# China and the Coming Revolution in Global Cargo

by Dennis Small

On Dec. 22, 2014, Egypt's President Abdel Fattah el-Sisi arrived in China for a four-day state visit, in which a central topic was cooperation between the two countries on Egypt's New Suez Canal project. On that same day, preliminary work officially began on the construction of Nicaragua's Great Inter-Oceanic Canal, a $50 billion, five-year great infrastructure project led by China's HKND company. The two events, and their suggestive coincidence in time, point to a revolutionary reshaping of the face of the planet's principal cargo flows, which is occurring under the impulse of the new global development system that is being created by the BRICS nations, with China in the lead.

If you take a step back and look at the future trajectory of the planet's production and cargo flows as a whole, as the Chinese government and its BRICS allies are clearly doing, it becomes immediately evident why it is necessary to build the Great Inter-Oceanic Canal in Nicaragua, the New Suez Canal, and the World Land-Bridge more broadly—all as platforms for a profound technological leap into the era of thermonuclear fusion power, centered on the mining of helium-3 on the Moon.

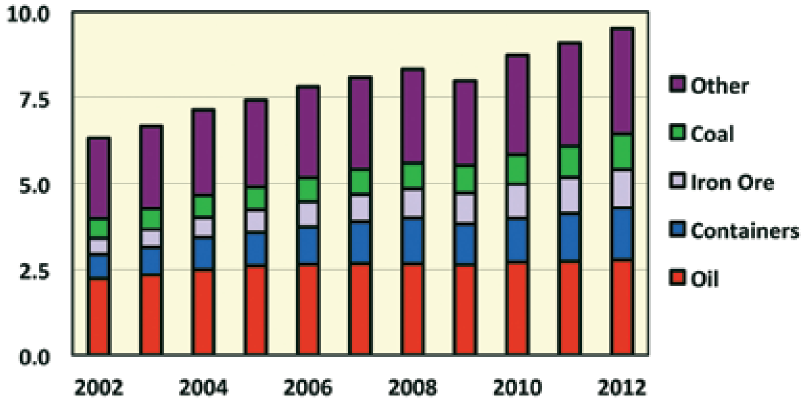
China's spectacular physical-economic growth since 2000 has meant that its *per-capita* production of steel has leapt six-fold, iron ore by 540%, and coal by 250%—just to take some leading industrial indicators—and that world shipments to China of coal, iron ore, grains, oil, and other products have grown similarly. If, in the coming 10-15 years, the BRICS agenda takes hold over the entire globe, as it must, with the required participation of the United States and Europe in that planetary mission, there is no reason that similar per-capita rates of growth cannot be generated for the remaining 80% of the world's people (China's 1.4 billion people today represent about 20% of the planet's 7.2 billion inhabitants).

If the world's current technological platform of production and cargo trade were to remain essentially unchanged, our current system would then have to handle, not today's 11 billion tons of total cargo, of which 10 billion (90% of the total) is shipped by maritime trade, but some 50 billion tons of cargo. *That cannot be done* without the new Nicaraguan and Suez canals, and the World Land-Bridge of high-speed cargo trains running from the tip of South America through the Darien Gap in Panama; on through Central and North America; across the Bering Strait into Russia and Eurasia; down into China and Southeast Asia; over into Western Europe; and down into Africa through a tunnel under the Strait of Gibraltar.

But the current technological platform must and will change as well, with the advent of the age of plentiful thermonuclear fusion power, in ways we will indicate below. Our purpose here is to present a picture of broad global physical-economic cargo flows, as a kind of "bill of materials" of the current physical-economic process, a baseline which points to the necessary *changes* in technological platform, with attendant leaps in energy-flux density both of production and transport.

As with any bill of materials, this only tells you how much of X, Y, and Z, in physical units, you need to produce A, B, and C: It is a kind of input-output table under the current technological mode. It does *not* tell you how to change that bill of materials as the economy is upshifted. That problem is addressed, Lyndon LaRouche has long emphasized, by starting with a concept of the required future of the planet—of where you need to be in a generation or two—and then work backwards. Often, the conclusion you reach is that *you can't get there from here*, given present parameters. That is the case, however, only if your "here" starting point is defined in terms of the present, and then linearly extrapolated forward in time. If, however, the "here" is conceived of as the future-defined potential of the physical

FIGURE 1
**Global Maritime Trade**
(Billions of Tons)




Source: HKND

economy, most emphatically including man's unique ability to create and revolutionize science and technology, then your entire perspective changes.

