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Haiti's Energy Problems

Posted by Gail the Actuary on January 30, 2010 - 10:52am
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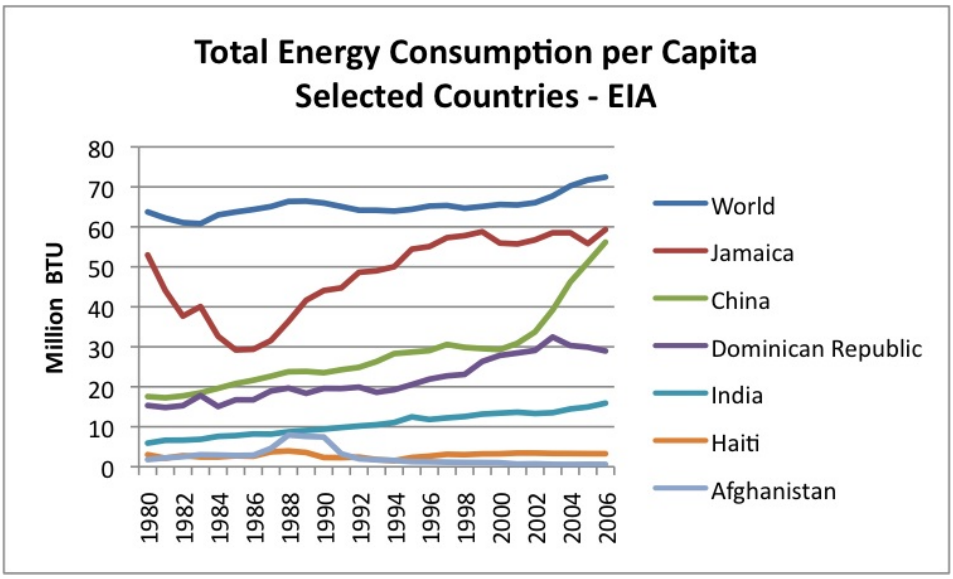

Figure 1. Total Per Capita Energy Consumption for a group of selected countries, based on the EIA's International Energy Statistics.

In Figure 1, I compare Haiti's total per capita energy consumption to that of a number of other countries. I included China and India because these are large and well known. I included Jamaica and the Dominican Republic because they are other Caribbean nations, and the Dominican Republic occupies the other half of the island where Haiti is located. I included Afghanistan because it uses even less energy than Haiti. I didn't include "developed" countries, because their consumption is so high in comparison, it would be hard to read the chart.

When one looks at Figure 1, one can see that Haiti's per capita energy consumption is about one fifth as much as India's and about 1/17 as much as China's. It is about 1/22 as much as the world average. I didn't include the USA in the chart, but Haiti's per capita energy consumption is about 1/100 that of the USA. Total per capita energy consumption is relatively flat, both on a world average basis and for Haiti.

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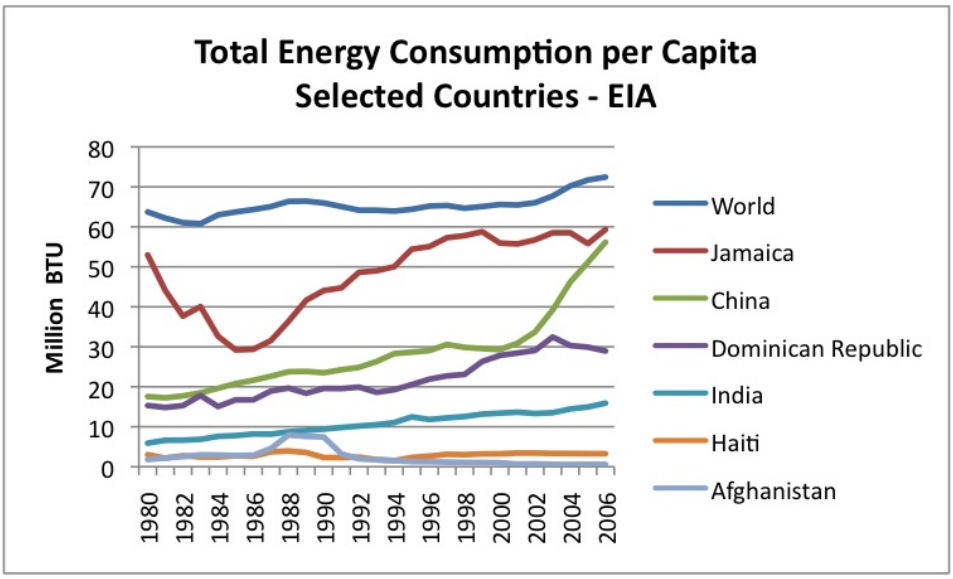

