

Renewable energy feed in tariffs, REBID, SASGI and the smart grid

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The renewable energy industry has experienced a laborious process with many course changes and reversals by government, NERSA and Eskom during the past several years. This paper discusses the relationship of this newly established South African Smart Grid Initiative and the renewable energy bid (REBID) programme.

A South African Smart Grid Initiative (SASGI) was recently established under the mandate of the South African National Energy Development Institute (SANEDI) to facilitate amongst others the effective strategic direction and roll out of Smart Grids in South Africa.

South Africa proposed the introduction of a renewable energy feed-in tariff (REFIT) in 2003. The intention was to bring certainty and encourage potential investors to fast track the introduction of renewable energy into the South African energy mix. This program failed due to, amongst others, the bureaucracy and red tape involved to obtain licenses and rumours that the REFIT tariffs would be reduced! To obtain government's renewable goals in terms of the integrated resource plan 2030 (IRP), a new initiative, REBID, was introduced. In terms of this initiative government would open a number of windows whereby potential investors could bid to provide bulk renewable generation. In December 2011 government announced the window-one preferred bidders (28) totalling 1415,5 MW from wind, concentrated solar, solar photovoltaic, biomass, biogas, landfill gas and small hydro. Again in May 2012 government announced the 19 preferred bidders in window two totalling 1043,9 MW from wind, concentrated solar and solar photovoltaic.

Parallel to these developments, SANEDI established under the National Energy Act, 2008, with experience from a recent mission to the USA organised by the United States Trade and Development Agency, formed SASGI. These two developments set the scene for development of a smart grid for South Africa [1].2.

A brief history of the proposed REFIT programme in South Africa

The white paper on South Africa's renewable energy programme was released in November 2003. This was followed by NERSA consultations and by March 2009 regulatory guidelines set out the basic structure of a renewable energy feed-in tariff (REFIT) programme,

with proposed feed-in tariffs (FIT) for four technologies being:

- Landfill gas: R0,90/kWh
- Small hydro (< 10MW): R0,94/kWh
- Wind: R1,25/kWh
- Concentrated solar power trough with Storage (6 hours): R2,10/kWh

These tariffs were to be increased annually in line with the South African consumer price index (CPI) [2]. It would have been between R0,90 and R2,10. South Africa will be relying in part on the private sector for the generation of electricity in the future. These independent power producers (IPPs) will be required to generate 30% of the country's additional power capacity [3]. Eskom would have been adopting three IPP programmes to accommodate the private sector, viz. the:

- Pilot national cogeneration programme (PNCP)
- Medium-term power purchase programme (MTPPP)

Multisite base load independent power producer programme

The MTPPP and PNCP would have secured IPP capacity in the short to medium term and, while the multisite baseload IPP programme was earmarked for the longer term [3]. In July 2009 NERSA issued a consultation paper, tabling a type of REFIT power purchase agreement (PPA), based on MTPPP and six more technologies were included in the REFIT programme:

- Concentrated solar power trough without storage: R3,14/kWh
- Solid : R1,18/kWh
- Biogas: R0,96/kWh
- PV (large ground or roof mounted): R3,94/kWh
- Concentrating PV: no tariff published on grounds of cost
- Concentrated solar power (central tower) with storage: R2,31/kWh

This was addressed at public hearings in September 2009. Electricity regulations on new generation capacity (covering IPPs and

REFIT) was initiated on 5 August 2009. On 30 October 2009 NERSA issued its "Decision on REFIT 2" in its consultation paper and set FITs for additional technologies. However it did not include a FIT for CSP as the cost was considered too high. The integrated resource plan (IRP1) was quietly published by the Department of Energy (DoE) in Government Gazette No.32837 (Notice No.1243) on 31 December 2009, without any public consultation [2]. It had objectives such as commencing on 1 March 2010 with:

- The installation of 1-million solar water heaters
- 10 000 GWh RE as approximately 4% of the energy mix (the construction of new generation plants based on RE technologies)
- A financial incentive scheme for energy efficiency and DSM [4]. This is to be procured through the REFIT, MTPP and Eskom's wind and CSP programmes.

