RARE LANDS ECONOMY.
NEW BRANCH OF ECONOMIC SCIENCES

Author: Emilian M. Dobrescu

"Middle East has oil, but China has rare minerals," he said in a premonitory Deng Xiaoping 30 years ago.

Abstract: For the first time in economics use this phrase - "rare lands economics, the discipline of the border, which is holding up the subject of the economy as general science and rare lands mining and processing operations". Economy and rare lands production and use of sophisticated technologies based on them, I propose to appoint rare lands economics. The planet, more than a quarter of new technologies for the production of economic goods economic use of rare lands s, which are also called critical minerals and industries that rely on the valuable items worth an estimated nearly five trillion dollars, or 5 percent of world gross domestic product. In the near future, competition will increase and Local Economic competition for control of rare lands minerals and incorporated into high-tech products. Minerals are rare in the twenty-first century what oil accounted for the twentieth century, and coal for the nineteenth century: the engine of a new industrial revolution. Future Energy is produced increasingly more technological equipment are based not only steel and concrete, but incorporates significant quantities of ferrous metals and rare lands. Wide application of these technologies will lead to an exponential increase in demand for this type of mineral, and what is worrying is that such minerals are almost unavailable in Europe and other industrialized countries in the world, such as U.S. and Japan. Becoming increasingly used in new technologies, especially negative effects on the environment, the lands are mainly produced in China. Obtained by

Emilian M. Dobrescu, Ph.D., Professor, Scientific Secretary of the Economic, Law, and Sociological Sciences Section of the Romanian Academy, e-mail: dobrescu@acad.ro
1. The main rare lands

Actinides and Lanthanides, as listed in Mendeleev's periodic table of elements together are called "rare lands". The term "rare land" refers to minerals that are vital metals isolated in the first instance: Cerium, Dysprosium, Lanthanum and Neodium. The today rare lands aficionados understand the following main elements: Dysprosium, Terbium or Neodymium. Most researchers consider that the group called rare lands metals containing 17 elements, used increasingly in May than in the current economy wide variety of industrial technological applications.

Rare lands have been discovered by a Swedish army lieutenant in 1787\(^1\). Most of the elements of the two classes, lanthanides and actinides, are quite common: many of them are more abundant in Land’s crust than lead or nitrogen. Flints of cigarette lighters made of rare lands were used in incandescent lamps many centuries, until the current invention and a light bulb.

Rare lands deposits are found, preferably with the precious metal. For a long time this was noticed in the U.S. state of North Carolina, in the process of washing of gold, hence the brownish-yellow sand, with a high density, which is monazite.\(^2\) Most used are Neodymium rare lands magnets (NdFeB) and samarium-cobalt (SmCo).

Rare-lands magnets - such as neodymium-iron-boron or samarium-cobalt permanent magnets are the most technically advanced. Net advantage of NdFeB-type magnets is given by the size and low weight, high reliability and excellent magnetic characteristics. Surface type NdFeB magnets can protect zinc, nickel or regular painting. Magnets of this type must be protected at the surface, otherwise it will corrode.

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In applications made at higher temperatures is recommended to prime the samarium-cobalt magnets, which are particularly stable. Because of component materials, this type of magnet does not corrode, successfully resists the harmful effect of acidic or basic liquids. Prices of some rare lands in 2006 were as follows: Cerium - $40/ kg, lantan - $ 30 / kg, ytterbium - $400 / kg, itriw - $50 / kg, scandium - $70 / kg.

The 30 elements called rare earths are part of the lanthanide series and actinide series:

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Rare lands are elements that are especially lanthanides group. Rare lands such as Samaria and cesium can form together with cobalt, ferromagnetic compounds with good magnetic properties. The magnets of these compounds can be made by casting, cold pressing. Magnetic energies obtained with magnets made of rare lands compounds are the largest of its kind known so far.

2. Areas of use of rare lands

Although rare specialists studying land a few years of their unusual properties in the scientific world and to encourage all economic use of wind generators successful composition, electronic parts and assemblies, the metal separators, motors, clutches and other auto parts, lifting and extraction, etc.. Rare Lands fall - very few people know - the composition of rare lands in the composition of magnets, which can be made in these rare lands.
of lasers, cell phones, computers, iPods, LCD screens, washing machines, cars, hybrid, digital cameras, some headphones, sonar, cameras, mobile phones, liquid crystal displays, electric vehicle batteries and even the composition of missile guidance systems, smart bombs and missiles space. Despite the name, "rare land" are not so rare, however - usually - are very small volumes, arranged on large areas and involve a complicated post-processing, which makes most deposits are still too or fairly expensive operation. Economy and rare lands production and use of sophisticated technologies based on them, we call rare lands economics, absolutely vital elements of modern civilization.

Coupled plasma mass spectrometry (ICP-MS) offers the possibility of measuring rare lands with great accuracy, which can not be achieved by another method. In addition, ICP-MS method is capable of measuring isotopic reports. Isotopic ratios are rare and a true footprint and provides information about the source of the pollutants in the environment.

