



# Global Energy Solutions

For Prosperity and Climate Neutrality

## The global energy transition now has a chance

Interview with Paul van Son, Desertec (Dii) by Bert Beyers

Hardly anyone has as much experience with renewable energy in North Africa and the Middle East. Paul van Son was the founding managing director of the Desertec Industrial Initiative (Dii) in 2009. Early on, he criticised the focus on exporting electricity from Africa to Europe - as too narrow and too early. First, he said, the local market in the producing countries had to be developed. In the past ten years, there has now been a rapid drop in the price of green electricity from the desert. This has also made Saudi Arabia rethink. Today, the country has become a significant driver of the energy transition. In the meantime, the export idea is once again coming to the fore at Dii. And this time, hydrogen and other energy-bearing molecules such as methane, methanol or ammonia play a decisive role. All in the spirit of Global Energy Solutions. Van Son, a market economist, is very optimistic about the Middle East and North Africa. The region could become an "energy powerhouse" for the world.

**Bert Beyers: In Germany you often hear the opinion: Desertec, that was such a project with electricity from the desert. But it didn't work. What do you tell these people?**



Paul van Son, founding managing director Desertec Industrial Initiative (Dii), (Photo: Ruud Ploeg)

**Paul van Son:** I hear this too and I am amazed. I can't see that there's nothing going on, quite the opposite. What I would say to people is: Look what's happening in North Africa and the Middle East! The development of solar and wind projects is even going much better than I expected ten years ago.

## How long have you been at Dii?

Since 2009. I was the founding managing director of Dii GmbH (Desertec Industrial Initiative) in Munich, founded by eleven large companies and the Desertec Foundation. Today I am only the president. I help the team and the partners and still appear at conferences.

## The Desertec idea originally came from the Club of Rome and others. What was it about in 2009?

At that time, one of the issues in the nuclear energy debate was whether electricity from the deserts of North Africa could replace nuclear power plants in Germany. We have learned over the years that the focus on exports from North Africa to Europe was too narrow - and also too early. Today we understand that first the local market must be sufficiently supplied with renewable energies. Exports come then later.

## An example?

Morocco still imports a lot of fossil fuels. Let's take the fertiliser industry. It imports a lot of ammonia produced from natural gas, which causes emissions. If Germany wanted green hydrogen from Morocco, Morocco would probably supply it. Provided, Germany pays well for it. But the local supply would then continue to be based on fossil fuel with undesirable emissions. There would also be extra costs and losses for transport. That would be quite nonsensical. From our point of view, the first thing to do is to use solar and wind power to meet domestic demand, especially that of industry.

## What is currently happening in the MENA region, i.e. North Africa and the Middle East?

The first projects were in the United Arab Emirates and Morocco. Today, we see a rapidly growing number of wind and solar projects in all MENA countries. In the beginning it was more solar thermal plants, but in the



Source: Desertec Wikipedia

last five years, besides wind, mainly PV plants have been developed. At first, the projects were in the range of 100 to 150 megawatts. Now we are talking about all sizes, from rooftop installations to projects of more than 1,000 megawatts, for example in Dubai, Abu Dhabi, Morocco, Egypt and Saudi Arabia. Since around 2015, both wind and solar energy have become very cheap. With solar energy, we are now talking about less than 1 euro cent per kilowatt hour in some cases. Saudi Arabia has now become a major driver of this energy transition, with huge projects and plans.

## **Why has the country moved?**

The leadership now understands very well that wind and solar are the most economical solutions. They also see the finite nature of oil. I still remember, we were there in 2010 and talked to the government. At that time they told me: solar energy is all well and good, and you are also a nice person, but we don't believe in it. And we don't need it either. We have oil. We don't need renewable energies, they are far too expensive. With the extreme drop in the price of green electricity production, that quickly changed. Today, people in Saudi Arabia say: we can produce green electricity very cheaply here and use it to make hydrogen or ammonia. There is a demand at home, but also worldwide. The leadership is rational. For the last three to four years, they have been fully committed to solar and wind energy. Green molecules also offer the first opportunity to export huge amounts of green energy, which is only possible to a limited extent with high-voltage direct current lines alone.

