DEBATE

Arnaud Breuillac, Senior Advisor to the Chairman & Chief Executive Officer of TotalEnergies

Are there any questions?

Louis Schweitzer, President of Initiative France, Special Representative of the French Foreign Minister for the Franco-Japanese partnership

I have one question on the scenario on total energy demand. I wondered how it was built and if there was an agreement among energy producers about the total amount of energy. I am not speaking about the breakup between sources of primary energy, but is this scenario coherent with of course the demographics, I assume, but with what type of growth in the developing world, specifically Africa and southern Asia?

Arnaud Breuillac

As I told you, the underlying hypothesis on both the rupture and the momentum scenarios is 3% growth of GDP. I cannot give you the details per continent, but we have it of course for reference.

Louis Schweitzer

Still the developing world at 3% is very low for what will be the larger part of the population of the world, so I was wondering if it meant really a limitation of growth for all developing countries and poorer countries today, which is in my view a major issue vis-à-vis climate change.

Arnaud Breuillac

Without going into detail, these scenarios do not take into account a limitation of the development of, as you put it, developing countries. In fact, we have a hypothesis regarding very low growth of GDP in developed countries, and certainly reduction of the energy needed anyway in the context of developed countries but recognizing the fact that for developing countries the need for energy will imply a growth of emissions. That is factored into those simulations, so there is no limitation on the growth of the developing countries, which is one of the challenges because it is how to combine, if I may say, the legitimate aspirations of developing countries for better lives and the fact that indeed a lot of the credit of how many emissions we can have in the atmosphere has been used already by developed countries.

Hervé Mariton, Mayor of Crest, Chairman of the Franco-British Council

Nuclear appears on some of your slides and not on others. Obviously forecasting the future of nuclear is rather difficult from country to country, so do you, in some sort of conservative way, consider that you take it as stable as a hypothesis or are there more subtle hypotheses on this issue?

Arnaud Breuillac

I do not think it is very subtle. It is very basic. In fact, the pathway to transition is more the one of TotalEnergies, which does not include nuclear. However, the energy mix in the different scenarios, rupture and momentum, and again these are two scenarios among many others that you can have, does include nuclear, and it is a growing energy. We will need a growing contribution from nuclear to achieve somewhere around the 2 degrees Celsius, and even more if you want to be below that, as you can see in the two scenarios. The rupture has an even larger share of nuclear contribution. It is clearly one of the important factors in the decarbonization of energy.

Igor Yurgens, Chairman of the Management Board of the Institute of Contemporary Development, Vice President of the Russian Union of Industrialists and Entrepreneurs

Any structural change of this caliber has to do something with your financial planning, so does TotalEnergies have any figures on what that would cost you and where did you get this money from? People say that it might cost us globally about 36 trillion, that is the estimate today. Either you put it as a tax on the population of the world or you cut down the dividends of your shareholders because taxation of that caliber is unbearable for the population. The question is: do you have a financial prognosis of what it will mean for you and how do you deal with your shareholders or with the consumer?

Arnaud Breuillac

That is a very complex question, but a very interesting one. I think your question is twofold, if I understood it well. The first aspect is in relation to a company like TotalEnergies and how we somehow manage to find our own way in this transition of energy. We believe that with the underlying hypothesis in terms of the energy price moving forward, and we take a rather conservative price for oil, for example – we take USD 50 per barrel, and this in public statements, so all of our long-term plans are based on USD 50 per barrel, which you could argue today is relatively conservative, or at least not an excessive oil price for the future – and with that we are able to spend USD 13 billion to USD 15 billion every year of capital investment and we dedicate about half of this to low-carbon energy, 3 billion being dedicated purely to solar and wind. With that, we manage, because of the cash flow generated from these activities, and the selectivity we can apply to new projects, and we have a pipeline of projects that demonstrate that we can do this, and when we run our long-term plan we see that we can continue to serve a dividend to our shareholders, and we believe therefore we have sustainable model.

