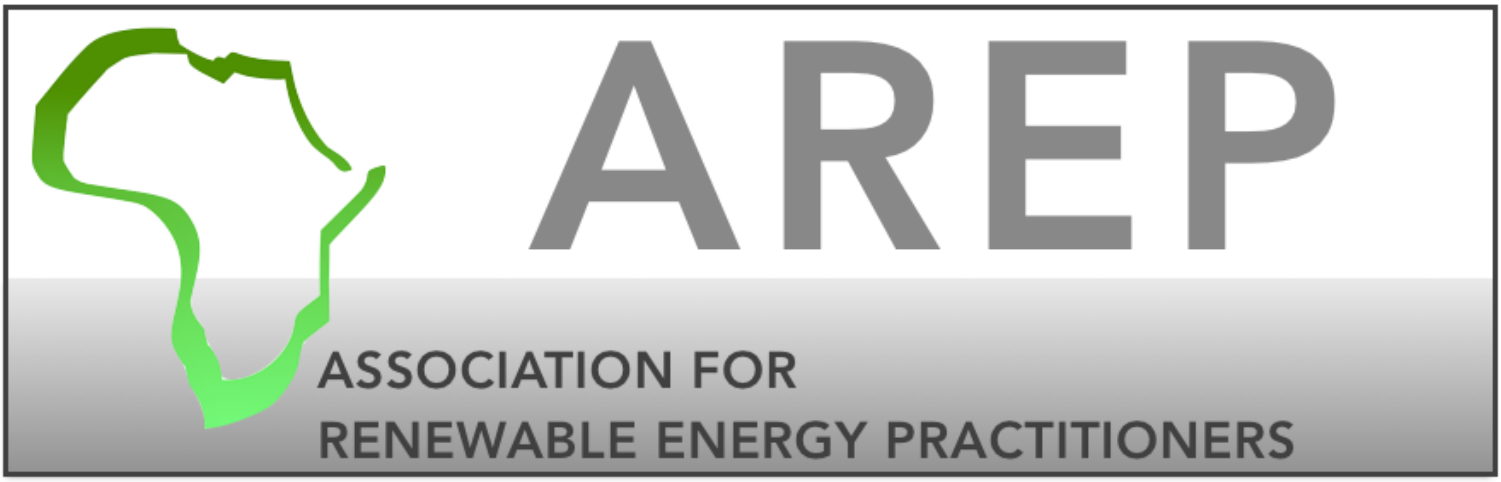


Draft IRP Submission

by

AREP

October 2018

1. Introduction

This document serves as the Association for Renewable Energy Practitioner's (AREP) written submission to the Draft Integrated Resource plan released by the Department of Energy on 27th August 2018 for public comment. AREP's submission is focussed on small-scale solar PV and highlights factors within the residential, commercial, industrial and agricultural sectors. AREP's submission excludes solar PV systems larger than 5MW as well as systems within the REIPPP or utility scale environment.

AREP is a newly established industry body created to act as a vehicle to promote renewables with a primary focus on the commercial and industrial solar PV rooftop sector. Founding members include distributors, financial institutions, contractors and other stakeholders with an interest in the sector. More details regarding industry representation can be made on request. Data used for the purpose of this submission was sourced from PQRS.

AREP welcomes the release of the draft IRP and note that although the document circulated for public comment is comprehensive, a deeper level of clarity is required on the final Plan.

Our view supports that of the Department of Energy; in that the cheapest way to provide new electricity is through an energy mix that combines fossil fuels and different forms of renewables. Solar PV however can be implemented much faster and have been identified as one of the cheapest forms of energy through the REIPPP report and studies released by the CSIR.

Our submission recommends the inclusion of real-world assumptions in support of the least-cost scenario. The financial feasibility of the Draft IRP should be re-considered as it is our view that the current models are not financially sustainable. In view of global trends towards renewable sources we would advise against further investment into coal fired power. Further to this we emphasize the notable drive by the local industry to install solar PV sources in the absence of formal policy frameworks. Our submission highlights how the IRP will have to include a realistic model making provision for solar PV systems which would include commercial, industrial, agricultural and residential systems. Since 2011 the C&I solar PV sector has been growing at an average rate of 28% y.o.y. and this growth is not recognised, noted or made provision for in the draft IRP. For 2018 alone it is estimated that 200MW will be installed in South Africa.