That is what China and the rest of the BRICS are doing; that is what the United States and Europe are not doing.

To be a bit more specific: China has embarked on the planet's most ambitious scientific endeavor, which involves space exploration leading towards the mining of helium-3 on the surface of the Moon. Since He-3 is the ideal fuel for thermonuclear fusion power, which will make pretty much all other forms of energy production secondary, if not obsolete, it is safe to say that the planet's critical cargo route of the future will be Earth-Moon shuttles to mine and transport He-3 back home.

If you look back at the Earth today from that future standpoint, the proper question to ask is: What do we have to do to shift the technological platform now, to invest to make that required future possible, and to make it happen on schedule? With the process that the BRICS have launched, we are already on our way.

## China Dominates Global Trade

We turn to look at elements of the global cargo trade, as measured in tons—and only tons. Why?

If you want to think about real economics, including planning our species' survival, the worst thing you can do is try to measure things in monetary units. Gross domestic product (GDP) is a meaningless measure, or worse, both because any mathematical representation of an economy is axiomatically flawed (inasmuch as it rules out human creativity, which is the driving force of an economy and the only actual source of value), and also because the British Empire has insisted that pure evil be given a monetary value and included in GDP calculations—to wit, the European Union's latest regulations that require member-nations to include prostitution and drugs in their GDP figures.

**Figure 1** shows the major components of global maritime trade from 2002 to 2012. Maritime trade, which reached some 9.5 billion tons in 2012, constitutes fully 90% of total world trade. The overall volume of maritime trade grew by about 50% over the decade, with its major components being:

| | % of Total, 2002 | % of Total, 2012 |
|---|---|---|
| Oil | 35 | 29 |
| Containers | 11 | 16 |
| Iron ore | 8 | 12 |
| Coal | 9 | 11 |
| Other | 38 | 33 |

The growth of container maritime shipping is particularly notable. It is flexible in terms of inter-modal transfers (e.g., to rail), and it is efficient in terms of economies of scale. Given the relatively large amounts of time and energy required to transport cargo overseas, it has become advantageous to design and build ever-larger container ships.

