



National and international MRV requirements for local mitigation action: The case of South Africa's renewable energy procurement programme

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Key points

- A wealth of energy, environmental and socio-economic data is expected to be collected under the REIPPPP. There is an opportunity for interaction between the data and institutions involved in the REIPPPP, national M&E & UNFCCC, however it is not currently evident
- Reporting on CO₂ emissions is not an explicit requirement of the REIPPPP programme, however could be deduced from the metered energy data currently being captured
- The non-GHG information currently being collected could be of value for the DEA's national and international climate reporting, yet is likely to be too detailed for their needs
- There are differences in methodologies for data collection & reporting across environmental, socio-economic and energy indicators
- Verification processes are unlikely to be homogenous across the REIPPPP programme. Guidelines are unspecified in some areas, which could be due to the quantity and variety of information along with the immaturity of the system
- Energy & environmental reporting appears clearer, however concerns exist around the MRV of socio-economic elements.

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List of acronyms used

CSP	Concentrated solar power
DEA	Department of Environmental Affairs
DoE	Department of Energy
DWAF	Department of Water Affairs and Forestry
ED	Economic development
EEDSM	National Energy Efficiency and Demand Side Management Programme
EIA	Environmental Impact Assessment
IPP	Independent power producer
IRP	Integrated Resource Plan
M&E	National Climate Change Response Monitoring and Evaluation System
MRV	Monitoring, reporting and verification
NAMA	Nationally appropriate mitigation action
NCCRWP	National Climate Change Response White Paper
NEMA	National Environmental Management Act 107 of 1998, revised in 2004
NERSA	National Energy Regulator of South Africa
PPA	Power purchase agreement
REFIT	Renewable Energy Feed-In Tariff Programme
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for proposals
SO	System operator
UNFCCC	United Nations Framework Convention on Climate Change

Abstract

The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is currently leading the way in cleaning up South Africa's energy mix as well as contributing towards national climate mitigation efforts. Energy security concerns, climate objectives and a strong focus on fostering socio-economic development are key drivers behind the REIPPPP. The programme is subject to various reporting requirements including environmental and socio-economic development indicators.

This paper examines the current monitoring and reporting requirements of the REIPPPP in South Africa and considers how it might interact with national and international climate monitoring, reporting and verification. The purpose is twofold: firstly, to describe the monitoring and reporting related indicators of South Africa's REIPPPP; and secondly, to consider how these might interact with MRV requirements emerging from the national and international climate change systems under the United Nations Framework Convention on Climate Change. The paper does not discuss financial reporting requirements, although it does acknowledge the importance of these.

The research demonstrates that the REIPPPP programme stipulates reporting on a series of energy generation, socio-economic development, environmental and financial indicators, which require data and information flows between various actors, particularly project developers and government. The Department of Energy plays a prominent role in stipulating these requirements along with the Department of Environmental Affairs (DoE), as well as other national and local government departments, financial lenders and, in some cases, corporate global headquarters. Methodologies for reporting on the different indicators vary, and in some cases are still being defined, particularly for the economic development requirements of the programme. Reporting on greenhouse gas emissions is not explicitly required by the DoE; however electricity generation data is available through live data feeds, from which emissions could be deduced. Environmental reporting processes are well established. In order for a project to be bid-compliant it needs to obtain environmental authorisation, and must adhere to the environmental impact assessment throughout the life of the project as stipulated by the National Environment Management Act. At this stage in the programme, details on how the information will be verified are less clear, although it seems mainly to be done through sampling and sporadic audits.

Project developers are gathering significant amounts of data for the DoE that could be relevant for both GHG and non-GHG aspects of the national monitoring and evaluation (M&E) system and international MRV. A formal process for this interaction is not clearly apparent however it is expected that it is centred around electricity generation data, and that the national M&E system and database will address the issue of integration to some extent.

1. Introduction

Whilst the climate community continues to develop suitable systems and indicators for the monitoring, reporting and verification (MRV) of climate mitigation efforts, there are MRV-related activities of existing policies and programmes already underway, from which insights can be gleaned. The South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is a case in point. The REIPPPP is a competitive bidding scheme aimed at increasing the share of renewable energy in South Africa's electricity grid, and increasing the participation of independent power producers (IPPs) and private financiers (Eberhard et al., 2014). Although the REIPPPP is recognised as a key mitigation effort within national climate policy, the mitigation potential was not the primary driver behind the conception and implementation of the programme.

The contexts and purposes of international climate MRV – to the United Nations Framework Convention on Climate Change (UNFCCC) – and the reporting requirements for projects under the REIPPPP are different. The former attempts to define an approach for demonstrating to the international climate community tonnes of CO₂eq emissions reduced, and co-benefits, while the latter is a renewable energy initiative motivated by energy security and economic development issues.

Like many countries, South Africa is currently in the process of developing a national climate MRV system. In the case of South Africa, the domestic interpretation of MRV requirements will be guided by the National Climate Change Response Monitoring and Evaluation (M&E) System, as stipulated in the National Climate Change Response Strategy (NCCRS) (DoE, 2011). At the time of writing, the National M&E System continues to be developed by the Department of Environmental Affairs (DEA), the ministry responsible for reporting on national mitigation action at the international climate negotiations. Meanwhile although the NCCRS includes a Renewable Energy Flagship Programme (DEA, 2011) the link with the REIPPPP is unclear. Furthermore, the REIPPPP is coordinated by a separate ministry, the Department of Energy (DoE). Thus, reporting requirements are currently determined and administered by the DoE, and not the DEA. Nevertheless, it is likely that these include information relevant to both departments, and that the DEA could utilise existing REIPPPP reporting data and processes, to feed into its national and international MRV requirements.

Note that, although the term 'MRV' is not explicitly used within the REIPPPP, the programme does have reporting requirements in place that are in essence aligned with the concept of MRV. Hence this paper's aim is to outline the MRV related requirements of the REIPPPP. Secondly, the paper reflects on the National M&E System that is currently under development, and how this might interact with the information captured in the reporting of the REIPPPP. Lastly, the paper considers the interaction with international reporting processes.

1.1 Research approach

The starting point for this research was to interrogate an existing mitigation action in the energy sector – the REIPPPP programme – and gain a deeper understanding of the various reporting requirements that are already imposed on project developers and institutions involved in the programme. Once the current monitoring and reporting requirements of the REIPPPP have been established we consider how this might interact with national and international climate MRV requirements.

A review of REIPPPP project documentation, as well as other research reports was undertaken in order to reflect the information that is publicly available. The REIPPPP entered the fourth bidding window in August 2014, such that projects currently exist in the bid phase, construction phase and operation phase. Two site visits were conducted: one to a concentrated solar power (CSP) plant, currently under construction; the other, a wind farm currently in operation. This allowed the research to identify differences for reporting dependent on the technology type and the phase of the project. REIPPPP documentation suggests that reporting requirements vary throughout the lifespan of a project, and therefore the opportunity to compare differences between construction and operation phases was valuable.

In addition to the site visits a further thirteen interviews were held with academics, developers, industry associations, civil society, and others. The purpose behind consulting this broad range of views was to adequately capture the information generated by the REIPPPP, as reporting of the programme contains information that is of interest to an extensive network of stakeholders.

A review of the latest developments in national and international MRV requirements was also undertaken to provide context within which this piece of research falls.

