ESTABLISHINGTHE REAL TIME MULTIDIMENSIONAL ENERGY MANAGEMENT SYSTEM ["RMEMS"] [ALSO KNOWN AS AN "ENERGY VAULT"] FOR THE KANNALAND LOCAL MUNICIPALITY AS THE FIRST ONE OF THE 120 IMPLEMENTATION PROJECT SITES IN SOUTH AFRICA

FEASIBILITY STUDY REPORT:

PART C: INVESTMENT AND FINANCE

Submission Period: November 2018

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Service Provider:	VARIOUS (for the Kannaland Local Municipality PPP Project: INOVASURE and Collaborators)
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1 INTRODUCTION TO THE KANNALAND PROJECT

A specific PROJECT PREPARATION AND DEVELOPMENT FACILITY (PPDF) APPLICATION (as well as concomitant applications for the SA Green Fund, IIPSA, DBSAGCF and any other related fund under the management of the DBSA) was prepared for submission to the DBSA (Development Bank of Southern Africa) as the future proposed Mandated Lead Arranger (MLA) and Public Private Partnership (PPP) administrator for the syndication of the funding for the envisaged **INOVASURE** (PTY) Ltd ("**INOVASURE**") REAL TIME MULTI-DIMENSIONAL ENERGY MANAGEMENT SYSTEM (the "RMEMS", also known as an "Energy Vault") and implementation thereof that is proposed to be established for the Kannaland Local Municipality as the pilot implementation site (encompassing two or more Energy Vaults in its full rollout) and then 119 similar other project sites across South Africa. The PPDF Application is based on this Feasibility Study and Financial Model that was developed by **INOVASURE** for the Kannaland Local Municipality.

Most people recognize the importance of electricity as an essential input to manufacturing and to economic activity in general. Changes in electricity prices impact on each and every person, and this has an effect on economic activity.

It is important to take cognizance of the strategic importance of the proposed development by **INOVASURE** in conjunction with specific Municipalities (such as the Kannaland Local Municipality) and to analyse the risk of reliance on foreign energy suppliers, the tariff hikes and the effect of perpetual power interruptions on the South African economy.

The following process is acknowledged that has been, and is being, followed by **INOVASURE** regarding the Kannaland RMEMS / Energy Vault Project:

- The formation of a Public Private Partnership (PPP) between **INOVASURE** and the Kannaland Local Municipality, proposed to be endorsed by National Treasury GTAC PPP division and managed under the auspices of the DBSA, covers all aspects of the implementation of the **INOVASURE** Energy Security Program as various energy infrastructure projects and will be arranged to be funded by the efforts of **INOVASURE,** including the installation of distribution and telecommunications devices and so-called Thin Client Technology ICT (Information Communication Technology) devices, as well as management systems;
- **INOVASURE** prepared Feasibility Reports[1] in parts that were submitted to the Kannaland Local Municipality as the initial pilot implementation project partner to the proposed PPP and the application for endorsement thereof in terms of the time period by National Treasury GTAC PPP division;
- The company **INOVASURE (PTY) LTD** (South Africa) has been registered with The Companies' and Intellectual Properties Commission (the CIPC")**;**
- A Special Purpose Vehicle (SPV) is in the process of being registered as part of the proposed PPP with the KANNALAND LOCAL MUNICIPALITY i.e **"INOVASURE** Kannaland Energy Vault Holdings (Pty) Ltd.; and
- This DBSA PPDF Application[2] (which is intended to be utilised for concomitant applications to the other relevant funds managed by the DBSA) was prepared in compliance with the prescribed process with due acknowledgement of the Feasibility Reports that were prepared for the Kannaland **INOVASURE** Energy Vault project.

INOVASURE provides an integrated power solution package[3] as an energy infrastructure project that allows for the production of Green Energy combined with off-peak energy from Eskom which is then stored and shifted through an energy demand / supply so-called "Real Time Multidimensional Energy Management System" ("RMEMS") [otherwise known as the **INOVASURE** "Energy Vault"] of which the end result is a constant supply of cost effective energy to Municipalities / Special Economic Zones (SEZs) / State Owned Enterprises (SOEs) and other Corporate Entities such as Mines, large construction companies and suchlike, as well as to informal settlement dwellings on a smaller scale.

[1] "Kannaland Local Feasibility Reports: Executive Summary and Parts A, B and C", dated November 2018
[2] SADC & DBSA Project preparation and Development Facility (PPDF): Operational Guidelines", dated 8 August 2017
[3] The INOVASURE "Ensurance" Presentation: "The Real Time Multidimensional Energy Management System ("RMEMS")["Energy Vault"], dated May 2017

The Energy Vault comprises of unique Utility Scale storage units (batteries) and "balance of systems" components such as inverters, distribution and telecommunications devices (so-called "smart meters") and unique Thin Client Technology devices, LTE communication networks and the like, all aspects of which have been developed and successfully deployed and tested worldwide through reputable and successful collaborators with whom **INOVASURE** has secured long lasting and valuable relationships.

The Energy Vault also includes smaller versions of the Utility Scale Energy Vault which are utilised for informal dwellings on a sub-centralised basis and is known as the INOVASURE "LivPak" mini-Energy Vault and which operated in DC.

In order to maintain a stable supply, a Measurement and Compensation method was designed by **INOVASURE** as a hybrid protection plan / warranty / "ensurance" product and service, i.e. the "Local Authority Energy Security Power Protection Plan" ("LAEP").

Building out the **INOVASURE** model will reduce Eskom's dependency on coal as its source of supply and convert same to renewable and alternative energy sources

In the case of the proposed RMEMS development for the Kannaland Local Municipality a financial model was adopted that was purpose developed. The latter mentioned model[4] was developed in line with the original Memorandum of Understanding (MOU)[4] that was concluded with the Kannaland Local Municipality on 17 September 2012 by Sun Graft (Ltd) in order to have Sun Graft and its collaborators investigate all possible aspects of dealing with service delivery matters relating to power and water reticulation This MOU was approved by the Municipality.

The purpose of this MOU was as follows (extract from referenced MOU):

[4] "Memorandum of Understanding (MOU) 1", dated 17 September 2012

1 PREAMBLE

The purpose of this Agreement is to define the basis for the supply and funding of services and/or products to **KANNALAND** by **SUN GRAFT** concerning:

electricity, electricity generating products, electricity saving products and grey water treatment systems in all areas under the control of the KANNALAND local municipality;
(the "Field")

and whereas **KANNALAND** has a need and obligation to supply electricity and to manage grey water and the treatment thereof in all areas under its jurisdiction;

and whereas **SUN GRAFT**'s business is to critically evaluate possible solutions related to energy provision and to provide efficient energy solutions and energy saving products to clients in the areas of solar photovoltaic systems, solid state lighting, solar heating, energy-from-waste and waste treating systems;

and whereas **SUN GRAFT** is, through its leasing company, willing and able to fund the solutions and to provide these solutions and technologies to **KANNALAND** on a purchase-, take-off or lease basis;

Sun Graft in due course transferred and delegated its rights in terms of the referenced MOU to **INOVASURE**, as the referenced "leased company" and suitable entity to perform the highly complicated tasks that the MOU required.

Following this transfer of the rights granted in terms of the referenced MOU, **INOVASURE** proceeded, in the years following the conclusion of the MOU, to carry our various Feasibility Studies with regard to the provision of electricity, potable water and other concomitant service delivery aspects such as education;

During the process of carrying out the various Feasibility Studies, INOVASURE designed various integrated systems and installations in order to fulfil the requirements of the MOU in terms of its referenced Project Proposals, as set out in clause 4 of the MOU. Over time it became clear to **INOVASURE** and its collaborators that in developing the various Project Proposals, their outcomes highlighted that the various solutions and proposed implementations worked best in an integrated manner as one system, which it termed an "Energy Vault" (and a "Water Vault" respectively);

INOVASURE, once it determined that the solution to the service delivery problems with the Kannaland Local Municipality, and in fact any other Municipality, lay in the design and implementation of an Energy (and Water) Vault, proceeded to refine the operation of the said Energy (and Water) Vault and to develop Financial Models to support the various aspects of the Feasibility Studies;

The developed **INOVASURE** Energy Vault has subsequently been refined to a unique large [20MW-53MWh] battery storage device supported by balance of systems [such as electricity

meters and LTE communication devices] and renewable energy sources [such as 25MW Photo Voltaic plants]), as well as smaller versions of the Energy Vault used in informal settlements, and which will be installed at the Kannaland Local Municipality (where two Energy Vaults will be implemented), or in fact any other Municipality in the RSA, in multiples as according to the size and needs of the relevant Municipality.

For clarity purposes, the **INOVASURE** Water Vault is a concomitant accumulation of water purification and / or desalination and / or management devices and installations, including water meters, which operate in conjunction with the **INOVASURE** Energy Vault.

For further clarification purposes, the **INOVASURE** Thin Client Technology devices are specific devices and systems, including unique server cloud technologies, which are designed and installed by **INOVASURE** to work in conjunction with the Energy (and Water) Vault/s and which provide WIFI capability to all home users which are fitted with pre-paid electricity and water meters as part of the Energy (and Water) Vault implementations and which also provide educational content. The Thin Client Technology also operates in informal settlements in providing shack electrification and concomitant educational content.

INOVASURE, in refining its Energy (and Water Vault) systems, also investigated the various laws and regulations that govern the provision of such, and determined that the Kannaland Local Municipality, and in fact any other Municipality in South Africa, may utilise its own constitutional right to generate, distribute, transmit and buy and sell power (as well as to manage its water resources and information communication technology needs). **INOVASURE** determined therefore that the Kannaland Local Municipality does not require a PPA (Power Purchase Agreement) with **INOVASURE** to operate is services and provide its products, nor is it an Independent Power Producer (IPP).

INOVASURE has, in carrying out its Feasibility Studies for the Kannaland Local Municipality, also secured the necessary collaborators to implement its Energy and / or Water Vault installations, coupled with the Thin Client Technologies.