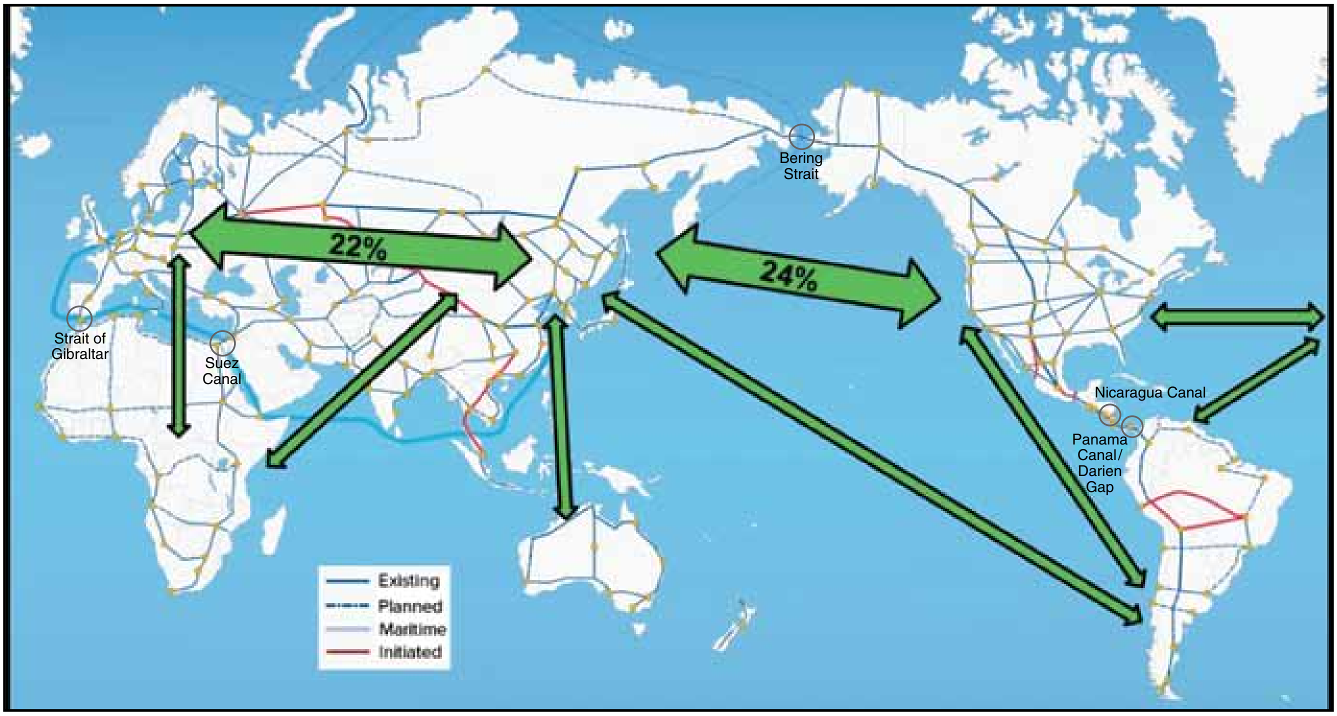
For example, China's CSCL company just completed the maiden voyage of the world's largest container ship, the *CSCL Globe*, with a capacity of 19,100 TEU (twenty-foot equivalent units—the international standard used to measure container ship capacity). The previous record-holder was Maersk's *Majestic* of Denmark, at 18,270 TEU. Built for CSCL by Hyundai Heavy Industries of the Republic of Korea, the *Globe* is the first of five such ships on order. The *CSCL Globe* is equipped with a single, electronically controlled 77,250 hp engine, which consumes about 20% less fuel per TEU than smaller ships.

Nearly half of all world container traffic flows from Asia eastward to the United States (24%) and westward to Europe (22%), as shown in **Figure 2**. (The arrow in this second case is not meant to indicate that the containers actually travel overland, since the vast majority actu-

FIGURE 2

## Principal Container Traffic Flows, 2011

(% of Total)