2. Background of M&V, M&E and MRV in South Africa

As there is significant variation in monitoring and reporting, it is useful to provide some background to the South African case, including: context for national and international climate monitoring and reporting in South Africa, local examples such as the REIPPPP (one of South Africa's flagship renewable energy actions), and South Africa's experience in measurement and verification (M&V) in the energy sector.

To avoid confusion in terminology, the working assumptions are as follows: M&V refers to measurement and verification of South Africa's demand-side electricity management; M&E is the monitoring and evaluation system being proposed by the Department of Environmental Affairs as part of the National Climate Change Response Strategy; and MRV relates to monitoring, reporting and verification of international climate action in the context of the UNFCCC. The REIPPPP also has reporting requirements, predominantly stipulated by the IPP unit at the Department of Energy.

2.1 National climate M&E System

As part of South Africa's response to climate change, the National Climate Change White Paper stipulates the need for a monitoring and evaluation system (DEA, 2011). The overall objective of the M&E system is to track South Africa's efforts towards becoming a lower-carbon, climate-resilient country (Letete, 2013), by measuring and tracking the costs, impacts and outcomes of mitigation and adaptation responses. In order to achieve this, cooperative government mechanisms are integral, with DEA playing a coordinating role.

The M&E system will utilise the outcomes-based system developed by the Presidency to evaluate the progress of the country's climate change actions. Whilst this system will be based on domestic processes, it will be designed to align and evolve with international MRV requirements (DEA, 2011). Although the system is still in draft stage, it is expected that from a monitoring perspective it will collect the relevant existing information of mitigation and adaptation actions in the country, through standardised reporting guidelines, and based on the information developed in a National Climate Change Response Database. The evaluation component will endeavour to analyse the impact of response with regards to adaptation and mitigation measures, and climate finance. Establishing indicators is an option the system may investigate to assess impact against (Letete, 2013).

Ultimately the intention of the M&E system is for the captured and analysed information to feed into the domestic annual climate change monitoring process, and to fulfil reporting obligations such as those under the UNFCCC (Letete, 2013). Although the exact form of the system is not yet certain, it is known that both GHG and non-GHG impacts will be captured by it. In order to achieve this ambitious objective it would be valuable for the M&E system to utilise existing monitoring and reporting systems present in South Africa. As demonstrated in this paper, the REIPPPP generates a significant body of data for both the GHG and non-GHG impacts of the programme. It is anticipated that the M&E system could benefit from utilising this information source.

2.2 International MRV

Internationally, the concept of MRV emerged in the Bali Action Plan of 2007 (Decision 1 CP/13; UNFCCC, 2007) as a key element for future climate negotiations under the UNFCCC.

Under the UNFCCC, MRV is broadly defined: it includes measures to collect and report data on emissions, mitigation action and support thereof, and to present this data for international review.

The reporting requirements differ for developed and developing countries. Parties to the UNFCCC have all agreed to the submission of reports and information on the state of their GHG emissions and the mitigation actions being implemented. The frequency of these reports varies, with Annex 1 countries to the Convention expected to submit annual National GHG Inventory Reports, in addition to National Communications – periodical reports, as per Convention guidelines, on the nations’ implementation of the convention (UNFCCC, 2014b). Under UNFCCC guidelines, Annex 1 Parties are also expected to electronically submit data tables of a standardised, ‘common reporting format’. In 2006, the IPCC produced guidelines for producing these national inventories, including guidance on principles and methodologies for quantifying emission changes. De Vit et al (2013) cite these amongst other methodologies and approaches that allow the quantification of GHG effects of actions.

The requirements and frequency of GHG reporting for developing countries is much less onerous. The Cancun Agreement (1/CP.16; UNFCCC, 2010), states that developing countries are expected to submit their National Communications (inclusive of GHG inventories) every four years. Biennial Update Reports (BURs) submitted by these nations should also include ‘updates of national greenhouse gas inventories, including a national inventory report’, albeit within the confines of ‘their capabilities and the level of support provided for reporting’ (Section 60(a) of 1/CP16; UNFCCC, 2010).

Within the scope of existing international MRV standards and practices, assessments of mitigation actions can be defined along three distinct mitigation categories: GHG effects, non-GHG effects and climate finance. Monitoring of climate finance is not considered in this paper beyond what has been described previously. This paper simply notes that MRV for climate finance is a requirement for informing developing countries BURs

Although broadly defined, the MRV concept is central to promoting transparency of nationally appropriate mitigation actions. The parties to the UNFCCC called for ‘Enhanced national/international action on mitigation of climate change’ including ‘Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner’ (paragraph 1bii).

The emphasis on MRV associated with Nationally Appropriate Mitigation Actions (NAMAs) has contributed to the improvement in MRV systems in developing countries through platforms such as the International Partnership on Mitigation and MRV. Importantly, the concept and definition of NAMAs, and associated MRV activities and requirements, emerged out of domestic mitigation actions implemented by developing countries (Teng et al., 2009; Rennkamp, 2012). As such, the concept of MRV can be extended across all domestic mitigation actions, providing useful information for governments to evaluate and benchmark their efforts.

Although South Africa has not formally submitted any NAMAs to the UNFCCC, it has made two unsuccessful NAMA submissions to the German-UK NAMA Facility. The DEA is currently compiling its National GHG Inventory, which forms part of its BUR due in December 2014; this was determined at COP 17 in 2011. In June 2014 a draft was published for public comment (DEA, 2014). The National Climate Change Response White Paper outlines the actions with mitigation implications in each sector (DEA, 2011). The national M&E system, will be important for capturing GHG-related information.

Therefore, it could be argued that the South African government’s approach to MRV has been conceptualised, at both domestic and international levels, from a climate perspective. This is reflected in the interface that the M&E system is expected to provide. However, while the DEA begins to consider the implementation of MRV processes through this system, there are already existing formal M&V practices occurring within the energy sector, as demonstrated through the national energy efficiency and demand side management (EEDSM) programme. Similarly, reporting practices are being implemented within the REIPPPP. It is important for government

as a whole to be cognisant of these experiences and developments, as it coordinates an MRV system for climate change response.

2.3 Previous M&V reporting in South Africa's energy sector

There is extensive M&V experience through other initiatives in the energy sector, particularly the EEDSM programme. This was part of a national drive towards promoting energy efficiency and demand management and was initiated by Eskom in 2004. It forms part of Eskom's larger Integrated Demand Management initiative, which aims to promote energy security in the wake of inadequate electricity supply. It also aligns with the Energy Efficiency and Energy Demand Management Flagship Programme in the NCCRS

EEDSM includes various activities that energy users perform to reduce or shift the loads they draw from Eskom, by agreement, and with incentive from the utility. Part of Eskom's DSM programme has also included incentives and rebates for consumers to install solar water heaters, heat pumps and energy-efficient lighting. M&V plays a crucial role in the implementation of this project, as Eskom states that success is dependent upon 'the fact that impacts can be determined to a degree of accuracy, trust and cost that is acceptable to all stakeholders' (Eskom, 2010).

The Department of Trade and Industry (DTI) with the National Treasury have introduced two regulations, via Sections 12i and 12L of the Income Tax Act, that provide incentives for private consumers and companies (respectively) to implement energy-saving measures in their operations. Consumers seeking to qualify for benefits provided under these incentives are expected to obtain certification from the South African National Energy Development Institute (SANEDI), a process which requires independent M&V to ensure that conditions set out in the legislation have been met (DoE, 2013b).