In the long run, these chemicals are very rare and can exploit the huge financial and environmental costs. In the short term, 97 percent of world production of rare lands is in China, which is becoming more reluctant to export, because electronics manufacturers wants to come live in China to produce and only then have access to their lands without rare the electronics of today would not exist\(^1\).

### 3. The main deposits China

Rare lands industry began to be developed in China after 1950. Now, after 60 years of development and construction, although their use is not in compliance with environmental standards, China is the largest country in possession of rare lands deposits, the largest producer, consumer and exporter. Mines of Bayan Obo (Inner Mongolia, an autonomous province of China), located on the border with Mongolia, has the largest deposits of rare lands in the world, but combined with deposits of iron. Bayan Obo rare lands is he meant to Saudi Arabia for oil. Bayan Obo deposits are formed from two-thirds of all known rare-lands on the planet in mid-2010. Bayan Obo mines have tripled in the last 10 years the production of rare lands to reach 125,000 tonnes in 2010. Local peasants, owners of land containing rare-lands deposits were sold to the Chinese Government that the land prices high. The two major mines in China to extract rare lands

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\(^1\) Buzatu, Adrian, *Tehnologiile moderne au nevoie de pământuri rare, iar ele sunt ... rare*, on www.stiintaazi.ro, March 21 2010

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Rare lands economy. New branch of economic sciences

mining giant controlled by Baotou Steel Rare Lands Mining, a publicly owned company. Operating costs are reduced, because Chinese labor is very cheap: miners earn no more than 150 Euros per month. Techniques used in separation processes are controversial because they use toxic chemicals for refining processes of minerals.4

Baotou is a city with the rank of city, capital of the prefecture, located on the north bank of Yellow River (Huang He), and located 160 km west of Hohhot, capital of Inner Mongolia. Baotou is the largest city located on the northern side of the country.

The region was colonized by the Chinese and served as a garrison during the Tang Dynasty (618-907), and then being occupied by the Mongol tribes5. The year 1730 was still a hamlet, which was consolidated as border city during the Qing Dynasty (1644-1912). Baotou then gradually developed as a market town. In 1923 he was linked by rail to Beijing and the 1925 has the status of the administrative county capital.

Throughout the twentieth century grew rapidly, becoming an important commercial centre for trade with Mongolia and north-western China, controlling and marketing area, including most of what is now Ningxia Autonomous Region, as and Gansu and Qinghai provinces. The area north of the Huang He was colonized by the Chinese in the late nineteenth century and Baotou became the main commercial centre for the Chinese community. The town grew rapidly and during the Japanese occupation (1937-1945) was a centre of the autonomous government Mengjiang. The Japanese began to develop light industry and the city also were discovered rich deposits of coal and other minerals in the vicinity.

After the establishment of popular power in 1949, Baotou has been completely transformed. Its rail link with Beijing, which was destroyed during the civil war in China, was restored in 1953 and railways doubled in the late 1950s. Another railway was built at the south-west of Huang He, the city of Lanzhou in Gansu, allowing rail link with central and southern China, or the city of Urumqi, capital of the Uighur autonomous from the northwest.

Baotou is a major manufacturing centre for steel, iron ore discovered on the north, at Bayan Obo, a town that was linked by rail), located on the Shiguai coking coal in the east, near the Daqing Mountains, and then based

4 Stéphane Pambrun, A Pékin, on ne badine pas avec ce nouvel Eldorado, on www.novethic.com, vizitat May 4 2010
5 Encyclopaedia Britannica Online, on 19 September 2010
on rare lands deposits also found in the area. From Baotou Steel Complex has begun work in 1961, became fully operational only in the late ‘60s.

Subsequent growth was phenomenal in Baotou, the municipal area was expanded to include coal mines, to the east and those of iron ore complex in the west. The city has emerged as a major industrial base not only for Inner Mongolia and northern China, but for the whole country. Industrial development continued. Another rail line, completed in 1989, connects the northern Baotou and Dongsheng province rich in coal. Since 1992, high technology is widely introduced in the city’s industrial park, here is producing machinery, chemicals and electronic equipment. Hohhot Baotou is linked by a motorway.

A subsidiary of Baotou Steel Corporation, Baotou Steel Rare Lands, specializing in the processing of rare lands in Baotou are growing, have already approved $3 million investment. I hope local governments to build an industrial base in Baotou in world class rare lands and to establish a mechanism to stabilize prices in this area. Book of the Bayan Obo rare lands near Baotou contains about 75 percent of total rare lands in China. This large Asian country, but also the world produces 97 percent of rare lands in the world.

China is the only country that produces almost all the rare ores and has already announced her refusal to export them. Understanding the geostrategic importance of its rare lands deposits, China decided in early 2010 to use it only to its domestic market yields. The news release has remained discreet on broadcast media. In an attempt to control his concern for rare land, China has permitted foreign factories to produce its territory and to participate in the exploitation of those mines. Probably between 2011 and 2012, domestic demand will exceed the Chinese rare lands production capacity. "This requires China to ban the export and sale of rare lands abroad," said Jack Lifton, a specialist in the field. Perhaps, after 2012 China will become the first manufacturer of solar panels and wind turbines in the world, two rare-lands-intensive industries.