We are also contributing to the transformation of the energy mix. We are more or less in line with, on the one hand, the fulfillment of energy demand –between now and 2030 we will increase our production of energy by 30% - and at the same time we decarbonize, and we

want to reach net-zero by 2050, and that is for all our products, not just about scope one and two emissions, but also the emissions of our products.

When it comes to a more global question about all of this, it is going to cost money. I will take the example of hydrogen because it is maybe a way to relate to you what it means to translate from, say, oil to hydrogen as a source of energy. Today we produce in our refineries what we call grey hydrogen by reforming methane. The cost is roughly, depending on the cost of gas and the environment, between USD 50 and USD 100 per barrel of oil equivalent. This is equivalent of energy. We are therefore kind of comparing apples to apples. You could therefore argue that grey hydrogen is not so different from oil. It is a bit more expensive, up to two times more expensive. If you want to go to what we call blue hydrogen, which is hydrogen produced out of methane but where you take the associated emission of CO_2 and you re-inject, you multiply the cost by two or three times, which means you are into the range of USD 150 per barrel. If you then want to go to green hydrogen, which is the hydrogen that would be produced out of electrolysis of renewable production through water, solar or wind power, then the factor is four to five, so you are in the range of USD 200 to USD 250 per barrel.

This gives you the immediate measure of the impact on the global economy of shifting dramatically to a purely hydrogen source. This is why we need to have a just transition. There is a cost associated with this transition and the question is: how are we going to share the cost to support developing countries in consuming these more expensive energies? When I spoke about this grey, blue and green hydrogen, I am sure that innovation will help reduce the cost, but it will not be from a factor of five in a few years. Again, all of this needs time. That is really the subject of this transition. Maybe Olivier wants to comment on the subject of the cost of the transition.

Olivier Appert, Chairman of France Brevets, Scientific Advisor of the Energy Center of Ifri, former President of the French Energy Council

I would say unfortunately for the policymakers, they do not count, and green is so attractive that you should not count. That is a pity. It is the case in France, it is the case in Europe. You take decisions, you put targets, you do not evaluate how you will reach these targets and what the cost will be. What is the cost of Fit for 55? How will it be achieved? The decision will be taken at some time and in two or three years it will appear that we will not reach this target, so we will increase furthermore the target and then you are sure to go below.

You referred to a strategic scenario. These scenarios are based on models, and I would say by experience a model is garbage in, garbage out. I wonder what the garbage in is, the hypothesis you put in this model. You referred to one hypothesis, which is that in 2035 there will be no more thermal engines. This is challenging. You know the difference between challenging and totally unrealistic is sometimes very thin. Would you give us some examples of the key assumptions which your models are based on?

Arnaud Breuillac

I think the best I can do is to refer you to our presentation that is online on the TotalEnergies website, because we presented this new TotalEnergies energy outlook last Tuesday and you

will see that there is a slide which details the underlying assumptions with a bit more detail than what I have just given. We believe that all of these assumptions are possible. That is to say there is nothing, at least in the momentum scenario, because we are looking at essentially commitments made by countries and technology that exists today, nothing that does not exist today, and we are looking at a time span towards 2050. The rupture scenario differs a bit from the perspective that it does include some solutions that we do not now have and that needs to be invented somehow. We believe it is possible as well, but we do not know what form it will take. We have refined those scenarios compared to last year's Total energy outlook. What we have tried to do, knowing that every scenario is bound to be wrong, is to somehow frame the challenges we are facing and what we can do to contribute to addressing these challenges. There was one last question.

Amine Bel Hadj Soulami, Head of Middle East and Africa at BNP Paribas

I have a very quick question. When I look at the projections in the world primary energy demand in both scenarios, there will be a very strong reduction in oil, so I was wondering what the strategy will be in terms of exploration going forward for TotalEnergies and how you see the same strategy for your competitors.