## **What are the dimensions?**

For the whole region, it would in principle be virtually unlimited, but not overnight. Let's take Saudi Arabia as an example. There are currently plans in the country for 60 gigawatts by 2030. In the northwest of the country, among other things, a huge project called Neom is being built. The area is about the size of Belgium. It is almost deserted at the moment. And the government says we will develop it completely emission-free. There will be construction, but it will be adapted to the natural environment. In this area, a project with an investment of 5 billion dollars is also planned to produce green ammonia over the next few years - from hydrogen produced from solar and wind power. The ammonia is to be exported by ship, mainly to Europe. The Saudi energy minister said this year that the country wants to become the world's largest exporter of hydrogen and could also look into exporting green hydrogen to Europe by pipeline.

## **The abbreviation Dii stands for Desertec Industrial Initiative. Who are your partners at the moment?**

There are currently about 50 companies from more than 25 countries. First of all, I would like to mention ACWA Power, based in Saudi Arabia. This is the market leader in the MENA region in solar and wind energy, as well as the world's number one in seawater desalination plants and now also very active in hydrogen. Another company is the State Grid Corporation of China, the largest power grid operator in the world, supplying electricity to more than a billion people and with an international footprint. And then there is a whole range of companies, including German ones, such as Siemens Energy or Thyssenkrupp. I might also mention the Fraunhofer-Gesellschaft and the Krinner company, which was significantly involved in the world's largest PV project in Abu Dhabi.

## **Siemens was involved in Dii before, then stepped out - and has now returned as Siemens Energy. Why?**

Siemens was one of the founders of Dii, at that time still with Peter Löscher as CEO. He said: solar is the future, we have to be part of it. At that time, the discussion was still strongly focused on solar thermal energy. Around 2011/12 we saw that solar thermal energy did not have a great future after all. At some point Siemens said: Desertec is not really for us. The company then pulled out again in 2012, accompanied by great media attention. A few years later, the Dii team moved from Munich to Dubai and we said we had to bake small rolls for the time being and concentrate on the countries in North Africa and the Middle East in order to build up the regional markets there. In 2015, Siemens came back and said, OK, we'll participate again, but only in a very modest way. Please no publicity, we don't want to keep reading big stories about us in newspapers. And since then, Siemens Energy has been a very good partner again and we exchange ideas intensively.

## **You mentioned Thyssenkrupp. What is their interest?**

About ten years ago, it was mainly the manufacturers and project developers of solar and wind energy who were interested in Dii. Today it's also about hydrogen. Thyssenkrupp is the world's largest manufacturer of electrolyzers and process technology for green molecules and chemicals. But the company is also becoming a big consumer of green hydrogen, which it plans to use to make steel without emissions. Hydrogen will then be used instead of coking coal. Thyssenkrupp is an example of large industries that say: we have to move away from fossil fuels and towards green fuels. Then you automatically go in the direction of hydrogen or hydrogen-based fuels.

## **How would you describe Dii's role at the moment?**

We are a market enabler, a pathfinder. We don't build, we don't invest. We are not really consultants per se either. We are a network of companies that push the market. For our own benefit, but especially for the benefit of the region. We started with green electricity, now we are increasingly adding hydrogen, but also the topics of storage, transmission and consumption. Consumption is often neglected, it's not so attractive. But when we talk about solving the climate issue, we have to talk about more efficient and flexible consumption in the first place.

