

Prospects for a Fusion Energy–Based Economy for BRICS Nations and Partners

The following is an edited transcript of Richard A. Black’s speech to the Oct. 25-26, 2022 meeting in Moscow hosted by the National Committee on BRICS Research, Russia, and titled, “International Scientific and Practical Conference: ‘Scientific-Technological and Innovative Cooperation of BRICS Countries.’” Mr. Black is the Schiller Institute’s representative at the UN in New York.

I would like to thank the National Committee on BRICS Research of Russia for inviting the Schiller Institute to participate in this historic conference.

At a September 2022 technology seminar in Beijing, Prof. Peng Xianjue of the Chinese Academy of Engineering Physics said:

Fusion ignition is the jewel in the crown of science and technology in today’s world. Being the first to achieve energy-scale fusion energy release will lay the most important milestone in the road to fusion energy for human beings.

Professor Peng announced that China will create continuous fusion energy by 2028 for use in a hybrid fission-fusion power plant. It is estimated that by 2035, reactors will be able to generate energy directly for the electric grid from the fusion process.

Speaking to 3,300 high level Russian corporate and international delegates at a Russian industrialization summit in 2019, President Putin reported:

Thermonuclear fusion energy, which in fact is similar to how heat and light are produced deep within our star, the Sun, is an example of such nature-like technologies. Potentially, we can harness a colossal, inexhaustible, and safe source of energy.

President Putin stressed that Russia is prepared to extend “expansive and equitable cooperation” with nations globally, to achieve the breakthroughs in the science and engineering required to produce vast amounts of electricity for global needs.

FIGURE 1

Enormous Deficit of Electricity Consumption in the Developing World

(Electricity Consumption, in Kilowatt-hours, Per Person, Per Year)

Proposed Standard: USA: 11,731

Current Actual Level of Consumption:

Africa	559
Mali	153
Sierra Leone	42
Chad	12
Ibero-America	2,096
Peru	1,398
Guatemala	589
Haiti	37
Asia (except Japan)	2,540
Indonesia	799
Myanmar	269
Yemen	123

Source: EIR; U.S. Department of Energy, Energy Information Agency; International Energy Agency (IEA)

The Global Energy Deficit

On-going research and development to bring thermonuclear fusion on line in the immediate future—by and for the BRICS nations and partners—makes this topic-area central in addressing the subject of today’s conference: scientific, technological, and innovative cooperation. If we add to this picture India’s leading work in developing a thorium-fueled reactor, and South Africa’s historic role in fission reactor design, it becomes clear that BRICS and the Global South stand now on the frontiers of world science in the service of the alleviation of global energy poverty.

In this report, I will briefly discuss the extent of worldwide energy deficits; present some key principles of physical economy from American scientist Lyndon LaRouche; consider the nature and source of fusion fuel; and finally, expose the lying character of the pervasive ideology, perpetrated in Academia and among governments in the West, known as “Limits to Growth,” or the alleged “scarcity of resources.”

My colleague at *Executive Intelligence Review*, physical economist Richard Freeman, has calculated the immense current energy deficits in the Global South, and the requirements to rapidly bring that area up to the U.S.A. standard of *per capita* energy consumption.

Look at **Figure 1**. Current energy use *per capita* in Asia (excluding Japan) is one-fourth that of the U.S. Latin America’s is one-fifth, and Africa’s energy use *per capita* is *one-twentieth the American level*—this technology deficit is the *cause* of famine, of unchecked disease and pandemic, and of social disintegration.

Fundamental Principles of Physical Economy

In **Figure 2**, we see the real, modern energy requirements of the developing world. The developing world as a whole needs 57.4 quadrillion watt hours of combined annual increased electricity consumption. Looking at the bottom line of this chart, you can see that the underdeveloped sector needs to *quintuple* its electricity production.