China now controls most of the global production of rare metals: 95 percent of the total rare lands, 87 percent of the antimony and 84 percent of the tungsten. Europe and U.S. are concerned about the limited access that we have such advanced technology in vital minerals. A European Commission report expressed concern over a possible shortage of 14

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6 Simona Haiduc, *China controlează azi cea mai mare parte din producția globală de metale rare*, in Financiarul, 22 June 2010, p. 10
elements, classified as "critical" for the industry. China itself has become a major consumer of rare metals.

Given the strategic importance of the area, the workers at the Air Traffic Management Bureau of Hohhot was observed on 11 September 2010, around 20 o'clock (local time), an unidentified flying object (UFO), 40 kilometers east of Baotou in Inner Mongolia Autonomous Region. Three flights from Baotou to Beijing and Shanghai were delayed and the aircraft were forced to sail in circles through the air in May, while waiting to land, 1107 Air China flight from Beijing to Baotou Airport landed Erdos, and the flight Juneyao Airlines Flight 1137, from Shanghai to the airport in Baotou Taiyuan landed. Only at 22, Baotou airport received a notice of resumption of normal operations.

In recent years, China has achieved an export quota of rare lands, which amount was reduced year by year, with a possible stop the export of rare lands on the horizon of the years 2014-2015. As stated above, the annual production of rare lands is about 125,000 tonnes per year, of which 97 percent belong to China. The monopolistic control of production is largely related to Baiyan Obo deposit, located near the city of Baotou, north Asian country, the so-called region of Inner Mongolia. Chinese exports of rare lands s restriction has several explanations: The official objective is to press the Chinese authorities' intention to bring together producers to better control the amounts of waste they produce, leading to closure of small producers most pollutants, so, in a short period of time reduce production and increase demand for rare lands s in the world market. Already industrialization countries have been "invited" to relocate their production manufactured in China based on rare lands.

Position of other countries

Canadians already exploring in the south, in search of rare lands s. Australia and Brazil have recently identified such deposits, but no new mining can not begin sooner than 2014. Problems are not given the rarity of rare lands, as the difficulty of extracting them.

4. The case of Afghanistan

In January of 1984, shortly after the outbreak of hostilities in the "war with the Soviets, Afghan director of the Geology Department published a report indicating that the country has a large basement variety of mineral resources including iron, chromium, gold, silver, sulfur, talc, magnesium, marble and lapis lazuli. It was only a superficial assessment,
Afghan geologists at that time not having the equipment with which to evaluate the performance all the minerals in the basement or even the size of the deposits in question. Information provided by geologists had already reached the ears of Soviet Afghans, who even before the beginning of their presence in Afghanistan, knew that this arid country hides huge riches than natural gas deposits, which the Kremlin was aware since 1957, Russian geologists when investigating natural gas reserves near the Amu Darya river.

The Afghan government was a puppet of that time supported the former Soviet Union: therefore, the Kabul authorities were preparing to develop and exploit the mineral resources extraction and processing technology for ex-Soviet-trained engineers with Moscow, ex-USSR wished to retain the lion's share for itself. Another long-sought treasure, then Jindu eyes ex-Soviet Afghan uranium reserves consist of highly appreciated throughout the world, as supplying the raw material for nuclear weapons whose development was at its height to mid 80s. Over the Soviet-Afghan plans to litter dust but after defeat by the ex-Soviet mujahedeen, shameful event ended with the withdrawal of the Russians in 1989.

In November 2009, not incidentally, a team of specialists at the Pentagon and U.S. geologists discover mineral deposits in Afghanistan of around 1 trillion $ (Thousand of billion) dollars. In early September 2010, Afghan Minister of Mines, Wahidullah Shahrani came with a ramp statement literally overturned the exchanges in London, New York and Tokyo. Afghan official said that after repeated research carried out by American geologists and specialists from the Pentagon, the natural mineral deposits, initially estimated around one trillion dollars, is actually much higher. According to data submitted by U.S. experts, only lithium reserves in Afghanistan are greater than those held by Bolivia, considered the country by 2009, the first world exporter. Similarly, natural reserves of copper and iron are well above those originally estimated. Only iron reserves in the province of Bamyan are higher than those of Western Europe. Shahrani also said that U.S. data, found that the mineral reserves would be worth "only" 1.000 billion dollars have been launched especially since a year ago, Washington not want to destabilize markets by announcing a profile of their sums about 3.000 billion dollars.

According to U.S. officials, the new discovery has fundamentally changed the economy of Afghanistan, but also the unjust war the U.S.

