

10 Reasons Why the World Can't Run Without Fossil Fuels

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It is now popular to talk about leaving fossil fuels to prevent climate change. Pretty much the same result occurs if we run short of fossil fuels: We lose fossil fuels, but it is because we cannot extract them. Practically no one tells us about the extent to which the current system depends upon fossil fuels, however.

The economy is extraordinarily dependent on fossil fuels. If there are not enough fossil fuels to go around, there is likely to be fighting over what is available. Some countries are likely to get far more than their fair share, while the rest of the world's population will be left with very little or no fossil fuels.

If losing fossil fuels completely, or nearly completely, is a risk for some of the world's population, it might be useful to think through some of the things that go wrong. The following are some of my ideas about things that change, mostly for the worse, in a fossil fuel-deprived economy.

[1] Banks, as we know them, will likely fail.

Before banks fail in areas with virtually no fossil fuels, my guess is that we will generally see hyperinflation. Governments will greatly increase the money supply in a vain attempt to get people to believe that more goods and services are being produced. This approach will be used because people equate having more money with the ability to buy more goods and services. Unfortunately, without fossil fuels it will be very difficult to produce very many *goods*.

More money will simply provide more inflation because it takes physical resources, including the proper types of energy, to operate machinery of all kinds to make goods.

Creating *services* also requires fossil fuel energy, but generally, to a lesser extent than creating goods. For example, the pair of scissors used in cutting hair is made using fossil fuel energy. The person cutting hair needs to be paid; his or her pay needs to be high enough to cover energy-related costs such as buying and cooking food to eat. The shop where hair cutting is operated will also need to pay for the fossil fuel energy required for heat and light, assuming such energy is even available.

Banks will fail because too large a share of debts cannot be repaid with interest. Part of the problem will be that while wages will rise, the prices of goods and services will rise even faster, making goods unaffordable. Another part of the problem is that service economies, such as those of the US and eurozone, will be disproportionately affected by a declining economy. In such an economy, people will get their hair cut less often. Instead, they will spend their money on essentials, including food, water, and cooking supplies. Service-providing businesses, such as hair salons and restaurants, will fail for lack of customers, leading to defaults on their debts.

[2] Today's governments will fail.

With failing banks, today's governments will also fail. Partly, they will fail because of attempts to bail out banks. Another problem will be declining tax revenue because fewer goods and services are produced. Pension programs will become increasingly difficult to fund. All these issues will lead to increasingly divisive politics. In some cases, central governments may dissolve, leaving states and other smaller units, such as today's provinces, to continue on their own.

Intergovernmental organizations, such as the United Nations and NATO, will find their voices becoming less and less heeded before they fail. Getting sufficient funding from member states will become an increasing problem.

Dictatorships ruled by leaders who wield absolute power and aristocracies ruled by leaders with hereditary rights are the types of governments with the least energy requirements. These are likely to become more common without fossil fuels.

[3] Nearly all of today's businesses will fail.

Fossil fuels are essential for all kinds of businesses. They are used in the extraction of raw materials and in the transportation of goods. We use fossil fuels to pave roads and to build nearly all of today's buildings. Without fossil fuels, even simple repairs of existing infrastructure become impossible. Without adequate fossil fuels, international companies are especially at risk of breaking into smaller units. They will find it impossible to operate in parts of the world with virtually no fossil fuel supply.

Fossil fuels are even used in making solar panels, wind turbines, and replacement parts for electric vehicles. Talking about solar and wind as "renewables" is to a significant extent misleading. At best, they can be described as fossil fuel "extenders." They might help a problem of a slightly low fossil fuel supply, but they are far from adequate substitutes.

[4] Grid electricity and the internet will disappear.

Fossil fuels are important for maintaining the electrical transmission system. For example, restoring downed power lines after storms requires fossil fuels. Hooking up solar panels or wind turbines to the electric grid requires fossil fuels. Home solar panel systems may

operate until their inverters fail. Once their inverters fail, their usefulness will be greatly degraded. Fossil fuels are needed to manufacture new inverters.

Fossil fuels are also important for maintaining every part of the internet system. Furthermore, without grid electricity, it becomes impossible to use computers to connect to the internet.

[5] International trade will be scaled back greatly.