## **What does your work look like in concrete terms?**

A lot of it is virtual at the moment. Our Managing Director, Cornelius Matthes is based in Dubai - with a small team in the United Arab Emirates. Dii Desert Energy, as we are now called, is a grouping of about 20 people who work as needed, partly on a voluntary basis. We provide first-hand information, we help companies developing projects, and we make high-level contacts with governments to improve conditions. We organise events in selected circles so that people can see what is happening in the region and prepare business

opportunities in this context. So we do a lot of basic work for a speedy energy transition. But we also provide concrete help. If things get stuck somewhere, we can offer solutions with our group so that things develop faster and more elegantly. The Dii also has a distinguished advisory board, with captains of industry such as Peter Terium from Neom, the former head of RWE/innogy, or CEOs such as from Masdar and ACWA Power. From the political side, the heads of organisations such as Masen (Morocco), GCC Interconnection Authority or the Energy Division of the Arab League are present. Decisive doors can be opened here.

### **Could you also summarize that in one sentence?**

Our mission: No emissions. Our goal is to eliminate greenhouse gases in the MENA region. We want the Middle East and North Africa to stop using fossil fuels and eventually export emission-free energy.

### **Let's talk about the history again. How did Desertec develop?**

We call the phase that is known mainly in Germany Desertec 1.0. In the beginning, the focus was on electricity from the desert that would flow to Europe and Germany. Then, in the years between 2013 and 2014, we said we would first concentrate on the region of North Africa and the Middle East. The countries there are taking the initiative into their own hands and our industrial network can support that well - that's Desertec 2.0. Solar and wind power suddenly became very cheap and therefore competitive. That helped us a lot. In 2017, the time was ripe for Desertec 3.0, which means not only a focus on green power, but also on hydrogen and green molecules. This is the current phase, which is also about export again - emission-free export for the world markets.

### **How do you see the situation in Germany?**

I am happy that the German hydrogen strategy is de facto spurring Desertec 3.0 and the connection with North Africa and the Middle East. Something is happening there. I am confident that all of us, the German government, German industry and Dii have learned a lot from the initial phase of Desertec and are now working together with local stakeholders to advance the energy transition in the region.

### **You were present during the discussions on the Desertec strategy. What did you learn from that?**

I learned a lot about cultures, how to work together or not to work together. I come from the Netherlands and was used to people getting along quickly and trying to achieve goals. And then, I realised that with large German companies, you can't do that so casually. The processes are more formal. In addition, the interests in Germany are also fought out more strongly, whereby the common goal, the global reduction of emissions, is easily lost sight of. At the beginning, I was rather naive and underestimated the interests of industrial groups. The hope at the time was that solar thermal could become a huge market, especially in North Africa and the Middle East. But then photovoltaic and wind power plants very quickly became much cheaper. Also, there was still no physical demand for electricity imports in Europe. I saw that and wanted to adapt our

strategy, more in the direction of regional development. But then we were told: no, that's not our plan. The solar power should be channelled from North Africa to Europe and finally Germany. But I didn't think that was realistic at the time. And there were many fights, even over years.

**From your point of view, why was it not realistic at the time to export electricity from North Africa to Germany?**

It's about markets. And you can't tell them how the electricity should run. It depends on supply, demand and prices. Ten years ago, the demand for electricity in Africa was much greater in relation to the generation capacity than in Europe, where there was a general decline. In Europe, there was a large production capacity for electricity and in Africa there were rather bottlenecks. But it would make sense to promote renewables in the MENA region by buying green certificates in Europe. I myself come from the energy sector. My analysis may sound simple today, but in the discussions back then people didn't want to believe it.

**Was the Desertec plan at the time to bring electricity from the south to the north wrong?**

Not at all, it is more a question of timing. In the coming years and decades, the green generation capacity in North Africa will become much larger than the consumption. So there will be surpluses. This will happen faster than we might think. At the same time, the zero-emission generation capacity in Europe is unlikely to meet all the demand in the long term. Under these circumstances, electricity will flow from Africa to Europe. So the practically limitless solar and wind capacities open up great opportunities for the MENA countries to make their own energy supply emission-free and to export it in the long run. Both electricity and molecules.