INOVASURE, as specifically required by the referenced MOU in clause 1, has also secured the required funding and technological underwriting from its collaborators, services providers and suppliers to enable it to facilitate the funding of the Energy (and Water Vault) combined Project Proposals and the concomitant Thin Client Technology installations at the Kannaland Local Municipality, either in part or whole.

The financial requirement of the referenced combined Kannaland Local Municipality **INOVASURE** Energy Vault project is determined by the accumulated cost of all its components, the capital expenditure to develop the Energy Vault and the working capital to allow it to become operational. Similar financial requirements apply to the Water Vault technologies which may be employed at the Kannaland Local Municipality, which will range from desalination plants of various sizes and capabilities, purification plants of various types, water management meters, water savings devices, water extraction devices and suchlike. The Thin Client Technology and installations are similarly costed to apply to the **INOVASURE** Energy Vault project at Kannaland Local Municipality. Based on the research and preparation that was done over the past 6 years at Kannaland Local Municipality, it has therefore been determined that the **INOVASURE** Energy Vault / Thin Client Technology project will cost approximately R1.2 billion per Energy Vault (or fractions of multiples thereof) for a 25MW Photo Voltaic Power Plant, 20MW-53MWh battery storage device, electricity measurement and management devices (meters) in all houses (approximately 25 000 per Energy Vault), off-grid systems for the electrification of informal housing units, LTE communication devices and streaming of educational material and other systematically operational devices that provide Energy and Education Security to **INOVASURE's** clients – the Municipalities and their citizens. Two Energy Vaults are contemplated for the Kannaland Local Muncipality due to the unique location in terms of irradiation for Solar Power Plants, and the fact that electricity can be exported by Kannaland to other Local Municipalities in the District as an additional revenue stream. ***Further multiples of the INOVASURE Energy Vault model may also be contemplated, should the need arise in terms of the growth of the Kannaland Local Municipality or the surrounding other Local Municipalities.***

For clarity purposes (since the Water Vault is not included in this Feasibility Study but intended as a separate phase) the financial requirements of the **INOVASURE** Water Vault are determined by the current needs of the Kannaland Local Municipality and its immediate status with regard to available water resources. The approximate cost of the proposed Water Vault system for Kannaland Local Municipality is linked to the cost of the Energy Vault, since approximately 80% of the cost of water is linked to the cost of the power to supply the water.

INOVASURE has recommended to the Kannaland Local Municipality that the Energy Vault referenced above be implemented as the first phase of the Project Proposal for energy, as a PPP, whilst the Water Vault be implemented as the second phase, once the required power capacity has been implemented.

Following extensive communications and presentations and feasibility studies, Kannaland Local Municipality concluded an Energy Security Management and Administration Agreement ("ESMA Agreement") with **INOVASURE** within which the project and its parameters were detailed.

It bears mention that the Kannaland Local Municipality believes that it has complied with the requirements of the Municipal Supply Chain Management (SCM) Regulation 32 of 2005 (Regulation 32) as according to the Municipal Finance Management Act 56 of 2003 in recommending that any other Municipality could also make use of the services of **INOVASURE** and its various collaborators in the provision of the ***ENERGY SECURITY*** Program.

South Africa's power utility, Eskom, has stated in writing, over the years, that it supports **INOVASURE's** energy storage program with possible rebate programs. However, **INOVASURE's** need for support from Eskom is minimal in its business strategy provided in its Feasibility Studies to Kannaland Local Municipality, primarily since **INOVASURE** is not an IPP, whilst it in turn can provide Eskom (albeit indirectly) and the RSA as a whole (when a number of the Energy Vaults similar to the ones developed for Kannaland Local Municipality are installed countrywide), with a viable "black start" capability (the ability to restart the power grid in the event that it trips) and assist to take the pressure off the need to upgrade the distribution network of many of the other Municipalities in South Africa for at least another decade, benefiting both Eskom and the RSA as a whole.

The National Treasury of South Africa, through its Government Technical Advisory Centre (GTAC) Agency, handles, amongst other things, the manner in which Public Private Partnerships (PPPs) are approved and finalized. The GTAC has indicated its support of the various initiatives of **INOVASURE**, and in particular for the **INOVASURE** Energy (and Water) Vault Program that it has been developing at the Kannaland Local Municipality, provided that **INOVASURE** partners with the Municipality as a participant in a PPP. The referenced GTAC support includes specifically the period of 25 years required for the effective development, implementation and management of the proposed **INOVASURE** Energy and ICT Technology PPP projects (based on the abovementioned ESMA Agreement/s) for the implementation of the **INOVASURE** Energy (and Water Vault) Program, with the concomitant Thin Client Technology systems to provide Education Security, starting with the ESMA Agreement concluded between Kannaland Local Municipality and **INOVASURE**. The National Treasury's GTAC division has indicated its provisional willingness to approve the

INOVASURE Energy Vault project with Kannaland Local Municipality as a PPP in the event that it requests it to register the project as a PPP under the auspices of the DBSA. In this regard, both the National Treasury GTAC PPP division and the BDSA have advised that they require suitable Transactional Advisors to carry out a due diligence process on behalf of the Kannaland Local Municipality to confirm the legal, technical and financial aspects of the proposed project to be viable and acceptable.

It bears mention that the African Regional Centre (ARC) of the New Development Bank (NDB) is an important contributor to sustainable infrastructure development in South Africa and is a participant in the development agenda of the continent. The ARC is the first regional office of the NDB that was established in August 2017 and as such represents the NDB in Africa. Assisted by the ARC, the NDB works with the Government of South Africa and other strategic partners, including development finance institutions such as the DBSA, on strengthening its project pipeline, focusing specifically on sectors such as water, transport, energy and urban development. The ARC specifically works closely with the Government, public and private sector agencies, and other relevant stakeholders in South Africa to identify projects that have strong development impact to be supported by the NDB. **INOVASURE** has received indication by the ARC that Energy Vault project funding, directed through the NDB, may be managed under the auspices of the DBSA for the **INOVASURE** Kannaland Local Municipality Energy Vault project, as well as further ensuing Energy Vault projects.

The Central Energy Fund Group of Companies (CEF) is a **Schedule** 2 State Owned national energy utility entity with a focus on oil, gas, coal and renewable and clean energy options reporting to the Department Of Energy (DoE) as its primary shareholder. The organisation operates in South Africa with strategic partnerships in Ghana and Mozambique. The company derives its mandate primarily from the *Central Energy Fund Act No. 38 of 1977.* The Act mandates the CEF Group to contribute to the national security of energy supply through commercial operations and projects, as well as investing in developmental projects, all the while operating in a highly competitive and capital intensive environment with the need to be a profitable entity through its subsidiaries and associates. The dual mandate of Commercial and Developmental obligations requires a tight balancing act between the two imperatives given the strategic nature of the national assets that The Group holds and its obligations as defined in the National Development Plan (NDP). The CEF Group thus has to contribute towards the triple challenges of Poverty Alleviation, Promoting Equality and Creating Jobs as well as supporting the economic growth efforts of the Shareholder. The

CEF Group supports **INOVASURE** in its endeavours to develop and institute the Energy (and Water) Vault Program in South Africa.

Certain matters proposed were accepted by the Kannaland Local Municipality for **INOVASURE** to fund, construct, install and operate the proposed Energy Vault i.e: The Municipality would in due course own the installed power plant (received onto its balance sheet) which would be operated by **INOVASURE** for the period of 25 years in terms of the ESMA Agreement referenced above, as suitably converted to a PPP Agreement by the relevant Transactional Advisors, and the Municipality would assist with the interconnection arrangements with Eskom and **INOVASURE** would carry the cost of the connection of the substation to the Energy Vault.

It is proposed by **INOVASURE** that the case study of the Kannaland Local Municipality Energy Vault Project, introducing the financial modelling and technology, should be reviewed during the next phases of the implementation and roll-out of the InovaSure Energy Vault projects in South Africa to 119 other similar sites with funding that may be provided by institutions such as the NDB and other interested Development Finance Institutions and/or private companies.

2 THE KANNALAND PROJECT DBSA SUBMISSION

2.1 The SADC and DBSA PPDF Fund

The initial Feasibility Study Report for the Kannaland Local Municipality Energy Vault Project in its parts was intended to be prepared as documents to be used with any funding applications that would be considered, e.g. in this case as an application submission to the DBSA and SADC.

Figure 1: The SADC and DBSA

This DBSA PPDF Application Report and the completed prescribed forms for online submission to the DBSA (if required) were prepared in compliance with the prescribed process[5] with due acknowledgement of the Feasibility Reports that were prepared for the Kannaland Local Municipality.

The Feasibility Study Report for all of the proposed 120 **INOVASURE** Energy Vault implementation sites in South Africa, was prepared for further review with funding that may be provided by institutions such as the NDB, other Development Finance Institutions or private financial institutions.

In the DBSA's Operational Guidelines it is stated that "Article 26A of the Southern Africa Development Community (SADC) Treaty provides for the establishment of a special SADC Fund to be known as the SADC Regional Development Fund (RDF).

"In March 1998, SADC Ministers of Finance considered the outcome of a study whose purpose was to recommend a development financing mechanism for SADC. The study had recommended:

[5] SADC & DBSA Project preparation and Development Facility (PPDF): Operational Guidelines", dated 8 August 2017

- The establishment of a sub-regional Development Finance Resource Centre;
- An SADC-wide Development Finance Institutions Network; and
- A Regional Development Fund

"The first two entities have since been established, while the third was given further consideration through a feasibility study[6] to determine its desirability and feasibility. Phase 1 of the study recommended that before the institutionalisation of the RDF, priority should be given to the establishment of a financing vehicle to support the promotion and preparation of major infrastructure projects. This recommendation was based on the prevailing view amongst donors and private investors that the main constraint to the development of economic infrastructure was not the unavailability of investment capital in the region, but rather there was a lack of expertise with regard to the successful development of bankable projects for market presentation.

"The feasibility of a project preparation facility to address the perceived constraint was assessed through a second study[7]in May 2005. This study, which recommended that such a fund be incorporated into the legal framework of the proposed Protocol on Finance and Investment (FIP), was given Ministerial approval. In August 2006, the SADC Heads of State adopted and signed the Protocol on Finance and Investment, under which it was agreed to establish a Project Preparation and Development Facility (PPDF)[8].

