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The Only Limits to Growth Are Self-Imposed

by Jason Ross

This is an edited version of the presentation Ross delivered to the Schiller Institute's Manhattan Dialogue, "The World Needs More People: Why True Economic Progress Depends Upon Population Growth," on April 10, 2021.

I'd like to talk about something that's related to the report recently released by The LaRouche Organization, "*The Great Leap Backward: LaRouche Crushes the 'Green New Deal' Fraud.*

The Green New Deal is not something that was planned to make a better future for people, but rather to reduce the world's population. Diane Sare, the previous speaker, discussed the recently deceased Prince Philip and his desire to be reincarnated as a deadly virus.

Here's what Prince Philip said in his Foreword to [Fleur Cowles' 1987] book *If I Were an Animal*:

> I just wonder what it would be like to be reincarnated in an animal whose species had been so reduced in numbers that it was in danger of extinction. What would be its feelings toward the human species whose population explosion had denied it somewhere to exist.... I must confess that I am tempted to ask for reincarnation as a particularly deadly virus.

Prince Philip

CC/Nick Harrison

Sir David Attenborough

Maybe he is an animal. And this is the man who claimed he was so concerned about the future of the world and who wanted to make sure that there we would all have a pleasant future, and a safe one!

Let's consider another fellow, whose menacing tones we are familiar with from nature documentaries:

> The human population can no longer be allowed to grow in the same old uncontrolled way. If we do not take charge of our population size, then nature will do it for us.
>
> —Sir David Attenborough.

Potential Relative Population-Density

Why can the human population not continue to grow in the "same old way" as Sir David Attenborough puts it. Well, in a certain sense he's right: Humanity can't grow in the same old way—without the introduction of new technologies and new scientific principles, mankind's growth will hit a limit. This limit is something that Lyndon LaRouche called the "potential relative population-density" of the human species or a certain culture of the human species: That is, the *potential* number of people that can be supported by a given land-area using the kinds of technologies and social organization that are available at the time, or in the culture, that sets a limit. And, indeed, you can't surpass that just by doing more of the same old thing. You need to develop new resources, new technologies. And that is exactly what the Green New Deal aims to prevent, by sending us *backward* on the track of human development.

Why does Sir David Attenborough believe that the world population must be controlled by us, and if not, by nature? Because he believes that resources are limited. Are they? Well, that was the title of a book published by the Club of Rome, *The Limits to Growth*. Lyndon LaRouche disagreed, and he wrote a book: *There Are No Limits to Growth!* Let's review some material from *The Limits to Growth,* and from the Club of Rome, which created *The Limits to Growth*. First, one of their earliest authors, who wrote 200 years earlier, Thomas Malthus, said:

> The power of population is so superior to the power of the Earth to produce subsistence for man, that premature death must in some shape or other visit the human race.
>
> —*Thomas Malthus, 1798*

Now, in terms of the so-called "power of the Earth to produce subsistence for man," the Earth doesn't produce much in the way of subsistence for man, at least not the Earth alone, unless you actually are in the habit of wandering into the forest and killing bears and then bringing them home to eat them; or if you find truly wild berries in your journeys through forest, or dig up morels or something like that, you are not relying on "subsistence from the Earth," you are relying on agriculture, which is subsistence from human beings. So unlike animals which *consume* resources and themselves are, in turn, resources for others in the web of life, we *produce* resources.

Dr. Kelvin Kemm had referred to the use of wood as a fuel; and wood, indeed, is a fuel, with the discovery of fire. But think about how coal completely transformed the equation there. Coal became a resource, rather than a mineral, or a rock formation of interest only to a geologist. Coal became of interest to everybody, with the development of steam power: We *created* a resource! We *transformed* a rock into a resource, a mineral deposit into an ore, in this case, coal.

The Club of Rome, in 1972, said:

> If the present growth trends in the world population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next 100 years.

Now, truly, in their book, they believed it would come much sooner than that. They had tried to wow people with lousy computer models, similar to some of the computer models that we have today that are claiming to predict the future of the entire world's climate over a period of years. The Club of Rome used computer models with such incredibly bland and non-descriptive and overbroad parameters as "population," "pollution," "resources," these kinds of things, and showed how resources and pollution would interact with each other over time and bring about the end of the human race.