While M&V of the EEDSM programme demonstrates electricity *saved*, the experience and knowledge of this system could be applicable to IPPs reporting on renewable electricity generated. Neither the REIPPPP nor the EEDSM were conceived of as mitigation actions, yet both have mitigation benefits, due to their offsetting of coal-based electricity consumption. Results from both programmes also serve to inform the progress being made towards achieving national targets and objectives. Both initiatives stemmed out of DoE's drive towards energy security, rather than in the context of domestic climate change mitigation actions.

2.4 Background to and origins of the REIPPPP

Given the electricity supply side shortage leading to rolling black outs in 2008, the financial crisis of Eskom, and the need to make contributions towards South Africa's Copenhagen pledge, the REIPPPP was proposed to expand renewable energy supply through the involvement of IPPs and private financiers (Eberhard et al., 2014). In August 2011, the Minister of Energy determined that 3 725 megawatts (MW) of renewable generation capacity would be supplied by IPPs. This determination was made in accordance with the Electricity Regulations on New Generation Capacity (DoE, 2011a). These authorise the minister, following the development of the Integrated Resource Plan (IRP) 2011, to determine the quantity of capacity to be built, the type of technology to be utilised and the actor (parastatal or IPP responsible for generating this new electricity supply (DoE, 2011a).

The REIPPPP was initiated by DoE and the National Treasury as a means of procuring renewable energy capacity in accordance with targets set in the promulgated IRP, released earlier that year. Key policy drivers leading to this programme stem from the Energy Policy White Paper of 1998, which called for the introduction of IPPs to create competition in the electricity sector, and the Renewable Energy White Paper of 2003, emphasising government's policy of energy security through diversifying supply. This has been exacerbated by the supply shortage experienced since 2008. The RE White Paper set an explicit target of 10 000 gigawatt hours (GWh) annual renewable generation by 2013 (DME, 2004). However, little progress towards meeting this target had been made before 2011, when the IRP was released.

In 2009 the National Energy Regulator of South Africa (NERSA) attempted to implement a renewable energy feed-in-tariff (REFIT) policy. In March of that year NERSA released

regulatory guidelines that indicated tariffs for specific generation technologies (e.g. R1.25/kWh for wind; R0.90/kWh for small hydro, etc) (NERSA, 2009). However, there was much uncertainty surrounding the institutional framework, the nature of procurement and the legality of the process that had not been sufficiently addressed: ‘the Department of Energy and National Treasury commissioned a legal opinion that concluded that feed-in tariffs amounted to non-competitive procurement’, contradicting government regulations and the Constitution (Eberhard et al., 2014). The release of a consultation review paper in March 2011 (NERSA, 2011), with revised (and reduced) tariffs, did not quell this uncertainty. The REFIT ultimately stalled, and thus DoE and National Treasury took it upon themselves to implement government’s renewable energy policy, by means of a competitive bidding scheme, the REIPPPP (Eberhard et al., 2014).

Since the launch of the programme in 2011, there have been four rounds of IPP procurement bidding. Prospective bids are evaluated on a weighted scoring system that accounts 70% to the proposed tariff and 30% to meeting economic development criteria (Eberhard et al., 2014). The Minister made a further determination for an additional 3 200 MW available for procurement in 2012 (DoE, 2012). Preferred bidders for the third round were announced in November 2013, at which point 3 916 MW of renewable capacity had been allocated (DoE, 2013a).

Error! Reference source not found., as developed by Pickering (2013), presents a visual framework of the institutions currently involved in the implementation and coordination of the REIPPPP. Each of these institutions plays different roles within the REIPPPP from regulatory, to operational, financial and others. Therefore interest in the types of information and outcomes from the REIPPPP differ significantly between actors.

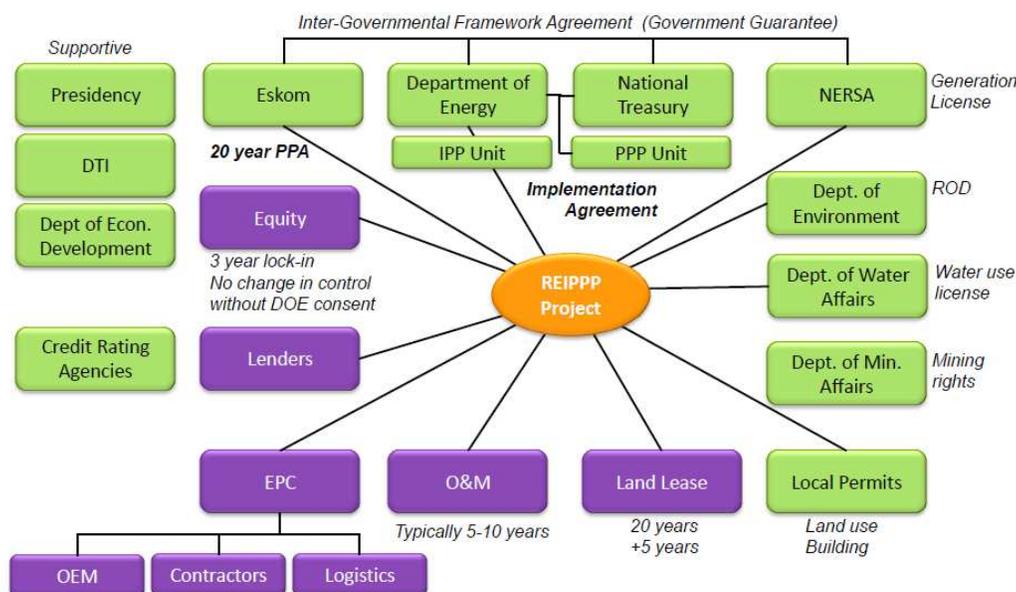


Figure 1: Institutional framework surrounding the REIPPPP
(Pickering, 2013)

The DoE, with the Public-Private Partnership (PPP) Unit of Treasury, formed the IPP Unit, a branch within the department specifically mandated to coordinate and facilitate the project. Thus, prospective bids could be evaluated through the PPP’s established project appraisal framework according to the DoE’s stipulated financial and economic criteria (Eberhard et al., 2014).

The IPP Unit launched the programme in August 2011 when it issued Request for Proposals (RFPs), which contain all the general requirements for bidders, as well as qualification and evaluation criteria against which projects would be selected. This included environmental impact assessment (EIA) requirements, stipulated in terms of National Environmental Management Act 2004, as well as other information pertaining to land, technical, economic development and financial qualifications. The DoE used this information to award ‘preferred

bidder' status to the projects they chose for further development and eventual commission (Eberhard et al., 2014).

Preferred bidders were obligated to sign three documents: a power purchase agreement (PPA) with the Single Buyer Office of Eskom (South Africa's state-owned electricity utility), an implementation agreement (IA) with DoE and the IPP Unit, and a direct agreement, giving lenders step-in rights in the event that the IPP defaulted on its payments (Eberhard et al., 2014). The PPA ensured that Eskom would buy the generated electricity onto its national transmission network at the contracted, inflation indexed tariff, for the 20-year economic life of the plant. The IA provided a guarantee from government on the PPA in the event that Eskom defaults on its payments. Plant owners also have to obtain a generating licence from NERSA, prior to commencing operations, as stipulated in the Electricity Regulation Act of 2006 (DME, 2006).

3. Current indicators reported on within the REIPPPP

The REIPPPP engages with a diverse range of actors who are interested in different information and involved in generating data related to their specific activities in the programme. Given this context, capturing all the relevant information is a challenging process, and requires a robust reporting system.