Consider just two principles of physical economy as regards to energy generation and its deployment in society: 1) energy-flux density, and 2) energy consumption vs. GDP *per capita*. Energy-flux density, as defined by American scientist and economist Lyndon LaRouche, is measured as the intensity of energy applied at the point of generation or application. Think of the energy concentrated in a laser beam used in metal-cutting, compared with the energy generated by a water mill of the 18th Century. See the comparative energy densities of different fuels, in **Figure 3**.

Observe that the increase in available energy from the Deuterium-Tritium fusion reaction, compared to the modern combustion of coal, is not a mere multiple higher, but, rather is seven orders of magnitude greater.

In all nations, rising rates of electricity use per capita correlate closely with rising GDP values. The greatly expanded level of electricity output derived from a fission-fusion based economy is a prerequisite for a modern labor force at work which allows a nation to progress. Although the massive expansion of

FIGURE 2

Developing World Requires 57.4 Quadrillion Watt-Hours of Increased Electricity Consumption

Continent	Current Net Electricity Consumption (Trillion Watt-Hours)	Increased Level of Net Consumption Needed to Bring to U.S. Standard (Trillion Watt-Hours)
Africa	638	13,768
Ibero-America	1,315	6,108
Asia (except Japan)	10,219	37,485
TOTAL Developing World	12,217	57,361

Source: EIR; U.S. Dept. of Energy, Energy Information Agency; China’s National Bureau of Statistics; International Energy Agency

FIGURE 3

The Energy Density of Fuels

Fuel Source	Energy Density (Joules/gram)
Combustion of Bituminous Coal	2.7×10^4
Typical Nuclear Fuel	3.7×10^9
Deuterium-Tritium Fusion	3.2×10^{11}

Source: EIR, *21st Century Science & Technology*

hydrocarbon-based and nuclear fission-based energy production is essential—immediately for the Global South, until fusion energy is brought on line within approximately 15 years—only fusion energy provides the total amount of energy required to bring the world community, including all of Africa, to the higher required level over the long term. Historians will note that the Senegalese nuclear chemist, historian and political visionary, Cheikh Anta Diop, prescribed as early as 1960 an energy policy, for the African continent, of what he specified as “the effective control of thermonuclear reactions ... [produced within instruments] called tokamaks.”

The current construction of the 4-unit Generation III+ fission nuclear complex at El Dabaa, Egypt—a collaboration of the Russian Federation and Egypt—is exemplary of what is required. What prospects would the Chinese-designed fission-fusion hybrid reactor have as a bridge to fusion-based power in Africa?

Figure 4 shows the correlation, nation by nation, between electricity consumption and GDP, per capita.

The Moon: A Practical Source of Fusion Fuel

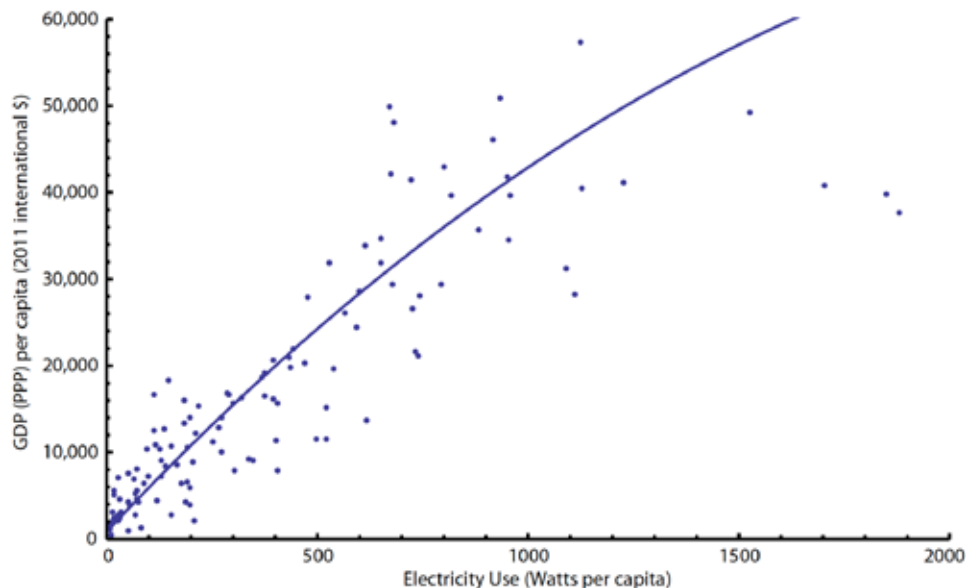
Although time constraints do not allow for further background here, the superior fusion fuel is the isotope of helium, He3. Although it is extremely rare on Earth, a nearby source, the Moon, contains enormous amounts of this fuel in its soil, or regolith. In a real demonstration of “solar power,” the Sun produces He3 as one of the components of the “solar wind,” which it constantly emits into our Solar System. Lacking the protective magnetic field of the Earth, the Moon is the depository of a vast amount of He3 from the Sun. The lunar soil is currently estimated to have one to five million tons of He3.

