights, hybrid and electric vehicles.

Dusar-Shaida Copper and Tin

Dusar-Shaida mineral sector contains both major and minor minerals which include copper, tin, lead, zinc and tungsten. The Dusar-Shaida-Misgaran copper and tin AOI (Area of Interest) is located in west central Afghanistan, and as the name indicates is divided into three different subareas where minerals are found including Dusar, Shaida and Misgaran.[35] This area contains numerous minerals including light and heavy rare earth elements which are essential for modern heavy industries including zinc, lead, copper, lithium, cobalt, arsenic, thorium, niobium, neodymium, cerium, rubidium, tantalum, titanium, praseodymium and uranium.[36]

Haji-Gak Iron

The Haji-Gak mine contains iron which is found in abundance and also contains other minerals like barium, marble, sandstone, uranium and copper. This AOI is located in provinces of Bamiyan, Parwan and Wardak.[37] The Haji-Gak ore deposits are more than 12 km long and 3 km wide and contain 16 separate zones which are 5 km in length.[38]

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[34] Stephen G. Peters "5A- Summary of the Daykundi Tin, Tungsten and Lithium Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/05A.pdf.

[35] Robert D. Tucker, Klaus J. Schulz and Stephen G. Peters "6A- Summary of the Dusar-Shaida Copper and Tin Area of Interest" in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/06A.pdf.

[36] Ibid.

[37] Karine Renaud et al., "7A-Summary of the Haji-Gak Iron Area of Interest" in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel*

Katawas Gold

Katawas Gold mine contains gold, silver, mercury and tungsten, but gold and silver is a major mineral of this mine. This mine contains a number of minerals which include gold, silver, mercury, tungsten, antimony, arsenic, lead, zinc, copper and nickel. It has been estimated that it contains 11, 900 tonnes of both lead (3,100 tonnes) and zinc (8,800 tonnes).[39]

Karnak-Khanjar Mercury

The Karnak-Khanjar mine is basically a mercury belt, but it also contains antimony, arsenic, gold and silver deposits. Deposits of mercury are found in nineteen different prospect areas in Afghanistan. The mercury prospects in Karnak-Kanjar are part of a northeast trending belt which extends 380 kms across central and southwestern Afghanistan.[40]

Kundalan Copper and Gold

The Kundalan Copper and Gold mine contains copper, gold, molybdenum, silver and lead. But gold and copper are also found in other subareas of this mine. This AOI is rich in gold and copper prospects, including the Kundalan copper-gold skarn deposits. It is estimated that the gold-copper deposits here contain 21,400 tonnes of copper, 1600 kg (1.6 tonnes) of gold and 133.4 tonnes of molybdenum.[41]

Nalbandon Lead and Zinc

The Nalbandon lead and zinc mine contains lead, zinc and silver. This AOI contains more than 50 other different mineral deposits; however only two

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Minerals in Afghanistan, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/07A.pdf.

[38] Ibid.

[39] Stephen G. Peters and Bernard H. Hubbard "8A- Summary of the Katawas Gold Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011).

[40] Gregory Fernette "9A- Summary of the Kharnak-Kanjar Mercury Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/09A.pdf.

[41] Stephen G. Peters, Said H. Mirzad and Emily Scott, "10A- Summary of the Kundalan Copper and Gold Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, eds. S.G. Peters, et al., U.S. Geological Survey Open-File Report 2011–1204 (Reston: U.S. Geological Survey, 2011), http://pubs.usgs.gov/of/2011/1204/pdf/10A.pdf.

have subsurface exploration; and six have been sampled by surface trenchin.[42] The areas where lead, zinc and copper have been discovered include Nalbandon district and Ghargananaw district in Ghor province. The reserves in Nalbandon prospect are about 2 million metric tonnes of grade 1 per cent of lead and 5 per cent of zinc. It also includes 1.6 grams per metric tonne of gold.[43]

North Takhar Gold Placer

The North Takhar placer contains gold, but there is information about the discovery of other minerals in this mine. This AOI is one of the two largest gold reserves in Afghanistan.[44] It contains several commercial grade reserves within the 6000 square kms area. The largest reserve is located at Samti, with estimated gold reserves of more than 30 tonnes.[45]

