

Are renewable technologies a vision or reality for South Africa and Africa?

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THE INTERNATIONAL ENERGY AGENCY HAS CONFIRMED THAT THE TARGET OF A 2°C INCREASE OF TEMPERATURES WORLDWIDE CANNOT BE REACHED AND THAT IT WILL BE MORE LIKELY BETWEEN 3 TO 4°C. PEOPLE NEED TO ACCEPT THAT THE CLIMATE IS RAPIDLY CHANGING AND THAT THEY NEED TO LOOK AT EFFECTIVE WAYS OF GENERATING ENERGY.

The more income available, the higher the electrification rate will be, therefore over 700-million people in Africa still have no access to electricity. With the electrification rate less than 10% and knowing that within this century the population of the African continent will increase to 3-billion people, from a technical point people will be unable to provide electricity in time.

Coal is still the backbone of the global energy supply and by 2025 it is estimated that 50% of the complete coal consumption will be in China. Africa is doing very well in comparison to other parts of the world and figure 1 indicates the growth of Africa. In 2009 the GDP took a dip, but in 2010 it had recovered and was looking very promising.

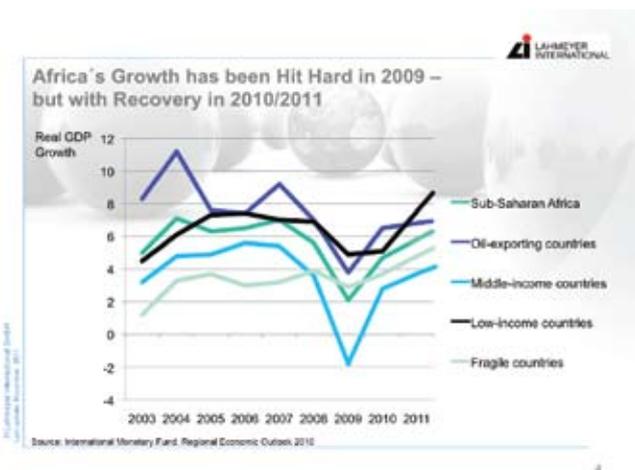


Figure 1: Africa's growth trend in 2009 - 2011

AVAILABILITY OF ELECTRICITY

A worldwide comparison of the power installed pro-capita per person is indicated in figure 2. South Africa, compared with other nations on the African continent and the global average, is in a strong position with well-organised infrastructure and leadership, and still the potential to improve is there through renewable energy generation.

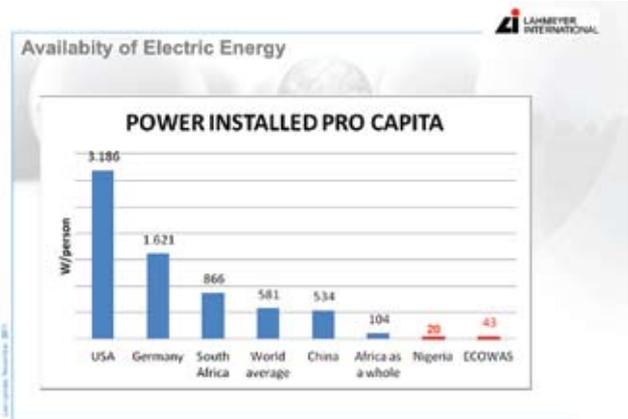


Figure 2: Available electricity in the world

ENERGY DEMAND

Figure 3 gives us an indication of the forecast primary energy demand globally. Oil, coal and natural gas demand will lessen as renewables come on line with solar showing the largest potential for growth, particularly focusing on efforts in Africa.

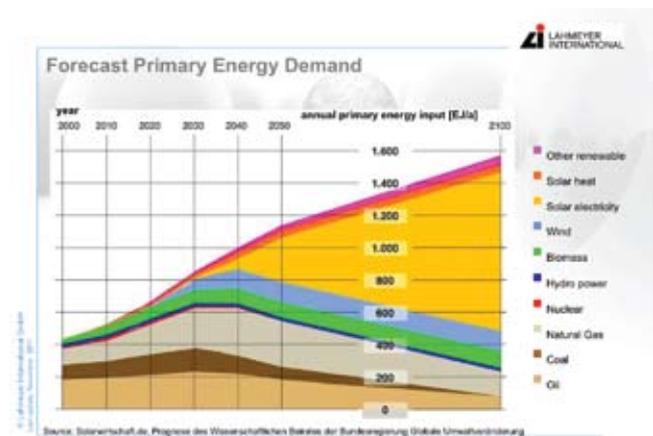


Figure 3: Future primary energy mix

HYDROPOWER

There is a lot of space for improvement in hydropower in Africa, with only 7% of the potential developed. In my opinion, the correct use of this potential could place the African continent in a position of leadership in hydropower development. Worldwide, Africa has the most potential for unused hydropower as indicated in figure 4. Sudan is currently generating power with the largest hydropower plant installed in the last five years in Africa, providing 1 250 MW.