"To operationalise the PPDF, a Memorandum of Understanding (MOU) was concluded between the SADC Secretariat and the Development Bank of Southern Africa (DBSA) in August 2008. Under the terms of the MOU, DBSA will assume responsibility for the administration, management, and disbursement of PPDF funds. To give effect to the hosting of the PPDF by DBSA, a Deed of Trust has been developed and the Trust established in South Africa.

6 "*Report on the desirability and viability of a SADC Development Fund",* Jordan Management Consultancy Ltd, May 2003
7 Final Report "*SADC Project Preparation and Development Fund (PPDF) – Investigation of the Modus Operandi"* GOPA Worldwide Consultants, May 2005
8 Chapter Nine, Article 16 "Development of a SADC Project Preparation and Development Fund"

2.2 Purpose and Objectives of the DBSA and SADC PPDF

In the Operational Guidelines of the PPDF it was stated that "SADC … identified infrastructure as one of the major drivers for economic growth and poverty reduction in the region. The aim of the SADC PPDF was stated as to:

- To create an environment conducive for investment through financing the preparation of infrastructure projects based in at least one SADC Member State or those with a direct and positive impact on another Member State. The PPDF will concentrate on those projects that will be considered as enablers of regional integration; and
- To provide technical assistance in infrastructure project identification, preparation and feasibility studies with a view to making the projects bankable and attractive to investors.

"The PPDF (intended to) … finance preparation of projects in the following sectors:

- Transport: including road, bridges, air, shipping, rail, ports, and border posts;
- Energy: including generation, transmission and distribution, including projects supporting alternative and/or renewable energy;
- Information and Communication Technologies, including Telecommunications;
- Water and Sanitation;
- Tourism related infrastructure (as in Trans-frontier Conservation Areas); and
- Other areas as identified within the Infrastructure Sector Plans and the Regional Infrastructure Development Master Plan.

"The PPDF would consider new (Greenfield) projects as well as those in need of upgrading and/or rehabilitation.

"The objectives of the SADC PROJECT PREPARATION AND DEVELOPMENT FACILITY OPERATIONAL GUIDELINES, henceforth referred to as *'the Guideline'*, (were) to set rules and procedures which shall guide the preparation of proposals, processing of applications, approval of support and effective implementation of the PPDF. Furthermore, the Guidelines will be utilised in funds mobilisation and interaction with co-funders and partners in the projects.

"The Guidelines are intended to contribute to:

- The effective and efficient management of the SADC PPDF; and
- The effective use of the resources available within the SADC PPDF.

"The Guidelines include Annexes which will be used in the processing and assessment of applications by different users".

2.3 Scope of the PPDF and Modalities for Implementation of the PPDF

The Operational Guidelines of the PPDF provided insights as to the "activities eligible for financing under the PPDF facility (being) pre-feasibility and feasibility studies, advisory services, environmental and social impact assessment as well as any other activity of an advisory, technical or operational nature related to preparation of projects. Broadly, these activities will include:

- Pre-investment Activities;
- Enabling Environment Activities;
- Studies;
- Advisory Services;
- Technical Assistance; and
- Capacity Building

The PPDF would provide grant financing to selected projects in the following sectors and areas that are outlined in the guidelines:

- Transport: including road, bridges, air, shipping, rail, ports, and border posts;
- **ENERGY: INCLUDING GENERATION, TRANSMISSION AND DISTRIBUTION, INCLUDING PROJECTS SUPPORTING ALTERNATIVE AND/OR RENEWABLE ENERGY;**
- Information and Communication Technologies, including Telecommunications;
- Water and Sanitation;
- Tourism related infrastructure (as in Trans-frontier Conservation Areas); and
- Other areas as identified within the Infrastructure Sector Plans and the Regional Infrastructure Development Master Plan.

The Guidelines provide clarity regarding which entities would be eligible for financing, i.e.:

- "All SADC Member States are eligible for PPDF financing as long as the proposed activity is intended to support regional infrastructure development in the energy, transport, water resources, ICT, TFCAs, and other areas not falling within the scope of these sectors but identified as of regional significance in the SADC Infrastructure sector plans. The Regional Infrastructure Development Master Plan will be used to identify the region's priorities;
- "The following entities will be eligible:
    - Governments of SADC Member States and their agencies; and
    - Regional Institutions promoted by Governments of SADC Member States;
- "A **private sector applicant may not apply** for funding under the PPDF. **However, projects proposed by private sector organisations, and involving the participation of the public sector (Public-Private Partnerships (PPPs)) would be eligible for financing under the PPDF ON THE CONDITION THAT THE APPLICANT HAS A LETTER OF SUPPORT FROM THE RESPECTIVE GOVERNMENT'S REPRESENTATIVE;**
- "Project proposals can be promoted by two or more eligible entities. In this case, one of these entities will vest the role of the APPLICANT in the other, and the other(s), will play the role of the PARTNER ORGANISATION(S)";
- "Projects are expected to take place within the boundaries of the SADC Member States. However projects taking place outside the boundaries of the Member States but for the benefit of SADC Member States will also be eligible;
- "To ensure ownership and commitment by the beneficiary, it shall be a requirement that they contribute a minimum of five percent (5%) of the total cost of the proposed preparatory activity. This amount will exclude any tax related implications;
- "The PPDF will finance major service contracts only. Therefore, only projects requiring a grant of a minimum of 250,000 USD, will be considered for support;
- "The financing structure must point out how the entire project is going to be financed and must specify the quota of financing expected from the SADC PPDF as well as the 5% to be financed by the beneficiary;
- "Only "eligible costs" will be taken into account in the calculation of grants. **THE ELIGIBLE COSTS TO BE INCLUDED IN THE BUDGET ARE THE FOLLOWING**:
    - Service contracts to carry out:
        - Pre-feasibility studies;

- Feasibility studies;
- Economic and financial analysis;
- Detailed design;
- Preparation of tender dossiers for works and supervision contracts; and
- Legal and Transaction Advisory Services.

- Meetings and conferences to:
  - Elicit stakeholder consensus on social and environmental impact mitigation; and
  - Develop institutional arrangements for the implementation of the project and its subsequent operations.

- "The following costs are not eligible:
  - Items not actually paid;
  - Items incurred before the implementation contract was signed;
  - debts and provisions for losses or debts;
  - interest owed;
  - items already financed by a third party for preparing the proposal or for proposed activities;
  - purchases of land or buildings;
  - credit to third parties;
  - salary costs of the personnel of national administrations;
  - currency exchange losses; and
  - taxes, inclusive of VAT.

The Guidelines provide clarity regarding the PPDF applications' process:

- "Potential beneficiaries will apply for the project preparation funds by filling in the online Application Form attached as depicted in Annex 2 of these guidelines:
- "Applications must be submitted through the online application process to DBSA before the deadline indicated in the RFP. The application must be in the client's letterhead signed off by duly authorised personnel;
- "DBSA will send a copy of the applications to SADC for assessment of the impact and relevance, while DBSA will take up the administrative/technical compliance evaluation; and
- "Subsequent RFPs will be launched as necessary, depending on the availability of funds"

More guideline details refer to the following selection process:

- "Proposals selected to be financed by PPDF will be chosen (i) on basis of the SADC Regional Infrastructure Development Master Plan (RIDMP) as revised from time to time, and (ii) proposals for development of projects that contribute to regional integration;
- "The process for selection will be carried out in a parallel assessment for relevance and for fitness of the applicant/organisation and technical quality of the proposal, and will be executed in 3 steps, in accordance with Annex 1:
    - **Tier 1**: by the SADC Secretariat Infrastructure and Services Directorate: Assessment for Impact on Regional Integration& relevance of the proposal in the context of the RIDMP; and
    - **Tier 2**: by DBSA: Assessment for Fitness of the Applicant/Organisation and Technical Quality of the Proposal. This level of the assessment will consist of two stages:
        i) The preparation of an Early Review Report for those projects which pass the Tier 1 assessment and completion of the Tier 2 assessment for each project in accordance with the attached Annex 1; and
        ii) Full due diligence will be done of those ERRs approved (projects that passed tier 1 and 2 assessment) and the results will be presented in an appraisal report by DBSA , including a draft facility contract for the application of PPDF grant funding;
    - **Tier 3:** Consideration by the Steering Committee to award a grant &announcement of awards. This level of assessment will consist of two stages:
        i) Steering Committee to approve in principle the ERRs; and
        ii) SC to approve the detailed project proposals and contracts as contained in the appraisal reports prepared by DBSA …..
- "The criteria for evaluation and selection are as follows:
        i) the contribution of the ultimate infrastructure project foreseen to SADC regional integration;
        ii) the current priorities in the SADC region for particular types of new infrastructure;
        iii) the fitness of the applicant/organisation that would undertake the activities described in the proposal for which support is requested; and

iv) the technical quality of the proposal including both the existing state of the infrastructure project preparation and the prospects for realisation of the infrastructure project envisaged"

- "As per … the MOU between the SADC Secretariat and DBSA, DBSA shall prepare documentation, descriptions and detailed specifications for projects which are eligible for the programme and shall, on receipt of the proposals, carry out a desk review to determine if the proposal is viable, properly prepared and verify whether the application is proposed by an eligible applicant/organisation. This assessment will lead to the preparation of an ERR and appraisal for each qualifying proposal. The criteria that will be taken into account by DBSA are the following:
    - **FITNESS OF THE ORGANISATION** proposing the project:
        - Assess fitness of the proposal in relation to the core business of the Applicant;
        - Previous experience of the Applicant and their partners in similar projects; and
        - Mandate of the applicant to apply for the grant;
    - **TECHNICAL QUALITY** of the proposal:
        - An assessment of the technical, legal, institutional, economic, environmental and financial aspects of the proposal;
        - Consistency of the proposed activities with the results to be achieved.
        - Appropriateness of the time schedule;
        - Inclusion of realistic assumptions and risk management in the proposal;
        - Presence of an adequate team in charge of project implementation and
        - Adequate monitoring of project implementation.

