

NICOLAS PIAU

Co-Founder and CEO of TiLT Capital Partners

I do not know if I am part of the problem or of the solution, as a private equity investor. Hello everyone, I am very happy to be here. I think it is very thrilling to talk after Frank and Franklin because they are part of the solution, and I think the two presentations come down to the same issue: let us deal with reality. I think reality also starts with what you mentioned at the very beginning, Franklin, that today out of 600 exajoules of primary energy consumption, 500 exajoules are oil, gas and coal; that is the very hard reality. Then, you turn to electricity. By the way, in Europe, gas consumption is as large for power production as it is for industry applications, so we should keep in mind that heat is a genuine issue, not only electricity generation. I will not bore you with too many figures, but so, if you turn to power, out of the 27 000 terawatt-hours globally, 17 000 are based on coal and gas. Yesterday, Laurent Fabius rightly said that in two or three years, renewables will overtake coal, but that is actually in terms of capacity, not in terms of energy produced, which is very different.

That is the reality. The challenge is, and I think you both alluded to that and talked about energy density, the three industrial revolutions we have undergone were all based on increased energy per capita. The first one was coal, roughly 20 megajoules per kilo, oil and gas 40, then nuclear 80 terajoules per kilo. The real challenge we are experiencing, which is fundamental to the way we think about the energy system, is that we are moving away from those energy-dense technologies to energy “undense” technologies. That means it is no longer a matter of production, it becomes a matter of logistics and optimization. You have much more solar energy available than any other form of energy and much more than what is needed for human needs. The problem is not whether you have the energy, it is how you harness it. Then there is the issue of how you harness and use it adequately because if you want to have industrial applications 24 hours a day, you are not going to be relying solely on sun, for example. You will have batteries and other storage technologies coming into play. And again, let us be clear, the energy density of a battery is 1 megajoule per kilogram on average, so 40 times lower than oil and gas.

We need to understand that this is a massive challenge. We had a system that was built on big energy-dense production capacity, transportation, distribution, and consumption and frankly, energy transition is making this organization totally obsolete. I am going to try to share with you a view of how I think the technologies are going to transform that sector in sequence. First, and I think Laurent Fabius said something very important yesterday, as an investor we focus on the next 10 years, because in the long-term we are all dead. I think the question of how we get on the Paris Agreement trajectory in the next 10 years is critical. On our side, we see two elements, first you need to get rid of coal. I am going to get back to your point on nuclear, but we need to get rid of coal, which is 12 gigatons of CO₂ every year and 20% of

GHG emissions alone. We need to get rid of coal and we are going to see the implications of that afterwards. Second, we need to get rid of methane fugitive emissions and I will just pause here because I am not saying we need to get rid of gas. I think gas is an element of transition because we need it as an energy transition vector if we want to get rid of coal in the absence of nuclear, which at best is basically developed in 15 years. However, there are roughly 350 million tons of fugitive emissions every year, which represents 20 gigatons of CO₂ equivalent because of the short lifespan in the atmosphere. CO₂ is a stock problem, and we need to reduce it. Methane is a flow problem and if we manage to reduce fugitive methane emissions, we would immediately have a very strong impact on GHG emissions over the next 10 years.

The problem is that at the same time, we are developing all those great technologies like solar and wind, and coming back to your question, I think renewables are an absolute must. However, using the example of oil and gas, I always say you do not drill in Switzerland because taxes are low, you drill in Norway where taxes are 78%, because there are oil and gas resources. It is the same thing in my perspective for renewables, you do not build renewables because you have tariffs, you build them because they make energy and economic sense, so you build them where you have resources. In Britain and northern Germany, you have massive offshore wind potential. In Spain, Italy, Chile, here in the Middle East and other parts of the world you do solar. Do you really do solar massively in Germany? In my view, I do not think so, it can be a solution, but it is totally marginal. The question is how you can replace that bulk power of coal and then gas and I think nuclear is certainly a solution, I particular small modular reactors. A word on one of the main advantages of that technology: instead of developing every time a specific project, small modular reactors are industrialized and are then meant to be deployed as an off the shelves technology. By contrast, apart from the French nuclear program in the last forty years for example, all reactors have been developed as individual projects, which makes it hard for them to be cost competitive. In terms of technology, I think hydrogen and e-fuels are going to be absolutely critical and that they should really kick-off in the next two to three years. One issue I see with hydrogen is it has very high gravimetric density, so energy per kilogram is three times that of oil and gas, and very low volumetric density, one-third of gas. There is an issue of transportation, storage, etc., but it will certainly be part of the solution, in my view, much more for industrial applications than pure energy production, fuel cells, or even mobility etc.