Panjsher Valley Emerald, Iron and Silver

The Panjsher Valley is famous for its emeralds, but in this mine, iron ore and silver have also been discovered. Panjsher AOI lies in eastern Afghanistan; this area contains emeralds, iron and silver. The total area of the AOI is 958.68 square kilometres which includes the silver-iron subarea (111 square kilometres) and emerald subarea (125 square kilometres) which lie within its central parts.[46] This area contains minerals like emeralds, chromium, mica, vanadium, beryllium, iron, copper, lead, zinc, silver and manganese.[47]

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[42] Gregory Fernette and Karine Reynaud "11A- Summary of the Nalbandon Lead and Zinc Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/11A.pdf.

[43] Ibid.

[44] Peter G. Chirico et al., "12A- Summary of the North Takhar Placer Gold Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/12A.pdf.

[45] Ibid.

[46] Stephen G. Peters "13A- Summary of the Panjsher Valley Emeralds, Iron, and Silver Area of Interest" in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/13A.pdf.

[47] Ibid.

Tourmaline Tin

This mine was discovered by a Soviet expedition team led by Meshcheryakov and Borozenets in 1970; and Nagaliov and others in 1971. These expeditions led to the discovery of mineralised areas and prospects, as a result of extensive geological fieldwork, especially in the Tourmaline area. This mine contains three major and minor metallic minerals including tin, tungsten and copper. It is spread over an area of 1,365 square kilometres in Farah province in the western Anar Dara district and in parts of Herat province in eastern Shin Band district.[48] The Tourmaline tin prospects on the western margin of the granite stock are the largest known prospects that have been sampled and mapped.

Zarkashan Copper and Gold

Zarkashan copper and gold mine contains both copper, gold, silver and lead, but the major mineral resource of this mine is gold and copper. This AOI is located in Ghazni province of southern Afghanistan and also includes other areas of Ab-Band, Gelan, Glarabaghn, Jaghuri, and Mokur administrative districts.[49] The total area of the Zarkashan AOI is 1,692 square kilometres, divided into three subareas: Luman-Tamaki gold subarea (356 square kilometres), Bolo gold subarea (313 square kilometres) and Zarkashan mine subarea (214 square kilometres) designated as having high potential prospects for commercial mineralised rock.[50]

Baghlan Clay and Gypsum

The Baghlan province contains the most important industrialised minerals including clay, bauxite, gypsum, limestone and coal, all of which are used in the production of cement. These mineral resources are found in the southwestern part of Baghlan province, the southeastern part of Samangan province, and the northeastern part of Bamian province.[51] Baghlan AOI

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[48] Stephen G. Peters, Bernard E. Hubbard and Trude Ridley-King, "14A- Summary of the Tourmaline Tin Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011).

[49] Stephen G. Peters et al., "15A-Summary of the Zarkashan Copper and Gold Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/15A.pdf.

[50] Ibid.

[51] Victor G. Mossotti, Barry C. Moring and Greta J. Orris, "17A- Summary for the Baghlan Clay and Gypsum Area of Interest," in *Summaries of Important Areas for Mineral*

(Area of Interest) is a rectangular-shaped spread with an area of about 1,800-square kilometres including mountains and narrow valleys that occupies the southern portion of the Afghanistan Platform.[52] It contains bauxite deposits in Eshpushta, Estoma and Nalag; gypsum in Shoraw and Dudkash; and clay is found in Surkhab and Kawkpar.[53]

Bakhud Fluorite

Bakhud Fluorite Area of Interest (AOI) is spread over 3,637.53 square kilometres; it includes Kandahar and Daykundi provinces and districts of Nesh, Dihrawud, Tirin Kot, Chera, Sha Wali Kot, and Khakere Ghorak.[54] This area contains the deposits of iron, fluorite, barite, tin, copper, lead, zinc, dolomite, silica and molybdenite etc.[55] The volume of calcareous fluorite occurrences makes up to 60-70 per cent of the ore; and the grade of the fluorite is between 30-65 per cent, including 0.5 to 1.0 zinc and 0.2 to 0.4 lead. It also includes other minerals like sphalerite, galena, chalcopyrite, tennantite, and molybdenite.[56]

Dudkash Industrial Minerals

The Dudkash Industrial Minerals Area of Interest (AOI) is spread over 4,922 square kilometres and is located in three provinces and eleven districts of Afghanistan.[57] It contains gypsum, limestone-dolomite, clay, celestite, and coal minerals that have great economic potential for Afghanistan.[58] The deposits are located in the provinces of Baghlan, Kunduz, Samangan, Daykundi and Kabul.[59]

Investment and Production Opportunities of Nonfuel Minerals in Afghanistan, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/17A.pdf.