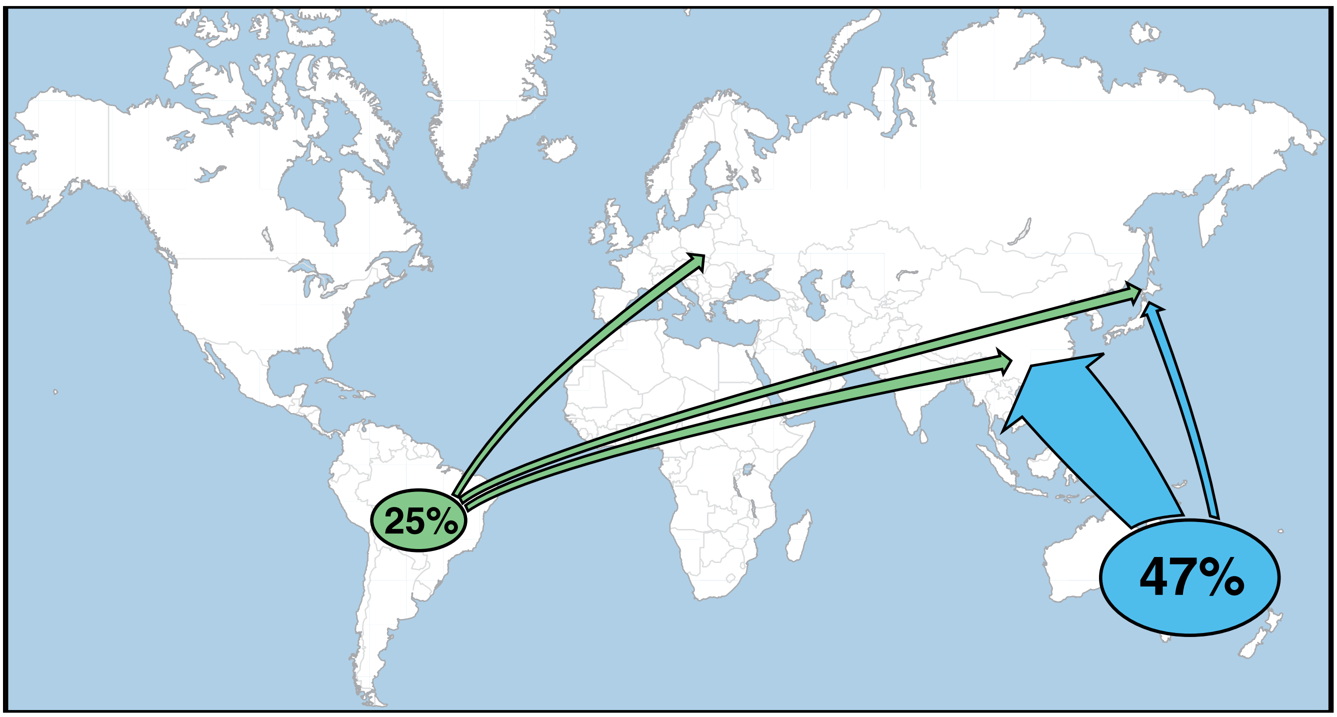



Source: Statista

FIGURE 3

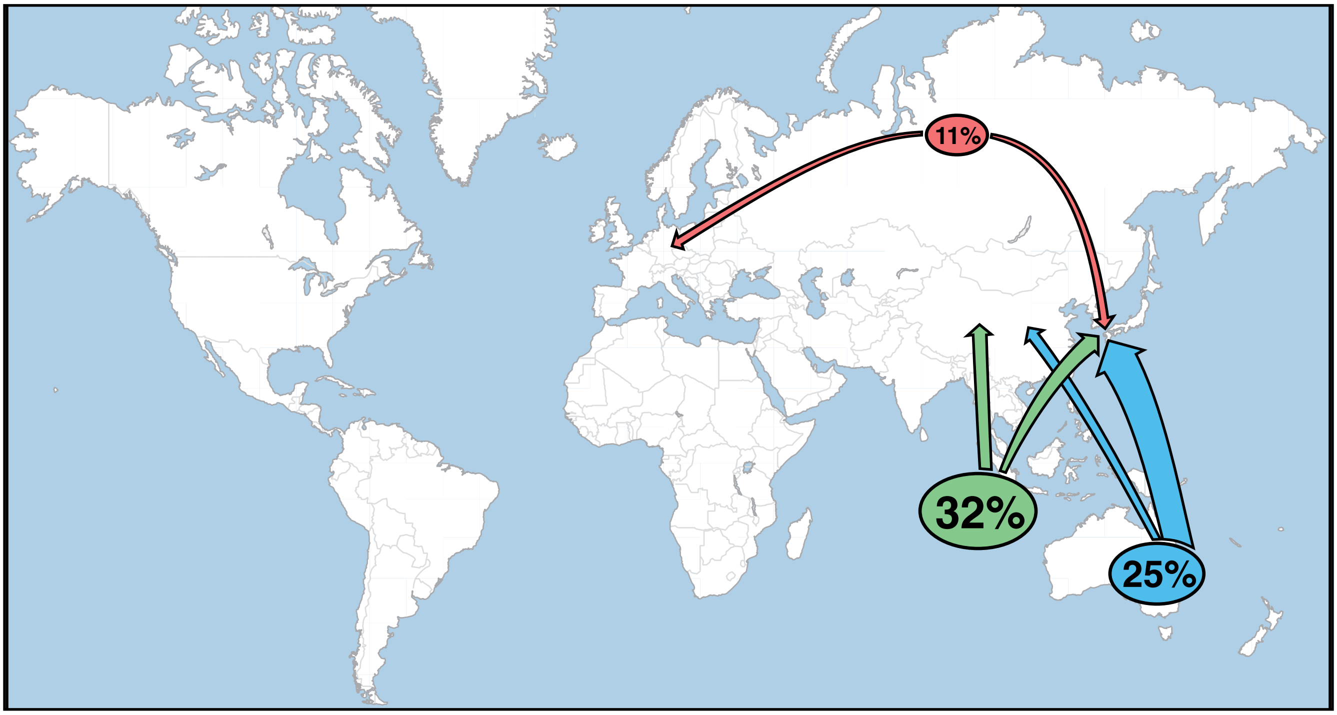
## Principal Iron Ore Export Flows, 2013