However, they did not count on entirely new technologies being produced, which is the obvious solution to the very real problem of any society that ceases to progress. If you stop progressing, you go extinct. Just ask the dinosaurs! The mammals are far superior, and that's why we're here, and they aren't.

Energy Consumption, Over Time

Let's talk about energy over time, because the type of energy that human beings have used has been transformed both in quantity and in quality. **Figure 1** shows how the initial source of world energy was traditional biofuels—in red, at the bottom. That's things like the stacks of wood that Dr. Kemm spoke about.

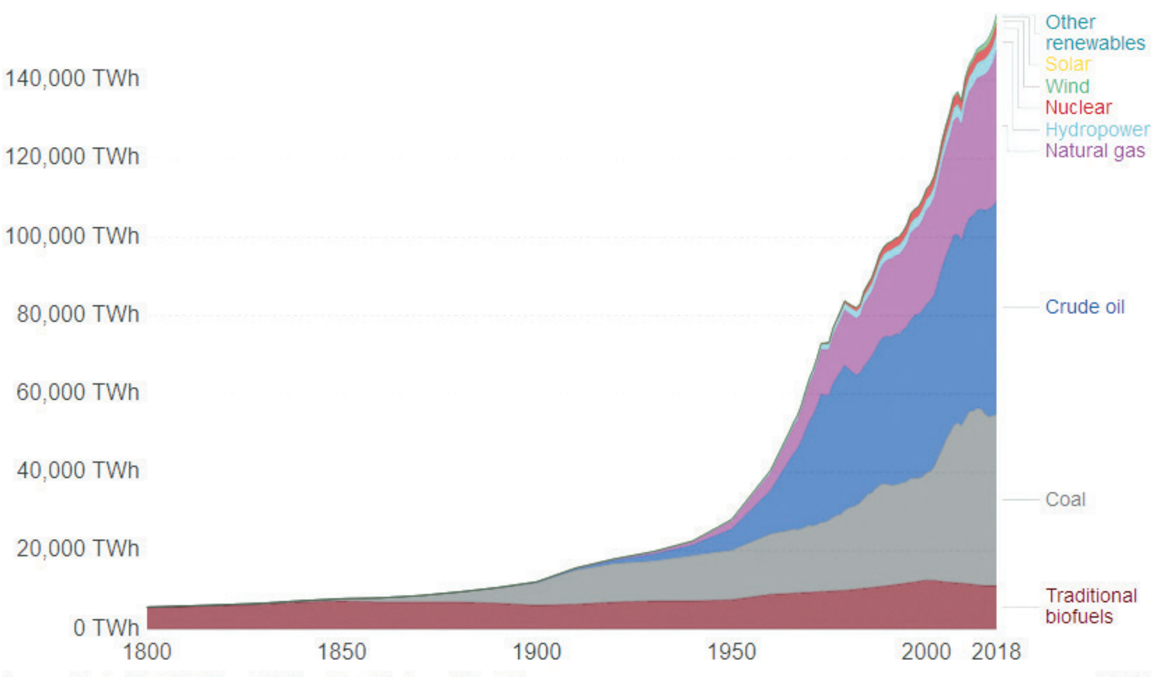
If you look at the growth in energy consumption, it wasn't because we started cutting down more trees, although this did go up somewhat. It's because we developed new resources, like coal, like oil, like natural gas, like the red that you see in the top, nuclear, which has been far too underutilized. And as we look at different regions of the world (see **Figure 2**), we find that the level of growth that we see in the Asia Pacific is absolutely phenomenal. This is the growth in countries coming out of poverty, and doing so, with an energy infrastructure able to support industry, science and technology.

Let's contrast the sources of energy in two different types of countries. **Figure 3A** compares the energy con-