[52] Ibid.

[53] Ibid.

[54] Ibid.; Mossotti, "16A- Introduction to Industrial Minerals."

[55] Ibid.

[56] Victor G. Mossotti, Barry C. Moring and Greta J. Orris "18A-Summary of the Bakhud Fluorite Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011); Mossotti, "16A-Introduction to Industrial Minerals."

[57] Mossotti, 16A- Introduction to Industrial Minerals.

[58] Victor G. Mossotti et al., "19A- Summary for the Dudkash Industrial Minerals Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/19A.pdf.

[59] Ibid.

Ghunday-Achin Magnesite-Talc

The Ghunday-Achin magnesite and talc mine contains minerals like magnesite, talc, asbestos, graphite, coal and marble. These are industrial minerals which are used in construction. These deposits are found near Tora Bora on the Pak-Afghan border just 16 kilometres south of Jalalabad and is located in Nangarhar and Paktia provinces of Afghanistan.[60]

Khanneshin Carbonatite

The Khanneshin carbonatite AOI is a region of light rare earth element (LREE) mineralisation, with an estimated 1 million metric tonnes of LREE. In addition to the LREE (such as lanthanum ytterbium), the Khanneshin carbonatite AOI is greatly enriched in cerium, barium, neodymium, strontium, thulium, praseodymium, holmium, erbium, lutetium, phosphorus, and uranium.[61] These elements are used in high technology industrial applications. For example, neodymium is used to make powerful magnets used in loudspeakers and computer hard drives; lanthanum is used in camera and telescope lenses; cerium is used in catalytic converters in cars; yttrium, terbium, europium are important in making televisions and computer screens and other devices that have visual displays. The total area of Khanneshin carbonatite is about 5,628 square kilometres and is located in Rig district of Helmand province which is relatively close to Helmand River and 168 kilometres from Lashkar Gah.[62]

Kunduz Celestite

Kunduz celestite mine contains minerals like celestite, limestone, gypsum, coal, dolomite and strontium as well as oil and gas. It contains nearly 1 million metric tonnes of celestite; and oil occurs in Katar. This AOI is spread over 2,266 square kilometres.[63]

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[60] Mossotti, 16A- Introduction to Industrial Minerals.

[61] Robert D. Tucker et al., "21A-Summary of the Mineral Information Package for Khanneshin Carbonatite Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/21A.pdf.

[62] Mossotti, 16A- Introduction to Industrial Minerals.

[63] Greta J. Orris, "22A- Summary of the Kunduz Area of Interest" in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/22A.pdf.

North Herat Barium-Limestone

The North Herat barium-limestone Area of Interest (AOI) covers 9,684 square kilometres, mainly located in Herat province where a variety of industrial minerals have been discovered including vein barite, brick clay, limestone (cement grade), marble and iron skarn.[64] The largest barite and gypsum deposits are found in the Sangilyan which covers an area of more than three square kilometres and is hosted in volcanic and sedimentary rocks that contain three mineralized zones.[65]

Nuristan Pegmatite

Nuristan pegmatite contains rare earth elements lithium, tin, mica, beryllium, tantalum, cesium, niobium, Ggem-quality tourmaline, kunzite, beryl and optical grade quartz.[66] Two pegmatite belts (the Nuristan and Hindu Kush) flank the Alingar Pluton on the east and west sides, respectively. The central part of Nuristan pegmatite belt lies within the Nuristan rare-metal pegmatite AOI and identical rare-metal pegmatite's are concentrated in four fields: Pacigram, Paron, Kantiway and Darrahe Pec. There are nearly ten mineral fields in Nuristan Pegmatite which contain different minerals including lithium, tin, niobium, tantalum, mica, tourmaline, beryllium, gemstone, quartz, cesium and rubidium.[67] This Area of Interest covers about 3,490 square kilometres which includes four provinces and nine districts of Afghanistan.[68]

Takhar Evaporite

The Takhar Evaporite Area of Interest covers 1,148 square kilometres which is mostly located in the Afghan province of Takhar. It contains

[64] Mossotti, 16A- Introduction to Industrial Minerals.