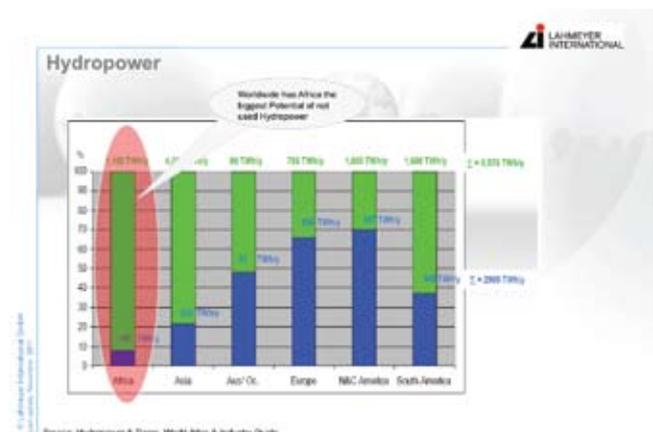


Figure 4: Africa's hydropower potential

SOLAR POWER

Africa's sun radiation is estimated at 2 500 kWh/m² per annum, indicating major potential with large investments into North Africa. Germany has between 650 to 750 kWh/m² a year and have roughly 20 000 MW installed solar capacity, mostly private initiatives on rooftops. Studies have shown that Germans (92%) want more clean energy as a source of their power supply and they are willing to pay higher tariffs (86%).

The Desertec Concept is presented in figure 6, where Europe tries to tap the surplus of the potential of North Africa's radiation. There are many myths about the cost of solar power but, in fact, prices are decreasing. A solar plant which has specific generation costs of less than 8 € cents per kWh is being built by Lahmeyer International. Other projects, the first 500 MW solar power project in Morocco, as well as projects in Egypt and Sudan are considered.

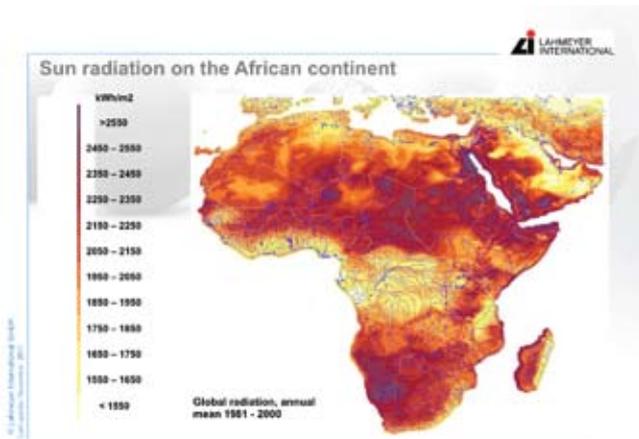


Figure 5: Africa's sun radiation is estimated at 2 500 kWh/m² per annum.



Figure 6: North Africa's radiation potential is being tapped into by Europe.

AFRICA HAS VERY GOOD SITES FOR WIND POWER GENERATION AS INDICATED IN FIGURE 7, AND WITH INVOLVEMENT IN EGYPT, MOROCCO, NIGERIA AND SUDAN, HOPEFULLY THE FIRST LARGE WIND FARM OF 200 TO 300 MW WILL SOON BE REALISED IN SOUTH AFRICA.

WIND POWER

Africa has very good sites for wind power generation as indicated in figure 7, and with involvement in Egypt, Morocco, Nigeria and Sudan, hopefully the first large wind farm of 200 to 300 MW will soon be realised in South Africa.

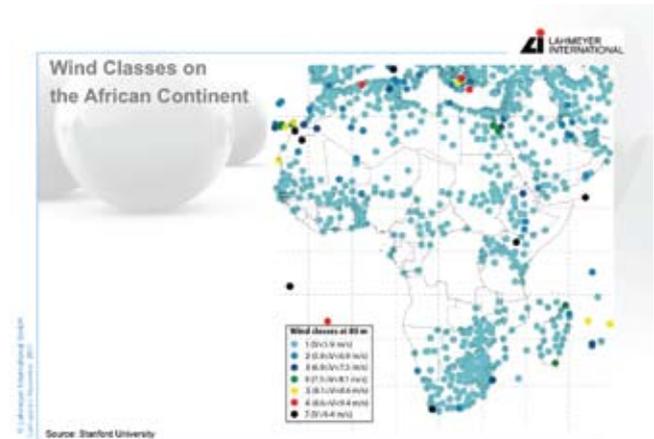


Figure 7: Africa's wind potential

IN 2010, THE GLOBAL RENEWABLES STATUS REPORT SHOWED THAT SOUTH AFRICA WAS AIMING TO HAVE 13% OF ITS ENERGY SUPPLY GENERATED FROM RENEWABLES BY 2020, AS INDICATED IN FIGURE 8.