At this time of year, many of us remember the story of the three kings from the East coming to visit the baby Jesus with precious gifts. We also remember stories in the Bible of Paul traveling to distant countries. From these and many other examples, we know that international trade and travel can continue without fossil fuels.

The problem is that without fossil fuels, some parts of the world will have very little to offer in return for goods made with fossil fuels. Countries with fossil fuels will quickly figure out that government debt from countries without fossil fuels doesn't really mean much when it comes to paying for goods and services. As a result, trade will be scaled back to match available exports. Exports of goods will likely be very limited for parts of the world operating without fossil fuels.

[6] Agriculture will become much less efficient.

Today's agriculture has been made unbelievably efficient using large mechanical equipment, generally powered by diesel, together with a huge number of chemicals, including herbicides, insecticides, and fertilizers. In addition, fences and netting made with fossil fuels are used to keep out unwanted animal pests. In some cases, greenhouses are used to provide a controlled climate for plants. Using fossil fuels, specialized hybrid seeds are developed that emphasize characteristics that farmers consider desirable. All these "helps" will tend to disappear.

Without these helps, agriculture will become much less efficient. Figure 1 shows that even with the small cutback in fossil fuel use in 2020, the share of employment provided by agriculture rose.

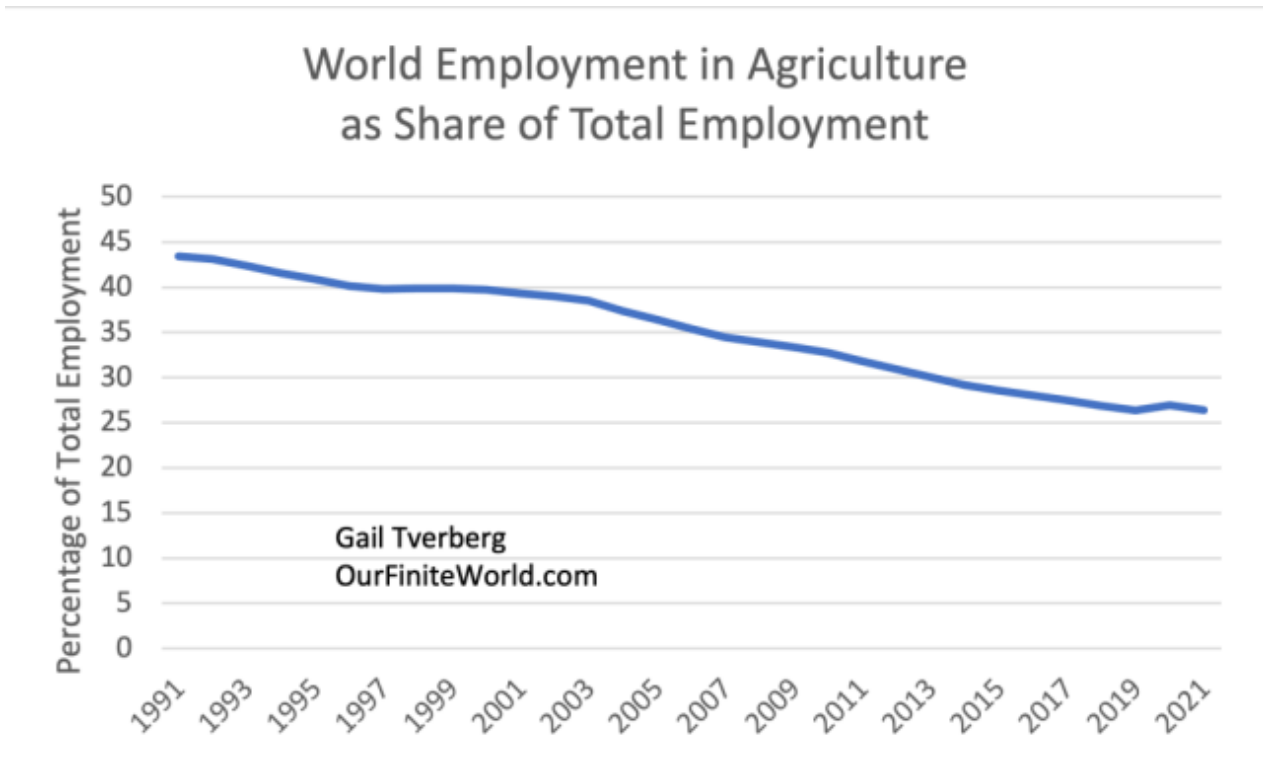


Figure 1. World employment in agriculture as a percentage of total employment, as compiled by the World Bank.