(% of Total)




Source: Statista

FIGURE 4
**Principal Coal Export Flows, 2013**
(% of Total)

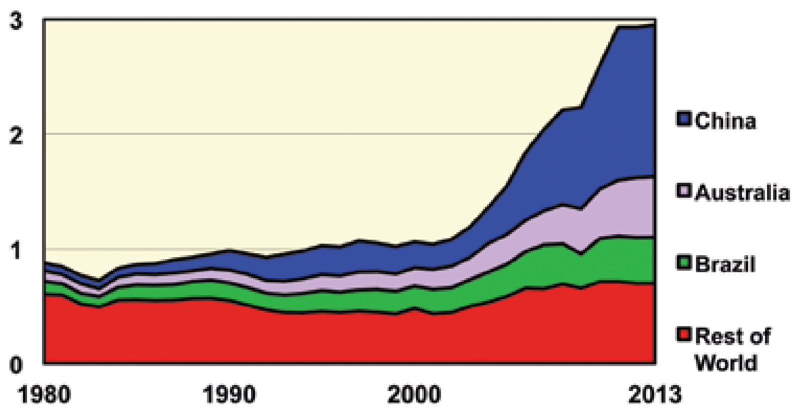



Source: WCA

ally follow a maritime route, such as the one indicated as part of the Maritime Silk Road.)

A second dynamic category of maritime trade is iron ore, which grew from 484 million tons in 2002, to 1,110 million tons in 2012, and an estimated 1,300 million tons in 2013. Here the driving force has been China's skyrocketing steel sector, with attendant requirements for iron ore above and beyond the substantial amounts they produce domestically. Today, the two largest iron ore exporters, Australia and Brazil, account for nearly 75% of the world total—and the lion's share of that (63%) goes to China, and secondarily to the Asian economies of Japan and South Korea (see **Figure 3**).

FIGURE 5
**Total World Iron Ore Production**
(Billions of Tons)



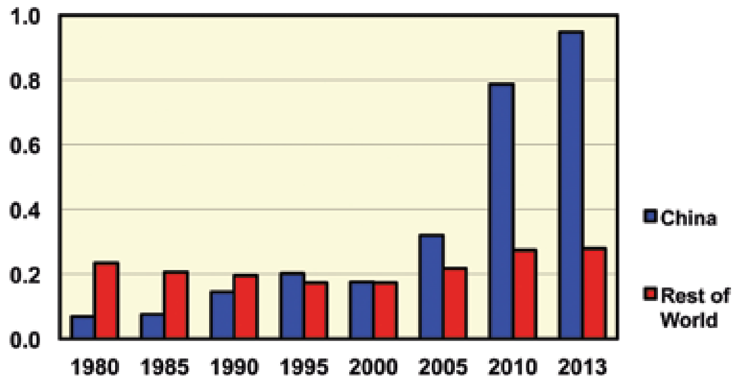

Sources: UN, USGS.

A similar picture applies to coal, with Indonesia being the world's principal exporter, with 32% of the total, followed by Australia (25%) and Russia (11%). Again, China is the leading destination, along with Japan and South Korea (**Figure 4**).

But as large as China's imports of iron ore and coal are, they are dwarfed by China's domestic production of these raw materials.

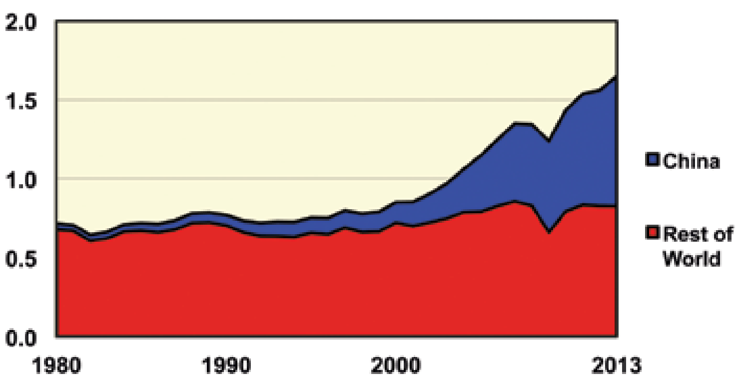
In the case of iron ore, China's imports of 820 million tons are about two-thirds the amount it produced in 2013 (1,320 million tons). As **Figure 5** shows, China's production of iron ore exploded after 2000, rising from 231 million tons in that year to 1,320 million tons in 2013—a 570% increase in 13 years! In 2000, China