[65] Victor G. Mossotti, Greta J. Orris and Barry C. Moring, "23A-Summary of the North Herat Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/23A.pdf.

[66] Mark D. Cocker, "24A-Summary for the Mineral Information Package for the Nuristan Rare-Metal Pegmatite Area of Interest," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/24A.pdf.

[67] Ibid.

[68] Mossotti, 16A- Introduction to Industrial Minerals.

industrial minerals which include salt, celestite, gypsum, clay,[69] limestone, sulfur, gold, mercury, dimension stone, sandstone and porphyry copper.[70]

Opportunities and Challenges for Afghanistan

Opportunities

Afghanistan has great opportunities to turn its gypsum, lithium and iron into major export byproducts which are used in different industries. Its uranium, copper, silver, gold, aluminium, titanium and thorium can be used for peaceful nuclear purposes and in industrial production processes. The value of rare earth elements (REE) found in Afghanistan is nearly 7.4 billion dollars which includes both light and heavy elements such as tin, beryllium, lithium, samarium, gadolinium, praseodymium and thorium. Some of these metals are used in military and civilian appliances like batteries, submarine hulls, nuclear medicine, high-temperature superconductivity, glass polishing and computer monitors etc. Today, REEs have great demand in the international market. China is the biggest producer of these metals.[71] During 1999 to 2000, United States was the biggest importer of rare earth elements from China.[72] In fact, 'the country's domestic consumption of rare-earth imports in 2013 increased to 10,500t from 5,770t in 2012 making it the third biggest rare earth consumer after China and Japan.'[73]

Afghanistan's industrial mineral wealth can be beneficial for re-building its own infrastructure, and can also be exported to other countries including Pakistan, Iran and the Central Asian States. However, the country needs international help to develop its industrial minerals, especially limestone, gypsum, coal, oil and gas. This will help the Afghans to rebuild their country and to produce electricity from gas and coal. Minerals such as copper, aluminum, gold, silver and the REE can bring an economic revolution in Afghanistan. Afghanistan's basins also contain oil and gas. During the last century, Afghanistan exported gas to Central Asian States.

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[69] Ibid.

[70] Greta J. Orris "26A- Summary for the Takhar Area of Interest (AOI)," in *Summaries of Important Areas for Mineral Investment and Production Opportunities of Nonfuel Minerals in Afghanistan*, U.S. Geological Survey Open-File Report 2011–1204, eds. S.G. Peters, et al. (Reston: U.S. Geological Survey, 2011), https://pubs.usgs.gov/of/2011/1204/pdf/26A.pdf.

[71] "6 Top Rare Earth-Producing Countries: A Look at Rare Earth Production," *Investing News Network*, July 14, 2016, http://investingnews.com/daily/resource-investing/critical-metals-investing/rare-earth-investing/top-rare-earth-producing-countries-2013-usgs-2/.

[72] United States Geological Survey, "Rare Earth Elements-Critical Resources for High Technology" (fact sheet no. 87, USGS, Reston, 2002).

[73] "Scarce Supply - The World's Biggest Rare Earth Metal Producers," *mining-tachnology.com*, July 3, 2014, http://www.mining-technology.com/features/featurescarce-supply---the-worlds-biggest-rare-earth-metal-producers-4298126/.

But in near future Pakistan can also import oil and gas from Afghanistan to fulfill its energy needs.