Up to 2011 the abovementioned objectives never materialised. However a revised integrated resource plan (IRP1) was published on 29 January 2010, superseded by IRP2. In a later development an inter-ministerial committee on energy has been established in February 2010. Its objective is a 20 year new generation capacity development as an integrated resource plan (IRP). The participation of independent power producers (IPPs) was welcomed. On 27 September 2010 there was a DoE publication of a request for information (RFI) with an extended response deadline from 4 to 7 October as follows:

- Information from developers of co-generation and REFIT projects up to March 2016 were requested
- Dedicated small projects (1-5 MW) allocated to REFIT programme
- Preference to projects using local materials, labour, manufacturing and maintenance
- Planned proposed release of Request for Proposals (RFP) in November

However companies not responding to

RFI could also tender. On 27 September 2010 the DoE released a publication of the terms of reference (TOR) for the appointment of additional consultants to advise Government. Additional legal and financial advisers, technical, black economic empowered (BEE), local energy experts, environmental and communication specialist advisers were appointed to finalise the programme. This timing however was so ambitious that it will impact on the commencement of the procurement process. On 30 September 2010 a media briefing was held by the DoE, where the intention was confirmed to publish the revised new generation regulations in October for public consultation and to publish the procurement documentation in November.

A publication of draft IRP 2010 was made on 8 October 2010:

- It covers a 20 year period up to 2030
- The deadline for public comments was extended to 10 December 2010
- Public hearings took place at the end of December 2010.

The main objective of the programme would be to procure a minimum of 1025 MW with a single technology or a hybrid using different renewable technologies [5]. A suggestion of a separate cogeneration feed-in tariff (COFIT) was made. According to Barbara Hogan, South Africa's Public Enterprises minister, the country's first cogeneration projects would be fast-tracked to add about 1 GW to the network [6]. Cogeneration was excluded in the draft REFIT programme in 2009 since it is not regarded as renewable. One form of cogeneration is when electricity is produced as a result of the heat by product from industrial processes. At the weeklong Cogeneration World Africa 2010 conference in Johannesburg in September, Minister Hogan advised that cogeneration has a high priority with the 2010 integrated resource plan (IRP) being developed by the government, it would become a blueprint when SA's electricity mix is finalized in the near future [7].

Key issues that arose from the IRP 2/2010 Draft, were the "Revised balanced scenario" that proposes:

- 1025 MW for REFIT Phase 1 from CSP, wind, landfill and small hydro
- Additional 3800 MW of wind energy from 2014- 2019
- Additional 400 MW of solar energy from 2016-2019
- Additional 7200 MW of renewables energy from 2020-2027
- The technology split was questioned and the timing and capacity for PV would be revised