FIGURE 1

Global Primary Energy Consumption

Twh per year

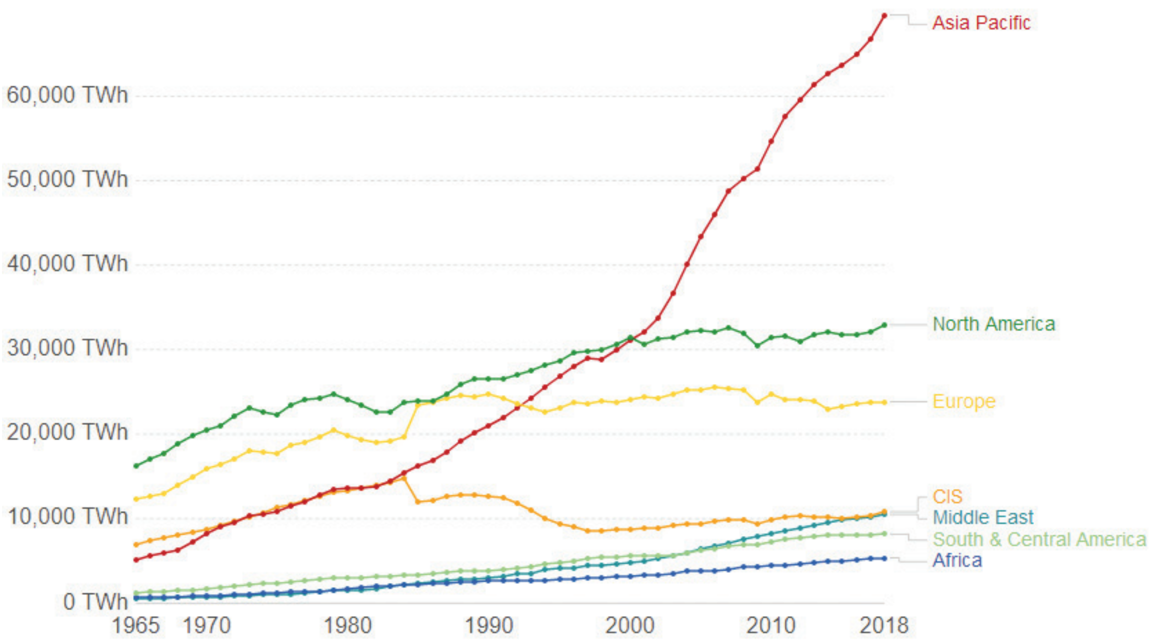


Source: Vaclav Smil (2017) and BP Statistical Review of World Energy. CCBY

FIGURE 2

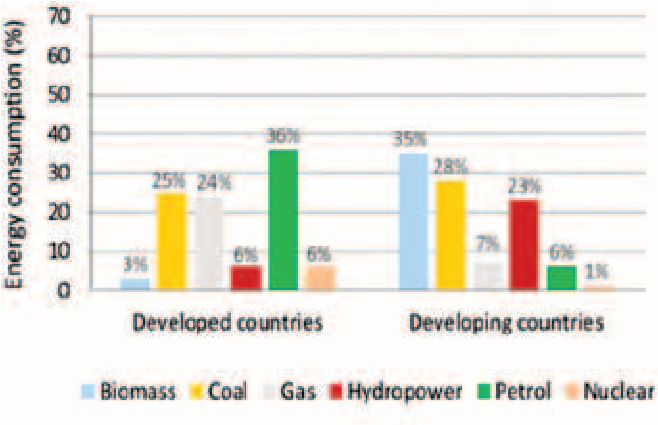
Primary Energy Consumption by World Region

Twh per year



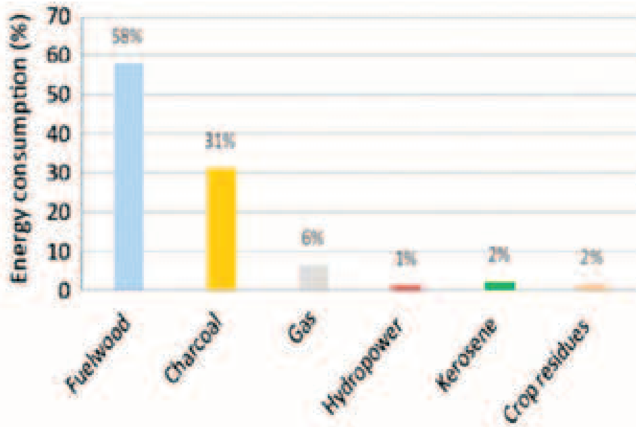
Source: Vaclav Smil (2017) and BP Statistical Review of World Energy. CCBY

FIGURE 3A
Energy Consumption by Source



Courtesy of Benoît Odille

FIGURE 3B
Ghana



Courtesy of Benoît Odille

sumption of developed countries, where in green is petroleum as a large source of power; yellow is coal, gray is gas. If you compare that with a typical developing country, the blue line on the left, there, is biomass. Biomass has somehow turned into a sexy or progressive word, as though it's a new thing to burn wood, but that's what it means: burning plants. Raising corn to turn into ethanol to burn it, instead of feeding it to a person or an animal—well, that's biomass.