Employment in agriculture is essential. These workers did not get laid off, even as workers in tourism and workers making fancy clothes lost their jobs, so agricultural jobs as a share of total employment rose.

[7] Future labor needs are likely to be disproportionately in the agricultural sector.

People need to eat. Even if the economy is operating in a very inefficient manner, people will need food. The share of people in agriculture (including hunting and gathering) can be expected to rise considerably.

Some people hope that a shift to the use of permaculture will solve the problem of the dependence of agriculture on fossil fuels. I see permaculture as mostly a fossil-fuel extender, rather than a solution for getting along without fossil fuels, because it assumes the use of many fossil fuel-based devices, such as modern fences and today's tools. Also, at best, permaculture only partly solves the inefficiency problem because it requires a huge amount of hands-on labor.

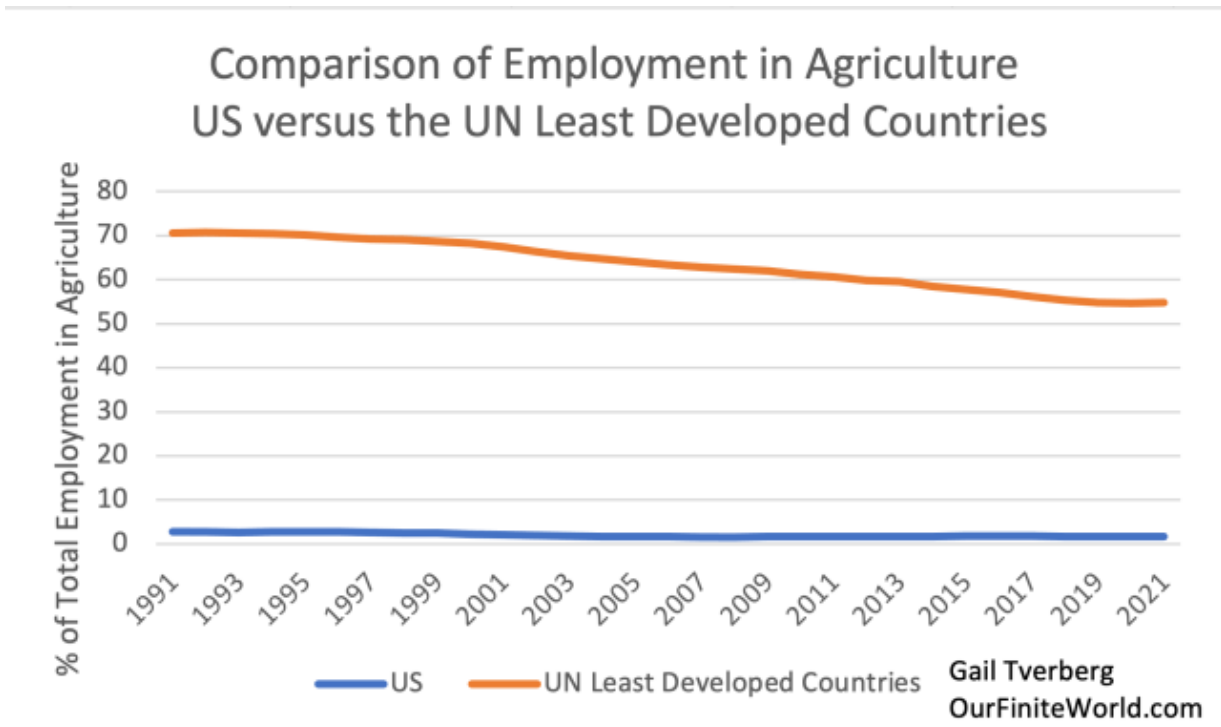


Figure 2. Comparison of US employment in agriculture as a share of total employment, with a similar ratio for the UN Least Developed Countries based on data of the World Bank.

Today, there is a wide divide between the share of employment in agriculture in the United States and in the same statistic for the UN group of [least developed countries](#). Most of these countries are in sub-Saharan Africa. They use very little fossil fuels.

