PV is more than just technology

The transition from fossil fuel to clean energy is about more than just technology. People and their behaviour, and government and its policies, are all at the heart of it, writes Professor Prathaban Moodley, General Manager of Applied Energy Research, Development and Innovation at the South African National Energy Development Institution (SANEDI).

The worst day of sunshine in South Africa is better than the best day of sunshine in Germany, runs a saying among solar-energy industry insiders. Yet, despite this obvious truth, South Africa lags many other less-sunny parts of the world when it comes to harnessing the sun's energy.

There are several reasons for this, among them the fact that for many decades South Africa was the world's lowest-cost producer of coal-fired electricity and supply outstripped demand. There was little need to use electricity wisely, adopt demand-side management measures or, indeed, invest in renewable alternatives.

The legacy of those times casts a long shadow over the current energy landscape. The adoption of photovoltaic (PV) technology is a useful case in point.

The technology to convert sunlight into electricity has been around for a long time but over the last decade or so, it has matured into a truly viable alternative to fossil fuels from a cost and efficiency point of view, not to mention surety of supply in sunny South Africa. Following the widespread utility-scale adoption of PV in the form of large PV farms between 2010 and 2015, recent years have seen a drive for smaller scale applications, notably solar panels on the roofs of commercial, industrial and residential buildings. Lately, the shift has been boosted by businesses and households needing to protect themselves from the devastation of loadshedding.

Despite its elegance and usefulness, smaller-scale PV technology remains expensive. The cost of panels has come down substantially in recent times, but inverters and batteries still carry a hefty price tag. Government's 15% tax rebate only on solar modules/panels helps to soften the capital-investment blow but it has at least two unintended consequences. The first is that it widens the chasm that already exists between the affluent and the poor in South Africa, in that the upfront capital outlay is beyond the reach of the majority of the population. People with access to capital will be better off, while the rest will be left even further behind – although there is a benefit to the whole country whenever load is taken off the grid. The second is that a year-long incentive does not stimulate economic activity around PV technology. All it does is create a rush to purchase and thus a bias towards importing as quickly as possible as the local South African industry cannot meet PV-component demand. Following this logic, a five-year, or ideally 10-year, incentive is needed before component manufacturers will deem it worth their while to set up factories and develop local skills to create a sustainable local industry.

It is on such investments that the speed and sustainability of the Just Energy Transition (JET) hinges. Critics rightly point out that it would be impractical to simply replace decommissioned coal-fired power stations in Mpumalanga with PV or wind farms – that part of the country simply does not have the optimal weather conditions to make it financially viable a first-choice investment site. However, were

we to locate PV- and wind-technology component factories there, the conversation becomes an entirely different one. Engineers, artisans and technicians now employed in power stations will have factories in which to ply their trades, while jobs that are relevant for the future will be created. It is a fact that the renewable sector requires different skills and will not be able to absorb all the jobs lost with the phasing out of fossil fuels. However, the impact can be significantly reduced through the development of an industry that supports the JET through local manufacturing.

Several moving parts have to come together for residential-scale PV to take its rightful place in our energy mix and economy, and SANEDI is set to help achieve that.

From this year, we are initiating a PV multi-micro-grid demonstration project to improve understanding of the technology and how it performs under environmental conditions specific to South Africa, and how households and indeed large industry should select the option best suited to their needs, maintenance best practices, and so forth. We will use learnings from this project to educate citizens on the dos and the don'ts. For instance, instead of a big and expensive solar system, households will be better served to become energy efficient and then combine a solar geyser for hot water and gas for cooking and space heating with a smaller PV installation.

In addition, we want to provide insights into the policies needed to create an enabling environment. These have to include uptake incentives and financial models, such as low-interest loans, to stimulate demand that is strong and sustainable enough to result in manufacturing investments.

Finally, lessons regarding behaviour change and adaption to technology have to be learned and applied. Unfortunately, many energy companies have piloted rudimentary versions of PV in the past and the technology was not accepted by communities because they could not do with the energy what people with grid electricity could do. The fact is that people must change their consumption patterns when using PV technology, and for that education is necessary. Acceptance of the technology and education of users are critical: without energy efficiency behavioural change, PV and storage solutions will be far too expensive and when deployed will not deliver performance over the full life of the solution.

South Africa has all the sunshine needed for the successful and widespread implementation of PV, but we must accept that doing so requires more than science and technology. We need an enabling policy environment, and we must win consumers' hearts and minds through behavioural changes. Only then will we be able to fully leverage our solar resources to arrive at a sustainable and inclusive future energy state.