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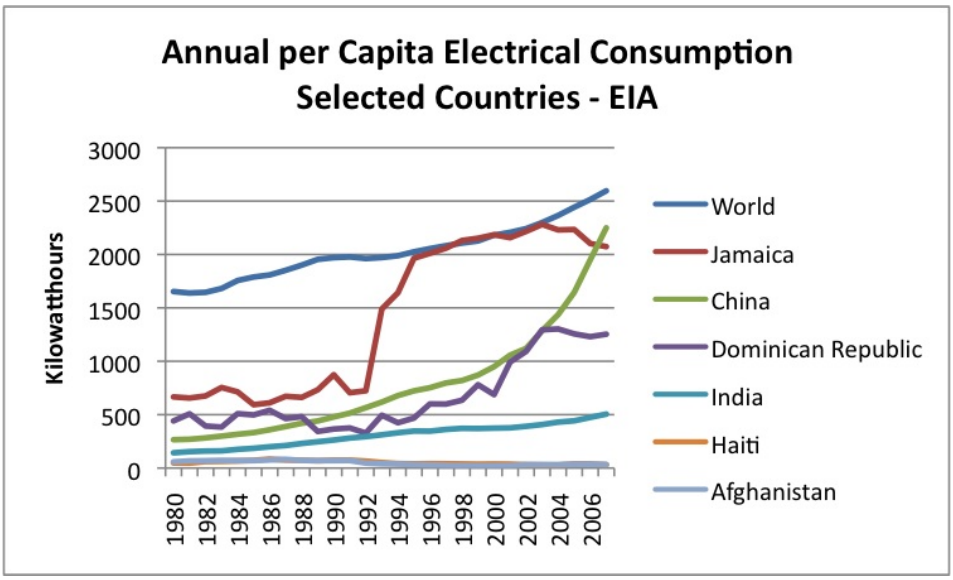

Figure 2. Per capita electrical consumption for a group of selected countries, based on EIA's International Energy Statistics

As badly as Haiti does compared to other countries on a total energy basis, it does much worse when one looks only at electricity. Haiti's electricity consumption is so closely tied with that of Afghanistan on Figure 2 that one cannot see much of the line for Haiti. In 2007, Haiti had only 1/84 as much electricity per capita as the world, 1/40 as much as the Dominican Republic, and 1/16 as much as India.

World per capita electrical consumption (Figure 2) has been growing much more rapidly than total per capita energy consumption (Figure 1)--perhaps because of energy efficiency. (It may also be that Figure 1 "undercounts" electricity.) I would expect that this growth in world electrical supply is a major contributor to world economic growth. Unlike the world, Haiti's per capita electricity consumption has not been growing. Its per capita electrical consumption is now less than half of the level it was in the mid 1980s.

There is an article in Wikipedia about the electricity sector in Haiti. These are a few quotes:

> "The largely government owned electricity sector in Haiti is facing a deep, permanent crisis characterized by dramatic shortages and the lowest coverage of electricity in the Western Hemisphere with only about 12.5% of the population (25% if illegal connections are accounted for) having regular access to electricity. In addition, Haiti's large share of thermal generation (70%) makes the country especially vulnerable to rising and unstable oil prices."
>
> "Most of the generation infrastructure in Haiti is very old and costly to maintain and operate. In 2006, total installed capacity was only 270 MW, of which about 70% was thermal and 30% hydroelectric."
>
> "The Haitian electricity sector has a national installed capacity that is largely insufficient to meet a demand of 157 MW in Port au Prince and of 550 MW at the national level. This electricity shortage has created a situation in which tens of thousands of households and institutions (e.g. hospitals, schools) have to rely on their own diesel generators and as a result spend large portions of their income on fuel to run those generators."
>
> "Service quality in Haiti is very poor. Those who have access received on average 10 hours of electricity a day, with very large disparities among the areas covered."
>
> "The public utility Electricité d'Haïti (EDH) suffers from high inefficiencies, with more than 55% estimated technical and non technical losses. This high percentage results from improper maintenance due to lack of financing; triggering incidents (e.g. fires); obsolescence of information systems, which prevents proper identification of customers, billing and accounting and in turn impacts quality of service and losses. The ratio of energy unpaid to energy produced is among the highest in the world, with 35% of the energy produced being stolen."