The US share of employment in agriculture has recently been about 1.7%. In the part of Europe using the Euro, the share of employment in agriculture has recently averaged about 3.0%. In either the US or Europe, it would take a huge change in employment to get to 70% in agricultural employment (as seen early in the 1990s for the UN least developed group), or even to 55% (as experienced recently by the same group).

[8] Home heating will become a luxury item available only to the wealthy.

Without fossil fuels, wood will come into high demand for its heat value. Wood will be needed for cooking food; it is very difficult to subsist on a [diet of all raw foods](#). Wood will also be in demand for making charcoal, which in turn can be used to smelt some metals. With these demands on wood, deforestation is likely to become a major problem in many parts of the world. Wood in general will be quite expensive, given the considerable cost of harvesting and transporting it over long distances without the benefit of fossil fuels.

People living in sparsely populated wooded areas may be able to gather their own wood for home heating. For other people, home heating will likely become a luxury, affordable only by the very rich.

[9] Living alone will become a thing of the past.

Without enough heat, and with barely enough wood for cooking, people (and their animals) will have to huddle together more. Homes housing multiple generations, built over a place for keeping farm animals, may again become popular. It will be more efficient to cook for large groups than for one person at a time. People in cold areas will huddle together with

each other in beds to keep warm. Or they will huddle together with their dogs, as in the saying, *three dog night*, meaning a night that is cold enough to need to have three dogs to keep a person warm.

Even in warm parts of the world, people will live together in groups, simply because maintaining a household for a single person will become impossibly expensive. Food and fuel for cooking will take up a huge share of a family's income. There will be little left over for other expenses.

[10] Governments and their laws will shrink in importance. Instead, new traditions and new religions will play a greater role in keeping order.

Governments have made dozens of promises, but without a growing supply of fossil fuels (or an adequate substitute), they will not be able to keep them. Pensions will be gone. The ability of governments to enforce ownership laws will likely disappear. Without any good substitute for fossil fuels, mass disorder is a likely outcome.

People crave order. Without order, it is impossible to conduct business. We know from recent experience that "sustainability groups," put together by people with a common interest in sustainability tend not to work well enough to provide order. They tend to fall apart as soon as obstacles arise.

What has seemed to work to provide order in the past is some combination of traditions and religions. With a changing world, both traditions and religions are likely to need to change. In the book, [*Communities that Abide*](#), by Dmitry Orlov et al., the authors point out that having a strong (non-elected) leader, and a shared set of religious beliefs, helps keep a group together. In fact, it helps if the group is somewhat persecuted. Fighting for a common cause is part of what keeps the group together.

The [*Ten Commandments*](#) in the Bible are interpreted in a way that strongly suggests that they are rules for behavior within the group, not for behavior in general. For example, "Thou shalt not kill," applies to other members of the group; wars against other groups were very much expected. In those wars, killing of members of another group was expected. This would seem to allow Israel's killing of members of Hamas, today. Without enough fossil fuels to go around, fighting becomes more frequent.

Conclusion

In my opinion, the problem the world is facing today is like one that smaller economies have faced, over and over, in the past: The population has become too large for the economy's resource base, which now includes fossil fuels. Today's leaders reframe the problem as *voluntarily moving away from fossil fuels to prevent climate change* in order to make the situation sound less frightening.

As I see the situation, the world needs to scale down its use of fossil fuels because, ultimately, the laws of physics determine selling prices for fossil fuels. We extract the inexpensive-to-produce fossil fuels first. The problem is that fossil fuel selling prices cannot rise arbitrarily high. Prices must be both:

- High enough for producers to make a profit, with funds left over for reinvestment and for adequate taxes for their governments.
- Low enough for consumers to afford to buy food and other consumer goods

produced with these fossil fuels.

If we assume that all the fossil fuels that seem to be under the ground can really be extracted, climate change from burning them may indeed be a problem. But it is hard to see that they can really be extracted, given the affordability issue. Politicians will hold down prices to get voters to vote for them if nothing else.

Researchers have been working diligently to find solutions, but to date, their success has been poor. Every supposed solution requires significant use of fossil fuels. So, we need to think through what might happen if we are forced to get along without fossil fuels and without an adequate substitute.

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