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7 * * *, Comoara din Afganistan – adevaratul motiv al invaziei americane?, on www.mozilla.firefox.ro, 16 September 2010

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fought for the resources that are actually owned by Afghanistan. New deposits, previously unknown, immense veins containing iron, copper, cobalt and gold and industrial metals critical, lithium, are so large and include so many minerals that are essential for modern industry, that Afghanistan could be transformed into a finally one of the most important mining centres in the world. According to a Pentagon memo intren, Afghanistan could become ‘Saudi Arabia of lithium, a key material in producing batteries for laptops.

Afghan President Hamid Karzai’s government and were informed about the new discovery. Although it could take several years to develop a mining industry here, the potential is so great that officials and industry executives believe that it could attract large investments, even before the mines to be profitable, providing the ability 4o create jobs, which could distract attention from the war. "There is amazing potential here," said Gen. David H. Petraeus, head of U.S. Central Command. "There are lots of conditions, of course, but I think there is a potentially huge," he added. United States announced the discovery of vast mineral deposits in Afghanistan is such a magnitude that could alter the Afghan economy and the war fought by the Allied Coalition, led by the U.S. for so many years. Containing deposits of iron core, cobalt and gold and rare metals such as lithium, essential for modern electronics industry.

The value of newly discovered mineral deposits placed in a new light of Afghanistan’s economy, based mainly on opium production and trafficking of drugs and aid from the United States and other industrialized countries. Afghanistan’s GDP is only $ 12 billion. American and Afghan officials have agreed to discuss these deposits are extremely valuable in a time of war edificial.

But American officials acknowledge that the mineral discoveries will almost certainly double-edged impact. Instead of bringing peace, its mineral wealth can cause the Taliban to fight intensifier to regain control over the country. However, corruption, which is already quite high in the Karzai government, could be exacerbated by new wealth, particularly if a handful of oligarchs who have personal connections with the president take control of resources. Last year, Afghan Minister of Mines has been accused by U.S. officials that he accepted $ 30 million bribe to award China the rights to develop copper mines. The minister was later replaced8.

8 Stoica, Mihaela, Americanii au făcut o descoperire uriașă în Afganistan: minerare în valoare de circa un trilion de dolari, in Adevărul, 14 June 2010

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Experts believe that without "culture of mining", will take tens of years before Afghanistan will be able to fully exploit minerals. Mineral deposits are scattered throughout the country, including in regions south and east along the border with Pakistan, where they recorded the most intense battles in the U.S. led war against Taliban insurgents.

The Pentagon has already begun to help the Afghans establish a system to deal with the development of minerals. International accounting firms that have expertise in mining contracts, pledged to consult with the Afghan Ministry of Mines and technical data are ready to be handed to multinational mining companies and other potential foreign investors. Pentagon helps Afghan officials in efforts to seek bids for the mining operation since the fall of 2011.

China could provide in this new context, what he lacks in Afghanistan: machinery for extraction. Afghanistan lacks all necessary mining infrastructure and decades until it can profit from these deposits are only found. "This country has a mining culture," says Jack McEdlin, American geologist involved in exploration geology. Has some small artisanal mines, but now it takes me much, much more to be little more than a "pipe".

It is not actually a single huge reservoir: the whole country seems to be riddled with mineral deposits; discovery seems to have been made possible thanks to some old maps found in the library of the Geological Institute in Kabul, Afghanistan; most maps showed the country's mineral deposits. These maps and satellite mapping have been studied since 2004 and American geologists have confirmed the information gathered by Soviet geologists; they demonstrated the existence of huge deposits of minerals. "There were maps, but the development of mining could not start because of those 30-35 years of war," explains Ahmad Hujabre, engineer of the Afghan Ministry of Mines.

Based on these maps, aerial exploration geologist with the U.S. made a satellite belonging to the Navy P-3 Orion, over about 70 percent of Afghan territory, obtaining three-dimensional results of underground mineral deposits, results were amazing: the deposits of copper, iron and rare lands are so important that they be able to make Afghanistan one of the leading manufacturers worldwide, categorized deposits containing niobium, rare lands metal, particularly important for the manufacture of missiles, nuclear energy for producing capacitors and the niobat Lithium, a crystal capable of changing the refractive index, so used to manufacture high-capacity optical fibers. There are also large deposits of gold in Pashtun, and...
enormous deposits of lithium in Ghanzi province. News of the discovery of these deposits remained in silence for many years or may have been deliberately ignored.

5. Republic of Moldova

Since 40 years ago, the Soviet Socialist Republic of Moldova, rare lands was used extensively in over 20 industries. Among the most important areas of application of rare lands since there were metallurgy and machinery, glass and chemical industry, electronics, radio electronics radiotechnics and contemporary medicine and pharmaceutical technology, optics and lighting technology, aviation and cosmic engineering, naval and military jewellery production and agriculture.

