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Study on regulations, policies and permits for implementation of bioenergy systems

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Abstract

The popularity of the Organic Fuel comes mostly from its Economic and Environmental benefits, and it can be effortlessly changed over into vitality for direct warming applications or potentially power era frameworks. Bioenergy can possibly break the Cycles of Poverty by developing energy security, food security, work creation, wage diversification and rural advancement. Care is required in light of the fact that bioenergy could have both positive and negative effects on nearby nourishment security. The significance of building up the Renewable part is further underscored by its consideration as a coordinated vital venture in the National Infrastructure Plan. This is managed by the Presidential Infrastructure Coordinating Committee, and is done for catalyzing development and development in South Africa. Renewable energy is likewise deliberately seen as a road through which the South African Government can react to the test of environmental change, enhance vitality security by broadening wellsprings of vitality supply, and impel green development through localisation and strengthening (DME 2003).Objectives were to take part in a complete audit of the national legitimate structures for bioenergy in South Africa. Controls, approaches and allows fundamentally explored and these will be supplemented by direct meetings with related Stakeholders. Existing Feasibility concentrates on that were completed for bioenergy Development were inspected and heightening elements were utilized to overhaul the expenses to reflect current costs. South Africa's Bioenergy Framework Main occasions were outlined and investigated and summarised. Recommendations were suggested.

Keywords

Bioenergy systems, Regulations, Permits and policies

Introduction

The utilization of biomass as a wellspring of energy is expanding greatly in countries such as America, Germany, Brazil and Japan .The popularity of the natural fuel comes essentially from its financial and ecological benefits, and it can be effortlessly changed over into energy for direct warming applications or potentially power generation frameworks (Evans et al, 2010).

Problem statement

Bioenergy is delivered from biomass, which thus is the principle source of energy for the majority of Southern Africa (Johnson and Matsika 2006) however the method of reasoning for bio-energy advancement is very unique in relation to that in Europe, where the emphasis is on nursery gas diminishments; or from that in the United States, where vitality security is the key issue. In Africa, the genuine capability of bioenergy can be discovered social improvement. It is in this manner imperative that Africa's limitless assets are utilized to build up a bioenergy area that is comprehensive,

creative, socially worthy and monetarily feasible, and adjusted with sufficient and manageable nourishment generation (Stafford and Brent 2011). Be that as it may, to date bioenergy in Southern Africa has been restricted by, among different components (Amigun and Von Blottnitz 2008), poor change proficiency and innovation exchange, poor feedstock accessibility and poor get to and reasonableness. Moreover, there is an absence of strong arrangement rules and a compelling usage methodology which is additionally expanded by the sustenance fuel face off regarding (Sapp 2013), which leaves strategy producers unverifiable in the matter of how to continue in the light of food uncertainty combined with water shortage particularly in South Africa.

Justification

Bioenergy can possibly break the cycles of Poverty by Developing Energy security, Food security, Job creation, salary enhancement and rural improvement. Care is required in light of the fact that bioenergy could have both positive and negative effects on nearby sustenance security. For instance, expanded bioenergy Production may prompt to a diminishment in land used to deliver staple yields, which means less nourishment is become locally and affecting sustenance costs. In any case, then again, bioenergy frameworks could enhance food security through changes in agricultural efficiency and the improvement of significant worth included items. A key issue for future nourishment/fuel frameworks is in this manner the need to consider the social, economic and work impacts. coordinated nourishment fuel fates can join Sustainable bioenergy with food generation to advance Social and monetary development, however how local individuals are fused into future food/fuel frameworks will be Critical for figuring out if cutting edge bioenergy frameworks can convey advantages to South Africa's poorest.

The importance of developing the Renewable sector is further underscored by its inclusion as an integrated strategic project in the National Infrastructure Plan. This is overseen by the Presidential Infrastructure Coordinating Committee, and is aimed at catalyzing development and growth in South Africa. Renewable energy is also strategically viewed as an avenue through which the South African Government can respond to the challenge of climate change, improve energy security by diversifying sources of energy supply, and propel green growth through localisation and empowerment (DME 2003).