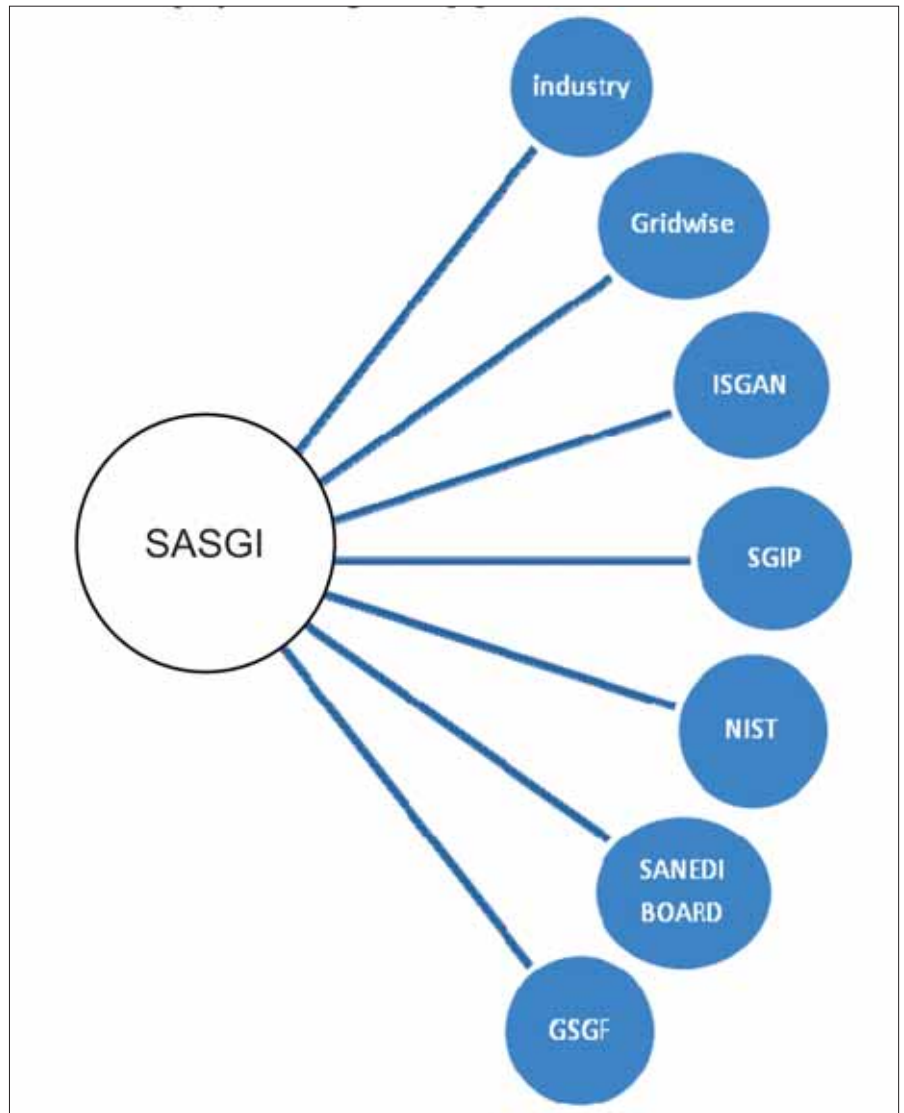


Fig. 1: SASGI model of role players.

- The proposed 5000 MW solar park in Upington is not covered in the draft

All role players in South Africa were waiting in anticipation for March 2011 for more clarity on the REFIT programme and finalisation of it. Unfortunately the REFIT programme was unceremoniously abandoned and replaced with the REBID programme where IPPs submit a bid proposing their own tariff to Eskom.

From REFIT to REBID

With the abandonment of the REFIT programme and after several revisions to it, REBID was formulated. This would be the first South African renewable energy auction. REBID, also commonly known as REIPPPP or REI4P (Renewable energy independent power producers procurement programme) would not be managed by NERSA, but by the National Treasury. Potential bidders needed to pay about R20 000 to obtain bidding documentation. They had to deliver social and economic development

for South Africans and only those with acceptable social and economic plans could advance to have their projects adjudicated on feasibility and price. Auctions for 1415 MW of renewable energy capacity has already been awarded to IPPs [8]. The REBID auctions drew competition from many international developers with various technologies offered, even though the bids were lower than the abandoned proposed REFIT feed-in tariff rates.

The South African smart grid Initiative (SASGI)

The South African smart grid initiative (SASGI), was established as an institute representing the industry to facilitate amongst others the effective strategic direction and roll out of smart grids in South Africa. It has set itself the mission to include all interested parties such as the International Smart Grid Action network (ISGAN), Standard Generator Interconnection Procedures (SGIP), National Institute of Standards and Technology (NIST) and the obal Smart Grid

Federation (GSGF) in the model displayed in Fig.1 [9].

To this end three workgroups were proposed to facilitate the work of SASGI, namely:

- Policy
- Technology and standards
- Implementation

Policy workgroup

This workgroup will focus on the policy and regulatory requirements to facilitate the effective introduction and roll out of smart grids in South Africa, and will proactively assess the policy and regulatory landscape, identify potential challenges and formulate recommendations. Since the promulgation of policy and the regulatory framework falls outside the mandate of SASGI and SANEDI, the deliverables of this work group will serve as input to amongst others the Department of Energy and NERSA.

Technology and standards workgroup

This workgroup will focus on the required standards and make recommendations in respect of technology options/utilisation with respect to smart grids and the various elements within the broader smart grid definition. It will also evaluate international trends and proactively make recommendations via SASGI to SANEDI to ensure that South Africa reap the benefits from appropriate international best practices, technologies and standards. Amongst others it can play a significant role in hedging against any potential technology dumping.