After A. Popuiac, rare lands production is widespread in India, Brazil, Austria, England, France, Germany, Russia and China. In the U.S., development and improvement of enterprises producing rare lands core is stimulated by the government and NASA. The central region of the Dniester River basin, over several decades has made a study aimed at determining complex geological features metallogenics geological formations in this area. Based on geological and geochemical data obtained by the Institute of Geology and Seismology of the Academy of Sciences and the State Geological Agency of Moldova (AGeoM) within the central basin of the Dniester River is considered the future in terms of detection of mineralization of radioactive elements, rare metals, iron, zinc, lead, barite, including the rare lands. Concentrations of rare lands elements (Tr), represented by lanthanum (La), cerium (Ce), ytterbium (Yb), yttrium (Y) and scandium (Sc) were found in formations in north-eastern terigene Moldova.

6. United States

United States of America, which was once a world leader in the production of rare lands, have operated until 2002 a deposit at Mountain Pass, California.

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10 Popuiac A., Aspecte generale din geochimia pământurilor rare din nord-estul Republicii Moldova, in Buletinul Institutului de Geologie și Seismologie al Academiei de Științe a Moldovei, no. 1, 2009, p. 29-40
In April 2010, Congress introduced an emergency text reminding me of the indispensable role of rare lands for the American economy. The U.S. Congress website, it read that "rare lands are needed for the development of technologies that produce renewable energy; these technologies allow the U.S. to reduce their dependence on oil and gas to reduce emissions of greenhouse gases. Will is to limit Chinese exports in this direction and put such a question of U.S. competitiveness, and we must on the one hand to ensure supply and, secondly, to allow development of land mines to extract rare American underground. U.S. can not longer depend 100 percent on imports from China. "We appreciate that Washington's reaction, which is preparing a law to encourage exports of rare lands s in the U.S. is somewhat delayed and the Americans caught on the wrong foot. By 2010 when China imposed its embargo on rare lands, the U.S. was forced to buy these strategic raw materials from China, the source of about 90 percent of these minerals, thus setting market prices. Therefore, Americans have decided that a priority for U.S. industry to seek such a rare mineral deposits, so the U.S. to be released "Chinese dependence.

7. Rare lands production

Metals and minerals known as rare lands s are a group of 17 critical elements that are extremely important, considered critical for the assembly of about a quarter of today's technology - from mobile phones, computer components and electric motors to technologies such as electric batteries, weapons sophisticated wind turbines. In mid 2010, and this situation will continue at least another four years until 2014 - until the opening of new mines in other continents: North America, Australia, Asia, etc.. - China produces about 97 percent of rare lands s consumed worldwide.

Overall, the application of so-called critical minerals increases from year to year and in their absence, much of the XXI century technology would collapse. If the Middle East has oil, China has a rare lands are important for current and future world civilization. The famous Chinese economist, politician and Deng Xiaoping, considered one of the fabulous artisans upward development of the Chinese economy over the past 40 years has understood the importance of rare lands and encouraged their exploitation. As such, China today produces almost the entire quantity of such items used in the world - 139,000 tonnes in 2008 and over 200,000 tonnes in 2009. Keeping the trend in 2010, China produces over a quarter of
a billion tonnes of rare lands, highly stressed and used the latest technology in the world!

Mines and surrounding regions belonging to the Baiyun Obo are seen as having strategic importance to national and crews that are patrolled by police cars in the field. Ore is transported to a depth of 200 meters, where mining is the crater, the Terex trucks, the largest in China, high as a two-storey building, carrying a single road every 168 tons of rock containing lands four shifts of all drivers operating the machine 24 hours a day, 7 days a week.

Operation of the Bayan Obo rare lands led to the complete destruction of the environment and the local ecosystem and turning into an industrial oasis offering apocalyptic images. Refineries are in various stages of operation, there are low valleys to the north-west mining town, about 150 km from Bayan Obo, Baotou City in the industrial outskirts. Partially frozen lakes are surrounded by up to 10 sq km area crossed by streaks of fatty red. The land surrounding them for many years marked the poisonous residue of the refineries. The ground is strewn with potholes and trenches. Some villages have been relocated due to intense pollution.

At a processing plant, isolated Chinese province of Inner Mongolia, Jiao He called Mu Qu factory, located about 50 km south of Bayan Obo, in crevices boiling sulphuric acid. The largest lake is Baogang discharge with an area of 11 square kilometres, is full of toxic waste. Air, toxic in turn, full of sulphur, stinging eyes and burning lungs, and clothing workers are full of acid burns. In these conditions of hell on lands, the salary of a worker is 1,600 Chinese yuan per month, equivalent to $220. Bayan Obo organically decimation caused by the extraction of rare lands, is of biblical proportions.

Currently in China, rare lands products are used in over 30 industries, and development and their use has become the main growth pole of Chinese rare lands industry and worldwide. If mankind will begin to focus seriously on green technology, this could lead to a demand for rare lands that those who are not able to extract a meet (John Kaiser, California, mining expert for 25 years rare lands industry). Japanese are addicted to rare lands, without them, can not survive. An and Hu, the Area Committee Baotau Rare Lands High Tech New export quotas are timely and necessary. The reality is that until now were rare land cheap and sold at random. As Russians enjoy their gas
reserves, which supply much of the European Union, China controls so far, global reserves of metals and rare lands. However, at least one third of the rare lands deposits are outside of China. And the rest of the world needs to exploit their own resources. China has already supplied the world with 90 percent of its land rare. We need our land for ourselves scarce. Chinese government spokesman in a press conference in early March 2010. This (and the discovery of large deposits containing rare lands s - Ed) will become the backbone of the Afghan economy (Jumriany Jalil, adviser to the Afghan Minister of Mines).