South Africa utilized bioethanol from sugar stick as a part of petrol from the 1920's until the 1960's, this fell away for a brief period because of low International Crude oil costs. Late high oil costs and Climate Change contemplations have prompted to real National and International enthusiasm for putting resources into biofuels Production once more. Various Potential Investors have communicated enthusiasm for biofuels Development. This has vacillated because of instability over Regulations and Incentives and because of the critical increment in nearby and world maize costs. The maize cost increment has happened to a great extent because of the USA, which creates around half of world exchanged maize, occupying 25% of its harvest to ethanol generation, and additionally to the staging down of agrarian fare bolster. Likewise, World oilseed and oil costs have expanded fundamentally because of higher oil costs combined with bio-diesel request and motivations in numerous created countries, especially in the USA and the EU. Numerous Foreign organizations have analyzed biodiesel creation as a component of their arms bargain counterbalance commitments. The Global maize cost increments and the deficiency of essential nourishment stuffs in Mexico, which were specifically connected to biofuels speculations, has affected South Africa to reject maize use in its underlying phases of biofuels Development. Thus the procedure should be returned to with the end goal that it can oblige the above changes (Biofuels industry methodology, 2007)

The World population keeps on developing and, throughout the following 40 years, agricultural creation will need to increment by exactly 60%. In the interim a fourth of all Agricultural land has as of now endured degradation, and there is an extending consciousness of the long haul outcomes of a Loss of Biodiversity with the possibility of climate change. Higher food, feed and fiber request will put an expanding weight on land and water assets, whose accessibility and profitability in agriculture may themselves be under risk from environmental change. The extra effect on

nourishment costs of higher interest for harvests as vitality feedstock is of genuine concern. Since biomass can substitute for petrochemicals as well, higher oil costs will trigger new non-vitality requests on bio-assets too. In the most recent 35 years worldwide vitality supplies have almost multiplied however the relative commitment from renewables has barely changed at around 13%. Worldwide vitality request is expanding, just like the Environmental harm because of fossil fuel utilize. Proceeded with dependence on Fossil energizes will make it exceptionally hard to diminish outflows of nursery gasses that add to a dangerous atmospheric deviation. Bioenergy at present gives around 10% of worldwide supplies and records for approximately 80% of the vitality got from Renewable Sources. The "new" renewables (e.g., sun powered, wind, and biofuel) have been developing quickly from a low base. Despite the fact that their commitment is still a negligible segment of aggregate Global Renewable Energy supply, they are persistently developing. Bioenergy was the principle wellspring of Power and Heat preceding the Industrial revolution. From that point forward, economic development has to a great extent depended on Fossil fills. A noteworthy driving force for the development of bioenergy has been the hunt down other options to fossil energizes, especially those utilized as a part of transportation.

In the past, burning fossil fuels, deforestation and other human activities have released large amounts of greenhouse gases into the atmosphere. Today, almost all of the commercially available biofuels are produced from either starch- or sugar-rich crops (for bioethanol), or oilseeds (for biodiesel). Recent research has found that these bioenergy sources have their drawbacks and turned attention to the use of ligno-cellulosic feedstocks, such as perennial grasses and short rotation woody crops for bioenergy production. Removing CO_2 from the atmosphere (negative emissions) implies that human-induced uptake of CO_2 would have to be larger than the amount of human-induced GHG emissions. One of the few technologies that may result in negative emissions is the combination of bioenergy and carbon capture and storage (CCS). The South African bioenergy framework and legal systems might need to refocus also and encompass such innovations.

The sustainability of bioenergy has been talked about broadly lately. Maintainability criteria have been presented, for the most part concentrating on direct impacts of the Production Chain of bioenergy items. Be that as it may, bioenergy may bring about noteworthy circuitous impacts in other generation frameworks as well. The removal of Agricultural generation has been examined widely in the Literature in the course of the most recent 2 years and is by and large called the circuitous land-utilize change (ILUC) impact. Nonetheless, extra crop generation can likewise be accomplished by Changes in Land Management (e.g. escalation). As a rule ILUC Emissions are ascertained as normal Yearly values over times of 20 to 50 years (EU Directive for direct outflows). Regular Emission values over the entire time frame are by and large 300 to 1600 t CO2 identical/ha for the change of woods to rural land, and 75 to 364 t CO2 comparable/ha for Grassland or Savannah and Fritsche displayed a normal estimation of 5 t CO2 proportional/ha every year. For Regions with generally more change of timberlands, this esteem may be higher. With the assistance of model figuring's appraisals are made for the Area and kind of Land really changed over as the aftereffect of the generation of a biofuel or any bioenergy item. This must be compensated by the Emission reserve funds from biofuel use, much of the time shifting somewhere around 2 and 20 t/ha every year. Obligatory bioenergy creation can prompt to diminishing costs of unrefined petroleum, and consequently prompt to an expansion in raw petroleum and aggregate vitality utilization. This impact is somewhat dubious, however could reach as much as half of potential increases. Different counts brought about an additional circuitous Emission of around 30% from the decrease in Direct Emissions. So these aberrant Emissions are in the request of 10–40% of the Emissions of the substituted fossil energizes and should be accounted for by Policy Makers.