**What needs to happen for investment to flow into the MENA region?**

There has been investment in electricity production in the MENA region for a long time. So far, mainly from oil and gas and also coal-fired power plants, for example in Morocco and the United Emirates. But no one in their right mind will still invest in such fossil power plants when solar and wind energy is so much cheaper, not to mention emission targets. At the same time, we will learn to integrate hydrogen, storage technologies, transport and consumption innovations into the energy chain. This means that the bottom line is that you have to invest much less per kilowatt hour. That attracts investors, they will go for solar and wind power plants. And this almost automatically creates excess or export capacities at certain times.

**Is the whole thing an economic self-runner? Or does it also require certain framework conditions on the part of politics?**

Ten years ago it wasn't economically viable. Because solar and wind were more expensive than the market. That's when the subsidies came into play. Today the situation is different, it is economically driven. Of course, there is not yet an optimal infrastructure, legislation, markets for trading green energy and so on. But you can already see that many projects are coming about, simply because of economic considerations. That is new.

The transition is running on its own. Of course, it is a question of accelerating it, for example through better framework conditions, exerting much greater pressure on emissions or through technical innovations. But all that is needed is some targeted start-up funding.

### What is Dii's relationship to Europe at the political level?

We said last year that we also need to talk to the European Commission. Together with Professor Ad van Wijk of the Delft University of Technology and Hydrogen Europe, we have written a study to push the issue of hydrogen in Europe, in conjunction with North Africa. Electrolysis capacities are to be built on both sides of the Mediterranean. Last year we spoke with Frans Timmermans, Vice-President of the European Commission. He was very impressed and said: This is exactly what we need. And so the idea of "2 times 40 gigawatts of hydrogen EU-Africa" also entered the EU's Green Deal. And thus into the connection between Europe and North Africa.

### What does 2 times 40 gigawatts mean?

This is to suggest that there has to be a balance: Renewable energies will develop on both sides of the Mediterranean, so there are great synergies to be achieved. We believe that two markets will develop rapidly in the future: one for electricity, one for hydrogen. Already today, the electricity grids of Spain and Morocco are connected via pipelines. And they will continue to be expanded. In addition, there are already natural gas pipelines between Europe and North Africa; Algeria, Libya, Morocco and Tunisia are connected. In the future, these gas networks will (also) be used for green hydrogen and further expanded.

### Is that technically possible?

Yes, step by step. First, the existing networks can be used with hydrogen admixtures. And in the long term, they can be upgraded so that they can transmit 100 percent hydrogen. In addition, real hydrogen networks will be built. This can already be seen in isolated cases in Europe. So in the long term we will have electricity and hydrogen networks across the Mediterranean to transport large amounts of energy from North Africa to Europe.



Quelle: <https://dii-desertenergy.org>

## **Is hydrogen export by ship also possible?**

Transport by ship requires conversion, for example into ammonia. Pipelines are far cheaper. The questions are always: Where are the customers? How expensive is transport? And under what conditions? In the future we will see a range of transport solutions: via networks, ships, perhaps also trucks.

## **What roles do you think methane and methanol will play?**

Actually, we are talking about bottom-line, emission-free, energy-carrying molecules. Whether that's hydrogen or ammonia, methane or methanol. That's about markets. If the zero-emission products can be brought to market competitively, that will happen. The normal procedure is to develop supply and demand, both sides, so that it fits together. Depending on which molecules are in demand on the market under pressure from emission reduction and preferences for renewables, they will then be produced. That's how it works today. Only today it is done on a fossil basis. And in a few decades it will be carbon-free. If carbon still plays a role - as with methanol, for example - then this carbon will be recycled. So that it doesn't remain in the atmosphere.

## **Green electrons or green molecules - do you have a priority at Dii?**

We have been betting on the electricity market for a long time. We now see that this is working. There are fewer and fewer structural problems. Photovoltaic projects are technically relatively simple - much simpler than a coal-fired power plant, not to mention a nuclear power plant. It's similar with wind. That's why these projects need less attention from our side. We are currently focusing strongly on hydrogen, transport, storage and green energy trading, for example with studies, seminars and conferences.