3.1 Summary of Indicators used in the REIPPPP

Table 1 provides a summary of the type of information that is reported under the REIPPPP, the documentation that stipulates the inclusion of this information, the institution being reported to, and how reporting is happening. The table aims to provide an overview of the reporting system of the REIPPPP through demonstrating information captured, information flows and main actors involved. The focus is on electricity generated, economic development and environmental indicators. Whilst it is acknowledged that the financial reporting for each project is extensive, this paper does not cover financial reporting in the scope of the research.

IPPs report according to several indicators, varying from electricity production units to economic development (ED) criteria, and environmental consent criteria that are required as part of qualification criteria in the bid phase (dependent on the technology). This information is reported to different authorities within the overall REIPPPP institutional framework (shown in **Error! Reference source not found.**). Electricity generation data is a requirement for the IPP Unit, to ensure compliance with the DoE's allocation and Implementation Agreement. Eskom receives a 'live feed' of information on the megawatt hours (MWh) being produced and fed into the national grid from each project. This is necessary for its role as system operator (SO) to maintain constant balance between supply and demand and a frequency of transmission within an acceptable range. Although the reporting requirements are consistent across projects, there are site-specific reporting requirements. For example, for projects that require a water supply as part of the running requirements of the plant, such as CSP plants, a water use licence needs to be secured, and water use reported on as stipulated by the National Water Act (RFP – Part B – Qualification Criteria).

The main channel for reporting energy production and ED criteria fulfilment is to the DoE, through the IPP Unit. Concerted efforts have been made through collaborations to ensure that the ED requirements can be reported on. Additionally, it appears that project developers are employing economic development officers within their organisations to undertake the reporting responsibilities – highlighting the recognition that this is a priority area.

Engagement with other government departments is based on other criteria such as the environmental consent criteria, and the need to apply for specific licences. The extensive reporting requirements of the REIPPPP present a challenge for designing and implementing a robust verification system, and at this point it is not clear how this will be operationalised.

The research revealed, that renewable energy installation projects are essentially large infrastructure projects,¹ and are subject to the same reporting requirements of any construction project or ‘listed activity’ under national law – such as environmental legislation, the NEMA, water and other relevant legislation. The project design of the REIPPPP does reflect additional reporting requirements that are unique to the programme – particularly energy reporting and economic development indicators. Reporting requirements for the REIPPPP are contained and stipulated in various project documents.

¹ Correspondence No. 1 & 2.

Table 1: Summary of key energy, environmental and social indicators reported as part of the REIPPPP

	<i>Indicator</i>	<i>Stage</i>	<i>Stipulated by:</i>	<i>Report to:</i>	<i>Who and how reported?</i>	<i>Frequency</i>	<i>Reference</i>
Energy	MW installed	Commencement	RFP PPA Appendix K Notice of Commencement of Facility	Eskom	Form of Notice of Completion, indicating 'Achieved Capacity' sent from Developer to Eskom, prior to commercial operation	Submitted once at completion of construction, and fulfillment of agreements.	(DoE, 2011); Correspondent No. 5
		Commencement		DoE, IPP Unit	The DoE receive a copy of the same Notice of Completion issued to Eskom		
	MWh	Operation	RFP PPA Appendix K Clause 12 on Metering	Eskom: System Operator & Singly Buyer Office	IPP meters measure MWh output at point of delivery. Eskom has remote access to IPP meters, as well as Eskom meters for verification.	Real time data to National Control Room; Historical metered data to Single Buyer Office	
		Operation	RFP Implementation Agreement (Appendix M) Clause	DoE, IPP Unit & National Treasury	Energy output data from metering that is sent to Eskom must also be delivered to the DoE, Treasury	The same frequency with which project data is reported to Eskom, but not through live metering	
		Operation	RFP or Licensing Agreement(?)	NERSA?	Site data to developer, to NERSA	Monthly	
MWh forecast	Operation	RFP PPA Appendix K Schedule 4 Forecasting Information	System Operator National Control Room	Week ahead and day ahead generation forecasts, including expected MWh and available MW, from IPP	Weekly and Daily	(DoE, 2011)	
Environmental	Basic assessment	Planning		DEA	Brief one year assessment in planning phase	Required for bid submission.	
	EIA and specialist assessments	Planning	Triggers activated in basic assessment, necessitate a full EIA process (3-4 years). Specialist reports generated in conjunction with the EIA process	DEA	DoE IPP Unit needs to grant environmental authorisation in order for project to progress. EIA process goes through a public participation process in 3 stages: prior, during, final consultation		

	<i>Indicator</i>	<i>Stage</i>	<i>Stipulated by:</i>	<i>Report to:</i>	<i>Who and how reported?</i>	<i>Frequency</i>	<i>Reference</i>
	Environmental authorisation (waste, flora, fauna, water, biodiversity)	Construction	Requirement under NEMA 2005 legislation and 2010 Regulations (for Environmental Authorisation from DEA)	DEA	On site Environmental Control Officer gathers data daily and completes EIA's that are sent to DEA	Environmental authorisation required for bid compliance. Compliance with EIA needs to be able to be proved throughout project lifespan.	NEMA of 1998 with subsequent amendments
		Operation	Requirement under NEMA 2004 Legislation	DEA	Continue submitting Environmental monitoring reports?		RFP – Part B – qualification criteria
	Environmental Management Plan	Planning – decommissioning	Requirement under the NEMA	DEA	Living document throughout the life of a project. Environmental compliance report submitted as part of this requirement, and an incidence register kept to track any incidences of non-compliance.	Monthly	
	Licensing requirements e.g. water use, waste management, atmospheric emissions	Construction	RFP – Part B – qualification criteria	Relevant government departments	Water use allocation and other inputs for construction process. Licensed water service provider needs to be identified to supply water for construction phase	Regular reporting not required.	RFP – Part B – qualification criteria
		Operation	NEMA and other acts. Example: DWS requires a water use license should a specific project require water for the ongoing operation of the project	Relevant government departments	Regular reporting not required, but need to be capable of proving at any time that the project is compliant with legislation of the relevant government departments. All projects need to be in line with NEMA regulations, as other regulation and Acts		
Economic development	Job creation	Construction/operation	RFP (Volume 5) Appendix JB9 ED Scorecard in ED Plan and Appendix M – IPP Implementation Agreement.	IPP Unit	IPP completes a spreadsheet template quarterly, indicating jobs (in people-months) for RSA-based, citizen, black, female, youth, disabled, and local communities employees, against IA target	ED Plan updated annually; economic development reporting completed quarterly in Annexure A and B templates to DoE	IPP Office Letter to Project Company and Annexure A of Implementation Agreement
	Local content	Construction/operation			Quarterly spreadsheet template, indicating value of local content (in rand) for that quarter, against IA target		