We have heard that environmental degradation is a major problem in Haiti, with less than 1.5% of the tree cover remaining intact. The reason for this degradation seems to be a lack of other

sources of energy:

> The primary cause of Haiti's environmental degradation has been caused by Haitian's need for energy. With an electricity sector that only covered 10% of Haiti's population in 2006, chronic energy shortages have contributed to Haitian's search for alternative sources of energy. Unfortunately for Haiti's natural environment, wood became and continues to be the principal energy source in Haiti, accounting for 70 percent of energy consumption in 2006. This resulted in the steady deforestation of Haiti, with an estimated 6,000 hectares of soil lost each year to erosion.

From the CIA World Fact Book, we read that there is widespread unemployment and underemployment; more than two-thirds of the labor force do not have formal jobs. Its industries are listed as sugar refining, flour milling, textiles, cement, light assembly based on imported parts. It consumes 12,000 barrels of oil a day in 2008, all of which is imported--no natural gas or coal. It exports manufactured goods, apparel, oils, cocoa, mangoes, and coffee, with the US accounting for a little over 70% of its exports.

There is a major imbalance between export and imports. Exports amounted to $490 million in 2008; imports amounted to $2,107 million in 2008, or about 4.3 times exports. If Haiti imports 12,000 barrels a day of finished oil products, these by themselves would seem to amount to something like $450 million dollars of value, if finished oil products average something like $100 barrel in cost.

There is at least some possibility of natural gas production in the future. Recently, there have been reports that the earthquake may have exposed potential natural gas resources. According to Bloomberg:

> The earthquake that killed more than 150,000 people in Haiti this month may have left clues to petroleum reservoirs that could aid economic recovery in the Western Hemisphere's poorest nation, a geologist said.
>
> The Jan. 12 earthquake was on a fault line that passes near potential gas reserves, said Stephen Pierce, a geologist who worked in the region for 30 years for companies including the former Mobil Corp. The quake may have cracked rock formations along the fault, allowing gas or oil to temporarily seep toward the surface, he said yesterday in a telephone interview.

So what are Haiti's options?

Haiti's economy was doing very badly, even before the earthquake and its aftershocks. Getting Haiti back to the state it was in before the earthquake won't really fix its problems. These would appear to be some options:

1. Develop a tourist trade. Tourist trade seems to be a principal source of income for other Caribbean nations. In the past, tourists have been willing to pay a high enough price for accommodations so that the high price of oil-generated electricity hasn't been too much of a

problem. (Island nations tend to use oil for electricity generation, because it is easy to transport.) But it is hard to see Haiti getting into the tourist trade for the first time now. In a post-peak oil world, there is going to be less tourism in general, so this is not a good new business to get into. Also, with all environmental degradation and now the earthquake damage, it is hard to see tourists wanting to come to sightsee.

2. Sell more crops (mangos, sugar, cocoa, coffee) on the world market. The amount being sold is probably close to a maximum level today, at least with current energy inputs. World market prices are so low, the effort is hardly worthwhile. More fertilizer probably wouldn't be a fix--prices for crops are so low that it is hard to believe that they would pay for the higher yields. And with higher oil prices, the cost of transporting the crops makes them more expensive for buyers, likely reducing demand.