Objectives

To engage in a comprehensive review of the national legal frameworks for bioenergy in South Africa. Some of the key questions addressed in the reviews are:

- Have adequate legal arrangements been made to back government policies and targets for renewable energy and bioenergy?
- Are appropriate market regulations and incentives in place to boost production and consumption of bioenergy?
- Have legislative measures been taken to ensure that the cultivation of energy crops to produce biofuels does not have adverse impacts on food security?
- Are questions concerning competing land uses and their social and environmental implications adequately addressed?
- How is bioenergy legislation related to the legal framework applicable to deforestation, protection of biodiversity, greenhouse gas emissions and introduction of alien species into the natural environment?
- Are appropriate procedures in place for assessing environmental impacts of bioenergy projects and ensuring stakeholder participation?
- Is the national institutional framework adequate and are there appropriate mechanisms for inter-institutional coordination?

Biomass Energy

The principle Sources of Biomass are fuelwood in the Rural Domestic division, bagasse in the Sugar business, and Pulp and Paper squander in the business Forestry Industry for in-house Heat and Electricity era. As per the then Department of Water Affairs and Forestry (DWAF, 2003) the key Biomass assets that assume a part as far as Renewable Energy are Invasive outsiders (e.g. intriguing acacia species like dark wattle and Port Jackson), Commercial estates and the Wood business, woodlots, trees in the urban Environment, Woodlands and Indigenous Forests and trees developed as fuel yields.

Methodology

Regulations, policies and permits critically reviewed and these will be complemented by direct interviews with related stakeholders. Existing feasibility studies that were carried out for bioenergy development were reviewed and escalation factors were used to update the costs to reflect current prices.

Policies, Permits and Regulations

The biofuels Industry was started through Government's Accelerated and Shared Growth Initiative for South Africa (AsgiSA) that was placed in 2006. At the time, biofuels Investment was viewed as an impetus for the Transformation of South Africa's Underdeveloped Rural economies, a donor to the nation's Renewable Energy objectives and its Energy Security, and also a strategy for decreasing Greenhouse-gas Emissions. Under AsgiSA, a Feasibility consider into the improvement of a biofuels industry in South Africa was attempted, which showed that the Industry spoke to an incredible open door for Rural Development. The practicality contemplate finished in the arrival of a Draft Strategy, trailed by the arrival of the Biofuels Industrial Strategy. As an aftereffect of the Strategy not favoring obligatory Blending at a controlled Price and postponements in the Implementation of the Incentive, four of the six bioethanol plants that were being Developed at the time, have been put on Hold. Just two of the plants stayed going concerns, in particular the Industrial Development Corporation's plant, in Cradock, in the Eastern Cape, and Mabele Fuels, in Bothaville, in the Free State. (http://www.engineeringnews.co.za/article/sa-biofuels-industry-anticipates usage of-directions 2012-09-21).

The Government is on course with respect to Diversification of South Africa's Energy blend far from fossil powers, and this is generally reflected in the Integrated Resource Plan (IRP2010) that was proclaimed on 06 May 2010. Under

this Plan South Africa's new form choices mean to include around 42% Renewables-based Capacity by 2030. As a beginning stage the Minister of Energy has determined that South Africa requires 3,725 MW keeping in mind the end goal to guarantee continuous supply of Electricity, and this will be created from renewable vitality sources. To further propel the upgraded Deployment of renewables, the Department of Energy (DoE) is seeking after other similarly imperative starts, to be specific, the National Solar Water Heating Program and in addition the mix of biofuels into the nation's fluid Fuels Pool. Far beyond this, strong biofuels Regulatory Frameworks, as Mandatory Blending Regulations and additionally the assurance of biofuels Transfer cost and financial support, are work in advance.