	<i>Indicator</i>	<i>Stage</i>	<i>Stipulated by:</i>	<i>Report to:</i>	<i>Who and how reported?</i>	<i>Frequency</i>	<i>Reference</i>
	Black ownership	Construction/operation			Quarterly spreadsheet template, indicating proportion of black IPP shareholders, EPC and O&M contractors, against IA target.		
	Community ownership	Operation			Quarterly spreadsheet template, indicating proportion of local community IPP shareholders, against IA target.		
	Management control	Operation			Quarterly spreadsheet template, indicating total top management, and total black people (male and female reported individually) in top management (in person-months), against IA target threshold.		
	Preferential procurement	Construction			Quarterly spreadsheet template, indicating portion of procurement spend in quarter, and value of BBEEE, QSE and EME procurement (in rand).		
	Enterprise development	Operation			(Where applicable) IPP completes spreadsheet indicating value of enterprise development benefaction; completes 'Annexure B' template, information on beneficiary.		
	Socio-economic development	Operation			Quarterly IPP reporting on adjusted and unadjusted, disaggregated socio-economic development contribution (in rand), in terms of local community, provincial and national contributions.		
Site specifics	Lenders' requirements	Financial lenders will also stipulate certain indicators that have to be reported on. In some cases it will be linked to compliance with national requirements. Details on/disclosure of these indicators tend to be confidential					
	Unique elements within EIA	Site specific elements will be outlined in the initial EIA, and the relevant monitoring systems will have to be established. For example particular wildlife, water supply etc					
	Internal/global reporting	Project developers or members of the EPC may have additional reporting requirements stipulated by their global head office (e.g. Abengoa's carbon accounting) or internal company-wide objectives					
	Local government specifics	Depending on the location of the site, there may be additional involvement from the local council – for example local DEA requirements, water restrictions etc.					

3.2 Energy and GHG emissions reporting

The total capacity of the project site is indicated and agreed upon between the IPP and Eskom through the Form of Notice of Completion, prior to the plant commencing operation (DoE, 2011). Given the electricity supply shortages experienced in South Africa, the additional electricity capacity provided by the REIPPPP sites is a key piece of information that needs to be captured. Reporting on the electricity generated is essential for ensuring a stable supply to the national grid. In addition, payments are made to the IPP from Eskom, through the utility's Single Buyer Office, based on the MWh 'bought' onto the grid. Furthermore, the System Operator (SO, another branch of Eskom) National Control Room requires the energy data to maintain appropriate levels of forecasting. The Request for Proposals (RFP) documentation, as well as PPAs, stipulate the levels of forecasting that must take place (which varies for technology) as well as a live feed of electricity generated². There are two meters installed on each project site to facilitate these processes. The first is installed and monitored by the IPP, which Eskom can access remotely. This meter provides 'real-time' data of electricity sent out to the SO's control room. This allows the SO to monitor and control the balance between national supply and demand, which is essential for ensuring the national transmission frequency remains within its allowable margins. This is especially pertinent given the intermittence from renewable generation.²

Data from the IPP's meter is also used to provide historical, monthly information on the generation output of the facility. The IPP collects daily sent out data and delivers this to Eskom's Single Buyer's Office. Meanwhile, the second onsite meter, installed by Eskom, also captures monthly generation data. This is used to verify data delivered by the IPP, from which a monthly invoice is agreed upon and paid to the IPP, in terms of the PPA.²

Eskom uses this data internally, for reporting to its SO, along with the IPP forecasting information. The latter data requirements are specific to the technology used at each site, as outlined in the individual PPAs. This all contributes to enabling the SO to perform its role of advance energy planning. Eskom also provides IPP historical data to the DoE and the National Treasury, as part of a Government Support Framework Agreement between government and the state-owned utility². The DoE, meanwhile, received monthly energy data directly from the IPP as well, through its IPP Unit, in terms of the Implementation Agreement (DoE, 2011).

Eskom's meter on the project sites provides a form of standard verification of the clean energy provided by the IPPs to the national grid. The purpose of this verification is for Eskom's internal financial arrangements, and does not form part of their greater M&V programme, as per its EEDSM initiative, for example².

Through this research, examination of publicly available RFP documents as well as the PPA and IA documents have shown few guidelines or explicit, standard or recommended practices in terms of verification of information from IPPs. This applies not only in terms of the energy produced, but extends to reporting of environmental and economic development indicators, as discussed below. From the information gathered from the correspondents (see Appendix), it appears that verification processes are occurring at the project sites, but with each developer adopting a unique, condition-specific approach, rather than following an established practice.

The reporting requirements of the REIPPPP do not include reporting on CO₂ emissions, as the primary driver of the REIPPPP has been energy security, rather than climate change mitigation. For the purposes of the national M&E system and international reporting, the DEA would be interested in the emissions implications of the REIPPPP. For these purposes it could refer to the DoE and Eskom for the information on MWhs generated, and with that information be able to estimate avoided emissions from replacing coal fired electricity with renewable energy capacity (although it should be noted that the selecting emissions factors can be a contested process). It is clear that, through the live feed, the energy generation data that could inform the DEA's climate reporting is being captured.

² Correspondence No. 5.

3.3 Environmental reporting

It has been discussed that the REIPPPP projects are essentially large-scale infrastructure projects and therefore are subject to national and local environmental reporting requirements and licensing. This means meeting standards as set out by the NEMA and other Acts relevant to other ministries; as well as that which the RFP documentation stipulates, such as the environmental consent criteria, including: environmental authorisation, proof of permission for water allocation (during construction), integrated water use licence, waste management licence, and atmospheric emissions licence (RFP – Part B – Qualification Criteria). It would appear that environmental reporting requirements are largely based on responding to the above.

Some environmental indicators can be site-specific or technology-specific. For example, demonstrating water allocation in geographical areas that are water scarce will be a strong requirement for meeting environmental compliance. For biogas projects a waste management licence will be more significant, whereas for water-cooled CSP plants demonstrating water allocation will be more critical.³

From a project level, engagement with DEA occurs in the context of environmental reporting in response to environmental authorisation. The DEA is the central ministry for environmental reporting. In addition the relevant line ministries are involved in reporting that is directly related to them (i.e. Department of Water and Sanitation for water licensing). The EIA process is well established, and is not unique to the REIPPPP programme, and is accompanied by specialist reports. An environmental management plan, is also required and is a living document which is updated as a project progresses from planning right through to decommissioning. During construction and operation monitoring and reporting is done by dedicated environmental control officers to ensure the project remains compliant with the EIA. During the construction phase these officers submit monthly environmental reports to the DEA, including information on activities taking place, issues of non-conformity, and rehabilitation plans or activities. The reporting requirements during operation are less onerous, as this stage generally has less environmental implication; that said, an incidence register is kept to capture any incidences of non-conformity and how these are addressed. Non-compliance issues that are not addressed within 15 days pose the risk of a removal of the project PPA. Although not regular, independent auditors are able to assess a project at any stage, and the evidence to verify environmental compliance must be made available.⁴

3.4 Economic development requirements and reporting

From the perspective of international MRV requirements, the information reported under the REIPPPP that is relevant is the actual production of electricity (GHG) and the co-benefits (non-GHG) in terms of economic development requirements. Table 2 presents these ED requirements for projects, including the minimum thresholds and ideal targets, as applied in the first round of bidding. According to Dane (2012), when designing a framework for domestic MRV, such as the DEA's M&E system, it should capture both the GHG and non-GHG impacts, as well as differentiate between the purposes of MRV, being for planning and prioritisation purposes, or for assessing the impact of the mitigation action.

The criteria in Table 2 marked in bold indicate the criteria that need to directly impact the immediate local community of the project. The project documentation includes an ED scorecard and an ED plan, which identifies needs of the surrounding communities and a strategy for addressing the needs with the committed ED amounts indicated in the scorecard; an implementation agreement, and a reporting plan which contains information about the ED obligations of the project, according to each quarter over the 20 year lifespan for the project (Eberhard et al., 2014). An updated ED plan needs to be submitted on a yearly basis, to reflect changes in the project, as well as the ED targets a project sets for the coming year.