## **Why?**

These are innovations, new elements in the energy chain. Hydrogen is added because electricity is now so extremely cheap in the MENA region. At a cost of around one euro cent per kilowatt hour, it becomes interesting. The Arab countries also see that there is international demand, for example in Europe or Germany. And when there is demand, a topic becomes sexy. It might also be hyped a little. But the way we see it, the hydrogen theme will stay. And the MENA region will then "automatically" become a big hydrogen producer for the world.

## **Green hydrogen is produced via electrolysis. This process is not particularly efficient. Is that a problem?**

Efficiency is a relative term. When you drive a car, you don't ask yourself how efficient it is. Or when you turn on the heating or air conditioning at home. Those are applications. And then the question is how can you

deliver the energy safely and cheaply - and without emissions. You can do that via electricity, for example, which is the easiest. But hydrogen-based molecules are an effective link between generation and consumption in many sectors, because they can be transported more safely and better. There is already a world market for these molecules. By the way, we should not lose sight of the issue of long-distance electricity transmission. Dii, for example, is involved in studies for submarine cable connections of up to 3,800 km between Morocco and Great Britain. Electricity and hydrogen transmission are in competition, so to speak.

### **How do you see the next 20 years?**

Maybe we'll go back ten years first. If you had asked me back then: What will the world look like in 2030? - I might have said: with solar power, things will work out, but it still needs a lot of subsidies. The political situation in the countries was also still difficult. Today we see that most countries in the MENA region - with exceptions, I'm thinking especially of Syria and Libya - are developing quickly. At that time, we would not have dared to think that solar energy would become so cheap and that the countries themselves would take it up quickly. This has consequences. The MENA region will quickly become the world's "energy powerhouse". But emission-free! This will also make this region a major geostrategic power. We can only speculate about what the consequences will be.

### **What does this mean for the relationship between Europe and Africa?**

Europe currently imports about 80 percent of its primary energy needs - almost all of it fossil. In the long term, Europe's southern neighbour will cover a large part of Europe's import needs with green electrons and molecules. Europe will become a big customer and North Africa a supplier. So far, Europe has a big head start, in terms of capital, technology, companies, etc. One should also not forget that photovoltaics also come from China to a large extent. And many components can be produced locally. Some things are also being automated and robotised. Overall, the Arab world will emancipate itself strongly. Also as a unit, because the countries depend on each other.

### **What is the relationship between European and Arab culture?**

That is a complex issue. In general, you can say that in Europe there is an idea of how we work together. We have learned this over the past centuries. The sense of democracy plays a big role in this, although there are differences between Western and Eastern Europe. In the Arab world there is a different culture, more autocratic. Shaped by "rulers", by presidents or sheikhs. They set the direction. People treat each other differently, friendship is very important there. People spend a lot of time together before they push things forward. You have to understand that, also internalise it. Then Europe and the Arab world can work well together.

## **And if you think ahead again?**

In 20 years, emission-free energy in the deserts will actually cost practically nothing and can be transported to all corners of the world. We will also see new technologies. Just to give you an example, with wind, energy will be generated by flying wind turbines from layers of air at great heights. You can't exclude anything, renewables, the carbon cycle, even nuclear energy. I believe that it is technically, organisationally and geopolitically possible to become emission-free in as little as 20 years, worldwide.

## **That sounds very optimistic.**

It is very possible. Whether that actually happens depends on many things. The individual human being is unfortunately not a simple being; and groups, countries, peoples are even less so. Technically, there is no problem. Economically, there are even only advantages. How quickly it develops depends on individual people, but also essentially on geopolitical forces.

## **What are your personal plans?**

At almost 68 years of age, my heart continues to beat for the global energy transition. The MENA region plays a decisive role in this. I hope to be at Dii's side until 2050, which is the original time horizon of Desertec. As long as I can still do that and as long as it is desired. [To the video.](#)