NOTE:

IN A SEPARATE NARRATIVE REPORT[9] THE APPLICATION DETAIL THAT IS REQUIRED FOR ONLINE SUBMISSIONS IS MATCHED ACCORDING TO THE LAID DOWN GUIDELINES FOR APPLICATIONS

SIMILAR NARRATIVE REPORTS TO THE REPORT THAT WERE PREPARED FOR THE KANNALAND MUNICIPALITY WILL BE PREPARED FOR EACH OF THE OTHER MUNICIPALITIES ACROSS SOUTH AFRICA IN DUE COURSE.

3 THE KANNALAND PROJECT PPDF APPLICATION

3.1 Letter from a Municipality to DBSA

The Guidelines for the PPDF application specified the following:

- "All SADC Member States are eligible for PPDF financing as long as the proposed activity is intended to support regional infrastructure development in the energy, transport, water resources, ICT, TFCAs, and other areas;
- "The following entities will be eligible:
  - Governments of SADC Member States and their agencies; and
  - Regional Institutions promoted by Governments of SADC Member States;
- "A private sector applicant may not apply for funding under the PPDF. However, projects proposed by private sector organisations, and involving the participation of the public sector (Public-Private Partnerships (PPPs) would be eligible for financing under the PPDF **ON THE CONDITION THAT THE APPLICANT HAS A LETTER OF SUPPORT FROM THE RESPECTIVE GOVERNMENT'S REPRESENTATIVE**.

3.2 Extracts from the Letter from Kannaland Local Municipality to DBSA

Extracts are provided here from the letter[10] that the Municipal Manager of the Kannaland Local Municipality, Mr. Reynolds, submitted to Mr Jaco Swart of the DBSA regarding the Kannaland Local Municipality and a PPP with **INOVASURE.**

Figure 2: The Kannaland Local Municipality

The following extracts from the Kannaland Local Municipality letter support the submission of Feasibility Study reports in setting up an intended PPP between a Municipality and **INOVASURE:**

[10] Letter from Municipal Manager at Kannaland Local Municipality: "KANNALAND LOCAL MUNICIPALITY AND A PUBLIC-PRIVATE PARTNERSHIP WITH INOVASURE", dated 5 November 2018

" … the Kannaland Local Municipality, after having first engaged during September 2012, has concluded an Energy Security Management and Administration Agreement ("ESMA Agreement") with InovaSure.

This ESMA Agreement and the servitude that it incorporates is the culmination of a process in terms of which INOVASURE was duly appointed and a Resolution taken by the Kannaland Local Municipality to implement the Energy Vault as a PPP under the auspices of the DBSA (and with the endorsement of National Treasury GTAC PPP division). The terms of the ESMA Agreement and intended future PPP furnishes InovaSure with the mandate to erect the Energy Vault components on the Municipal property, including any other concomitant structures and Photo Voltaic (PV) structures that would be required for the project/s, as well as any concomitant devices such as distribution and telecommunications devices and the like.

'We at Kannaland Local Municipality believe that the InovaSure Energy Security plan and its Energy Security installation as set out in the referenced ESMA Agreement and supporting Financial Model and Feasibility Study, can have a meaningful and quantifiable beneficial effect on the Kannaland Local Municipality's economy.

'InovaSure also advises us, as detailed in the Feasibility Study, that they have finalized the technological and funding arrangements to supply a minimum of a 53.5MWh energy storage facility, which may also be upsized to allow for the further storage and the concomitant export of power to other neighbouring Municipalities, and that this technology will be utilized at the Kannaland Local Energy Vault site as a standard part of their Energy Security Program.

'InovaSure also advises us that they will provide and implement prepaid distribution and telecommunications devices and management systems as part of the Energy Vault operational system, in both formal and informal neighbourhoods, in such a way that the home becomes the mechanism to control power usage along with the Municipality's ability to shift, store and shave the power so distributed.

"We understand from InovaSure that the Energy Vault installation for the Kannaland Local Municipality is in essence a minimum of a 20MW – 53 MWh storage device introduced at substation level which is coupled with the concomitant balance of systems required to shift energy from off-peak periods into peak periods – in our distribution network. The Energy

Vault will target dispatchable energy delivery during peak periods – typically 2 hours in the morning and 3 hours in the evening. It may also be upsized to allow for the storage of power for sale to neighbouring Municipalities as an extra revenue stream.

'In addition to the referenced storage device, a Photo Voltaic Power Plant is mooted to be installed with a 50MW capacity. This capacity is well in excess of the requirements of the Kannaland Local Municipality, but the intention is to trade with the power and to sell it to our other Municipalities within the Garden Route District Municipality, so providing a much needed extra revenue stream.

'We are convinced that the introduction of the InovaSure Energy Vault at Kannaland Local Municipality by means of the basis contained in the ESMA Agreement, the ensuing PPP arrangement under the auspices of the DBSA and the underlying principles that it contains will bring a number of crucial benefits to our town.

'The main benefit will be that of quality of supply and delivery – we believe that the introduction of the InovaSure Multidimensional Energy Vault solution will have a profound effect on the energy supply system in the Kannaland Local Municipality. Dispatchable energy – we are advised - will become available in milliseconds as opposed to minutes and also can be a balancing load with the same response time. This is invaluable for normalisation of the load profile, voltage and frequency stability at Kannaland, as well as for balancing non-symmetric network loads while reducing dynamic load stresses on base-load power stations.

'We at Kannaland Local Municipality believe that the InovaSure intervention secures the management of renewable energy into the Real Time Multidimensional Energy Management System ("RMEMS") and optimises intelligent energy dispatch which in turn maximises value and preserves our distribution hardware. In this regard, the InovaSure RMEMS (Energy Vault) eliminates the need for any possible significant substation expansion programs in the future. As a balancing contributor, it also maximises Eskom output by shifting off-peak power into peak times.

'We also believe that the intervention of the InovaSure Integrated RMEMS System (Energy Vault) will have a profound impact on the reliability of the energy delivery and generation system in our Municipality. The reliability of energy delivery will increase significantly for shorter interruptions and due to the enhancement of the distribution capacity and the quality

of supply, will impact positively to the reliability of the delivery in the Kannaland Local Municipality and surrounds.

'We believe that the InovaSure / Kannaland Local Municipality ESMA Agreement and future PPP arrangement under the auspices of the DBSA will ensure the delivery of well maintained, cost-effective public infrastructure and services, by leveraging private sector expertise and transferring the risk to the private sector.

'We, as the Kannaland Local Municipality, receive a full set of services, including infrastructure and other services, from InovaSure as the private sector. We pay for these over the term of the proposed PPP Agreement, based on successful delivery. When the process has run its course we receive these assets onto our balance sheet. InovaSure puts its own capital at risk, funding its investment in the project with debt and shareholder equity. Because of the financial risk that InovaSure takes, it is motivated to provide a high level of service, as good returns on equity will depend on the quality of services it delivers.

'We believe that through this arrangement, we can achieve other social objectives, such as economic empowerment, educational skills, enhancement of telecommunications, health and food and water security through aligning the incentives of InovaSure as a private party with these objectives. In this regard we are advised by InovaSure that a shack electrification and telecommunications program will also be set up by it and its collaborators, in the format of a Co-operative, and furthermore that a significant portion of the proceeds of the Energy Vault operation will be paid to a Community Trust for use in uplifting various aspects of the Kannaland Local Municipality community. The Financial Model in question produced by InovaSure details the exact nature of these contributions and costs.

3.3 The Feasibility Report Submission and the DBSA Application

This Part of the Overall Feasibility Report for the Kannaland Local Municipality Energy Vault Project shall be submitted in support of the DBSA submission of the intention by the Kannaland Local Municipality (as one of the pilot implementation sites in South Africa) to enter into a PPP with **INOVASURE** as well as for funding requests to funding institutions such as the NDB and other Development Finance Institutions under the auspices of the DBSA and endorsed by the National Treasury GTAC PPP division**.** The Feasibility Study

Report for each of the other 119 implementation sites in South Africa, will also be prepared for further review with funding that may be provided by institutions such as the DBSA.

InovaSure, in conjunction with the Kannaland Local Municipality, as a PPP based on the concluded Energy Security Management and Administration Agreement (ESMA Agreement) will apply to the DBSA to act as the Mandated Lead Arranger (MLA) for the Kannaland Local Municipality Energy Vault Project as an implementation project for the InovaSure Energy Security Program in South Africa and to facilitate the syndication of the funding therefore as part of its process of receiving and managing the PPP process under its auspices.

In fact, InovaSure also applied for the consideration by the DBSA to act as the Mandated Lead Arranger for all of the proposed InovaSure Energy Vault projects (120) planned for implementation over the next 7 years at a total of 2400MW, and in addition to facilitate the PPP processes in the light of the various protocols signed between **INOVASURE** and the Russian Federation, as well as various companies in Russia, as a BRICS partner, including a confirmation of Underwriting by the Department of Fuels and Energy, Russia, for the **INOVASURE** Energy Security Program and its intention to set up Manufacturing Facilities for the manufacture of the various components of the Energy Vault in South Africa.

This narrative report was created for purposes of completing the DBSA application for support in terms of its ability to manage the proposed PPP process and to act as Mandated Lead Arranger for the syndication of the funds envisaged for the REAL TIME MULTI-DIMENSIONAL ENERGY MANAGEMENT SYSTEM (the RMEMS, also known as an Energy Vault) that is due to be established for the Kannaland Local Municipality.

An OVERALL FEASIBILITY REPORT FOR THE KANNALAND PROJECT was submitted to the Kannaland Municipality in support of the intention by the Municipality to enter into a Public Private Partnership (a PPP) with **INOVASURE**. A similar submission is now being made to the DBSA for the intended Kannaland Local Municipality Energy Vault Project as one of the identified sites mentioned above.