2. Current trends

The local small-scale solar PV market is growing in the absence of it being reflected in the IRP. Recognising the technology will allow all stakeholders to accept the estimated rate of growth and allow for the expansion of the technology into the energy mix. Rather make provision for the growth in estimations and raise awareness with municiplaities that the technology is a reality and needs to be incorporated into the future mixed energy models.
In total approximately 25 municipalities nationwide, with all of the municipalities in the Western Cape have policies in place to accommodate small-scale renewables, and are actively involved with small-scale renewables. This includes most of the large metros such as Johannesburg, Ekhuruleni, Ethekwini, Cape Town, Nelson Mandela bay, etc.
The IRP should take into consideration current levers influencing the adoption rate of renewables specifically related so solar PV; such as

2.1. The Reducing costs of storage

2.1.1. Some forms of storage already pose a lower levelised cost of energy than Utility scale rates

2.2. E-mobility

2.2.1. The route between Durban and Johannesburg has sufficient charging infrastructure for e-mobility to become a reality in South Africa. This will see reduced fuel consumption.

2.3. Reducing costs of PV plants

2.3.1. Levelised cost of energy on Commercial solar PV systems make it financially viable to opt for renewables. This promotes the move to PV as a technology and should raise concern for the sustainability of fossil fules as it becomes less competitive

2.4. Financial models

2.4.1. Various financial models make it possible for consumers to use solar without any capital investment

2.5. Energy efficiency implementation

2.5.1. Consideration for possible delays in the completion of newly built and planned coal generation plants, consumers are reducing their loads through energy effiency measures in order to further reduce the cost of moving to renewables.

3. Results of scenarios

Page 32 and 33 deals with the levels of certainty on assumptions for the scenarios included in the IRP and states that assumptions for the period up until 2020 is high and up until 2030 is medium to high.

It is the opinion of AREP that these assumptions may be further from correct as anticipated, due to the fact that PV systems smaller than 1MW has been completely disregarded for all assumptions and a cap of 200MW was placed on systems between 1-10MW in size.

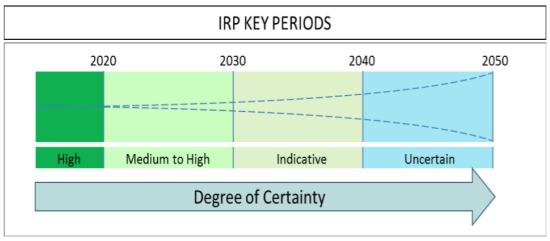
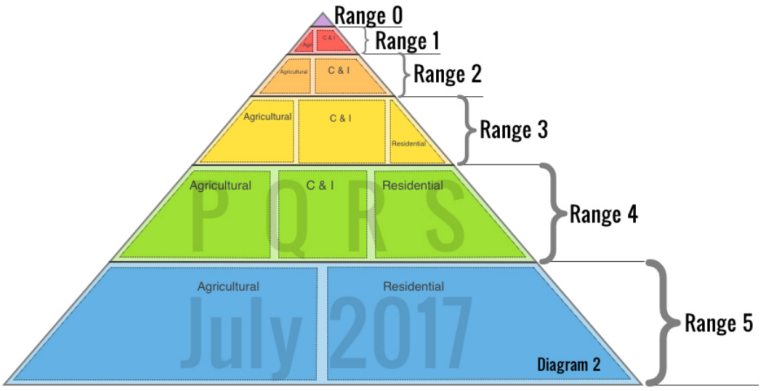


Figure 10: IRP Study Key Periods

Generally industry grows based on demand and the absence of the entire small-scale embedded sector in the IRP increases the risk to all stakeholders

as municipalities and utilities cannot plan ahead. As indicated in the section of this document referred to as "current trends" industry grows regardless of whether it is recognised by government, albeit at a slower slower rate.

The Solar PV Sector is divided into various ranges according to reports issued by PQRS. Each range resembles a different sized system. Range 1 would be the only range in the sector that falls within the scope of the IRP as it represents PV systems ranging between 1-5MW.