³ Correspondence No. 1 & 2.

⁴ Correspondence No. 1 & 2.

The DoE has stipulated that ED obligations be represented in quantitative indicators, to aid monitoring and evaluation. It should be noted that determining the ED implications may not necessarily be best represented in quantitative measures. During the operation phase of a project, developers are required to submit quarterly ED reports to the IPP Unit, which contain information on the indicators that developers report against to demonstrate the ED contribution of the project. The DoE is able to make use of ‘economic development independent monitors’ to assess whether projects are fulfilling the ED commitments as stipulated in the ED plans (Eberhard et al., 2014). Should a project not meet thresholds of given ED criteria they run the risk of termination of the PPA. Should a project accumulate six termination points within the period of twelve consecutive contract months, the DoE has the right to terminate the PPA (RFP, Appendix M – Implementation Agreement). Although the information that needs to be reported is stipulated, there is little guidance on the format of reporting, or how to represent the information⁵ (Tait et al., 2013). For instance, the percentage range of revenue that should be allocated for socio-economic development is outlined, but no guidance is given as to how this should be spent, or what it should be spent on. This results in significant variation in the format of reporting of the different projects, with no feedback provided by the DoE on the preferred format. Information is also lacking on the most beneficial arrangements for structuring the ED component of projects, for the purposes of securing preferred bidder status (Tait et al., 2013)⁶.

This apparent lack of clarity can also result in developers tending to adopt a minimum compliance approach, instead of the most ambitious approach for achieving the ED objectives of their projects (Tait et al., 2013). Furthermore the requirements are defined at the bid stage, with little guidance provided after this. Indeed, not all economic development data is reported. From the project level, ED officers state that reporting is governed by the need to meet compliance. This can result in the situation where the full impact is not reported on and, whilst it may still meet the compliance requirements of the REIPPPP, it would not reflect the full impact of the programme that the international climate community is concerned with.

⁵ Correspondence No. 4.

⁶ Correspondence No. 4.

Table 2: REIPPPP economic development requirements – first bidding round
(Tait et al., 2013)

	ECONOMIC DEVELOPMENT ELEMENTS	MINIMUM THRESHOLD	MAXIMUM TARGET	DESCRIPTION
1	Job creation – SA citizens	Various indicators		Number of jobs held by local citizens.
	Job creation (local area)	12% of RSA employees	20% of RSA employees	
2	Local content	Differs by technology		This refers to the capital costs and costs of services procured for construction minus the finance charges, land and mobilisation fees of the contractor (DoE, 2011b).
3	Ownership (overall black ownership requirement)*	12% of project shareholding	30% of project shareholding	The percentage of company ownership measured through shares and other instruments that provide the holder with economic benefits such as dividends or interest payments (DTI, 2004)
	Ownership (community ownership requirement)	2.5% of project shareholding	5% of project shareholding	
4	Management control	0	40%	The effective control of a company with reference to 'top management' (DoE, 2011b)
5	Preferential procurement	Various indicators		The procurement of goods and services from suppliers that are BBBEE compliant.
6	Enterprise development (ED)	0	0.6% of project revenue	Supporting the development and sustainability of black-owned businesses.
7	Socio-economic development (SED)	1% of project revenue	1.5% of project revenue	Financial contributions to socio-economic development initiatives that promote access to the economy by black people.

Although the lack of clarity does cause challenges, the flexibility within the ED requirements is also perceived to be a positive aspect as it permits compliance, through the emphasis on different criteria depending on what is most appropriate for that specific project. This allows projects to compensate for poor performance according to one criterion by good performance in another.⁷

In terms of alignment with national development objectives, local job creation from the REIPPPP is highly relevant. For the first two rounds of bidding, local jobs were reported as a percentage of the workforce employed by the project. This has the potential to cause a misinterpretation of the impact on local jobs as it gives no indication on the duration and quality of jobs. Thus, from round 3 onwards, local jobs have been reported on in terms of person-months, giving a better representation of the contribution of a local workforce to the project, and the quality of jobs and duration of employment.

In relation to job creation, another important measure is skills development. Although highly politicised, it is not captured in the reporting as it is a difficult element to report against. Although on-the-job training does occur, it does not translate into a formal qualification, and many of the skills are only applicable to a specific project; unless workers are able to relocate

⁷ Correspondence No. 4.

and the developer or EPC contractor has the intention of transferring an existing work force, to another project.⁷

In spite of this difficulty, it is evident that the local skills base required for developing successful projects is improving, such that the dependence on international expertise has reduced through the rounds.⁸ Should this process continue, it has the potential in the long term to enhance the impact made by RE projects in South Africa. As discussed, it is important to establish how the newly-acquired skills can continue to be utilised, and not remain limited to a specific project, and under-utilised when the project enters a different phase or comes to an end.

The local content requirement is also an attempt to make the programme beneficial for local industrial development in the country. This can be represented in a number of different ways, and has evolved through the rounds of the REIPPPP. An example of this is that the fees paid to Eskom were initially included as part of the local content but from round 3 onwards are not included as part of the local content. Local content requirements are becoming more significant as bidding rounds progress, and bidders are required to produce local content plans to demonstrate how local content requirements will be met by their project over time (Eberhard et al., 2014). As discussed by Rennkamp and Westin (2013), determining the full impact of local content requirements, and how beneficial they are for a country, is difficult. The REIPPPP is no exception. Although the local content requirements have evolved with every bidding round, it is not yet clear the impact that these are having, nor how to attribute enhanced impact (if there is any) to the changes in each round.

As the REIPPPP has matured, the reporting requirements have become clearer to the developers, ED officers and others involved in reporting. It is anticipated that the data produced from round 3 onwards will be more robust than in previous rounds. The improved clarity has ensured that the necessary systems are in place systems to capture the required information.⁸ In earlier rounds there were cases where, on completion of the construction phase, construction companies were leaving site before the necessary ED information for the construction phase was captured. Subsequently, systems have been implemented to ensure the necessary ED information is captured whilst construction is in progress.

The changes in reporting requirements that have occurred as the bidding rounds of the REIPPPP have progressed have predominantly been viewed as positive developments. However, changes between the bidding rounds makes for tight timelines in which the developers need to incorporate these changes, which adds pressure to preparing new bids⁸ (Eberhard et al., 2014). Those that are able to best incorporate the changes in the given timelines give their bids a competitive advantage over those that are not able to incorporate the changes as successfully. Reporting requirements are evolving based on the learnings from the different rounds. Ultimately, as the information generated through the reporting process provides an accurate reflection of the impact being made, the value of reporting is best demonstrated.

Due to the comprehensive reporting requirements of the REIPPPP, the volume of documentation that needs to be checked by the DoE is substantial. It seems unfeasible for the DoE to assess every piece of project documentation throughout the lifespan of projects. Therefore the verification of compliance is done through random sampling and is criteria-based.⁸ Collaboration between different projects on a development project to meet ED criteria could improve effectiveness and assist in reducing the administrative load on single projects, but this collaboration cannot take place before bid selection, due to the competitive nature of the bid process. Collaboration after the bid round could cause challenges with the monitoring and evaluation of expenditure, should a number of renewable energy projects collaborate on a development project (Tait et al., 2013). Although collaboration may present opportunities, it is unlikely that it will change reporting requirements, as each project would still need to report separately on the contribution to ED.