The Biofuels Industrial Strategy concentrates more on Previously Disadvantaged Communities and Emerging Farmers. The Strategy concentrates on Economic and Social improvement of provincial ranges through the agrarian advancement in the previous country territories. The South African government arrangements to put a portion that requires at least 25% of the feedstock to be provided by Small Scale agriculturists in accomplishing proposed biofuel Blends. In August 2012, the South African government Revised Regulations in regards to the Mandatory Blending of biofuels with Fossil Fuels, taking into account 5% Blending of biodiesel with diesel and a scope of 2% up to 10% mixing of ethanol with petrol. With a Blending focus of 10%, around 125 000 direct employments could be made essentially situated in Rural Areas.

SA Bioenergy Framework Main events summary

1) Renewable Energy Policy Framework (2004) – this set out objectives and focuses for renewable vitality improvement and take-up for SA by 2014 and beyond

2) Biofuels Industrial Strategy December 2007 (following 3 years of "discussion" – not implemented to date

3) NERSA Consultation Paper – Renewable Energy Feed – In Tariff December 2008 (updated even before usage)

4) NERSA further discussion on Feed in levies 2012

5) Department of Energy – Stakeholder conferences on Biofuels Break notwithstanding estimating and Bio ethanol Blending Value Determination 2012 counsel prepare all year (consequences of study and discussions pending)

6) 2009 Development of the National Growth Path

7) 2011 Development of the National Development Plan

8) 2012 ANC Policy Conference June and Mangaung Conference Dec 2012 Adoption of the National Development Plan

9) Announcement that PetroSA to create 400,000 barrel/day refinery been a risk to advancement

10) Announcement of Eskom new power era limit in next 5 – 7 years in abundance of R385 billion (for the most part coal based) yet with no option arranges set up

11) Announcement that SASOL should create Mafutha including a further 80,000 barrels (now quieted and taken of the advertise mastery by these players who will soon control more than half of the SA showcase for petroleum items on one hand and still more than 90% as for power and vitality) Despite that announcements – then again the certainties of the ground say a lot of government heading and approach

12) Recent fire and issues acquired by Engen show a reasonable issue with under speculation by the Fuel business in refineries, ecological assurance and so forth

13) No sign that any of the other remote Oil majors would consider a noteworthy new interest in SA refineries (BP, Chevron, Total, Shell) without government bolster

14) Refit program in limbo and numbers changed before usage – always showing signs of change advertise mastery by these players who will soon control more than half of the SA showcase for petroleum items on one hand and still more than 90% as for power and vitality) Despite that announcements – then again the certainties of the ground say a lot of government heading and approach

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There is a lack of regulation of mandatory blending of mineral fuels with bio- fuels, the pricing structures for the sale of biofuels and the incentives for licensed producers have led to challenges in establishing the industry in South Africa. The Department of Energy (DoE) published regulations regarding the mandatory blending of biofuels with petrol and diesel in the Government Gazette. The regulations, once implemented, constituted another step towards the establishment of a biofuels industry in South Africa. Establishing the industry will also be in line with the country's aim of moving towards using cleaner fuels that have a lower sulphur content and produce less greenhouse-gas emissions by 2017. The regulations state that a licensed petroleum manufacturer must buy all bio- ethanol and biodiesel offered for sale by a licensed biofuels manufacturer, provided the volumes can be blended with the petroleum manufacturer's petrol and diesel within the minimum concentration of 5% volume per volume (v/v) biodiesel blending with diesel, and between 2% v/v and 10% v/v of bioethanol to petrol. (http://www.engineeringnews.co.za/article/sa-biofuels-industry-awaits-implementation-of-regulations-2012-09-21).

Government plans for meeting South Africa's growing electricity demand needs are outlined in the Integrated Resource Plan for Electricity (IRP) of 2010. The plan contains long-term electricity demand projections, and details of how demand should be met in terms of generation source, capacity, timing and cost. In late 2013, a draft update of the IRP was published for public comment. This outlined the optimal energy mix in a variety of scenarios linked to economic growth, the energy intensity of the economy, and various other factors and events. In the Base Case scenario, premised on average economic growth exceeding 5% per annum and full implementation of the National Development Plan (NDP), there is a gradual ramp-up of renewable energy capacity to 9% of South Africa's total electricity supply capacity by 2030 (DOE 2013). Even in this optimistic scenario, generation from new coal-fired and nuclear plants will dwarf the share of electricity produced from renewable sources. Further, should economic growth continue to be hover around current levels of 2-3% due to weak international demand, RE will only account for 6% of the country's electricity supply by 2031. Continued reliance on coal-fired power for more than two-thirds of South Africa's electricity requirements suggests that there will be on-going competition between the energy and agricultural sectors for scarce arable land and water resources, threatening the delicate balance in the food energy-water nexus.