As at Jan 2017 solar systems sized between 1-5MW only contributed 19% of the generation capacity for small scale embedded generation and only included 28 installations generating 40MW. The point being that systems sized between 100kW-999kWp contributed 43% of the

2016	PQRS data showing installation data up until Jan 2017						kWp ave.	by number % of installations	by capacity % of installations
Range 1	Count nr of installations	28	installations, generating	40764,0	generating	1456	per system	0,02%	19,37%
Range 2	Count nr of installations	305	installations, generating	91234,8	generating	299	per system	0,22%	43,36%
Range 3	Count nr of installations	326	installations, generating	12107,3	generating	37	per system	0,24%	5,75%
Range 4	Count nr of installations	8776	installations, generating	37434,5	generating	4	per system	6,36%	17,79%
Range 5	Count nr of installations	128622	installations, generating	28871,9	generating	0	per system	93,17%	13,72%
		138057		210412,5					

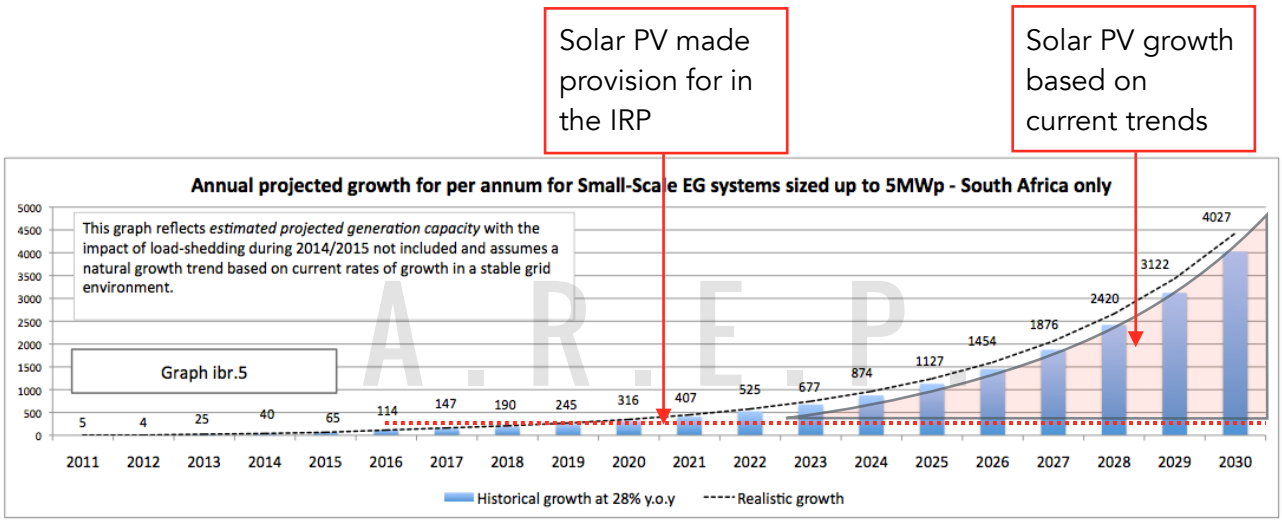
generation capacity. Although generation capacity for range 2 systems were more than double that of range 1; Range 2 systems have not been included in the IRP and therefore the reflection of small-scale solar PV cannot be deemed to be realistic.

4. The Sleeping Giant

Self consumed small-scale generation capacity may currently seem insignificant when compared to larger contributors such as coal or most of the systems installed under REIPPP. Given the right environment which would include

- rising electricity costs
- reducing renewable energy costs
- reducing storage costs
- more flexible financing options
- grid instability

small scale solar may become the sleeping giant and surpass the expectation of goverment regardless of the presence of policy making provision for installation capacity.



Graph ibr 5 above shows the generation capacity for small scale renewables <5MW up until 2030 where growth is indicated on historical data sourced from the PQRS database. This graph is an indication of the realistically expected generation capacity possible up until 2030 for small scale PV and excludes any other form of renewable technology. The values indicated in Graph ibr5 above exceeds the estimated 200MW as indicated in the IRP on page 41.
Page 41 of the IRP further notes "Total installed generation for own use regardless of installed capacity is unknown as these installations were exempted from holding a generation license or were not required to be registered."
It is the opinion of AREP that regardless of whether a registration license is required, the generation for own consumption should be included in the IRP to reflect a realistic view of the energy mix.