⁸ Correspondence No. 4

There are also potentially specific financial reporting requirements, due to the varied and often complex financial arrangements of the PPAs for individual projects. These are not addressed within this research paper – due to confidentiality issues that surround project finances, as well as the fact that a detailed investigation from a finance perspective is not in the scope of the present research. Linked to finance, and also not covered in this paper, is the issue of setting up of community trusts with different projects. There are many ways these can be structured, with varying implications for the communities.⁹

The emphasis on ED requirements of the REIPPPP is a highly contested aspect of the programme. On the one hand it is viewed as a progressive element, including in the programme design what other RE auction schemes have not. That said, it is viewed by some as an aspect that puts developers under significant strain to achieve these objectives and remain competitive (Eberhard et al., 2014). Contrastingly, some local actors have expressed the opinion that the requirements are not sufficient to ensure benefits of the programme reaching the local communities, and it is difficult to assess the actual impact the programme is having on beneficiary communities (Tait et al., 2013). It is a challenge for the programme to, as it evolves, balance these competing interests and at the same time ensure that the information reported is adequately monitored and assessed, and a degree of transparency is maintained.

Having considered the reporting requirements and indicators of the REIPPPP, it is clear that there is a significant amount of data that is being generated and captured. It is useful to understand what information is being captured, and where it is reported to. Data is collected at project level to adhere to reporting requirements stipulated by the RFP (see Table 1), and environmental reporting requirements (see Table 1) through: the EIA and environmental compliance reports, submitted on a monthly basis to the DEA (it should be noted that the departments in the DEA involved in EIAs and climate reporting are different). Information on energy is provided through live feeds on-site to Eskom and the DoE. ED requirements are monitored by ED officers and submitted through quarterly ED reports to the IPP unit at the DoE. The focus on energy and economic development data appears most relevant during operation, whereas environmental reporting is more of a focus during construction. Something that is less clear is whether information is available to those other than the direct recipient, and, if so, how this is being achieved. If not facilitated through setting up the necessary processes, there is a danger that the wealth of information being generated and captured is limited to the use of the recipients, and not utilised by a wider group for which it would be valuable. For instance, is the DEA able to draw upon the information from the REIPPPP for its climate reporting? This is an important question, as it determines whether the data can be utilised for multiple purposes, and in so doing maximise the usefulness of the data that exists.

Whilst the data is important from a programme perspective, much of it is also relevant for the national and international context. At this stage it doesn't appear that a formal agreement for data flows and exchanges are in place.

Therefore it is worth considering how best to utilise the information generated for the national and international purposes. The following sections discuss the MRV context in South Africa, as well as internationally, and seek to identify the linkages between these reporting processes and those of the REIPPPP.

4. The REIPPPP within the context of national and international MRV

It is clear that reporting processes will exist at the project (REIPPPP), national (M&E) and international (MRV) levels. What is less clear is the extent to which the different processes interact. In the interest of building effective reporting systems and avoiding duplication of efforts, identifying potential linkages and interaction between the different processes is valuable.

⁹ Correspondence No. 8.

Table 3 uses the example of a few indicators taken from the broad thematic areas identified in Table 1, and considers certain data might be useful across the different levels of reporting. For example the DoE records the number of MWh produced by the REIPPPP in order to identify electricity capacity on the grid. This data is also relevant to estimate a reduction in GHG emissions for the purposes of reporting requirements under the UNFCCC, which the DEA is responsible for. Meanwhile, information on jobs will not only be relevant to ensure compliance with ED requirements under the REIPPPP but also to the DEA who are reporting on non-GHG elements as part of the M&E System.

Encouraging interaction between these processes would be dependent on different institutions accessing and sharing data. Also certain data will more relevant depending on what is being reported on, as in the case of EIA compliance, which remains more centrally the concern of REIPPPP project developers than the international climate community.

Table 3: Potential Interaction of REIPPPP reporting indicators with national and international climate reporting (Authors compilation)

	<i>Driver</i>	<i>Purpose of reporting system</i>	<i>Indicator</i>	<i>Required to</i>	<i>Indicator</i>	<i>Required to</i>	<i>Indicator</i>	<i>Required to</i>
Energy sector action – REIPP	<i>Energy security</i>	To establish electricity generated and SED elements	<i>MWh electricity generated</i>	Demonstrate contribution to electricity supply, IRP targets	<i>ED requirements</i>	Demonstrate compliance with RFP requirements	<i>Environmental requirements</i>	Demonstrate compliance with national regulation and RFP requirements
National climate M&F system	<i>Climate and development</i>	To capture domestic GHG and non-GHG efforts of national climate actions		Calculate CO ₂ emissions and contribution to national CO ₂ target		Demonstrate non-GHG effects of a climate action		Identify potential non-GHG benefits
International climate MRV		To report at a global level the national climate effort and support		Calculate CO ₂ emissions and national contribution to global effort		Identify co-benefits of mitigation action		Potentially demonstrate co-benefits

In terms of the actors involved, a key interaction occurs between the Engineering Procurement and Construction body, who are responsible for collating the project-level data (from site managers, sub-contractors, ED officers and environmental control officers) and the project company, who are responsible for reporting to the IPP unit at the DoE. At a national level it is the DoE and DEA who will be interested in similar data; bearing in mind that within DEA there are different departments concerned with EIA information and climate, equally within DoE the IPP unit is one distinct unit.

Actors are important when considering the potential information and data flows from the REIPPPP programme. Figure 2 depicts some of the relevant actors involved at different levels, namely: REIPPPP (project level), national M&E, and international MRV levels. Currently there does not appear to be coherent interaction between these actors, although there are potential opportunities to improve these.

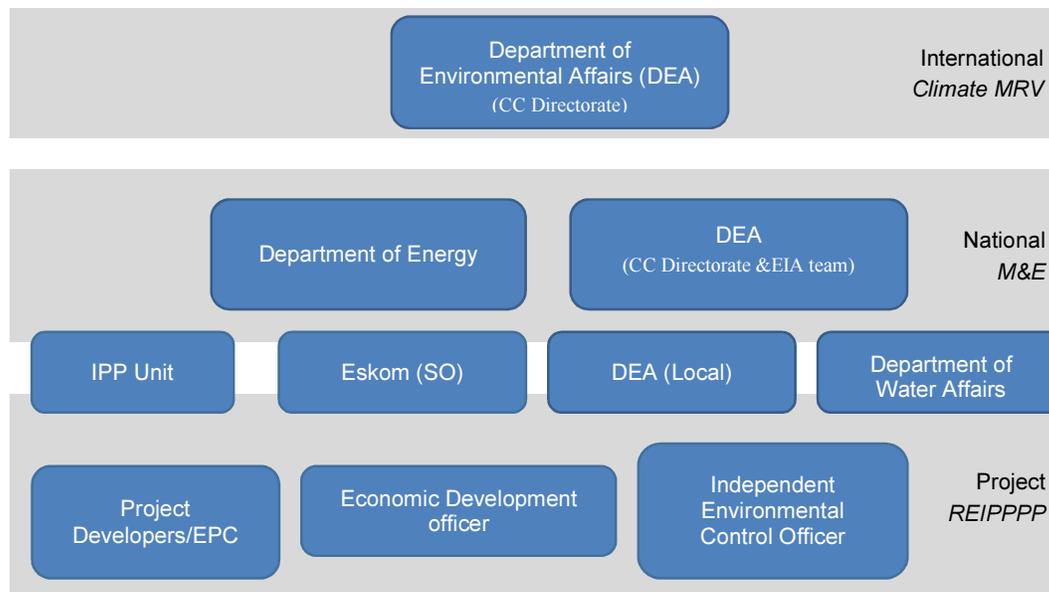


Figure2: Main actors that have emerged active in the MRV space of the REIPPPP (Authors compilation)

Improved coordination is also necessary for avoiding duplication of effort by different actors. For example REIPPPP projects are already required to report on economic development criteria to the IPP unit, in order to satisfy the requirements and obligations of the PPA and IA. Should DEA require non-GHG information to satisfy MRV reporting, there could there be an opportunity to extend the existing requirements rather than impose additional requirements? This would likely be welcome in light of the already existing volume of data being collected.