FIGURE 6
**World Iron Ore Production Per Capita**
(Tons)



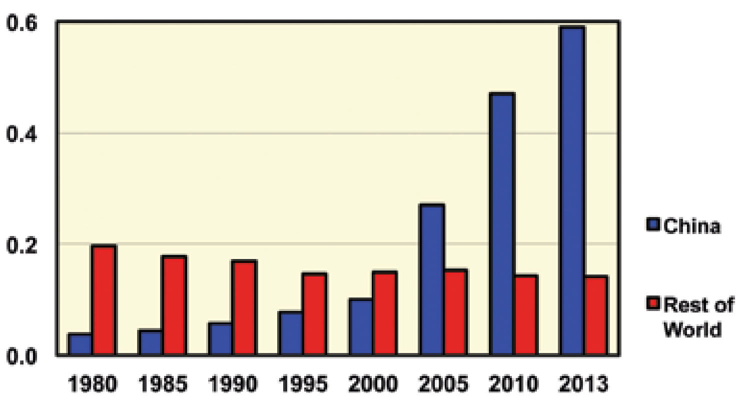

Sources: UN, USGS.

FIGURE 7
**Total World Steel Production**
(Billions of Tons)




Source: WSA.

FIGURE 8
**World Steel Production Per Capita**
(Tons)




Source: WSA.

produced 20% of the world's iron ore; today it produces 45%.

Although you might be tempted to argue that China's predominance is principally due to its large population, that is not the case, as a comparison of changes in *per-capita* production in China and the rest of the world clearly shows (**Figure 6**). From 1980 to 2013, China's per-capita production of iron ore soared from 68 kg in 1980 to 947 in 2013, an increase of 1,291%. The rest of the world stagnated, going from 234 kg to 279 kg in that same period. China's per-capita iron ore production today is more than three times greater than the rest of the world, having started at three times *less* back in 2000.

A comparable picture exists in the case of coal, where China's production rose sharply after 2000, and now accounts for 47% of global production.

Steel is even more dramatic. China's total production rose by nearly 650% from 2000 to 2013: The 822 million tons produced it last year was half of total world output (**Figure 7**). And its per-capita production of steel rose by a whopping 1,500% between 1980 and 2013, while the rest of the world *declined* on a per-capita basis, to the point where China's performance is more than four times higher than that of the rest of the world (**Figure 8**).

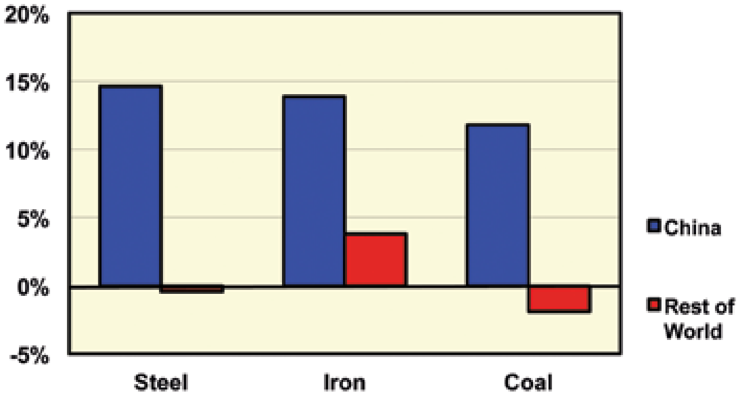
In **Figure 9** we summarize the findings for these three, essential industrial products. Over the 13-year period from 2000 to 2013, steel production per capita grew by an average 14.6% in China, while the rest of the world showed an average annual decline of 0.4%; for iron, China grew by 13.9% per year on a per-capita basis, while the rest of the world grew by only 3.8%; and per-capita coal production showed an 11.8% per-capita annual rise in China, but in the rest of the world it fell by 1.9% per year over this period.