While Chile and Australia produce the most lithium (the lightest known metal) in the world, its two main sources have also been found in Afghanistan.[74] Lithium-brines are found in Lake Ab-i-Estoda, Lake Dashte Nawar, (near Ghazni) Lake Namaksar (Herat), Chakansar (Nimroz) and Gowde Zerah (Helmand) have the highest potential. It has been estimated that the 350,000 tonnes of lithium are found in Afghan lakes.[75] Economic potential of lithium pegmatite has been discovered in areas of Parun (Paron), Shamakat, Tagawlor, Eshkashem, Alingar, Marid and Nilaw-Kulam fields. It has been geologically estimated that Parun district contains 3 million tonnes of Lithium Oxide.[76] In fact, since 2010, it has been speculated in various articles that Afghanistan could become the 'Saudi Arabia of lithium'- a key raw material in the manufacture of aircrafts, batteries for laptops and BlackBerrys.[77]

India has been taking keen interest in investing billions of dollars in mining, steel plants and related infrastructure in Afghanistan.[78] In 2011, as mentioned before, a consortium won a ten billion dollar Afghan mine deal, led by the state-owned Steel Authority of India.[79] In 2014, China renegotiated a three billion dollar Mes Aynak copper mine deal which was earlier signed in 2007. This mine contains 5.5 million tonnes of high grade copper.[80] According to London Metal Exchange, the price of copper was $6399 per tonne as of May 14, 2015 which means the mine contains $35.194 billion worth of high grade copper.[81] The former Afghan President Ashraf Ghani made his first official visit to China, during which both

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[74] Ministry of Mines, *Lithium in Afghanistan: Minerals in Afghanistan* (Afghanistan Government, 2014), http://mom.gov.af/Content/files/MoMP_LITHIUM_Midas_Jan_2014.pdf.

[75] Ibid.

[76] Ibid.

[77] Chossudovsky, "'The War is Worth Waging'," Afghanistan's Vast Reserve of Minerals and Natural Gas; Lorimer Wilson, "$1 Trillion Motherlode of Lithium and Gold Discovered in Afghanistan," *Mining.com*, June 16, 2010, http://www.mining.com/1-trillion-motherlode-of-lithium-and-gold-discovered-in-afghanistan/; Risen, "U.S. Identifies Vast Mineral Riches in Afghanistan."

[78] Dinoj K. Upadhyay and Athar Zafar, "Afghanistan under Transition: Assessing India's Economic Engagement," (issue brief, Indian Council of World Affairs (ICWA), New Delhi, 2012), http://www.icwa.in/pdfs/IBafganistan.pdf.

[79] "Indian Consortium Wins $10 Billion Afghanistan Mines Deal," *BBC News*, November 29, 2011, www.bbc.co.uk/news/world-asia-15936402.

[80] Lynne O' Donnell, "China's MCC Turns Back on US $3b Mes Aynak Afghanistan Mine Deal," *South China Morning Post*, March 20, 2014, http://www.scmp.com/author/lynne-odonnell-0.

[81] "Non-Ferrous Metals," London Metal Exchange, May 14, 2015, www.lme.com/metals/non-ferrous/.

countries discussed issues of common interest, including increasing diplomatic and economic ties.[82]

Challenges

Afghanistan is facing numerous challenges in the extraction of its minerals such as corruption, lack of infrastructure, security risk to investors and lack of safety procedures. But if the International Security Assistance Force (ISAF) leaves Afghanistan in its current situation, there is a risk of civil war; and these minerals might be used as a resource to buy military equipment which is more likely to be used against each other. The country is already facing a major problem of ruby smuggling from its mines, the income from these mines is being used to buy weapons and pay salaries to of rebel fighters.[83]

Both China and India have taken keen interest in buying major mines in Afghanistan. China has already invested heavily in Afghan minerals, especially in their oil sector and also in the Aynak copper mines in Logar province. Although, there is a huge potential for investment, the security situation is so volatile that it is difficult for investors to invest their capital.[84] While Afghanistan does have a National Mining policy[85] and has never faced serious internal challenges with regards to its mineral wealth, 'fights could erupt between the central government in Kabul and provincial and tribal leaders in mineral-rich districts.'[86] If the warlords in Afghanistan take control of these mines, it can become a major risk for the entire region, not just for the Afghan nation.