In Ghana, **Figure 3B**, look at where the energy comes from: fuel wood, 58%; charcoal, 31%. Now, where does that charcoal come from? Charcoal comes from … wood. So essentially, low energy usage means, wood, biofuels. That also means a lot of pollution: If your source for heat in your home, for cooking, or home heating, is a biofuel fire, well, you're dealing with the kind of smoke, the kind of emissions that come out of that inside your home.

Energy Return on Energy Invested

Let's talk about what the difference is in terms of how much you get out of developing a new power source. If you build a windmill, you get 16 times more energy out of that windmill than you had to consume in producing it. This is, mining the resources, producing the steel, producing the fiberglass blades, transporting them, and all of that.

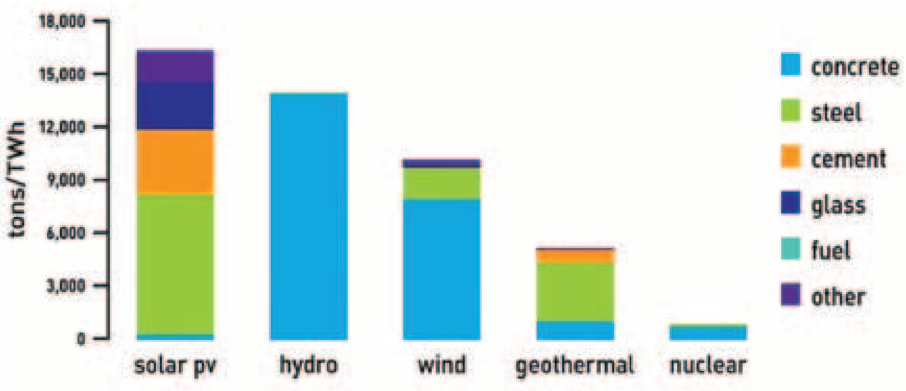
But, what happens when you take storage into account: a drop of 75% in the energy return on energy invested, taking it below the level of economic viability. What does this mean? A windmill on its own, produces energy *sometimes,* and if you add up all the energy it produces, you can say, "Oh look, it's way more than went into making the windmill." But, a windmill is increasingly useless the more of them that you build, because they are unreliable. So, along with your windmill, if you want to be sure you have power all day, you have to either create storage, or back up power plants—that is, in order to support windmills, you have to build a natural gas power plant that actually works all the time. You're doubling, essentially, your capital investment, in terms of how many megawatts of power capacity you're installing; it's not quite double, but it's almost that much.

When you consider that, they become *absolutely useless*—throwing money away. And here's why. Comparing different fuel sources, the energy contained in 1 ton of wood, is also found in 500 lbs. of coal; or 340 lbs. of oil—so that's an improvement—or, 0.0002 lbs. of uranium. That's also 75 milligrams, and either number is basically incomprehensible, if you try to imagine it in some type of everyday relationship. Tiny amounts of fuel, but a million times more energy dense in uranium. So, in fuel intensity, nuclear is off the charts. You wouldn't even be able to see that thing if there were a chart. It would be just a line at the bottom of the axis, literally off the chart.

Figure 4 shows the amount of material that goes into making energy sources. Here you can see, per amount of energy produced—not energy capacity, how much it might *supposedly* produce—but the actual amount of energy that you get out of it. Look at nuclear on the right. Look at how much material is required per amount of energy you're getting from nuclear. Then, look at wind, look at hydro—look at how many tons of material are required to produce solar panels able to generate as

FIGURE 4

Material Required by Energy Source



Source: DOE Quadrennial Technology Review 2015, Table 10.4

much energy as a nuclear power plant. The fuel consumed by the nuclear plants is almost nothing. Even the material going into making that power plant, is almost nothing, if you compare it to wasteful solar panels.