I think there is one thing that should not be overlooked, which is how we are going to manage that from a power perspective on the grid. On this, I would say that the emerging technologies we see are grid-enhancing technologies, everything that will allow the grid, the system, to accommodate a larger share of intermittent renewable energy. There are a number of super interesting things being developed, such as dynamic line rating, which is looking at the amount of energy a line can transport according to weather conditions, the sagging of the line, etc., or power flow controllers that enable rerouting of electricity flows in case of congestions etc. These technologies are being developed and need to be deployed at scale right now.

Moving to 2050, in my view the big elephant in the room is nuclear fusion. There are a lot of things going on right now and you have seen USD 1 billion raised in the Series Bs of Commonwealth Fusion Systems. There are great companies in Europe, Renaissance Power, as well as the work done by ITER, which is extremely important for maturing this industry.

I will just end here on a note on geopolitics because it is the topic of the session and there are two things: one I would say is solidarity and the other is integration. When I say solidarity I am going to take an example that is probably a bit rough in the current situation, I am going to talk about Russian gas. Russian gas is an issue and yesterday I heard that the EU was short sighted; I am sorry, I do not agree with that. I have been working in this industry for years and we knew we had a bit of an exposure to Russian gas, the issue is: what choice did Europe have? I do not think we were short-sighted, or the issue was Russian gas. The issue is the Putin regime. Gazprom delivered gas for 70 years without a hiccup, even when the Berlin Wall and the Soviet Union fell. The issue is not Russian gas, it is a regime and as a European, I do not think we should rejoice in abruptly cutting off Russia from part of its revenues and having Russia in a shambles on Europe's doorstep. It is much easier for the US, they have oceans on each border. I think from a geopolitical perspective, we need to work with Russia, not Putin, to see how we organize that transition. The second thing is integration and I think Khaldoun Al Mubarak said something very important on supply chains yesterday. Yes, we need to reindustrialize in different parts of the world because again, we need to have things that make sense locally, but I think it is also very important that we have a trusted supply chain. Today, the energy transition means that we are reorganizing all supply chain and exposures and frankly, I do not know how we are going to do that. I know we have an issue of exposure to China on key materials and pieces of equipment and this needs to be dealt with. It is not a defiance against China, it is just a reality. To do that, we need to take account of the externalities of social justice, environmental sustainability, etc. I will end on that note, I think what we are missing is that our investment models do a very poor job of actually accounting for those social and environmental externalities and until we do that, I think we have difficulty in coming up with sound and sustainable energy policies.

John Andrews, Contributing Editor to *The Economist* and *Project Syndicate*

Thank you very much indeed, Nicolas. I am very conscious of the time because the previous panels went overboard a bit so I think we will try to steal a bit from lunch. Just one quick question before I ask Friedbert to sum up. Nicolas, you say on your website that the energy transition in Europe is an investment market of about EUR 500 billion a year. That is quite an impressive number, it is a great target but how much of it is actually being reached?

Nicolas Piau

We are a long way from it. We were investing EUR 160 billion per year in the last decade. I think we went up to EUR 200 billion from 2018 onwards when we should actually be investing EUR 600 billion.

John Andrews

Is the failure at government level or with the private sector?

Nicolas Piau

To be very blunt, I think the issue is that if you put EUR 600 billion per year at a 15% return on capital employed, the costs are going through the roof. We need to understand that the real gain we get from that is again externalities. If we try to price in the same way as before, we



are going to have problems because the cost of energy is going to be unsustainable in Europe and elsewhere.