Energy Efficiency Regulations, Standards and Labelling

The world communities are shifting from energy use business as usual practice to a more energy efficient culture. This is being emphasized worldwide through the implementation of energy efficiency standards and codes of practice. The DoE, the DTI and its agencies SABS and SANAS in consultation with industry players, have over the past few years introduced a number of energy efficiency standards. Some of the standards include the standard for energy efficient industrial motors, Energy Management standards, standards for efficient domestic appliances. The Department of Energy together with the dti, with the assistance of GEF and UNDP will now start with the implementation of Appliance Standard and labelling programme aimed at transforming the appliance market to energy efficiency. This project will focus on strengthening the regulatory and institutional framework and also develop labelling specifications and MEPS thresholds for the products selected for Standard and Labelling regulation. The project will also strengthen institutional and testing capacities as well as increase energy efficiency awareness amongst consumers, retailers, manufacturers and public stakeholders. This will be done through public outreach campaigns and training on energy efficiency to appliance professionals. The project will also implement an evaluation process for energy programs and disseminate the finding of the Standard and Labelling projects to the main stakeholders for replication on other appliances and equipment.

Industrial Energy Efficiency

The project aims at contributing to a sustainable transformation of industrial energy usage practices in South Africa and possibly in the Southern African Region, by putting the system of Energy Management Standards (EMS) in place and ensuring that industries in a group processing, chemical and liquid fuels, mechanical engineering, automotive and mining industry use it. In order to achieve this goal, it is planned to stimulate the demand of Energy Efficient services through formulation and implementation of an enabling policy framework including a supportive financial mechanism for EE, creation of institutional capacity to implement the EMS, awareness raising, energy audits, and demonstration projects. It is also planned to support the supply of Energy Efficient services by building the institutional capacities to accredit, certify EMS compliance, and by training local trainers and consultants in EMS implementation and energy system optimization, as well as in energy management in the targeted sub-sectors. Sharing experience gained and providing initial support to the neighboring countries in the region have also been envisaged. To date an Energy management Standard has been developed and being piloted through workshops and training programs taking place country wide. Training programs focusing on Steam, fan, pump and system optimization are currently being offered with the intention to create capacity within the industrial sector. 6. Energy Efficiency Campaign The department in consultation with key stakeholders through the NEDLAC process has developed an Energy Efficiency campaign strategy which seeks to provide a collective approach in information dissemination. The campaign aimed to design, distribute energy efficiency publications and to establish and manage an energy efficiency information system (ITLibrary & Website).

International legal instruments relating to biofuels

There are no Intergovernmental systems or International understandings particularly addressing bioenergy, albeit a few Multilateral Instruments force commitments with suggestions for the route in which bioenergy is directed at national level. A portion of the worldwide lawfully restricting natural assertions are applicable to bioenergy, for example. They incorporate the United Nations Framework Convention on Climate Change (UNFCCC) (1992) – which gives that prudent steps to suspect, avoid or minimize the reasons for environmental change and relieve its antagonistic impacts, (for example, bioenergy generation) ought to consider distinctive financial settings, be exhaustive, cover every important source, sinks and stores of nursery gasses and adjustment, and contain every monetary division (craftsmanship. 4). All the more unequivocally, the Kyoto Protocol perceives the significance of renewable vitality as

a benefactor to the moderation of environmental change, giving that all gatherings, considering their normal however separated duties and their particular advancement needs, might plan, actualize, distribute and frequently upgrade national and, where fitting, Regional projects containing measures to mitigate climate change in the energy, transport and industry areas (art. 10).