Prof. Ouyang Ziyuan, renowned geochemist and cosmochemist, chief scientist of the Chinese Lunar Exploration Program (CLEP), has said that the Moon is so rich in He3 that this source could “solve humanity’s energy needs for around 10,000 years, at least.” Part of the mission of China’s series of *Chang’e* lunar probes is to scout out He3 deposits on the Moon. Professor Ouyang has long advocated this “great project” to be a joint collaboration among many nations to, in his words, “solve humanity’s energy needs....”

V. I. Vernadsky and the Future of Humanity

The outlook and practice of Professor Ouyang today, in an exemplary way, reflects the immense conceptual contributions of the 20th-Century biogeochemist, Vladimir I. Vernadsky. Academician Vernadsky’s contributions established principles of Man’s progress in the Universe which allow us a deeper understanding of the natural progression represented by all current work moving us into a fusion energy-based economy. In 1938, in his *Problems of Biogeochemistry II: On the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bod-*

FIGURE 4
Electricity Consumption vs. GDP Per Capita



EIRNS/Jason Ross, using 2010 data from World DataBank.

The correlation between per-capita electricity consumption and GDP is remarkably clear. Insisting that developing nations use “appropriate technologies” is insisting that they remain eternally poor.

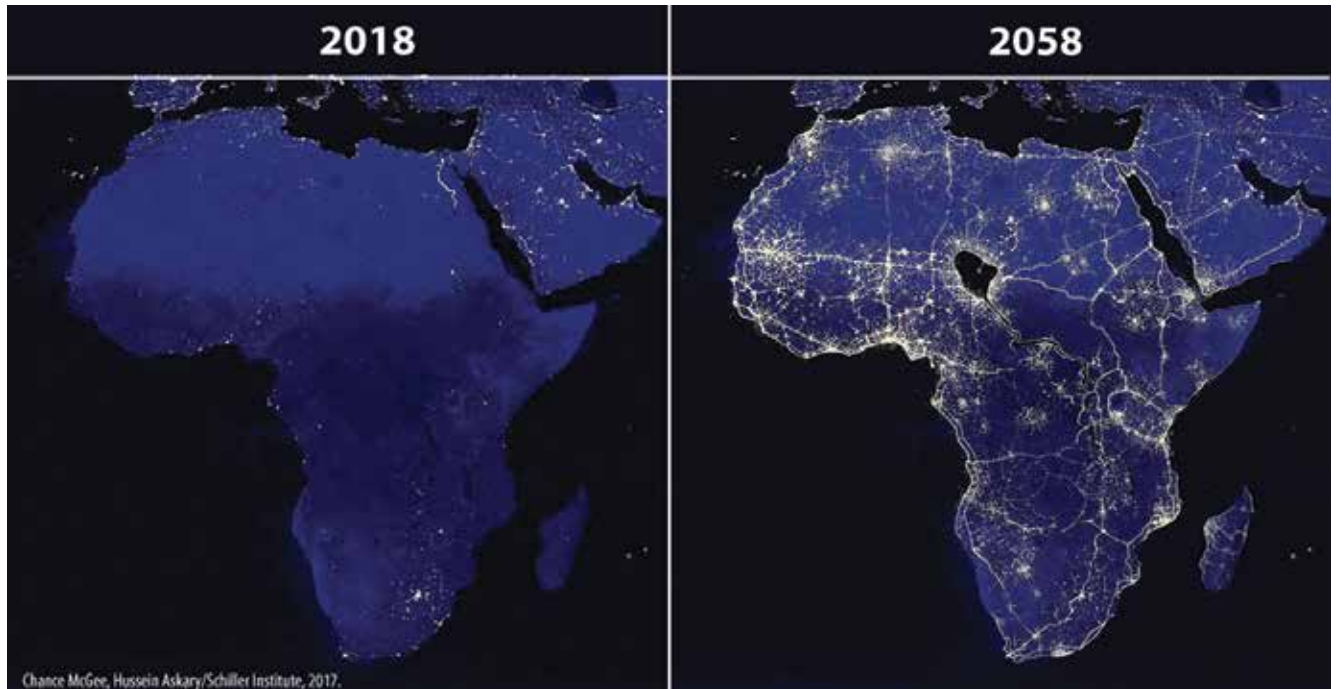
ies of The Biosphere, Vernadsky wrote:

We are living in a brand new, bright geological epoch. Man, through his labor—and his conscious relationship to life—is transforming the envelope of the Earth—the geological region of life, the biosphere. Man is shifting it into a new geological state: Through his labor and his consciousness, the biosphere is in a process of transition to the nōosphere. Man is creating new biogeochemical processes, which never existed before....

The face of the Earth is changing profoundly. The stage of the nōosphere is being created. Within the Earth’s biosphere, an intense blossoming is in process, the further history of which will be grandiose, it seems to us. In this geological process—which is fundamentally biogeochemical—a single individual unit, out of the totality of humanity—a great personality, whether a scientist, an inventor, or a statesman—can be of fundamental, decisive, directing importance, and can manifest himself as a geological force. This

FIGURE 5

Africa by Night, 2018/2058



sort of manifestation of individuality, in processes of enormous biogeochemical importance, is a new planetary phenomenon.

Thus, the recent decades’ fraud of “neo-Malthusian economic liberalism,” as LaRouche termed it—propagated by the Club of Rome of David Rockefeller and Aurelio Peccei with their widely read book, *The Limits to Growth*—was already discredited by Vernadsky, decades before its release. Vernadsky has shown through rigorous scientific work, that the universe is—as was understood in classical Greece—an axiomatically hylzoic universe.

The intensification of BRICS activity and its expansion with new members and partners, and similar processes involving the Shanghai Cooperation Organization (SCO), the Eurasian Economic Union (EAEU) and other open-to-all multi-national organizations, put the prospects for both a fusion-based economy, and a new paradigm of rapid, equitable and advanced development for each and all nations into a new, hope-filled domain.

I close with a graphic published by the Schiller In-

stitute in 2018 (**Figure 5**). On the left, see a current satellite photograph of energy-deprived Africa by night; on the right, see an artist’s projection of an “electrified” Africa by night—in the year 2058.

Thank you for your attention. Comments and questions are welcomed; email them to the Schiller Institute at richardblack1776@gmail.com.

Sources

1. Lyndon H. LaRouche, Jr., *So, You Wish To Learn All About Economics*, 1984.
2. Lyndon H. LaRouche, Jr., “The Legacy of Mendeleev and Vernadsky: The Spirit of Russia’s Science,” *Executive Intelligence Review*, Vol. 28, No. 47, Dec. 7, 2001, pp. 23-45.
3. Richard Freeman, “Clean Coal Can Electrify the World,” *Executive Intelligence Review*, Vol. 48, No. 31, Aug. 6, 2021, pp. 38-44.
4. *EIR* Special Report, *The New Silk Road Becomes the World Land-Bridge*, 2014.
5. Hussein Askary and Jason Ross, *Schiller Institute Strategic Report: Extending the New Silk Road to West Asia and Africa*, Nov. 2017.