Arnaud Breuillac

It is an important question in the context of where we are today, in Abu Dhabi, and the Middle East region, especially for countries with a lot of reserves at the current rate of production. The first thing is that you may have in mind the statement made by the Head of IEA, Fatih Birol, not so long ago when he commented on one of these scenarios, saying that essentially, in view of the lower demand for oil, we could stop investing in exploration and developing new projects. Today, roughly speaking, demand – I am not speaking about production because everything is driven by demand – for oil is just around 100 million barrels of oil per day. He was saying that in view of the projection by 2050 we should no longer need to do any new investment and he was doing a linear extrapolation or interpolation between today and 2050. This will not be like that because this was meaning that by 2030, which is 10 years from now, the world will be consuming 70 million barrels of oil per day, a reduction of 30 million, and that is not possible because when you just look at the way we use oil today there is no substitution, so there is no force in the universe that will enable such a drastic reduction.

We at TotalEnergies in our economic energy outlook are not so different, when you look at our rupture scenario, which is maybe the most consistent with the IEA's scenario, when you look at the energy mix and the contribution of oil. The endpoint in 2050 is therefore not necessarily so wrong in our view, plus or minus a few million, but it is the trajectory. We believe that it will not be linear. In fact, everything we can learn from the past indicates that in this sort of situation we do not have linear phenomena because you have some technological breakthroughs and market changes. The electrification of the light vehicle is an example of that. If you just take Europe, this is now going to happen, but it will not happen in a linear way.

To get back to your question about exploration, there is a demand for oil and gas and it will continue to be significant. There is a growing demand for gas. We think there will be a plateau in demand for oil. Our prognosis is that it will plateau around 2030, so in the next decade we

consider that we will probably reach a peak and then we will slowly decline. That is our view. Then if you take into account the fact that oil production is a depletion industry, so the day you start to produce you start to decline, and you take the average decline of an oilfield globally, you see that in 10 years you lose 30-40% of your production depending on the assumption. This means if you do nothing you effectively get to what Fatih Birol was talking about, 70 million barrels per day. However, since we know that we need more, we still need to explore for oil and we need to develop new oilfields.

If you just look at what we need to supply the demand projected for the next three years, and three years is a relatively short period of time, we are short of 3-5 million barrels of oil per day according to the IEA, and if you look at what we have been able to put on stream in the last three years it is 1.5 million barrels of oil per day. The immediate challenge therefore is a risk of an oil shortage and one of the many explanations about the current oil price and energy price is due to this tension, because our industry has been under-investing since the last downturn in 2015. There was under-investment by the industry in 2015, 2016, 2017 and 2018. 2019 was the first year we really started to get back to normal investment levels, and then we got 2020 and 2021, with, very significant reductions. There is therefore an underlying structural shortage of oil production coming in the near future. As you know, oil markets are always supplied, but the price is the anticipation of the shortage in the coming years, so there is a tension today and indeed we need to continue to explore.

The strategic choice of TotalEnergies is to focus on what we call low-cost oil projects. Why is that? Because of the volatility. Look at what happened in 2020: the oil price fell below USD 40 per barrel. Your projects have got to be resilient to this sort of environment. This is why, by the way, we have a big presence in Abu Dhabi and in other countries in the region, because we believe this is where you can produce low-cost barrels in an effective way, of course with associated greenhouse gas reduction projects.

Amine Bel Hadj Soulami

Thank you. That is very clear. In that case, I understand the most important part is the nonlinearity. However, do you have a sort of approximate trajectory of, if it is not linear, how it is going to be distributed over time in the next few decades?

Arnaud Breuillac

We can say more or less anything we want, and it will be wrong because it depends on things we do not really anticipate. What we are saying is that if we want to get to net-zero by 2050, and this is with the two scenarios we have, you can see where you are going to end, but it is very difficult to predict exactly what the trajectory will be. However, we think that oil demand should peak in the next decade and should decline after that. This is taking into account the significant changes that are being made by car manufacturers, particularly in Europe. They are really now shifting to electric vehicles.