8. Using rare lands

The current economic world consumes only a small amount of rare lands - about 130 thousand tons per year, with just over a tenth of the quantity of copper. Economic analysts expect the development of world trade in rare lands s to reach the $2 billion in 2009 to $3 billion by 2014. Rare lands s have a low value of which is extracted from the mine, the largest part of their market value is added in the refining process. 11 The main uses of rare lands elements are key: Dysprosium - for electric motor magnets, which become easier with 90%; Terbium - electric lights more efficient by 80 percent; Neodimuthium - for electric motor magnets; Lanthanum - used for storing hydrogen; Praséodimum - used lasers and ceramics; Gadolinium - used to manufacture computer memory; Érbium - used steel-vanadium alloys; Ytterbium - used to manufacture infrared lasers.

Rare lands are an important strategic resource. When we say we consider applications that do not "traditional" based for more than a century and a half in some cases, rare lands s, and catalyst for refining oil into gasoline, medical radiography, etc., But modern procedures based on rare lands s: catalyze gas-based car Cerium to remove particulates from diesel combustion in diesel engine, flat screens or light grinding, Terbium use in the manufacture of light tubes and electroluminescent diodes (LED) or plasma and LCD flat screens. More rare lands -based technologies are also emerging: yttrium based superconducting and magnetic refrigeration based on gadolinium.

By increasing production of electric motors based on permanent magnets of neodimuthium or Terbium-Dysprosium, large future industrial applications based on rare lands s will have an environmental purpose.

11 Charles Homans, Sunt rare pe Terra pământurile rare? , in Foreign Policy, 15 iunie 2010, www.Foreign Policy, 19 September 2010
demonstrated in the construction and use of conventional and hybrid electric vehicle and electric generators by off-shore wind turbines (installed on the sea, which is extremely corrosive, an off-shore wind turbine 3 megawatts may contain about 600 kg structure neodium, which ensures the operation and maintenance at sea. using two wind turbines neodium types for their permanent magnets strong. Other ingredients used in most modern cars need small quantities of rare metals such as europium, yttrium, cerium, zirconium, terbium, dysprosium and praseodiu. In the last ten years, production of rare lands s increased five times from 40,000 tons in 2000 to 200,000 tonnes, preliminary for this year and next five years is expected to increase production to 300,000 tonnes per year. Other countries, which hold deposits, could not compete on price with China, at least until now. There are deposits of rare lands, worth billions of dollars to Europe and USA, but for now, just as it would cost and exploitation.

On the other hand, while the rare-lands world needs is increasing, with an estimated at least 10 percent each year, China reduced export quotas in the past three years, up from zero in 2010. Such a development has alarmed the industrial giants of the planet: U.S. import rare lands s worth over one billion U.S. dollars, Technological high in Japan and the European Union is also dependent on scarce land. Other new systems and factories that deal with rare lands extraction and separation will not become active in less than 4-10 years.

Although the prices of minerals have risen in recent years, rare lands operation is still less profitable than that of copper or iron ore. Cerium is a precious ingredient in enamels and glasses lenses, Euromarket is used in the production of screens for TVs and other screens. Military production is based on the rare lands elements are important for lasers, missiles, radar and other military technologies.

It is anticipated that the application of rare lands s own needs China will exceed its supply in two to five years. Neither the U.S. market is stationary: the company Molycorp Minerals bought a new mine, the one in Mountain Pass, Avalon and Rare Metals develops a large deposit of rare lands s Northwest Territories of Canada.

Currently, in 2010, there are only two future mining rare lands s outside China: Mountain Pass in California and Mount Wells in Australia. China claims to be rare lands that produce for their own industries that are growing. In 2010, China consumed about 60 percent of its production. China's efforts to bring to the surface and are noted for rare lands separation, to better exploit the underground riches, China aims to produce
and economic assets have embedded in them for this rare and should supplement its economy about 300 million jobs in November 2020.

Western governments are worried about the Chinese monopoly on rare lands, since they are employed including the construction of missile systems. Disprosiul, for example, allows the missile to operate in extreme conditions. The U.S. military does not want to buy an open market. He needs a guaranteed supply, and this has become a problem. If only China would be the only place on Lands where they find rare lands, this could lead to a planetary war. The problem is not an immediate crisis but approached with great strides.

In this context, China is building, slowly but surely planetary domination, being aware of the difficulty of putting the West. In recent years, the Chinese government has introduced forced mines and refineries in the rare-lands wing of the state company, Steel Boat to control thus easier prices.