The mining sector suffers from serious corruption and nepotism. Between 2007 and 2012, the Afghan government gave five mining contracts to local private mining companies which include Ghori Cement (coal, cement) and Qara Zaghan (gold) in Baghlan province; Nuraba and

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[82] Ayaz Gul, "Afghanistan's Ghani Visits China First Official Trip," *Voice Of America (VOA)*, October 28, 2014.

[83] "Afghanistan's Fabulous Ruby Mines Plundered by Thieves," *BBC News*, May 26, 2012, www.bbc.co.uk/news/world-asia-18070571.

[84] Renard Sexton, "Case Study 6: Industrial Iron Mining in Bamiyan Province: Natural Resources and Conflict in Afghanistan, Seven Case Studies, Major Trends and Implications for the Transitions," July 2012, www.watchafghanistan.org.

[85] "Mineral Law of Afghanistan," Public Intelligence, http://publicintelligence.info/AfghanMineralLaw.pdf; "Afghanistan Mineral Mining Law and Regulations 2010," Public Intelligence, https://publicintelligence.net/afghanistan-mineral-mining-law-and-regulations/ ;
Ministry of Mines, "National Mining Policy," (Afghanistan Government), http://www.aisa.org.af/Content/Media/Documents/National-Mining-Policy11120141638542325533253 25.pdf.

[86] Wilson, "$1 Trillion Motherlode of Lithium and Gold Discovered in Afghanistan."

Samti (gold) in Takhar province; Kohi Safi (chromite) in Parwan province; and Western Garmak (coal) in Samangan province.[87] One of the contracts given was to the Afghan Investment Company (AIC) owned by the brother of former Afghan President Hamid Karzai.[88]

The mining sector in Afghanistan today is characterised by irregularities and lack of transparency in the tender process, influence peddling, beneficial ownership of mining contracts by politically connected interests, unfulfilled legal and contractual requirements, and substantial loss of government revenue. Despite provisions in the Mineral Law of 2010 and its 2014 revision, responsible government entities have largely failed to effectively regulate and monitor the mining sector. Companies have not been paying their financial dues for years and generally do not meet contractual provisions for either funding local development or responding to complaints and grievances from local communities, yet continue to operate with an absurd level of impunity.[89]

Investment Opportunity in Afghanistan for Pakistan

Pakistan should consider investing in key Areas of Interest, especially Nuristan rare-metal pegmatite, Haji-gak iron ore, Aynak copper, Dusar-Shaida copper and tin, Daykundi mines, Nalbandon, Kunduz celestite, Karnak-Khanjar mercury, Khanneshin carbonatite and Dudkash industrial minerals.

The possibilities of utilisation of iron-ore deposits of Afghanistan should be explored. Afghanistan has a very large deposit of good quality iron in its Bamiyan province (Hajigak). There is a supply of coke-grade coal nearby. Both are essential inputs for producing pig/blast furnace iron. Pakistan does not have similar iron ore deposits of comparative quality and quantity. Pakistan currently imports iron–ore and coke-grade coal from Australia for Pakistan Steel Mills' requirements in Karachi. Development of Pakistan's iron and steel industry has suffered because of local availability of raw materials. A considerable portion of Pakistan's steel demand is imported and the demand is growing. Steel industry is bound to expand due to persistent demand creating significant demand for iron ore and raw materials. Afghanistan can be a good source of import of this ore from the mines for iron and steel projects to be located in the joint border areas of

[87] William A. Byrd and Javed Noorani, " Exploitation of Minerals Resources in Afghanistan without Government Revenues or Development Benefits" (Peace Brief no.182, United States of Peace (USIP), Washington, D.C., 2014), https://www.usip.org/sites/default/files/PB182-Exploitation-of-Mineral-Resources-in-Afghanistan-Without-Government-Revenues-or-Development-Benefits.pdf.
[88] Noorani, *Afghanistan's Emerging Mining Oligarchy*.
[89] Ibid.,1.

Afghanistan-Pakistan. Such projects would create employment and economic activity. Iron and steel production and mining industry is quite compatible with the proposed rusty/dusty region and would be compatible with the rough and tough workforce, as opposed to other industries that have been proposed now and then and have not reached the stage of materialization.[90]

Pakistan can offer three mineral trade routes to land-locked Afghanistan, (i) Northern Trade Route (Tourkham), (ii) Central Trade Route (Ghulam Khan) and (iii) Southern Trade Route (Chaman Border Post) in return for shares in the mines near the Pak-Afghan border.