3. Increase manufacturing capability. There really needs to be more electricity for more manufacturing. There doesn't seem to be an option for adding hydro-electric--the streams dry up except in the rainy season. Adding electricity generated by oil will be very expensive--not only will the oil for fuel be expensive, but building the facilities for power generation and transmission lines will be expensive. A new manufacturer might have its own diesel generator, but electricity costs based on diesel generation are likely to be prohibitively high--certainly much higher than in areas which have access to coal or natural gas generated electricity. Wind turbines might be added, if someone else would pay for the up-front costs and the cost of upgraded transmission lines. But oil backup would still need to be added, and the cost still would be very high compared to coal or natural gas.

4. Add financial services. Financial services, like those offered by Bermuda and the Cayman Islands and Dubai, really need nice resorts areas to supplement them, so that the people involved in the transactions can visit nice places while attending meetings. It is hard to see Haiti competing in this arena. It is also difficult to see financial services expanding on a world-wide basis, now that oil production has plateaued.

5. More aid on a continuing basis. Sending food and other aid on a continuing basis is a problem because then local farmers have to compete with a price of $0, so there is no point in raising food. If the aid doesn't include assistance with family planning (or perhaps even if it does), population keeps rising. According to the CIA World Factbook, an average of 3.81 children are born per woman in Haiti.

6. Develop the natural gas resources that might be available. This will take a few years, even in the best of circumstances, and won't last indefinitely. The development of natural gas resources might make lower priced electricity available for manufacturing or for other purposes. All of this is iffy at this point. Even if natural gas is available, the cost of extraction may still be quite expensive, yielding expensive natural gas, rather than cheap natural gas.

7. Attempt to build a self-sufficient economy, with no more fossil fuels than can be paid for by exports. This would seem to be one possible direction to go. Haitians would need to figure out what foods they can grow for themselves, and how much fishing in small boats that they can do. They may also want crops that can be used for clothing, and crops added to the rotation to enhance soil fertility. At least part of the forests will need to be planted back, so as to prevent further erosion, and to prevent landslides.

It seems to me that a self-sufficient economy using little fossil fuels would support some Haitians--say 2 or 3 million, but it is hard to see that it would support the whole 9 million Haitians. The issue then would be, "What happens to the rest of the Haitians?" I expect it would be difficult to

get other countries to accept the large number of Haitians needing new homes. Nearly all adults would all need jobs; many would be illiterate.

8. Other supplemental approaches. Solar ovens would be great, if donation of a large number could be obtained, so as to cut back on the need for wood for charcoal for cooking. Perhaps some donations of solar PV would help provide charging capability for radios and telephones, and would provide some source of electricity besides generators for hospitals and schools.

General

What ideas do others have for solving the problems of Haiti? I expect that what in fact will happen is that more aid will be provided on a continuing basis--at least for a while, until other countries become too poor, or manage somehow to forget Haiti's problems. Then the people of Haiti will be left to fend for themselves, and there won't be enough to go around.

The reason I am not suggesting ramping up fossil fuel imports is because the exports generated by the use of fossil fuels (really only oil) seem not to be generating enough of a payback to pay for their cost. Without a good plan, adding more oil imports would seem only to make the out-of-balance worse. Perhaps there is a way around this issue that I don't see.

One thing that Haiti doesn't need is more loans. It needs the loans that are currently outstanding forgiven.

The world is going to run into the problem of a natural disaster hitting an already impoverished nation again and again in the next 20 years, I expect. Such countries will need to be bailed out in some way by others. When everything is sliding downhill to begin with, countries with low energy consumption, like Haiti, are especially vulnerable.

One issue I see as one gets to lower and lower energy consumption is political stability. It is one thing to govern a country which is held together by radio and television stations carrying the speeches of the leaders of the country and with roads carrying cars and trucks. It is another when there really is very little means of communication beyond word of mouth, and transportation is mostly by walking.

We are used to having rather large countries now, but I am wondering if as energy becomes less available, and portable phones become increasingly out of reach, local governments will become more important and governments for the nation as a whole will fade away. The countries I see most at risk of this are ones with very low energy use today--Somalia, Afghanistan, Haiti, Ethiopia, and Congo-Kinshasa, for example.

Trying to figure out how to deal with Haiti is a major challenge. I am hoping these thoughts will add a little background to the news stories that one sees so often.