Composed of minerals rich in rare lands elements are key to the development and manufacture of key components in clean energy technology, construction, automotive and electronic industry. They are essential for almost all technologies tubes friendly as wind, solar panels and hybrid engines. China appreciates the rare lands industry in 2010 is a turning point.

In order to promote industry, science and technology of rare lands, China held a summit for six years on rare lands, through China Society for Rare Lands. The 2010 meeting was held 2-6 August in Beijing, as the International Conference on Development and application of rare lands. The conference theme was "Politics in China rare lands industry and rare lands global economy." The event aimed to build a platform for companies from the rare lands, for the understanding of industrial policy in relation to land rare in China and worldwide. He also held a discussion and exchange of ideas on the global problem of rare lands resources, their production, environmental protection, using, marketing and marketing in order to help promote a rare lands industry worldwide.

The forum focused on the impact on Chinese rare lands industry policy has on industries dependent on the whole world's supply of rare lands, the relationship between the new renewable energy industry and rare lands industry, the current status and trends of new rare lands materials, influence of rare lands industry on the environment, etc.

Communications have been invited to this summit of leaders in government, entrepreneurs in the production of rare lands, their application, marketing and information, renowned experts and scholars from around the world. For
detailed information, see the conference website: http://www.cs-re.org.cn /asc/. China society for rare lands (CSRE) is founded in 1980. CSRE is an organization for research on rare lands science and technology. Its members registered thousands of experts, is the largest academic community in the world rare lands.

CSRE support the rare lands researchers to exchange ideas about their research plans to propose fundamental areas of science and technology and application of rare lands and the plans for research and development of rare lands industry.

9. Minerals critical importance for the world economy

In 2008, in a study group chaired by Professor Roderick Eggert, from Colorado School of Mines and further seminars attended by renowned experts in the U.S., was developed by the National Research Council of the National Academies, a report Title: "Minerals, Critical minerals and the U.S. economy." This document brings together the principal recommendations made by the U.S. Government, the measures should be taken to secure access to certain non-energy mineral resources, considered as a result of scientific evaluation, to be critical or strategic to the U.S. economy. There are taken into account all risk factors: availability of minerals can be extracted by current techniques, the degree of substitution, the political risks in international trade and strategic materials critical aspects of U.S. defence policy and strategic role that some minerals have when it comes to producing technology applications for civil use but especially the military.

The document, developed in the U.S., was taken as reference by other reporting or institutions. The European Commission, in turn, efforts to shape a sustainable and integrated strategy on raw materials. To this end the Commission has proposed to assess progress every two years so that it can identify gaps and correcting measures prove ineffective\textsuperscript{12}.

When they were discovered in the nineteenth century in Sweden, rare lands were considered some of the most special elements on Lands. Rare lands are relatively abundant in Land's basement. However, the

\textsuperscript{12} Dumitru Fornea (member in The European Economical and Social Committe raportor of CESE for: "Inițiativa privind materiile prime" and "Industria minerii neenergetice din Europa"), the seminar „Transformarea Europei într-un lider în mineritul responsabil”, European Parliament, Bruxelles, 26 January 2010
extremely high costs of extraction and processing, plus the ecological disaster caused by mines lead to the belief those only regions with rich deposits - very rare - worth exploited. Metals, rare lands are known, by their nature malleable. They also have a high electrical conductivity. Rare lands deposits are extracted from normal through a process involving the dissolution of the elements contained in composite ore in different liquid - usually water and an acid solvent.

There are 17 types of rare lands each of vital importance for the manufacture of hi-tech products, from plasma screen TVs, computers, and mobile phones, nuclear reactors, missiles, and seismic monitoring equipment.

Toyota Company, for example, does not have guaranteed long-term reserves of rare lands batteries for its hybrid cars. If the Japanese company wants to secure its future to produce millions of electric cars, then you should invest in a guaranteed reserve of rare lands. Toyota plants need 10,000 tonnes of rare lands on the year to make its hybrid Prius models and batteries should supply the black market to comply with decisions taken in Beijing. Already production of automotive batteries changing priorities: General Motors has decided to transfer the direction of international operations from Detroit to Shanghai, and Toyota is making its batteries required for its cars in China, thereby respecting the regulation banning the export of rare lands. A type of rare lands, terbium, behaves like a natural amplifier, therefore, is used in fiber optic cables for signal amplification. Terbium generates a change in an electrical circuit when the metal is compressed, therefore, is located in seismic monitoring devices to detect movement of tectonic plates. Rare lands alloys are combined to create powerful magnets, used in wind turbines. Magnets are a crucial part of the generators that convert natural movement of the propellers into electricity.

Other rare lands, Dysprosiumum is used for manufacturing advanced electric motors and hybrid vehicle battery systems, as magnets containing this element can be much lighter and therefore more efficient in terms of energy. Dysprosiumum tends to absorb neutrons - the tiny particles of atoms produced in nuclear reactions. Therefore, Dysprosiumum metal components containing nuclear reactors are used to control the rate of availability of neutrons. Magnetic properties of Dysprosiumum alloys make them useful for the manufacture of CD players. Cerium is used in catalytic converters, which reduce carbon dioxide emissions of vehicles, while the yellow colour
creates praseodymium ceramic alloys. In alloys, lanthanum metal softens, making it more manageable and sometimes more sustainable.