Implementation/applied research workgroup

It is essential that the roll out of smart grids in South Africa take place in a coordinated and integrated manner. Furthermore it is of critical importance that best practices and learning's from a South African market perspective be identified, documented and shared with the broader industry. Through this approach the best/most appropriate smart grid related options/practices/equipment performance/compatibility/system solutions etc. from a South African perspective can be identified and shared [1]. The diagram in Fig. 2 depicts the interface of SASGI with the SANEDI Board, the South African industry members, the international Smart Grid institutes, the Engineering Council of South Africa (ECSA) and the standing Work Groups [9].

Conclusion

The renewable energy industry has experienced a laborious process with many course changes and reversals by government, NERSA and Eskom during the past several years. With bulk renewable generation coming on-line as soon as 2014, the mandatory introduction of smart meters in terms of GN 773 and

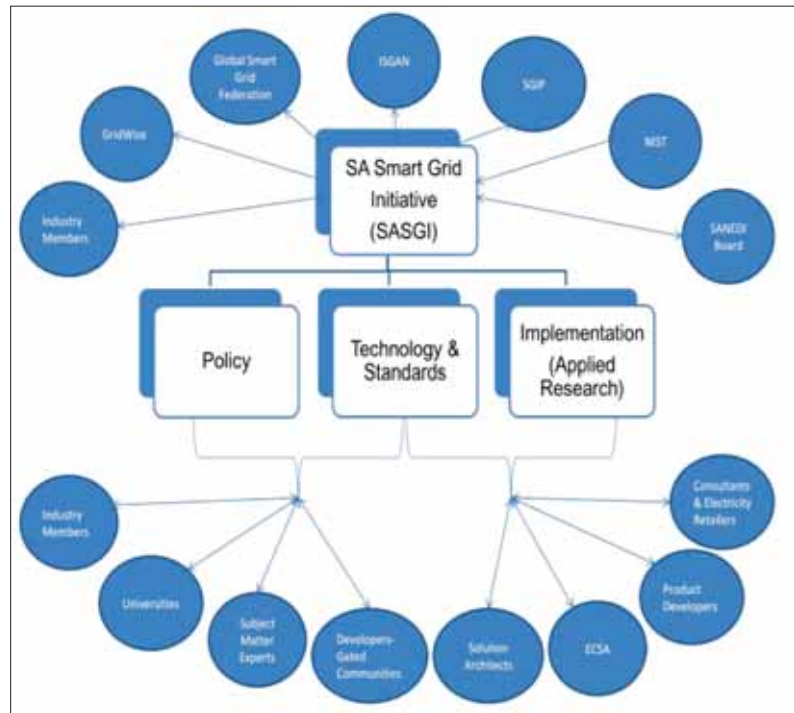


Fig. 2: Representative members, affiliation and workgroup arrangement.

the continuous pressure from individual households to grid-tie their small PV installation, it is timely that SASGI was established. By now it is general knowledge that there is a lack of funding for proper generation and infrastructure development, because retail electricity prices had been kept too low, for too long in South Africa. The 25% pa electricity tariff increase, the REBID programme and a proposed smart grid are attempts by government to stimulate renewable energy development.

A lesson learned from the first world countries, is that one needs a well coordinated approach to make a success. When the REBID projects come on-line, SASGI customers would theoretically be able to have a choice of supplier for their energy needs. One would possibly find that large multi-national companies would opt for renewable choices in order to reduce their carbon footprint to avoid future carbon taxes as well as to make their product attractive on international markets. The successful implementation of a smart grid in South Africa will be substantially influenced by and contribute towards the creation of stable markets for investors, developers and funders.

When the active renewable energy generation industry comes online, after the two rounds of competitive bidding it will have a huge impact on the grid. Several experts have warned that the impact of solar and wind energy on the grid, as far as harmonics and availability, for example are concerned, must not be underestimated. Hence the need for a

smart grid. The new body SASGI has been formed to discuss this impact and will play a huge role in grid tied systems and smart grid regulation.

Acknowledgement

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