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Why renewables? It has been said again and again; it is basically about the transition to a low carbon economy, and also a sustainable solution for the energy supply. We have mentioned peak oil, and we do not know when it is, but it is a finite resource. The other solution to a low-carbon future was seen as nuclear, but it becoming a post-Fukushima scenario, and just on a cost basis alone nuclear looks far less likely as a solution.

Why are renewables still only 3%? It is because they are still very expensive, and they are considered to be more expensive than conventional sources. It depends of course on how you count; some environmentalists will say that, if you count the externalities and the cost of pollution, renewables are already competitive today. The other very big issue which has been mentioned several times is the lack of adaptation of the grid and of the infrastructure, which limits integration, and also entails additional costs, but these costs have been socialised for large fossil fuel plants, so there is no reason they should not be socialised for renewables.

The third issue is that the really rich veins of renewable resources are not the centres of consumption, whether it be offshore wind, geothermal in Iceland, or the desert power, which is something my company focuses on. Regarding the cost of electricity in an island environment, where you are not hooked up to the grid, whether a real island like Martinique or a remote village in Africa or India, renewables are already largely competitive. However, looking at fossil fuel grid connected electricity, most of the renewables are still not in that price band. A lot of the biofuels are in that price band, and onshore wind is considered quite competitive to large fossil fuel plants onshore if there is a good wind resource. Then geothermal is also seen to be quite competitive, as well as hydro.

Therefore, that is the scene; renewable is becoming competitive, though some technologies are more competitive than others. However, the real issue is how you integrate renewables on a large scale. Basically, you have sources of supply, with this new element of variable renewables, then you have your energy system, how it is managed, and the issue is dispatchability, how you have firm power and capacity, and there are various solutions, short-term, medium-term and long-term. There are some technology challenges; if there were cheap energy storage, we would not have a problem in integrating renewables, but energy storage is very expensive in most cases, which is why there has to be more R&D in this area.

One of the other solutions is additional investments in grid, because if you have a lot of renewable energy entering on one side of the grid, you have to be able to move it to where the rest of the consumption is. You also have the concept of grid extensions, where you have to bring the grid to the rich resources of renewables, whether this is offshore or even on other continents. Looking at the example of Germany, which is arguably the most advanced renewable economy on the planet, they started early, they have invested more, and right now they have reached a bottleneck situation, where they need more investment in grid to make their electricity system work. The German Energy Agency has estimated that they need an additional 3,600 kilometres of grid upgrades, some of them very large capacity lines, and as you can imagine, people do not like building large electricity pylons, so they are trying to find solutions by adding to the existing electricity pylons, increasing the voltage, etc., but this is a real bottleneck. Ironically, the environmentalists are the biggest opponents to any grid extension, so you have to figure out what you want, a low carbon environment or a pretty back yard.

The third point is that the resources are not where the centres of consumption are, but this is not a new problem for the energy industry. We are looking at doing very large-scale solar power plants in the Sahara Desert and transporting the power to Europe. Transporting energy from North Africa to Europe is not a new idea; there is already a submarine gas pipeline that goes from Algeria to Tunisia and on to Italy, and there is no reason we cannot start building high-voltage DC cables, which have very low losses, from North Africa to Europe. That is really the basis of our project, the concept of building large-scale solar panels in the Sahara Desert.



What is interesting about some forms of solar power is that you can store energy; instead of going directly to electrons, you can collect the heat, and the heat is very easy to store, so you are able to deploy energy storage. Then you can have dispatchable power with a firm capacity and compete with the fossil fuel plants, offering a better quality solution than even offshore wind. We have also calculated that we are able to be quite competitive with new nuclear build and also with large offshore wind farms, and also be able to deploy this power in the same kind of timeframe.

There is an opportunity, if you deploy technologies like solar thermal, to encourage local development, and this is always an important geopolitical consideration, because then you end up with a win-win situation where you are enhancing local development in countries where there is a political consensus that we need to stabilise them, and I am talking about the Arab Spring. Our example is Tunisia, where we are working; the multilateral institutions are all encouraging investment in local industries, so it becomes a very interesting project from a geopolitical point of view, because we are stabilising North Africa while stabilising the European energy system.

Finally, renewables are heading towards competitiveness with fossil fuels. Policymakers still need to get their heads around renewables, as one of the biggest problems for investors is that policy keeps on changing. There are subsidies, but they are taken away, and then they are put back, etc. There is also an inconsistent policy on upgrading the grid and who pays for what, and this makes it quite challenging to build a renewables industry, when you are not sure how you can transport your renewable power to the market. There are also a lot of regulatory issues that still need to be addressed, in terms of the priority of dispatch and how you integrate them into the energy pool. There is a whole new geopolitical situation that needs to be rethought, and there will be new countries like Egypt, Tunisia, Morocco who will all of a sudden become energy players, because they have very rich solar and wind resources, they are very close to Europe, and it is not that expensive to transport this energy to Europe and have it become part of the European energy mix. Thank you for listening.