The Need for Electric Power, and the Cold Truth about Global Warming

by Prof. Franco Battaglia

This is an edited presentation to the panel titled "A New Paradigm in the History of Mankind Is Taking Shape," of the Schiller Institute's international conference of Sept. 9, 2023, "Let Us Join Hands with the Global Majority." Franco Battaglia is Professor of Chemical Physics at the University of Modena, a member of CLINTEL [Climate Intelligence] Italy, and a signer of the scientists' statement, "There Is No Climate Emergency." Subheads, and a few clarifying notes [in brackets] have been added. The video of Professor Battaglia's presentation is here and can be consulted for his graphics, which are not printed with this transcript.

Schiller Institute

Prof. Franco Battaglia

Good morning. Today I want to talk about a peculiar situation where the world is, which is that we are in a situation with a solution—which is the "energy transition"—in search of a problem, which is the "climate emergency."

I don't want to talk about the climate emergency too much, I just mention [it]; but there is a little book I wrote, titled *There Is No Climate Emergency*. This book tells about a petition which has been sent to the United Nations and has been signed by—the cover says 1,000, but by now it's more like 1,600—scientists who have declared that there is no climate emergency. The first signatory is Ivar Giaever, a Nobel Laureate; and there is also John Clauser, the 2022 Physics Nobel Laureate, who signed this declaration.

So, there is no climate emergency. But this is, as I said, the problem. The problem is: The fact has been declared that there is a climate emergency—which is not true—as a problem [for] a solution: The solution is energy transition.

How Electricity Needs Are Met

Now, we shall see that the energy transition is not possible; it is impossible. Also, it is undesirable. To see why it is impossible, let's look at this picture. This is a very important picture, which represents the power absorbed in a typical day. This is in Italy; I chose the most important day of the universe, which is my birthday, the 15th of December in Italy. Italy has absorbed [this] much electric power in the 24 hours of the 15th of December 2022.

This is typical. For instance, this [graph] shows a typical day in the United Kingdom. As you see, the power absorbed along the day is similar. Now, let's go back to this picture [Italy's electricity consumption]. As we can see, there is a maximum absorption, which in Italy is more than 50 GW [50 gigawatts, or 50 billion watts] of electric power; and there is a minimum, which is about 30 GW. So, Italy absorbs, 24 hours a day, at least 30 GW of electricity.

Why is this important? Because this picture tells us how electrical energy should be produced. Every country has to take the maximum power from hydroelectric power, and that, as we know, is a renewable energy like the Sun's energy—solar energy. Once every country

has taken the maximum from the renewable energy as hydroelectric, how can the remaining needs be satisfied?

For instance, Norway; Norway takes 100% of its power from hydroelectric. But this cannot be done by every country. For instance, Italy can only get 20% of its needed power from hydroelectric, not more. How to get the remaining electric needs?

Well, 30 GW are absorbed 24 hours per day, which means that photovoltaic does not count, because at night, for at least 14 hours between, say, 5 o'clock in the afternoon until 10 o'clock in the next morning, photovoltaic has a zero contribution. And even wind can very easily have zero contribution, because wind is not guaranteed to blow as we hope. So, the only way to produce 30 GW of electric energy during at least 14 hours of the day is by one of the conventional methods.

And the best conventional methods are nuclear energy and coal. Why nuclear and coal? Nuclear because it's a technique that produces energy continuously. It has to produce electric energy continuously; one cannot switch on and off, very easily, the nuclear plant. So, nuclear energy is the best way to satisfy what is the baseline electrical energy needs, those 30 GW. Which means that a country like Italy should have about 30 GW—around 30 nuclear plants—if Italy wished to produce electrical energy in a rational way.

As Power Demand Increases

How should we produce electric energy above the baseline of 30 GW? Well, the best way, for [the increase from] 30 GW to 45 GW, should be produced by coal. Why coal? Because coal is a very cheap fuel; it is quite abundant, and is easily transportable around the world. So, coal is the second-best choice after nuclear power. Of course, one can have more coal than nuclear, or vice versa, according to the country. Why? Because the most developed countries will use nuclear power, whereas the less technically oriented countries will use more coal than nuclear. So, coal and nuclear should actually satisfy at least—if we want to be rational—at least 50% or 60% of electrical power needs worldwide.

What about the peak demand, which is about 50 GW, or 45 GW? The best way could be by natural gas. Why? Natural gas should be reserved for the peak because natural gas plants are easily switched on and off, first of all. Natural gas is quite expensive fuel, and the plant is cheaper than nuclear or coal plants. So, this is the rational way.

Here we have a graph of the electrical production of the world. As we see, on top is coal. So, almost 35% of electrical needs worldwide are satisfied by coal. Now, the second fuel is natural gas; but this is a mistake. Gas would be most appropriately used for transportation needs rather than for producing electric energy. Then we have hydropower; this is good, but hydropower cannot, of course, satisfy more than what it does, because of the way it is built. As I said, Norway can satisfy 100% of its electricity from hydropower; Italy 20%. Other countries of course could easily get nothing from hydropower.

And then there is nuclear, which counts for 10%, which is very little. Actually, nuclear should be more important than what it is now. Unfortunately, nuclear has been stopped by silly political reasons. And then we have wind, which contributes very little, in spite of trillions of dollars spent on wind power. And then at the end, we have solar. There is also some oil, but it's not good to produce electric energy from oil. Oil, like gas, is better used for other purposes. Of course, countries swimming in oil, like Saudi Arabia, use oil to produce electric energy. But that's not typical for what happens in most countries of the world.

Now, what does a country like Italy do? I mention Italy because of course I know Italy better. What Italy does seems to be the intention of the world, according to this energy transition program. Italy produces electric energy mainly from gas and hydropower. Nuclear is zero. Actually, nuclear is imported into Italy. So, as a result, Italy is perhaps the country where electric energy is most expensive among all. Maybe Denmark and Germany have electric energy costs higher than Italy.

Electricity Is Quality of Life

Now, energy transition is impossible. This is how global primary energy consumption occurs now: It's mainly oil, coal, gas, and then nuclear. So 90% of primary energy needs are from conventional resources. The silly idea is to get this very tiny slice of renewables to cover all the needs. This is impossible. This is what they want to do; they wish to get to

zero emissions by 2050. But that's impossible! They have tried several times—the Kyoto protocol [1997] and the 2020 climate program package of the European Union.

But actually, all these programs aimed at reducing the CO_2 emissions—by about 3% in the Kyoto protocol, about 20% from the European climate package in 2020—what actually has happened is that the annual CO_2 emissions, in comparison with those of 1990, have increased by 60%. This is the reality. Of course, countries like China and India have increased their emissions by 350%; which is good! Just 30 years ago, 30% of Indian citizens had no access to electricity. Now, thanks to coal, 100% of Indian citizens have access to electricity. This is very important. Nowadays, almost 50% of people in Africa have no access to electricity. If you want them to have a better quality of life, we need that also African countries use more coal to get more abundant energy at a cheaper price.

Of course, India is quite far from reaching the average emissions levels of the world, so India I think will increase—by increasing both coal use and also nuclear plants—will increase their energy production to have a better life.

Finally, the energy transition is undesirable. Why? Because this [graph] shows how the Gross Domestic Product per capita occurs in several countries as a function of energy consumption. According to the energy transition programs, to use less energy, the aim is to get the quality of life of the GDP of Burundi! This is the program, unfortunately.

Instead, if you want to have healthier cities around the world, we should have higher energy consumption. We should have access to more energy at a lower price. Thank you.