Recommendations and Conclusions

- The South African Government ought to give a clearer, more elevated amount commitment to low - carbon climate-versatile Infrastructure that ought to educate all Public-drove Infrastructure projects from energy, to transport, to human settlements, to water, to agriculture and land use. .
- The development of a national green financial architecture would contribute considerably in accelerating South Africa towards a green economy by attracting private and international development finance through some domestic public investment (such as the commitment to South Africa's new National Green Fund), thereby creating investor certainty, reducing barriers to scale and leveraging public procurement.
- The Government ought to likewise advance regulatory plans to accelerate the take-up of energy efficiency (EE) and Renewable Energy (RE) Technologies and invigorate the related household areas.
- Government ought to accompany policies that are great to the development of the RETs showcase and ought to clearly set targets to be met by energy Suppliers. It ought to help the market to develop by giving incentives and opportunities to exhibition of RETs frameworks and give Capital Subsidies to Installation of renewable energy frameworks with get eliminate timetables to guarantee high effectiveness. Government ought to Remove Barriers, assemble human and institutional limit, set up innovative work foundation, make an empowering domain for venture, and give data and components to advance RETs. Government should also introduce and implement the concept of integrated resource planning to ensure that only cost effective solutions are incorporated in the System Development Plan
- The pricing methodology for renewable energy technologies should consider power transactions and the additional benefits accruing through embedded generators
- RETs in remote rural ares should be considered first so as to stimulate growth
- The local communities should be empowered by the licensing framework.

Bioenergy installations can make an important contribution to the local economy and to the accomplishment of regional, national and European CO2 emission and renewable energy targets. The bottlenecks for the construction of these kinds of installations should therefore be analyzed, not only from a local perspective, but also taking regional and national policies into consideration. A catalogue of best practice examples with contact details should be created so that local, regional and national authorities can easily access the experience and lessons learned of other authorities when dealing with new or less known technologies and systems.

Coordination of work inside Permitting authorities is expected to maintain a strategic distance from over the top data trade and the related measure of tedious work. This coordination could appear as a "One-Stop Shop", where all permitting authorities and Stakeholders in charge of Issuing a Permit meet to talk about an application and choose together on whether a Bio-vitality Plant ought to get endorsement. With a specific end goal to guarantee straightforwardness and to diminish the work heap of powers, the full arrangement of criteria expected to pick up licenses ought to be distributed, posting extremely essential necessities to get the approvals required and illuminating the candidates as ahead of schedule as could be allowed about them. In this way, basic perspectives might be

incorporated into the arranging and the application stages. A preparatory meeting with the candidates for a screening of the necessities (substance of an inevitable EIA, required security and moderation measures, and so on) could likewise be extremely important to diminish any false impressions or mistakes in the application procedure and to quicken the procedure.

In order to increase the knowledge base inside the permitting authorities, it could be useful to set up an in-house pool of experienced employees, who have previously participated in former similar permitting procedures and can advise others during the process of new permitting applications. This could be complemented with regional or even national networks of experts within the permitting authorities. In that way, the necessary search for information, as well as the needed exchange of information, could be managed more efficiently. In case of a lack of experience with new technologies, external advice could be helpful to clarify questions related to the technologies, the possible impacts, the mitigation measures, etc. Identify suitable locations which could be designated for industrial activities or for small-scale bioenergy production. It is also advised that authorities should consider how best to use local biomass waste-streams for local energy purposes (heating, electricity or transport).

Despite being critiqued for its heavy reliance on coal-fired power in the past, South Africa has recently developed what is arguably one of the most successful IPP-driven renewable energy programmes globally. It has hosted the fastest-growing clean energy market over the past five years, and is now one of the world's most attractive RE investment destinations (Pew 2014).

South Africa has many elaborate plans and visions however despite this there remain significant policy gaps and areas where it appear there is a policy vacuum of sorts. There is a desperate need to synchronise these policies and plans into a more coherent strategy. Implementation and follow up becomes key and for this to happen a number of things must occur. The state must allow the private sector a role and be clear on what that role is. Fundamentally the state has neither the capacity, resources and skills to execute of the elaborate and complex programs as set out.

National priority (SA Incorporated) matters must override vested short term interests. Corruption and poor execution that results not only in delayed projects and projects with huge overruns must be avoided at all costs (Medupi already 18 months behind and is likely to come in at 2 X the price). SA cannot afford major policy and investment blunders (an investment into the mooted 400,000 barrel Mafutha plant in Coega will be an unmitigated disaster and block any development of a biofuels industry in SA)

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BIOGRAPHY

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