Import of rare earth elements will also boost Pakistan's exports and help improve its heavy mechanical industry, which include automobile, aerospace and defense industry. While there is room for improvement in Pakistan's mining sector, Afghanistan can learn from Pakistan's experience in this area.

Market Value of Afghanistan's Mineral Resources

The mineral resources that have been discovered in Afghanistan have great value in the international market. According to London's Metal Exchange, the prices of precious metals as of July 18, 2014 for copper was $7026.50 per tonne; for zinc $2,287.50; for cobalt $ 32,750 per tonne; for nickel $18505 per tonne; tin $22,080 per tonne; and for molybdenum $29,500 per tonne.[91] Afghanistan also has energy minerals like uranium, thorium, oil and gas, with the total gas reserves estimated to 15.7 trillion cubic feet and oil and gas estimated to 1.5 billion barrels. According to U.S. Geological Survey estimates, Afghanistan has 36.5 trillion cubic feet of gas which is located in Northern Afghanistan and 3.6 billion barrels of oil.[92] The prices of other minerals range from $ 6 per pound to $26000 per tonne, including vanadium, bismuth, tungsten, antimony, molybdenum; and some minerals cost around $415 per troy ounce to $920 per troy ounce.[93] According to the mineralprices.com, the prices of both light and heavy rare earth elements range from $12 to $15,500 per kg.

[90] Akhtar Ali, "Afghan Mineral Resources For Regional Development," *Development Pakistan Blog*, June 25, 2010, http://developmentpakistan.blogspot.com/2010/06/afghan-mineral-resources-for-regional.html.
[91] "Non-Ferrous Metals," London Metal Exchange, July 18, 2014, www.lme.com/metals/non-ferrous/.
[92] US Geological Survey, *Afghanistan Oil and Gas Reserves* report(Washington, D.C.: USGS, 2012).
[93] Mineralprices.com

Conclusion

The treasure of precious mineral metals can turn the fate of a war-torn country like Afghanistan around. The problem, however, is that the security situation in Afghanistan is so volatile that most international companies are reluctant to take the risk and explore its untapped resources. Despite this risk, regional giants India and China have already invested billions of dollars in projects like the Aynak copper mine and Haji-gak iron ore. Pakistan should also look into these projects and Afghanistan's mineral prospects.

The (approx.) three trillion dollar resources must be utilised in a proper way so that Afghanistan can benefit economically by exporting its byproducts and improve the country's overall GDP. The bottlenecks like corruption, favouritism, insecurity, insurgency and lack of infrastructure (like roads and railway system) have also made it close to impossible for investors to invest in Afghanistan's mineral projects.

What is needed is to develop a strategic long-term vision, including knowledge driven development of the mining sector, more mineral processing within Afghanistan, integration with other sectors of the economy, revised and expanded legislation, a recentralized licensing system, transparency in the tender process, due diligence, a mechanism for revenue and tax collection, NEPA (National Environment Protection Agency) review, and an involved and educated civil society.[94]

Other than the old trading routes, Pakistan can help its neighbour develop more routes which can give Afghan products more access to outside markets, and also enhance our role in the country's development. Starting from north to south more routes can be opened, which would give almost the whole of Afghanistan, easy access to other markets e.g. the Brogal Pass, Nawa Pass, Mohmand Area, Torkham, Parachinar, Ghulam Khan, Angor Ada and Khost-Miranshah.

The international community should help the government develop the mining sector rather than push for overly rapid extraction in the short run. International partners may help both in developing a good strategy for governance of the sector and in providing technical and financial support for capacity building and implementation. Last but not least, international partners can play an important role in helping ensure sound environmental management and mitigation of adverse environmental impacts of mining activities.[95]

[94] Noorani, *Afghanistan's Emerging Mining Oligarchy*.
[95] Ibid., 11.

The bottom line is that the development of major heavy industry in Afghanistan is linked with peace in Afghanistan (and the region) without which the prosperity of local Afghans will remain an elusive dream.■