5. Technology, Fuel and Externality Costs

Cost assumptions for PV for the commercial rooftop sector cannot be compared to those taken from REIPPP as reflected on page 23 and we quote from the IRP, "This IRP Update includes the costs as contained in the EPRI report, except for the following technologies: PV, wind, coal and sugar bagasse for which average actual costs achieved by the ***South African REIPPP were used***."

Funding mechanisms supporting solar PV plants are not as complex as those in the REIPPP program. Finance for rooftop is readily available and a multitude of finance mechanisms make it easy for end-users to move over to solar PV as a source of power. REIPPP cost assumptions should therefore not be used as a means of comparison against the commercial rooftop sector.

6. Real world pricing

The IRP does not account for the reducing costs of solar PV as a technology and is therefore deemed to be unrealistic and unachievable. The manufactured cost of solar PV has reduced globally and the reduction in costs can be seen as solar PV module prices as well as those of inverters and batteries are being reduced by manufacturers as technologies improve and new manufacturing methods deliver the same product at a better price.
Eskom on the other hand is proposing steep tariff increases in order to remain financially sustainable and recover incurred debt.

The IRP does not make provision for the fact that as the price of electricity is constantly increasing, the cost of installing renewables is decreasing. The result would see end-users opting out of coal fired power, and generating power for own use through renewable sources. In the commercial sector, the business model for end-users will also be to remain competitive and therefore a saving in electricity costs would force them to opt for cheaper alternatives.

7. Business development

AREP understands that the IRP serves to accomplish an enourmous task as it should balance job creation, economic development, energy security and a list of other factors.
South Africa saw significant investment through REIPPP with 5 solar PV factories assembling modules locally. Due to the stop-start way in which the REIPPP has been managed and implemented, 3 of these factories namely (Jinko, Solaire-Direct and Sunpower) have closed down resulting in job losses exceeding 250 people just for the Jinko factory alone.
Despite the fact that decisions at government level has an impact on international investment, local businesses continue developing albeit at a slower pace to provide in local demand.

Locally SA has seen

- 7.1.3 successfull Li-ion battery factories doing assembly, all of which also export equipment
  - 7.1.1.Freedomwon
  - 7.1.2.Blue Nova
  - 7.1.3.MyPower24
- 7.2.Three lead-acid battery manufacturers i.e.
  - 7.2.1.Dixon
  - 7.2.2.First National Battery
  - 7.2.3.Willard
- 7.3.A number of inverter manufacturers
  - 7.3.1.MLT Power
  - 7.3.2.Microcare
- 7.4.Aluminium frames are manufactured locally for solar modules
- 7.5.2 Remaining solar PV assembly plants/factories continue trading
  - 7.5.1.Art Solar in KZN
  - 7.5.2.Helios in the Eastern Cape

Local Content - We need to be practical when it comes to local content. It will be futile to push for local content with no ecosystem supporting that.
The IRP should take economic development into consideration as well as job creation. The renewable sector has the capacity to create jobs under the right conditions. Where the IRP is transparent and reflective of ongoing development both locally and internationally, it can provide the framework for ensuring sustainable economic development.
Currently the IRP does not make provision for small-scale solar PV systems which is needed in order to support a growing market. Specifying continued growth in the IRP would ensure that utilities can plan accordingly and the foreseeable growth of small scale PV in the energy mix would make the technology visible and allow for further policies to be developed in order for municipalities to cope with the demand and raise awareness of the anticipated growth in demand. Municipalities are also faced with a decline in income as a result of the rate at which solar PV is currently being installed. Making it visible in the IRP would force municipalities to deal with the

reality of growing demand and motivate innovative ways to deal with a declining municipal income through electricity sales.

Planning and continued growth

In the period between 2022 – 2025 the approach to connect utility projects do not support the growth and sustainability of the industry. The market expects continuity and not the start/stop approach. International investment needs to see consistency and sustainable growth projections in order to support the market.

As an alternative suugestion to the existing REIPPP poll-out, what about reducing the PV allocation 2025-2030 from 1000MW/year to 800MW/year to enable connection 2-3years earlier. This we believe will maintain momentum in the market.
It is not clear where private utility PPAs have been accommodated into the IRP?
The IRP is a very important "living plan" that should be updated periodically so that industry keeps track. Unfortunately this was never done and hopefully going forward it will be updated regularly. It is important to have a live IRP with annual updates.