Elements of the feasibility study outcomes and the financial modelling that was developed for the Kannaland Local Municipality Energy Vault Project are discussed in detail in the following documents:

InovaSure RMEMS Feasibility Study Report
EXECUTIVE SUMMARY
Part A: **INTRODUCTION TO INTERVENTIONS**
Part B: **FEASIBILITY OF INTERVENTIONS**
Part C: **INVESTMENT AND FINANCE**
FINANCIAL MODEL (FINANCIAL MODEL, Kannaland 04.01a & 04.01b Stage 1 & Stage 2 Rev G

Table 1: Feasibility Study Reports and Financial Model

The financial modelling and Feasibility Reports for the Kannaland Local Municipality Energy Vault Implementation Project will be reviewed further during the next phases of the implementation and roll-out of the InovaSure Energy Vault program in South Africa with funding that may be provided by institutions such as the NDB and /or other Development Finance Institutions.

4 THE KANNALAND PROJECT PPP FUNDING APPLICATION

4.1 The Public Investment Corporation (the "PIC") as identified possible co-funder along with other identified entities (such as the New Development Bank)

InovaSure and the Kannaland Local Municipality (as the initial implementation site), as a future PPP arrangement based on the ESMA Agreement that was concluded and which will be amended to comply with a PPP Agreement in the format required by the DBSA, has applied for funding / co-funding from the following institutions in South Africa and abroad, which funding applications are currently under review:

- The Public Investment Corporation (PIC);
- The African Regional Centre (ARC) of the New Development Bank (NDB);
- The African Development Bank (AfDB);
- The development Bank of Southern Africa (DBSA)
- The Department of Trade and Industry (dti);
- The Industrial Development Corporation (IDC);
- The International Finance Corporation (IFC);
- The EXIM Bank of China;
- The China Development Bank;
- The EXIM Bank of Russia;
- The Vasheconom Bank for Development in Russia;
- Other Development Finance Institutions.

The application process that is being followed for the Kannaland Local Municipality Energy Vault project is intended to be replicated for the 119 (there are two Energy Vault's planned for Kannaland) other roll-out implementation sites, such as the City of Tshwane (35 Energy Vaults), the Central Karoo District Municipality (3 Energy Vault), various Municipalities in the Garden Route District Municipality (7 Energy Vaults), Mkhondo Local Municipality (1 Energy Vault) and Ulundi Local Municipality (1 Energy Vault) in Mpumalanga and in fact many other Municipalities in South Africa.

The Public Investment Corporation (PIC), headquartered in Pretoria, South Africa, is the largest investment manager on the African Continent.[11]

Figure 3: The Public Investment Corporation (the "PIC")

The mission[12] of the Public Investment Corporation SOC Ltd (PIC) is to deliver investment returns in line with client mandates; create a working environment that will ensure that the best skills are attracted and retained; be a beacon of good corporate governance; and contribute positively to South Africa's development.

The funds invested in are primarily from pension, provident, social security and guardian funds. Investments are diversified across the following broad asset classes: Listed Equities, Capital Markets, Money Markets, Property, Developmental Investments and Private Equity. The PIC controls approximately 12% of the Johannesburg Stock Exchange and has a mandate to invest in the rest of the African continent.

As a long-term investor[13], the Public Investment Corporation sets its objective as one to achieve returns higher than the clients have benchmarked and is spread amongst four investments areas:[13]

- **Fixed income and dealing** - Manages all fixed bonds in which the Public Investment Corporation has invested. A government corporation or parastatal would approach the Public Investment Corporation to borrow funds and in exchange a fixed interest bearing bond would be issued and managed on behalf of the former organisations. They are a member of the Bond Exchange of South Africa (BESA);
- **Listed equities** - Their largest client is the Government Employees Pension Fund (GEPF) with approximately 80% of the stocks managed internally and external managers managing the remaining 20% of the fund with the ability to invest up to

[11] https://isibayafund.pic.gov.za/Pages/Home.aspx
[12] https://nationalgovernment.co.za/units/view/149/Public-Investment-Corporation
[13] https://en.wikipedia.org/wiki/Public_Investment_Corporation

10% of the funds outside of South Africa. Its investment on the Johannesburg Stock Exchange is worth approximately 12.5% of the exchanges capitalisation;

- **Properties** - Manages high-quality retail, offices and industrial properties including property asset management, property development and new property acquisitions. The clients of the property fund are the Government Employees Pension Fund (GEPF), the Unemployment Insurance Fund (UIF) and the Compensation Commissioner Fund (CC). Some of the properties managed or part managed are the Menlyn Shopping Centre, Cresta Shopping Centre, The Pavilion, Tyger Valley Centre, Westgate and Southgate shopping centres as well as the Minosa and Victoria & Alfred Waterfront and the Airports Company South Africa, owner of national and international airports and
- **Isibaya** - making use of a portion of client funds, it provides financing for projects that contribute to long-term economic, social, and environmental outcomes in South Africa but provide a financial returns for the client

The objective of specifically the Isibaya Fund portfolio is to earn good financial returns whilst supporting positive, sustainable economic, social and environmental outcomes in South Africa and the rest of the African continent through the various. The Isibaya Fund is a division of the PIC, which provides finance for projects that generate financial returns while also supporting positive, long-term economic, social, and environmental outcomes for South Africa. The emphasis on investments with a developmental focus demonstrates the PIC's commitment to the country's growth and development aspirations.

4.2 Interaction with the PPP Unit at National Treasury

Regular meetings were held between representatives of **INOVASURE** and the PPP Unit at National Treasury GTAC, as well as the DBSA's PPDF division, regarding the intended application, under the auspices of the DBSA and with the consent of the National Treasury's GTAC PPP division, for the approval of the Kannaland Project that would be submitted to the Public Investment Corporation (the "PIC") and/or or any other relevant funding agencies as mentioned above. The outcomes of the process at the Kannaland Local Municipality implementation site would serve as valuable inputs for future application processes of the other 119 potential sites.

4.3 Further Interaction

Further interaction is envisaged between **INOVASURE,** selected Municipalities (such as Kannaland, Kannaland and Tshwane Municipalities as Pilot Implementation Projects), National Treasury and other stakeholders. The main aim of such interaction would be to identify and clear any issues that may have been identified for the final preparation of the DBSA submission as contained and described in this Feasibility Report for the Kannaland Project.

The process for finalisation of the PPP for any specific future Energy Vault project site will include the appointment of strategic advisors to the specific site for Legal, Technical and Financial aspects – as the DBSA has been formally requested to do so.

5 ENERGY VAULT PROJECT (KANNALAND): LEGAL OPINION

5.1 The Need for a Legal Opinion on Matters raised by the National Treasury

As was mentioned earlier in this part of the Feasibility Report, the National Treasury GTAC PPP division recommended that a Commercial Lawyer should address the matter of the INPVASURE Energy Vault project in terms of its legal parameters which could then be taken to the Kannaland Local Municipality City Council for the confirmation of its final endorsement and approval of the relevant Energy Security Management and Administration Agreement ("ESMA Agreement") entered into as the basis for the future Public private Partnership arrangement under the auspices of the DBSA.

The Senior Advocate (Adv. S.F. Mouton) was previously approached by **INOVASURE** for a legal opinion on relevant legal principles. The legal opinion was provided as requested and is included as an Annexure to this part of the feasibility report.

Transactional Advisors to both the DBSA and National Treasury GTAC PPP division were selected and appointed and are in the process of vetting the Legal, Financial and Technical aspects of the INOVASURE Energy Vault Project proposed for Kannaland Local Municipality. They are also in the process of drafting a suitable PPP Agreement for the DBSA, based on the referenced ESMA Agreement already finalised, to peruse in the finalisation of the PPP process under the auspices of the DBSA

5.2 Legal Opinion by Adv, SF Mouton

Adv. Mouton was requested "to advise … whether the LOCAL AUTHORITY ENERGSURE PROGRAM (the 'LAEP') complies with all existing legislation in South Africa and whether the proposed structure will adequately protect the rights of all the stakeholders".

In the Legal Opinion document[14] Adv. Mouton referred to the LOCAL AUTHORITY ENERGSURE PROGRAM (the 'LAEP') as one of the InovaSure products that are described on InovaSure's website:

[14] 04.03 Legal Opinion by Adv, SF Mouton: "Opinion", dated 26 October 2016

- "InovaSure's integrated power solution program allows for the generation of Green Energy, which is then stored and shifted through an energy demand / supply management system of which the end result will be a constant supply of energy to Local Authorities;
- "In order to maintain a stable supply, a measurement and compensation method has been designed in the form of an insurance product, i.e. "LOCAL AUTHORITY ENERGSURE" PROGRAM (the LAEP);
- "It is a 'Power Protection Plan' product which is combined with a Capital Markets Program, offsetting capital requirements and referencing the risks and economic realities as well as complying with all the relevant Government and Industry stakeholders' regulatory requirements and Government Departmental Governance Procedures; and
- "The LAEP Product will provide, through proprietary means, Energy Security to the Local Authority in exchange for one monthly Insurance Premium. InovaSure and its partners will introduce assets onto the Local Authority's balance sheet, then become the usufructury user of the assets and provide generation, storage, shifting, shaving distribution, metering and regulatory issue"

In the Legal Opinion Adv. Mouton referred to the following in support of his Legal Opinion:

- The Constitution of the Republic of South Africa;
- The Electricity Regulation Act that repealed the Electricity Act, No. 41 of1987, and commenced on 1 August 2006;
- The Municipal Systems Act, No. 32 Of 2000;
- The Municipal Finance Management Act, No. 56 of 2003; and
- Immoveable Property of the Municipality;

The full Legal Opinion is available upon request from **INOVASURE.**

6 KANNALAND and KANNALAND PROJECT INVESTMENT & FINANCE

6.1 Financial Modelling and Scenario Planning

The Engagement Team of **INOVASURE** and its collaborators conducted the Feasibility STUDY Process over many years (from September 2012 to date) to provide focus for the development and implementation of the RMEMS (also called the Energy Vault) for the Kannaland Local Municipality.

The purpose of this final Feasibility Study Report is to provide sufficient roll-out motivation for the business case for the proposed RMEMS Development by **INOVASURE** in South Africa. Information and documentation was sourced from identified stakeholders and collaborators for analyses, stakeholder interviews, site visits and brainstorming sessions which were conducted to test the intention for the development of the proposed stages of the development. This is an ongoing process.

