

Thinking of going renewable? Here's how to assess which option is best for your business

By [Deepak John](#)

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It is no secret that South Africa's energy crisis poses a threat to almost every industry in the country. However, we are past the point of highlighting government inadequacies or what should have or could be done. The wisest way to reduce your vulnerability is to include renewable energy as part of your strategic future planning. This way, you can lessen your company's dependence on Eskom and increase your control over this important facet of your supply chain.



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We are in a fortunate position in that South Africa has an abundance of natural resources which make for excellent renewable energy. Some of these have been exploited for a number of years by industries that now operate with solid experience. The beauty of them all is, of course, that they are renewable. When managed correctly, the infrastructure you implement to generate your own electricity will yield returns long after amortisation. Beyond ensuring sustainability, some forms can even generate a profit if executed on a large enough scale.

To start, a quick overview of how each of the four main types of renewable energies work:

- **Solar:** Solar photovoltaic panels, typically installed on a roof or ground mount, capture the sun's light and, using an inverter, convert it to electricity.
- **Wind:** Wind turbines on large open spaces of land use wind to turn the propeller-like blades around a rotor which spins a generator that creates electricity.
- **Water:** Hydropower plants use turbines to convert the kinetic energy of running water into mechanical energy, after which a generator converts this into electrical energy.
- **Biomass / Biogas:** Biomass is renewable organic material that comes from plants and animals. Energy from the sun is transferred and stored in plants in the form of chemical energy. When biomass is burnt, it releases energy in the form of heat / methane gas, which is either converted into electricity using a generator or processed into biofuel.

A report by the International Energy Agency (IEA) shows that the contribution made by renewables to the overall global energy supply continues to rise year on year. It is estimated that in 2020, renewables contributed a total of 28% energy used worldwide. This came mainly at the expense of coal and gas, although those two sources still represent close to 60% of the global electricity supply. Also, according to IEA, renewable energy has, so far, been the energy source most resilient to Covid-19 lockdown measures.



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So, if you are considering adopting renewables into your energy mix, where do you start?

Examine what resources you have

What renewable resource do you have available at your site? Most African countries have a sunny climate, although this is less so in coastal regions, where wind is often more powerful.

To calculate the feasibility of solar energy on your site, calculate how much solar irradiation you get over a 12-month period. Do you have roof space or open land where you can install solar panels? They can also float on large surfaces of water.

For wind, how much wind do you get in a similar direction and at what speeds? Do you have large open land spaces open that are unlikely to be obstructed in future for possible turbines?

For hydro, do you have a fast-flowing river that is sufficiently consistent or a terrain where you can build a dam (pump it, store it)?

Biomass / biogas is quite broad as this uses biodegradable material that produces methane when it degrades. It is almost anything that produces energy from vegetation, for example, even burning wood can create heat and that heat can be used to run a turbine. The question is, therefore, do you have consistent access to biodegradable materials in large quantities?



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At what scale do these technologies make sense?

Harnessing any renewable energy source requires an initial investment to set up the necessary infrastructure. These investments all have different scales of flexibility and amortisation.

With solar energy, even small solar systems e.g., 1KW / 100MW tend to make financial sense as the technology is very modular. The bigger the system, the more panels are used. Solar is one of the most flexible sources as both tiny and large-

scale systems tend to work favourably with the numbers. This is why it is the most commonly used self-generation source in residential developments.

With wind, however, this is not the case as anything smaller than 700KW generally does not make financial sense for a single wind turbine. On the other hand, when producing massive quantities, wind is one of the cheapest renewable energy sources.

Hydropower must also be done on a very large scale. Using the flow rate in a river, 100KW and upwards starts to make sense. If you are building a dam, this must be done on a mega-scale, producing multiple GW upwards. This tends to work only for mines or government utilities, however, there are successful cases where farmers have put a turbine into a river if they have a dam on their property.



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Assess your payback period and your financial return

As with any capital investment into your business, the payback period and financial return will play a role. In this case, it will influence how advantageous this energy source will be for your business in future. At the same time, consideration must be given to the sustainability of the resource you will be exploiting for energy.

Usually, the companies that install sustainable energy systems can help you calculate your financial return based on the savings you will be making, determined by the power output capacity of the system and your historic usage. The payback period is a factor of this, together with whether you'll be loaning the funds to cover the investment.

Solar and wind energy are considered dependable resources and projections regarding their availability can be made with high confidence. These are both also relatively straight forward to finance as financial institutions understand these models.

It is, however, extremely resource intensive to start a hydropower plant and there are more complexities involved. If you are building a dam, you must have suitable terrain and maintenance can be onerous. Additionally, climate change and shifting rainfall patterns may affect the water supply in years to come, so your payback forecasts will need an element of fluidity. Finance would require a more specialised approach.

Biomass / biogas depends largely on your ability to access to a huge volume of vegetation over a long period of time, for instance on a twenty-year basis if you are looking to achieve a worthwhile output. In this case, you would be doing your calculations for a turbine or generator run on biofuel, from 1MW upwards. This resource does not generally make sense on a small scale. If it is approached on a micro scale, it is generally just to capture the methane for cooking or heating.



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New alternatives

Extensive research is being done on new forms of renewable energy and new approaches to harness their potential. The concept of a space-based solar plant is gaining a lot of traction, as is the implementation of geothermal energy, effected by drilling into the Earth's core. New alternatives will undoubtedly be added to this list as the world continues to seek renewable energy sources, while our fossil fuels diminish, and our energy usage increases.

Renewable energy is not only better for the environment, but more sustainable for your business. Whichever route you take, the best starting point is thorough research into your options, using the approach above. The more informed you are, the better selection you will make. Either way, there has never been a better time to increase your independence by adopting renewable energy in one way or another.

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