These are among the stark numbers behind Chinese President Xi Jinping's invitation to the United States to join with the BRICS in unleashing this kind of economic growth globally, which he issued at a joint press conference with President Barack Obama on Nov. 12, 2014, at the APEC summit in Beijing. Are American political leaders in Congress and the White House

FIGURE 9

**Growth of Production Per Capita**

(Average per Year 2000-2013)




Sources: UN, USGS, UNCTAD, EIA, WCA, WSA.

**Table 1** compares capacity and other features of some of the world's major canals: the current Panama Canal; the expanded Panama Canal, after a third set of locks is completed in 2016; the current Suez Canal; the expanded Suez Canal, scheduled to be completed later in 2015; and Nicaragua's Great Inter-Oceanic Canal, which will take some five years to build.

The coming changes are dramatic. The current "Panamax" (maximum size of a ship that can pass through the Panama Canal) is about 5,000 TEU; the expanded Panama Canal will be able to handle ships more than 2.5 times that size, or some 13,000. Even that is dwarfed by the Nicaraguan Canal, which will be able to handle ships up to 25,000 TEU—five times Panamax. Already, the China-led revolution in maritime shipping is affecting the entire spectrum, from ship sizes, to port capacity, to dredging and bridge modifications, to railroad links. In the United States, major projects are underway in the ports of New York, Baltimore, Norfolk, Savannah, Miami, and Long Beach, among others.

really so stupid—or so pathetically puppets of the British Empire—that they are prepared to reject this offer for joint economic development, and instead sink with the bankrupt trans-Atlantic financial system?

## A Glimpse of the Future

Why is the Nicaraguan Great Inter-Oceanic Canal a necessity for global development? Just consider what the picture of iron ore tells you about global production and shipping patterns. Brazil today exports some 330 million tons of iron ore, or 25% of total world exports, largely to China. The Brazilian government announced at the end of 2014 that it is investing to increase its output of iron ore by 50% over the next five years. Brazil's Vale do Rio Doce, which handles the enormous Carajás iron ore mine in northeastern Brazil, has already placed orders with various Chinese and South Korean shipbuilders for 35 new cargo ships, with a maximum capacity of some 400,000 deadweight tons (DWT) each—way more than current cargo ships handle. Although DWT and TEU are not strictly convertible metrics—DWT measures tonnage; TEU measures volume—industry standards estimate about 14 tons per loaded TEU. That means each Vale cargo ship is roughly the equivalent of a 28,000 TEU container vessel.

Brazil's new iron ore cargo vessels will be too large to go through the expanded Panama Canal, and even the expanded Suez Canal. But they can be handled by the Nicaraguan Canal. This strongly suggests that the current maritime shipping route from Belem, Brazil (which is very close to Carajás's principal port of São Luis) to Shanghai, China—which currently goes eastward across the Atlantic, rounds Africa's Cape of Good Hope, and then traverses the Indian Ocean towards

TABLE 1

**Comparison of Panama, Suez, and Nicaragua Canals**

| | Current Panama Canal | Expanded Panama Canal | Current Suez Canal | Expanded Suez Canal | Nicaragua Canal |
|---|---|---|---|---|---|
| **Date in Service** | (NA) | (2016) | (NA) | (2015) | (2019) |
| **Length** (km) | 77 | 77 | 193 | 193 | 278 |
| **Maximum size** (TEU) | 5,000 | 13,000 | 14,000 | 20,000 | 25,000 |
| **Maximum size** (thousand DWT) | 65 | 180 | 200 | 280 | 400 |
| **Ships/day** | 30 | 60 | 49 | 97 | 25 |
| **Transit time** (hours) | 8-10 | 8-10 | 18 | 11 | 30 |
| **Estimated cost** (billions $) | (NA) | 5.3 | (NA) | 8.4 | 50 |

Sources: EIR, HKND, pancanal.com, suezcanal.gov.eg

FIGURE 10
**Belém to Shanghai Maritime Routes**


Source: searates.com

China—will instead go westward, once the Nicaraguan Canal is in operation, proceeding through the canal and across the Pacific, directly to Shanghai (see **Figure 10**). The current route, according to maritime shipping experts, takes an estimated 36 days to cover 22,800 km; the new route will be a shorter 20,500 km and take only 32 days—a saving of more than 10%, which is highly significant in physical-economic terms, given the magnitudes involved.