Energy Systems

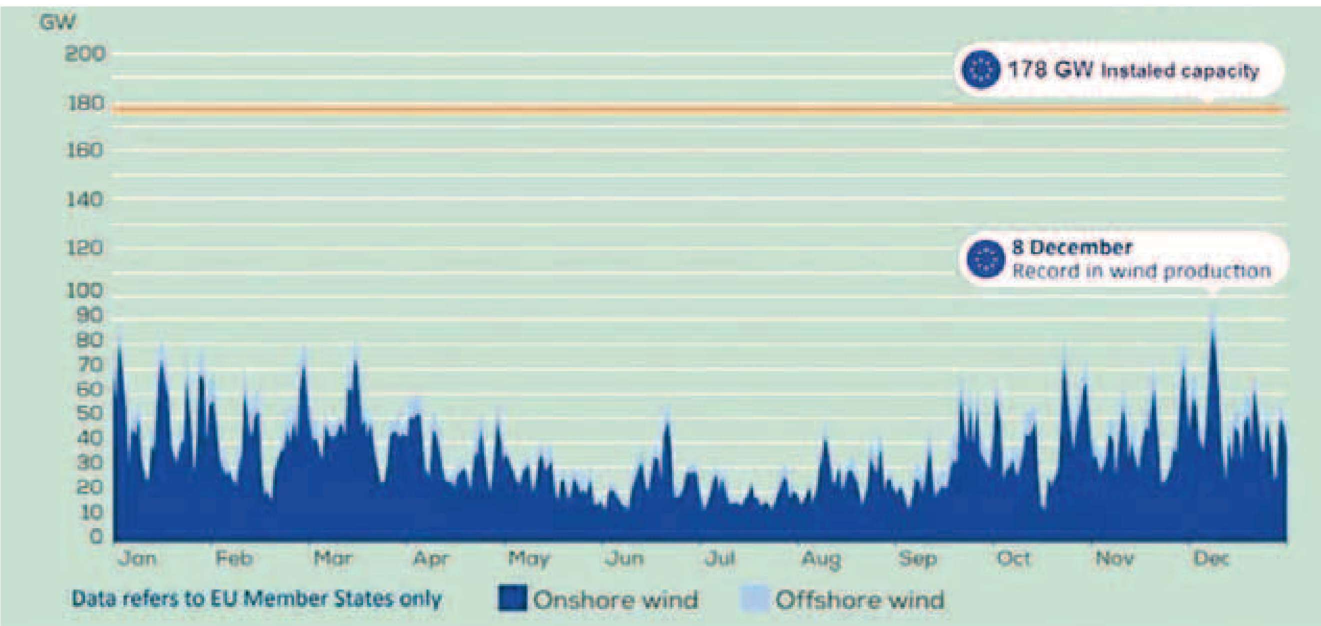
What we have to think about is how do we provide energy as a whole to society? This is a dynamic approach. Rather than looking at one energy source at a time, or one power plant at a time, we say, how do we create a network, a *platform* that's able to support a certain quality of economic activity? That is, if you're going to industrialize, if you're going to be building factories and the like and increasing the productivity of labor, you need a reliable power supply. If you build a factory and you're able to use it for only four, or five, or six hours per day, is that economically viable, compared to if you're able to run 24 hours a day, by having a reliable energy source? So, we've got to get away from thinking of one energy source at a time, one solar panel on your roof at a time, and think, how do we provide *society* with the power that it needs?

And here you see the issue with that. In **Figure 5**, "European Wind Energy Generation in 2018," the orange line, way up at the top, is the amount of wind capacity that supposedly is installed. So, supposedly, in 2018, there were 178 GW of installed windmill-power in Europe. The blue chart at the bottom, shows how much power it's actually making: Look in July or August, look at the summertime. The average is maybe 25-30 GW—that is a tiny portion, 10%, maybe 15%. As a yearly average, maybe 15, or 20% of what the installed capacity supposedly is. You can't count on it.