The range of approaches for satisfying and reporting the ED requirements of the projects appears fairly wide, as a means of encouraging participation, ensuring compliance and allowing the respective projects to ‘cross-subsidise’ their performances. In a similar manner, it appears that the international reporting requirements, in the absence of specific outlines and tasks from the UNFCCC, allow for the emergence of varying approaches to MRV.

In the process of undertaking this research, it was confirmed that, from a site-level perspective, the reporting requirements are governed by reporting requirements set by the DoE’s IPP unit, national legislation relating to their licensing agreements, and any corporate reporting. It became apparent that there was no knowledge of national or international climate reporting requirements. From a national climate perspective, the REIPPPP programme is being recognised as a significant contribution to the domestic mitigation effort. It was one of the programmes identified as a climate change flagship programme in the National Climate Change Response white paper published in 2011 (McDaid, 2014). The national M&E system is being designed to measure and evaluate the impacts of climate action in the country. Given that the DEA is responsible for reporting to the UNFCCC on the country’s mitigation efforts, it would be expected that the framework is being developed in order to align with international MRV procedures. Capturing information from projects such as the REIPPPP is an important part of the design of the M&E system, as is being able to use it to present to the international climate community. In order to do this, the DEA will need to collaborate with the DoE and other relevant government departments to access the information from projects with emissions implications. The REIPPPP demonstrates the importance of involving a diverse range of actors, both government and non-government to ensure the success of the project, and a similar culture of collaboration and coordination will be needed for an effective M&E system.

5. Conclusion

This paper has given an overview of the REIPPPP from a reporting perspective, and demonstrated that there is a substantial body of information. It has been valuable for consolidating a range of sources to consolidate existing information to create a picture of the monitoring and reporting of the REIPPPP. This has provided greater clarity on what these processes involve. It should be noted that whilst it is a valuable contribution, further investigation would be of value.

In achieving the dual objectives of being a competitive bidding scheme and aiming to achieve ED objectives, the REIPPPP represents a unique programme, with nuances such as incorporating Broad Based Black Economic Empowerment, that can be trying for those unfamiliar with these policies, such as foreign project companies. The challenge for the monitoring and reporting is to capture and demonstrate the uniqueness of the programme and its value. As illustrated in this paper, some of the difficulties experienced in the monitoring and reporting reflect this challenge. For instance, despite the processes and indicators for reflecting ED, it is not easy to determine the ED impact of projects.

The environmental reporting requirements appear to be more straightforward and are predominantly in line with national legislation such as the NEMA, which requires an EIA. Such requirements need to be met to be bid-compliant. Environmental reporting does appear to change depending on the phase (planning, construction, operation) of the project. Monthly environmental compliance reports are one of the main formats for environmental reporting.

When assessing the linkages between reporting under the REIPPPP and national and international climate reporting, it should be acknowledged that the REIPPPP originated prior to the M&E system. Therefore, reporting on REIPPPP projects is not specifically for the purpose of national objectives nor for international MRV reporting. This distinction of the REIPPPP – as not constituting a ‘mitigating action’ – is important when considering how the reporting structures are compatible with the forthcoming M&E system, as well as the international MRV requirements and standards. Whilst the information generated from the REIPPPP may not be able to directly feed into climate reporting, the data can be utilised and converted into data useful to these processes.

The interaction of institutions and actors affects the design, operation and enforcement of an MRV system. The institutional setup needs to be carefully designed, with an emphasis on transparency and collaboration, where linkages are developed between the different processes, rather than creating a context with parallel processes and duplication of reporting. Clarity on verification processes will also support a system that ensures continuous improvement in terms of quality of data and progress towards meeting objectives of the REIPPPP. Achieving this aim whilst maintaining a manageable reporting system is a challenge. As demonstrated by the REIPPPP, developing robust MRV-type systems within a single project is a multifaceted and challenging process.

There are many opportunities for utilising the wealth of data being monitored and reported as part of the REIPPPP. The data requested as part of the REIPPPP comprises elements that could be of use for a climate MRV system – including energy data which could be used to calculate CO₂ reductions, as well as non-GHG impacts such as jobs. Yet successful use of this information by DEA will depend on access to data and clear reporting channels. At this stage it is unclear how accessible information from the REIPPPP is to other ministries such as the DEA, and what processes exist to facilitate access to the data. What is apparent is that in order to fully make use of and capitalise on the experience of the REIPPPP, processes must be developed so that information does not remain concentrated only with the direct recipients of this information, but to a wider group for which the data is relevant. To achieve this, cross-ministerial coordination is imperative.

Drawing on existing REIPPPP projects for this research, has provided insight into the practicalities of orchestrating an effective reporting system. The process has enabled the authors to generate a consolidated overview of the various indicators and reporting systems connected to the REIPPPP. Useful questions that are often overlooked when reflecting on the various

reporting systems, are the ‘why report this’ and the ‘how to report it’. Reporting should not only be regarded as a means of demonstrating compliance, but as a way of informing progress and opportunities for improvement of performance, as well as addressing economic development and environmental issues. These elements of ‘why’ and ‘how’ must be given careful consideration when moving forward with the development of effective reporting systems.

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Appendix: Interviews and other correspondence

No.	Organisation	Type of correspondence	Position
1	Savannah Environmental Pty Ltd	Phone interview October 2014	Environmental Control Officer
2	Abengoa Solar Power	Interview on site May 2014	Environmental Coordinator
3	Globeleq South Africa Management Services Pty Ltd	Email correspondence October 2014	Managing Director
4	Juwi Renewable Energies Pty Ltd	Interview, July 2014	Economic Development & Land Acquisition Manager
5	Eskom Holdings SOC	Email correspondence, October 2014	Single Buyer Officer Representative
6	South African Wind Energy Association	Skype Interview May 2014	Chief Executive Officer
7	Altgen	Interview June 2014	Executive Recruiter Renewable Energy
8	Energy Research Centre	Interviews & email correspondence, May-September 2014	PhD Researcher
9	GIZ	Interview April 2014	South African – German Energy Programme (SAGEN) Representative
10	Project 90 x 2030	Interview June 2014	Director
11	Energy Blog	Skype interview April 2014	Founder
12	IPP Unit at DoE	Phone & email correspondence September 2014	IPP Unit representative
13	Khi Solar One Pty Ltd	Interview on site May 2014	General Manager
14	Biotherm Energy Pty Ltd	Interview on site May 2014	O&M Site manager
15	Biotherm Energy Pty Ltd	Email correspondence October 2014	Technical Director
16	NuPlanet	Interview September 2014	NuPlanet Representative
17	DEA	Interviews & email correspondence, August-October 2014	DEA Climate Change Directorate