But that is only the beginning of the revolution in global cargo that is underway. Although it will remain necessary for another 20-30 years to ship bulk cargo such as coal and iron ore from one part of the planet to another via maritime routes, container traffic—which is already 16% of the total, by volume, and is the fastest-growing component—is another matter. Containerized cargo is ideal for shipment by high-speed rail along the World Land-Bridge, once it is completed, especially since the contents of containers are often of higher value per unit weight, and also require more rapid transportation to their destination.

To get an idea of the horizons that the World Land-Bridge will open up, in terms of both passenger and freight movement, look at **Figure 11**, a map displaying a polar projection of the Earth. For containerized freight that needs to be moved from, say, Los Angeles to Shanghai, the maritime shipping route following a great circle is about 11,000 km, and takes about 17 days. That same route on the World Land-Bridge is also close to a great circle and likewise stretches some 11,000 km. But the difference is that a high-speed train, traveling at a modest 250 km per hour, will complete the trip in about two days—about a tenth the time it would take by ship! The physical-economic benefits of improving global cargo transit times by an order of magnitude, can scarcely be exaggerated.

But it can be superseded, with yet another set of technological leaps.

First of all, the required revolution in nuclear energy, both fission and fusion, will quickly show the physical-economic absurdity of shipping enormous quantities of petroleum and natural gas from one corner of the Earth to another, which today accounts for 29% of global maritime trade by volume. Those shipments, in any event, are primarily used as instruments for global speculation on futures markets, not for satisfying actual energy requirements. As Lyndon LaRouche has long advocated, nuclear energy will quickly relegate petroleum to its proper role as an industrial feedstock for the production of plastics and other goods, as opposed to

FIGURE 11
**Los Angeles to Shanghai, Maritime vRoutes**


Source: searates.com, EIR.

the inefficiency of its use as a fuel—let alone a heavy one that has to be hauled long distances. That conversion to nuclear will not wipe out the entirety of the 2.8 billion tons of oil that was shipped in 2012, but it will certainly reduce it dramatically, freeing up shipping capacity for more productive uses.

Another major component of global freight flows is grain, and this too will have to change dramatically. The British Empire has succeeded in destroying the food self-sufficiency of most parts of the planet, and turned food into a weapon in the hands of their giant food cartels, such as Cargill and Archer Daniels Midland. With adequate supplies of energy made available, and with the major water management projects that will accompany the World Land-Bridge, a doubling and even tripling of world food production can be achieved in short order (*EIR*, June 6, 2008), concentrating on achieving food self-sufficiency in what are today the most impoverished regions of the planet. As with oil, there is no physical-economic justification for transporting massive amounts of grain for long distances, when it can be produced more efficiently locally. And as with oil, today these flows are principally used for speculation and profiteering, while millions of people are condemned to hunger and starvation.

Nuclear energy will also be used to power future cargo ships. Some such ships have been developed over recent decades, but they are generally out of service at this time. Although the speed of the ships will not be materially affected by that change alone, going nuclear will dramatically reduce the total weight that the ship has to transport, by eliminating the need to carry its own heavy bunker fuel with it. A non-nuclear cargo ship is as economically inefficient as a non-electrified railroad: Why in the world would you want to drag your own fuel around with you, when other options are available?

But it is only with the advent of a full fusion economy, as helium-3 is mined on the Moon and shipped back to Earth, that the true revolution will take shape. The fusion torch, which is capable of cheaply producing pretty much all needed raw materials *in situ*, literally from waste products, will entirely redefine the nature of cargo on a planetary basis, up-shifting the nature of what is transported into the domain of scientific and high-technology products, in a manner befitting a global division of labor of such an economy.

That is the vista before us, if the United States and Europe come to their senses and join the BRICS planetary economic revolution.