In assessing the financial viability of the proposed Special Purpose Vehicle (SPV) for the intended support of a Municipal Authority such as the Kannaland Local Municipality a financial model had to be developed that accommodated the following scenarios, i.e.:

- **A PPP-type entity that can raise funds for the Energy Vault Development:**
  - In this scenario the SPV Management Company usually is responsible to finance, and therefore owns, the top-structures identified and therefore incurs a liability on its balance sheet;
  - In the case of a PPP, the income includes infrastructure and central services levy based on size, use, lease arrangements where suitable, etc;
  - The payment basis by the participating Municipality is structured on the payback of the external loans over a period; and
- **A government entity that can only obtain funds for advisory services, bulk infrastructure and certain operational expenses:**
  - In this case the SPV Management Company balance sheet does not incur liabilities for the establishment of the top structures and therefore no external or third party finance is included;

- The income generated by the Management Company in this scenario is limited to the infrastructure and shared services levy;
- The SPV in this case will only be sustainable in the event that there is continued support from either government institutions to support the overhead costs;
- The projected income from the services and levies alone are not sufficient to cover the SPV overhead costs and maintenance of the infrastructure.

The outcomes of the technical Feasibility Studies that were undertaken and the resultant reporting that was discussed in Parts A and B of this Overall Feasibility Report were used as inputs to the financial modeling for the Kannaland Local Municipality Energy Vault Project that is covered in this part, Part C, of the Overall Feasibility Process Report. The latter, in turn, are used to prepare the specific submissions to funders and investors that have shown an interest in the Overall **INOVASURE** Energy Vault Project and associated interventions. This is also the case for the intended support of the Kannaland Local Municipality Energy Vault Project and its stakeholders.

The financial projections have revealed that the proposed Kannaland Local Municipality Energy Vault and associated developments could operate profitably as a PPP case, as could other similar implementations.

6.2 Financial Parameter Assumption Inputs

A Financial Model[15] (for CAPEX and OPEX) was developed and relevant assumptions were tested during the business planning phases of the engagement. The total investment funding that is to be applied for from various funding institutions for the RMEMS implementation at the Kannaland Local Municipality was determined and is referred to in this report.

The total investment funding that is required for the RMEMS (Energy Vault) implementation at a Municipality such as the Kannaland Local Municipality that is envisaged to be partly funded by funding institutions such the NDB, was determined and is referred to in this report. The funding of the Energy Vault that is due to be established for the Kannaland Local Municipality as the initial implementation site (starting with one and ramping up to two

[15] 04.01a & 04.01b Financial Model, phase 1 & phase 2", dated November 2018"

Energy Vaults) will be reviewed for the 119 other roll-out implementation sites in South Africa.

At the feasibility phase of the development the following indications were given of the nature and preliminary extent of the categories of investment required for the development:

- The nature and extent of capital requirements for establishing the RMEMS;
- The nature and extent of establishing and rolling out the governance structures, processes and systems of the identified and associated Special Purpose Vehicles (SPVs);
- The impacts of generation and load management systems on system responses;
- The identification of scope/service gaps, potentially complimentary services;
- The optimisation of the overall solution by harmonisation of the various components; and
- Maximisation of incidental value propositions – such as the life extension of existing sub-stations by injecting supporting injection of the Municipal side of Eskom substations.

The Financial Parameter Assumption Inputs

The following financial parameter assumption inputs[16] were used in the financial model:

Current exchange rates		**General parameters**		
ZAR/USD	14.42	Tax rate	28.00%	
ZAR/ERO	15.87	Discount rate	15.00%	(norm for IPP projects)
ZAR/AUD	10.89	CPI	8.00%	(sculpted – projected)

Scope		**Solar**	**Hydro**	**Smart meters**	**LTE network**	**LiveSure**	**MyPower**	**Vault**
Loan term	yr	10	10	7	10	5	7	10
Interest rate	%	10.50%	10.50%	10.50%	10.50%	10.50	10.50%	10.50%
Depreciation period	yr	3	10	7	10	5	7	3
Debt/equity ratio	%	70.00%	80.00%	80.00%	80.00%	80.00%	70.00%	80.00%

Table 2: Financial Parameter Assumptions

Parameters are adjusted to account for the characteristics of particular technologies, and financial risk.

[16] 04.01a & 04.01b Financial Model, Stage 1 & Stage 2", dated November 2018"

6.3 Option Analysis

The Financial Model is based on income, balance sheet and cash flow projections over a 25 year forecast period, commencing with the start of operations once bulk infrastructure is in place. The projections are based on projected annual financial statements and key assumptions in terms of growth and inflation. The base option is "doing nothing", which is deemed impractical due to challenges encountered by the Kannaland Local Municipality managing payments for power and trying to deal with high Eskom tariffs during peak periods, as well as penalties.

While the final configuration will have 25MWp of solar PV, and even ramp up to 50MWp when exports of power to neighbouring Municipalities are implemented, the current Eskom off-peak tariff is below the tariff required to support the solar PV portion of the project. With the Eskom tariff increases currently being discussed, this will most definitely change during the period when the Environmental Impact Assessment for the chosen site is carried out in 2018. For this reason, the solar PV is implemented in two stages; stage one implements one MWp circuit of the proposed 25MWp solar PV solution in the first Energy Vault model, allowing for the convenient expansion of the solar PV portion when justified by tariffs in further Energy Vault size increments. From a practical perspective, the LTE network and Thin Client Technology is considered for both options as additional cost, as the network is required to communicate with the Smart Meters.

Option 1: Do nothing	**R0**
Option 2: InovaSure RMEMS Stage 1	**R523,628,041**
Solar PV Plant	R18,880,360
Smart meters	R27,783,936
LiveSure Thin Client Technology System	R3,012,000
Battery Vault	R329,894,441
LTE network	R93,669,750
LivPak B4I	R50,387,554
Option 3: InovaSure RMEMS Stage 1 + 2	**R1,039,277,822**
Solar PV Plant	R360,737,556
Smart meters	R112,156,771
LiveSure Thin Client Technology System	R22,762,000
Battery Vault	R269,894,441
LTE network	R223,339,500
LivPak B4I	R50,387,554

Table 3: The CAPEX of the Options

The implementation CAPEX requirements of the LivPak Shack Electrification communications hub systems of R35.97 million is included in the table above for 2000 implementations, however, it is possible that there will not be that many shacks to incorporate into the Livpak program.Comparing the benefits of the options, the cash flows from the projections are extracted to estimate the Year 1 operational expenditure. Current Eskom costs are expected to be duplicated, with the reduction in higher tariff consumption and increased off-peak consumption. With projected increased Eskom tariffs, more of the premium tariff energy is obtained from the larger solar PV system. The annual costs of the LTE network (at a capital cost of approximately R223 million), as well as Smart Meters (at a capital cost of approximately R94 million), are added to all options. For the case of the **INOVASURE** RMEMS implementation, the costs to the Municipality include reduced Eskom charges, energy costs to the generation SPVs and the Vault lease costs.

The Year 1 cost to the Municipality is approximately R1.2million, which offset by the benefits, with a saving of approximately R1.4million. The "negative energy cost" to InovaSure is additional off-peak energy purchased from Eskom and reimbursed from the Vault (which is supplied during peak periods). This reduces with more energy coming from an increases solar PV installation after implementation of Phase 2.

No project finance is required of the Municipality, and all assets are transferred to the Municipality free of charge at the end of the project.

Option	Annual cost	Annual benefit
Option 1: Do nothing	**R36,324,317**	**R0**
Eskom charges	R36,324,317	
Option 2: InovaSure RMEMS Stage 1	**R34,987,540**	**R1,336,777**
Eskom charges	R35,351,658	
InovaSure energy charges (vault + solar)	-R1,564,118	
Vault lease	R1,200,000	
Future do-nothing Eskom charges	**R49,741,455**	**R0**
Option 3: InovaSure RMEMS Stage 1 + 2	**R39,987,155**	**R9,754,301**
Eskom charges	R28,637,467	
InovaSure energy charges (vault + solar)	-R650,312	
Vault lease	R12,000,000	

Table 4: The Benefit Analysis Options

6.4 Infrastructure Investment

The proposed investment in each of the Infrastructure Components is captured in Table 4 for Plant and Equipment CAPEX of approximately R805 million and Working Capital CAPEX of R254 million, i.e. a TOTAL CAPEX requirement of approximately R1 060 million, i.e. including the implementation CAPEX requirements of the **LivPak** Shack Electrification / communications hub systems of approximately R35.97 million as was stated before. Each of the contributing components is considered as a separate SPV company ensuring that each venture is developed on a sound commercial basis. The components are:

- Development of a 25MWp **solar PV power station** – not grid-connected but supplying DC power to the battery of the Vault system;
- Roll-out of approximately 25 000 **Smart Meters** (plus 2000 in informal settlements);
- Implementation of a 20MW/53MWh **storage battery system**;
- Implementation of an **LTE communications network** for the Smart Meters as well as media/telephony solutions;
- Establishment of a **virtual machine computational facility** for Smart meter / LTE customers including educational and entertainment media; and
- The implementation CAPEX requirements of the **LivPak** Shack Electrification / communications hub systems of approximately R35.97.