AFRICA'S RENEWABLES PICTURE

In 2010, the global renewables status report showed that South Africa was aiming to have 13% of its energy supply generated from renewables by 2020, as indicated in figure 8. Cameroon, which has many hydropower projects in place, is aiming for 80% and Rwanda is aiming for 90% in the same timeframe.



Figure 8: Africa's renewable energy implementation plan

NUCLEAR PICTURE

Figure 9 illustrates the positioning of the 441 nuclear power plants still in operation worldwide. Germany has plans to shut down its last 17 plants by 2023. In France, major discussions on nuclear power are being held, and Tampa is trying to reduce the number of nuclear power plants it relies on.

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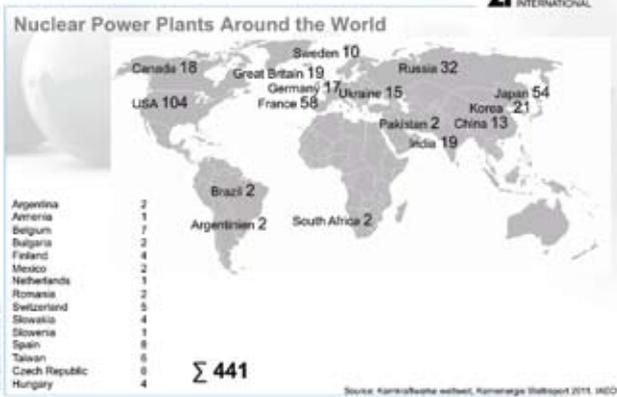


Figure 9: World's nuclear picture

GERMANY TODAY

In Germany, at the moment, over 20% of the energy mix comes from renewables, as indicated in figure 10. The goal is to increase renewables to at least 35% until 2020. More than 370 000 persons are directly employed in the renewable industry in Germany. During 2010 investments in the sector of renewable energy in Germany rose to a record high of nearly €27-billion, with further investments of more than €200-billion expected until 2020.

RECENT TRENDS IN FINANCING SHOW THAT AFTER THE PEAK IN 2009, PRICES OF RENEWABLES ARE REDUCING DUE TO INCREASED DEMAND AND MASS PRODUCTION WORLDWIDE.

In 2010 the renewable electricity generation in Germany alone was able to save imports of fossil energy value about €2,5-billion, and according to an TNS infratest inquiry 86% of the surveyed German customers consider an allocation of €3,59 c/kWh as reasonable for the promotion of renewable energy, with some people feeling it's too low.

Recent trends in financing show that after the peak in 2009, prices of renewables are reducing due to increased demand and mass production worldwide. Recent trends in financing show that this happened faster than expected and looking forward, price trends will depend on the funding of projects. This means the bankers and insurers have an obligation. International financing of large projects is the only way forward for Africa's potential, which makes it the perfect opportunity for investment.

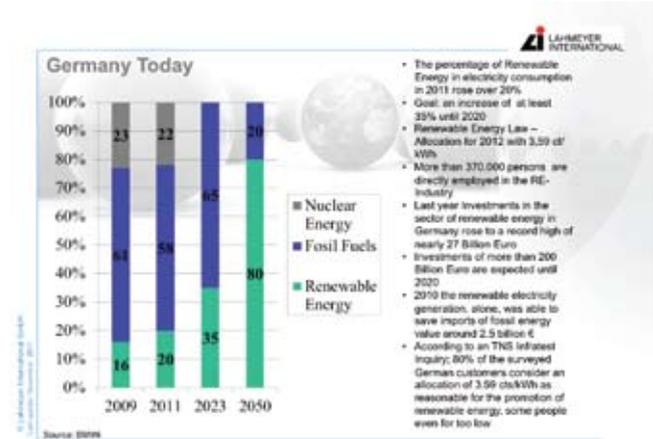


Figure 10: Germany's energy mix

A major global problem that hampers the development and implementation of renewable energy projects is not that there is no potential or possibilities – it's that there are not sufficient numbers of engineers and leaders championing the cause worldwide. If people had made the right decisions 20 or 30 years ago in building up engineering capacities in a sufficient way, they wouldn't be experiencing the bottlenecks in electricity that currently exist. Africa is ripe for major clean renewable energy efforts – the potential is clear.

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