There's a cost to that unreliability, and you can ac-

FIGURE 5

European Wind Energy Generation in 2018



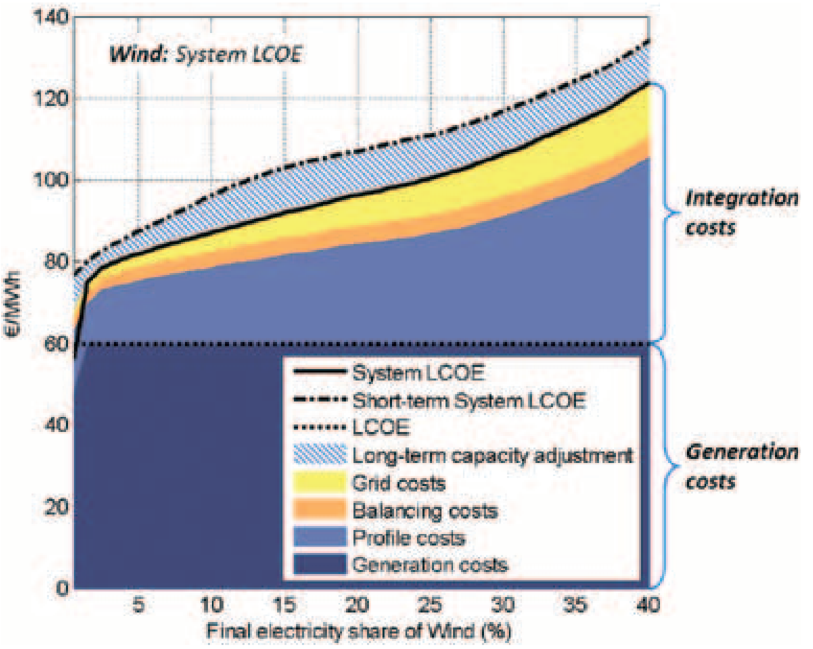
WindEurope

tually measure it. **Figure 6** is a chart that demonstrates how expensive it is to have wind. Now, the x-axis, going across horizontally, is what percent of electricity is generated by wind. If I'm only going to have a tiny amount of electricity produced by wind, and I'm building the first windmill in my area, then we look all the way at the left side of the chart. The blue is the generation cost: What does it take to actually produce that windmill, compared to the energy that comes out? You can see a line there—about €60/MWh.

But the full cost, the cost of providing an energy system, you can see, as you go up to maybe 40%, or before that, 30% wind—if you had that as your goal, the cost of providing that wind energy *will double*: Because as part of a system, it's useless. The more of it you have, the worse each piece is. It's sort of like the opposite of what you get by going in bulk or economies of scale. Here the economy of scale is negative.

FIGURE 6

Wind: System Levelized Cost of Electricity



F. Ueckerdt et al., *Energy* vol. 63 (Dec. 15, 2013), 61-75.

The larger the share of wind-powered electricity, the higher the cost of electricity per megawatt-hour.

'There Are No Limits to Growth'

Now, to conclude on this, and move on to the discussion that I'm eager to engage in, as I'm sure we all are: the point to take here from this, is LaRouche's approach on resources and on the limits to growth. *There are no limits to growth,* because the universe is infinitely discoverable, and we will never run out of new physical principles to uncover and to create as hypotheses in our minds.

There are so many fields of science, where, if you go just beyond the surface, you realize that we actually don't have it all figured out! Chemistry—maybe we think we have a pretty good knowledge about that, and I agree. How about nuclear science? There is so much that we don't understand! What is the best way to create nuclear reactions? Why do isotopes have the characteristics that they do? If you change the number of neutrons, why does resulting behavior of the nucleus vary as it does? We don't have complete answers to these things!

As we come to discover more about nuclear science, as we unlock the power and potential of controlled thermonuclear fusion, well, this is going to be the springboard for the next level of energy development. That will make us today seem almost as energy-impoverished, as we would, looking back 200 years, before the introduction of the steam engine, back when the only power sources human beings had were those proposed by the Green New Deal today—going back to hydro, wind, and biofuels, instead of that leap that we had with the introduction of coal and powered machinery, with the introduction of understanding electromagnetism, and the ability to use motors and communications systems, and control systems and all of this.

And then, the energy unleashed through controlled thermonuclear fusion may make us view resources and even water in an entirely different light, as we become able to make economically viable, physically viable, the desalination of seawater at a level, not only for residential and city use, but also for agricultural use, just to give one example.

That is the future that we can create, that actually eliminates poverty on this planet. The Green New Deal approach will perpetuate poverty. It will reduce the potential carrying capacity of the Earth for human beings. It will result in depopulation, if it is implemented. And this is why, as the rubber meets the road, more and more countries like India are simply saying, "No! We cannot achieve these goals without holding back our development, and we will not do that."