The CAPEX and returns estimates are presented in table format[17]:

INOVASURE KANNALAND ENERGY VAULT PROJECT: SUMMARY OF CAPEX / WORKING CAPITAL - ONE ENERGY VAULT					
	Plant, equipment, etc.	**Working capital**	**Total CAPEX**	**IRR**	**NPV @ 10%**
Solar PV Plant	R 12,880,360	R 6,000,000	R 18,880,360	8.36%	R-1,109,489
Smart meters	R 22,745,889	R 5,038,047	R 27,783,936	12.61%	R 969,374
LiveSure Thin Client Technology System	R 2,012,000	R 1,000,000	R 3,012,000	31.41%	R 3,489,335
Battery Vault	R 219,894,441	R 110,000,000	R 329,894,441	10.60%	R 12,089,119
LTE network	R 76,669,750	R 17,000,000	R 93,669,750	8.47%	R-3,749,698
SSS B4I	R 31,054,145	R 19,333,409	R 50,387,554	12.63%	**R 8,144,662**
Combined ZAR	**R 365,256,585**	**R 158,371,456**	**R 523,628,041**	**10.56%**	**R 19,833,302**
Combined Dollars	**$30,438,049**	**$13,197,621**	**$43,635,670**		**$1,652,775**

Table 5: Infrastructure Investment Projection

[17] "Feasibility Reports: Financial Model, 04.01a and 04.01b Rev G Stage 1 and Stage 2, Capex Summary" dated November 2018

INOVASURE KANNALAND ENERGY VAULT PROJECT: SUMMARY OF CAPEX / WORKING CAPITAL - ONE ENERGY VAULT					
	Plant, equipment, etc.	**Working capital**	**Total CAPEX**	**IRR**	**NPV @ 10%**
Solar PV Plant	R 245,610,697	R 115,126,859	R 360,737,556	1.40%	R-84,663,130
Smart meters	R 92,156,771	R 20,000,000	R 112,156,771	20.95%	R 20,098,503
LiveSure Thin Client Technology System	R 13,762,000	R 9,000,000	R 22,762,000	25.54%	R 13,977,326
Battery Vault	R 219,894,441	R 50,000,000	R 269,894,441	99.36%	R 1,482,470,956
LTE network	R 153,339,500	R 70,000,000	R 223,339,500	17.09%	R 72,083,485
SSS B4I	R 31,054,145	R 19,333,409	R 50,387,554	12.63%	**R 1,503,967,140**
Combined ZAR	**R 755,817,554**	**R 283,460,268**	**R 1,039,277,822**	**35.10%**	**R 1,503,967,140**
Combined Dollars	**$62,984,796**	**$23,621,689**	**$86,606,485**		**$125,330,595**

Table 6: Infrastructure Investment Projection (Stage 2)

The figures that are mentioned are supported by the detailed financial model, as well as the technical (and elements of financial) inputs of Part B of the overall feasibility report, i.e. the technical feasibility of each intervention.

The Parts to the Feasibility report and the Financial Model will be reviewed in the implementation roll-out process for the proposed development of the RMEMS for other project sites based on the experience with the Kannaland Local Municipality Project. During the financial modelling process, each of the financial modelling of each of the SPVs was conducted. The financial modelling outcomes of each of the SPVs[18] are available upon request and not included here.

6.5 The Combined SPV Financial Modelling Outcomes

In developing the framework and content of this Feasibility Report for the intended submission to the Development bank of Southern Africa (the DBSA) and other fundinng institutions, the following process is acknowledged that has been, and is currently, being, followed by **INOVASURE (PTY) LTD:**

- The formation of a Public Private Partnership (PPP) between **INOVASURE** and the Kannaland Local Municipality, proposed to be endorsed by National Treasury GTAC

PPP division and managed under the auspices of the DBSA, covers all aspects of the implementation of the **INOVASURE** Energy Security Program as various energy infrastructure projects and will be arranged to be funded by the efforts of **INOVASURE,** including the installation of distribution and telecommunications devices and so-called Thin Client Technology ICT (Information Communication Technology) devices, as well as management systems;

- **INOVASURE** prepared Feasibility Reports[19] in parts that were submitted to the Kannaland Local Municipality as the initial pilot implementation project partner to the proposed PPP and the application for endorsement thereof in terms of the time period by National Treasury GTAC PPP division;
- The company **INOVASURE (PTY) LTD** (South Africa) has been registered with The Companies' and Intellectual Properties Commission (the CIPC")**;**
- A Special Purpose Vehicle (SPV) is in the process of being registered as part of the proposed PPP with the KANNALAND LOCAL MUNICIPALITY i.e **"INOVASURE** Kannaland Energy Vault Holdings (Pty) Ltd.; and
- Various other project specific SPVs are also in the process of being registered under the overhead umbrella of **INOVASURE Kannaland Energy Vault Holdings (Pty) Ltd**, being the following:
  - **INOVASURE** Kannaland PV (Pty) Ltd
  - **INOVASURE** Kannaland Thin Client (Pty) Ltd
  - **INOVASURE** Kannaland LTE (Pty) Ltd
  - **INOVASURE** Kannaland Smart Meter (Pty) Ltd
  - **INOVASURE** Kannaland Battery (Pty) Ltd

During the financial modelling process the financial modelling of each of the SPVs[20] was conducted. The financial modelling outcomes of each of the SPVs are available upon request and not included here.

6.6 The Risks Associated with the RMEMS Development

The key potential risks associated with the proposed Kannaland Local Municipality Energy Vault Program and its installation have been identified. These include risks of a technical, financial and economic nature that would mostly also apply to all the identified 120 roll-out implementation sites in South Africa.

[19] "Kannaland Local Feasibility Reports: Executive Summary and Parts A, B and C", dated November 2018
[20] 04.01a & 04.01b Financial Model, Stage 1 & Stage 2", dated November 2018"

- A key driver is the support for the Kannaland Local Municipality Energy Vault Project by National Treasury GTAC PPP division, SALGA, COGTA, the Central Energy Fund Group of Companies (CEF), various other government departments and stakeholders and various funding agencies, as well as Eskom and the Kannaland Local Municipality itself;
- Besides the market development risks, it appears that all other risks can be mitigated suitably by employing and training the various SPV management teams and Kannaland Local Municipality officials to take part in the promotion and management of the implementation process; and
- The other risks associated with the establishment of the Kannaland Local Municipality Energy Vault are typical of any industrial or property development and infrastructure project and relate to availability of land, funds and resources to establish the whole of the Energy Vault installation in all its aspects, as well as licensing and regulatory processes that need to be completed.

6.7 Extrapolated Parameters for full InovaSure Energy Vault Program in South Africa (120 Energy Vaults providing 2400MW)

The below mentioned modelling outcome for the implementation of the full InovaSure Energy Vault program in South Africa with 120 Energy Vaults is provided in the table below.

INOVASURE intends to implement the intended 120 Energy Vaults over the next 7 years, each one of which is based on the Kannaland Energy Vault implementation project model. The Energy Vaults in question are proposed to be centred on the Metro's, starting with City of Tswhane (which has already indicated its interest in doing so with 35 Energy Vaults) and thereafter Cape Town, with other Metro's to follow in due course, and also with District Municipalities such as the Central Karo and the Garden Route, which have also indicated their willingness to take part in the project:

InovaSure (South Africa) Energy Vault Program x 120 units					
	Plant, equipment, etc.	Working capital	Total CAPEX	IRR	NPV @ 10%
Solar PV Plant	R 47 654 217 912	R 1 330 055 913	R 48 984 273 826	15,64%	R 9 833 650 353
Smart meters	R 13 730 310 487	R 95 349 646	R 13 825 660 133	14,57%	R 1 004 100 052
LiveSure Thin Client Technology Systems	R 1 671 378 316	R 0	R 1 671 378 316	279,80%	R 8 881 636 618
Battery Vault	R 38 242 683 997	R 4 640 896 904	R 42 883 580 901	18,23%	R 12 263 421 751
LTE network	R 18 400 740 000	R 0	R 18 400 740 000	27,22%	R 14 466 781 037
ZAR	**R 119 699 330 712**	**R 6 066 302 463**	**R 125 765 633 175**	**20,42%**	**R 46 449 589 811**
DOLLAR	**8 300 924 460$**	**420 686 717$**	**8 721 611 177$**	**20,42%**	**3 221 192 081$**

Table 6: InovaSure Full Energy Vault Program

7 CONCLUSION

As was stated throughout this report the outcomes of the feasibility process as part of the broader business planning process is strictly for business planning process information purposes. Projections in the report have been compiled for reporting and submission purposes and may not constitute final forecasts.

The eventual outcome of the business planning roll-out process may be more or less favourable than that portrayed in the report

The process and the reported outcomes for each of the intended pilot site financial models (i.e. Kannaland Local Municipality) and for each of the subsequent implementation site models will be reviewed during the next phases of the implementation and roll-out of the **INOVASURE** Energy Vault program in South Africa.

8 CONTACT DETAILS

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9 SUPPORTING DOCUMENTATION

For ease of reference all the supporting documentation is contained in the annexures. These include:

- Part C: Annexure 1: Financial Modelling Outcomes: Summary
- Part C, Annexure 2: Legal Opinion by Adv. S.F. Mouton

PART C, ANNEXURE 1: FINANCIAL MODELLING OUTCOMES: SUMMARY

The Overall Financial Model[21] that was developed is available upon request

INOVASURE KANNALAND ENERGY VAULT PROJECT: SUMMARY OF CAPEX / WORKING CAPITAL - STAGE 1							
	Plant, equipment, etc.	Working capital	Total CAPEX	IRR	NPV @ 10%		Equity required
Solar PV Plant	R 12,880,360	R 6,000,000	R 18,880,360	8.14%	R-1,272,686		R 6,000,000
Smart meters	R 22,745,889	R 5,038,047	R 27,783,936	12.61%	R 969,374		R 5,038,047
LiveSure Thin Client Technology System	R 2,012,000	R 1,000,000	R 3,012,000	31.41%	R 3,489,335		R 589,600
Battery Vault	R 219,894,441	R 110,000,000	R 329,894,441	10.60%	R 12,089,119		R 120,994,722
LTE network	R 76,669,750	R 17,000,000	R 93,669,750	8.47%	R-3,749,698		R 18,733,950
LivPak B4I	R 31,054,145	R 19,333,409	R 50,387,554	13.61%	R 11,786,827		**R 151,356,319**
Combined ZAR	R 365,256,585	R 158,371,456	R 523,628,041	10.65%	R 23,312,269		R 151,356,319
Combined Dollars	$30,438,049	$13,197,621	$43,635,670		$1,942,689		$12,613,027

Investment profile		
	1	
Solar PV	R 18,880,360	
Smart meters	R 22,535,498	
LiveSure	R 1,410,000	R 820
Vault	R 329,894,441	
LTE network	R 93,669,750	
LivPak B4I	R 164,216,580	
Total	R 630,606,629	R 820
Cumulative total	R 630,606,629	R 631,427