There is a risk of shortage of raw material deposits are rare lands, but a risk of shortage of processed rare lands available to the consuming industries. Fast enough to compensate for the reduction announced by the Chinese rare lands production, is indispensable to make them accessible as quickly discovered new deposits on the planet, especially in Afghanistan, but inaccessible deposits, because there is infrastructure in that area or discovery of deposits required. But financing such operations is difficult in times of crisis.

Economy of raw materials and manufacturing technologies, some of them, as I mentioned, very recent, do not know and therefore do not allow overnight replacement of these raw materials, rare lands. Permanent magnets obtained from neodium have qualities that can not substitute based classical magnets away, which is significantly lower randmanet. Only car batteries Nickel metal hydride (NiMH) containing lanthanum may be progressively replaced by batteries based on lithium-ion (Li-ion).

10. Conclusions

Rare lands are used in the composition of a long list of electronic devices - ranging from wind turbines in flat screen televisions, the majority of consumer electronics, the economics of green energy supply. Include rare lands minerals, such as dysprosium, terbium, thulium, lutetium and yttrium, which have applications in electronics, aviation, atomic energy, and aeronautics and space research. Rare lands are used in the technologies used to manufacture wind turbine generators and motors, electric vehicles and their batteries, fuel cells and energy efficient lighting.

Current and future economic world depends increasingly more rare metals extracted from the lands that form the core of very diverse economic goods, from solar panels and electric motors to computer parts. It is expected that during 2010-2011, to reach the global economic crisis and the non-energy raw material supply.
ANNEX

ROMANIAN RESEARCH PROJECTS IN RARE LANDS

- Univ. Dr. Wilhelm Kappel, Ph.D. thesis in physics: study the magnetic behaviour of rare lands ternary compounds (Babes-Bolyai University, Cluj-Napoca, Faculty of Physics, 1999);
- French-Romanian Summer School on the theme of high performance permanent magnets, Cluj-Napoca, August 25-September 2, 1999, organized by the University of Paris South, France, Université Joseph Fourier-Grenoble, France, CNRS Grenoble, France and University Babes-Bolyai University in Cluj-Napoca;
- Composite magnetic materials, technical characteristics and functional requirements, project RELANSIN 718/2001, conducted between 2001-2004;
- Fe-Cu composites for anisotropic permanent magnets (COMPOMAG) MATNANTECH project program, carried out between 2003-2005;
- Codescu Prof. Mirela-Maria, PhD in Engineering Sciences: Research and experimental research on processing and characterization of new hard magnetic alloys with transition metals and rare lands metal group (Polytechnic University of Bucharest, 2003);
- Study of compounds with molecular magnetism, CERES project, conducted between 2004-2006;
- Fe-Cu-smart materials for equipment designed to prevent accidents in nuclear power plants (MIDAC), Security Project, conducted between 2005-2006;
- Prof. Dr. Titus Murariu, Geochemistry of rare and radioactive metals in Romania pegmatitele, grant type, code NURC 1399, Contract no. 2607, 2005-2006;
- Nanocomposites for anisotropic permanent magnet magnetic high specific energy (NANOMAG) CEEX project, conducted between 2005-2008;
- Based sintered magnets Nd-Fe-B alloys with high thermal stability (MAGSTAB) project INVENT program, no. 4197/2005, conducted between 2005-2006;
- Temperature Stability and Corrosion Resistance of Rare Lands Magnets Transition Metals, INCO Copernicus project no. ERBIC15CT 96-0758, held from 1977 to 1999;
- Characterisation of magnetic and steel industry, INCO Copernicus Project, Nr. ERBIC 15CT 96-0817, held in 1999;
- Cristina Gheorghe Petra PhD in physics, Effects of composition and structure of rare-lands ions emission in the crystal and ceramics (University of Bucharest, 2008).

International recognition of ROMANIAN RESEARCHERS IN THE FIELD OF RARE LANDS

- Prof. Dr. Mirela-Maria Codescu, Gold medal at the Salon of Inventions Eureka, "The 49th World Exhibition of Innovation, Research and New Technology, Brussels, 2000, for the patent" Process for obtaining powder of NdFeB alloys 
- Prof. Dr. Mirela-Maria Codescu, Gold Medal Exhibition of Inventions, Geneva, 2001, for the patent "sustentation magnetic circuits of industrial applications;
- Prof. Dr. Mirela-Maria Codescu, Bronze Medal at the International Exhibition of Inventions, Geneva 2002 for patent "Method for obtaining permanent magnets bonded magnetic busy."

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8. Gorman, S., As hybrid cars gobble rare metals, shortage looms, Reuters, aug 31, 2009