	CAPEX (R'm)	Outp
Solar PV	R 12.9M	
InovaSure Vault	R 219.9M	

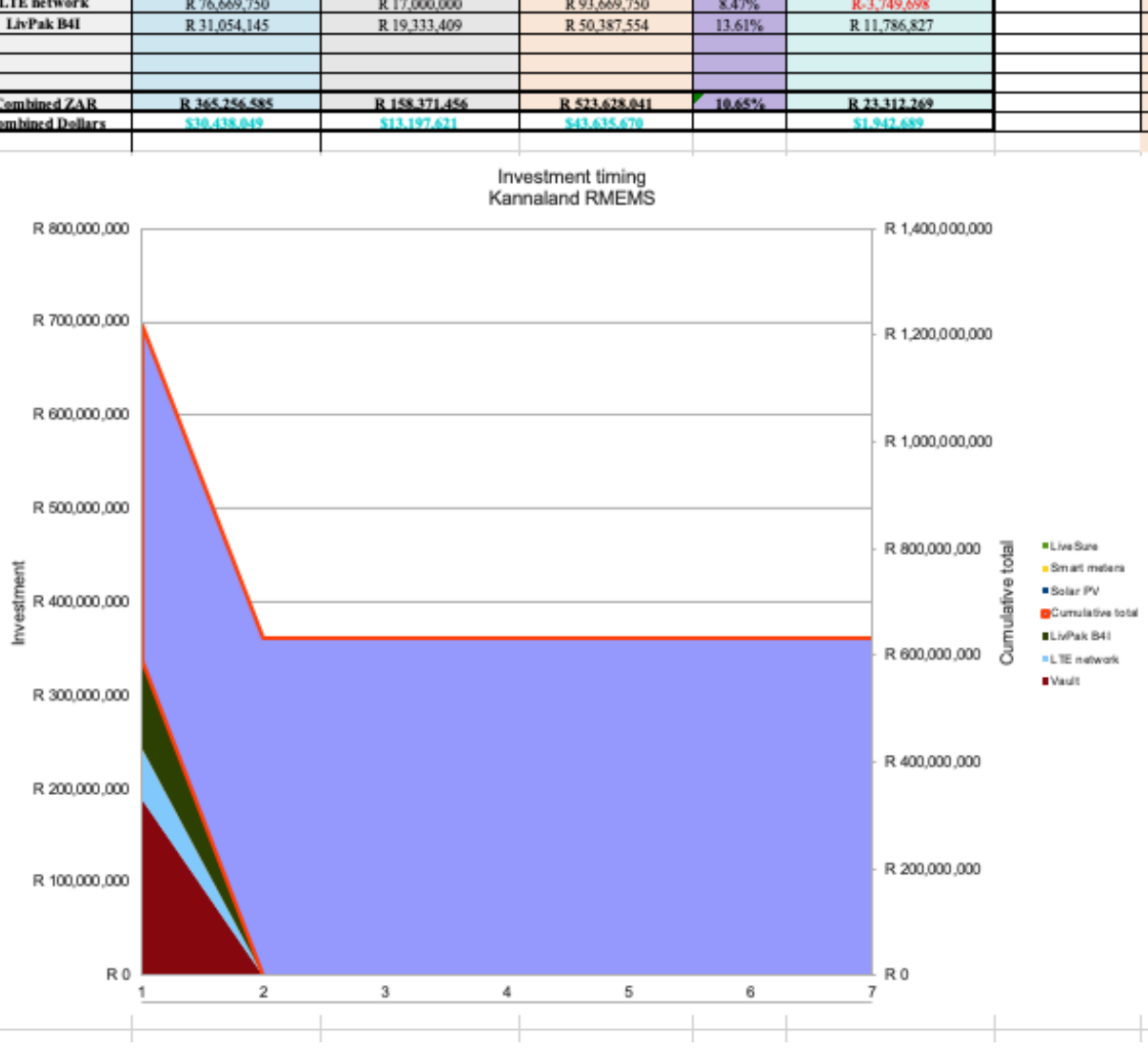

Figure 4: CAPEX Summary from the Financial Model (Stage 1)

[21] 04.01a & 04.01b Financial Model, Stage 1 & Stage 2", dated November 2018"

INOVASURE KANNALAND ENERGY VAULT PROJECT: SUMMARY OF CAPEX / WORKING CAPITAL - ONE ENERGY VAULT							
	Plant, equipment, etc.	Working capital	Total CAPEX	IRR	NPV @ 10%		Equity required
Solar PV Plant	R 245,610,697	R 115,126,859	R 360,737,556	1.40%	R-84,663,130		R 127,407,394
Smart meters	R 92,156,771	R 20,000,000	R 112,156,771	20.95%	R 20,098,503		R 20,000,000
LiveSure Thin Client Technology System	R 13,762,000	R 9,000,000	R 22,762,000	25.54%	R 13,977,326		R 3,661,300
Battery Vault	R 219,894,441	R 50,000,000	R 269,894,441	99.36%	R 1,482,470,956		R 60,994,722
LTE network	R 153,339,500	R 70,000,000	R 223,339,500	17.09%	R 72,083,485		R 44,667,900
LivPak B4I	R 31,054,145	R 19,333,409	R 50,387,554	13.08%	R 9,923,329		**R 256,731,316**
Combined ZAR	R 755,817,554	R 283,460,268	R 1,039,277,822	35.12%	R 1,513,890,468		R 256,731,316
Combined Dollars	$62,984,796	$23,621,689	$86,606,485		$126,157,539		$21,394,276

Investment profile		
	1	
Solar PV	R 373,018,091	R
Smart meters	R 90,388,690	R
LiveSure	R 10,959,000	R 3,918,5
Vault	R 269,894,441	R
LTE network	R 223,339,500	R
LivPak B41	R 50,387,554	R
Total	R 1,017,987,276	R 3,918,5
Cumulative total	R 1,017,987,276	R 1,021,905,7

	CAPEX (R'm)	Output
Solar PV	R 245.6M	
InovaSure Vault	R 219.9M	

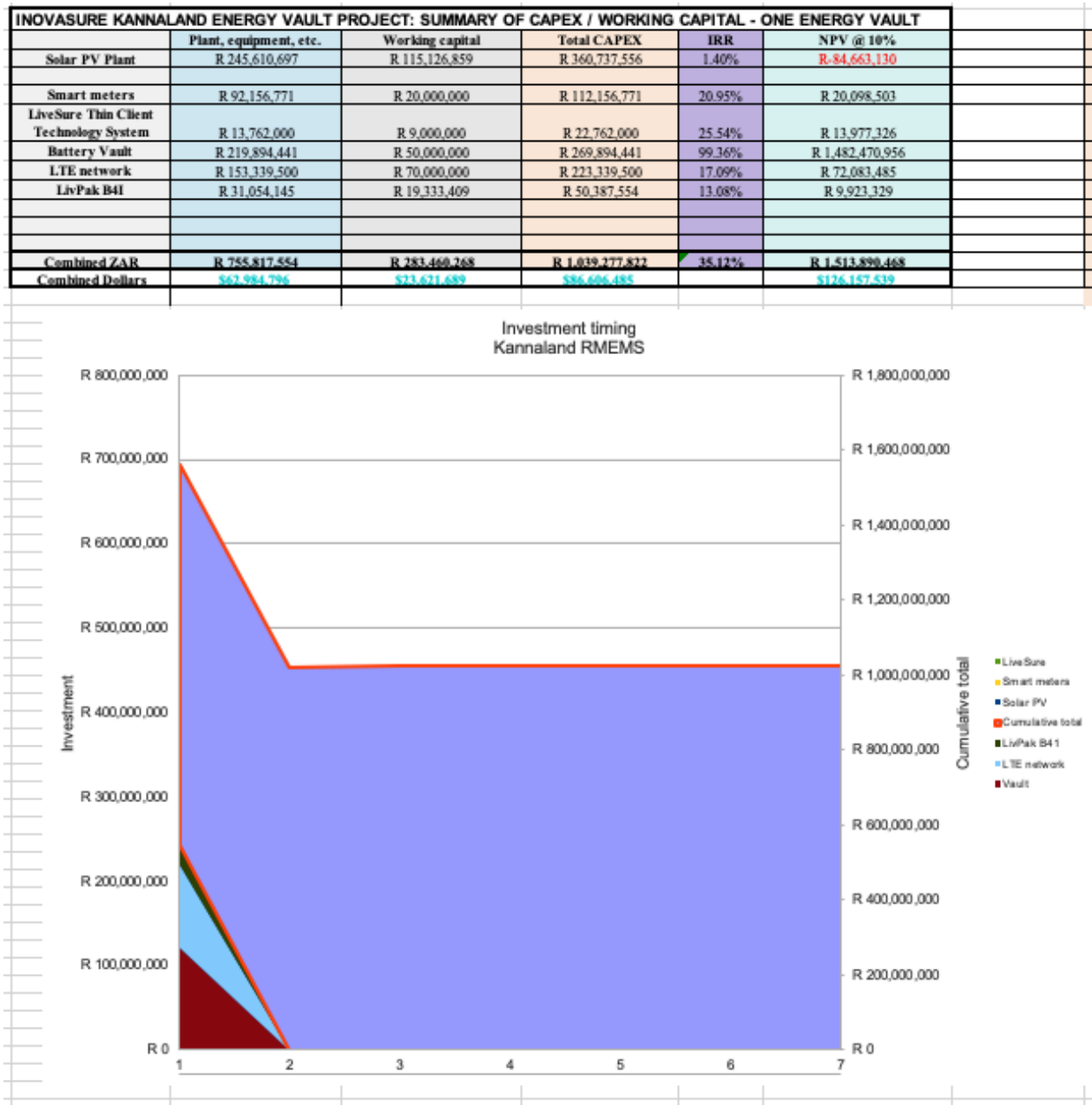

Figure 5: CAPEX Summary from the Financial Model (Stage 2)

PART C, ANNEXURE 2: LEGAL OPINION BY ADV. S.F. MOUTON

The full Legal Opinion by Adv. S.F Mouton is available upon request