



ANNEXURE A: SCOPE OF WORK

1. PURPOSE

CEF requires the services of an IT services company to migrate a web-based GIS application (DBMS) from where it is currently hosted to another hosting environment, host the application as well as provide support services over a five (5)-month period.

The support will be on a time and material basis based on estimated Eight (8) hours of support services per month. The DBMS runs on both desktops and mobile devices.

2. BACKGROUND

The Central Energy Fund (CEF) together with the Department of Mineral Resources and Energy (DMRE) are jointly implementing the National Solar Water Heater (SWH) Programme as set out in the Joint Implementation Agreement signed by CEF and DMRE.

AfriGIS was appointed by CEF to develop, implement, host and support the Database Management System (DBMS) technology services, to support the implementation of the Solar Water Heater Programme that seeks to install solar geysers on rooftops of deserving beneficiaries.

The system has been implemented and has been in use since 2020 but the contract with AfriGIS has come to an end.

3. THE DATABASE MANAGEMENT SYTEM (DBMS)

The DBMS system is a bespoke development tailored for the specific needs and requirements of CEF/DMRE. It automates key processes for the rollout as well as monitor the installation of the Solar Water Heater systems (SWHs) on rooftops of deserving beneficiaries.

3.1 The DBMS incorporates the following key requirements:

- A solution that understands and accurately reflects the approved locations that are destined to receive the benefit of installation of SWH.



- Best practice application of mobile technology to ensure that field teams accurately record suitable locations and recipients with statistical analysis.
- Linking of the approved locations with the manufacturing process or warehouses to match demand and supply.
- Tracking and tracing of SWH units from warehouse to installation areas.
- Real time monitoring of roll out and installation progress.
- Quality control of subcontracted installation teams and actual installations.
- Real time monitoring and statistical reporting to all stakeholders through a single spatial (mapped) view indicating demand, supply, and progress.
- Audit trails and archives to support responsible expenditure.

4. SCOPE OF WORK AND DELIVERABLES

CEF requires the services of an IT services company to migrate a web-based GIS application (DBMS) from where it is currently hosted to another hosting environment, host the application as well as provide support services over 5 months. The DBMS runs on both desktops and mobile devices.

The DBMS system is a bespoke web-based software solution that makes use of a variety of technologies and underlying services and products to perform the scoped functions.

Some specific services of the DBMS make use of AfriGIS products and may require code or configuration changes to replace these products with suitable alternatives.

4.1. Scope and deliverables of work

- **Migration of DBMS from where it is currently hosted to another hosting infrastructure.**

There is need to migrate the DBMS from the current host to a new host to be provided by the bidder. The DBMS data that is contained in the system comprises personal details of beneficiaries of the programme, therefore, it needs to be secured and treated with confidentiality.

- **Initial Technical Testing**

Upon migration of DBMS from where it is currently hosted to the new hosting infrastructure, technical testing will be required to ensure the migration has been



successful and that all the services are still running, and the system can be accessed via both mobile devices and desktops; and this will need to be confirmed and signed-off.

- **Hosting**

Upon successful technical testing sign-off, there is need for ongoing hosting for a period of 5 months, during which time the system is expected to be available and running all services optimally 24 hours a day.

- **Navigation**

The DBMS has navigation capability to assist Installers move from SWH warehouses to the beneficiary houses to do the geyser installation. Navigation component of the DBMS is proprietary to AfriGIS. The scope includes provision of navigation capabilities.

- **Base data proprietary to current service provider**

The base data relating to properties, addresses, geocoding, and the mapping which the DBMS accesses via subscription belong to the current service provider.

- **Support**

During the hosting period, technical support will be required for an estimated eight (8) hours per month during working hours to ensure that the system is available and is running optimally on both desktops and mobile devices, free of technical glitches.

4.2 The DBMS architecture and technical requirements

- **System Architecture**

The DBMS web-based system is a combination of front- and backend services that are configured to run in Docker containers in a virtual environment.

Data storage is done via a relational PostgreSQL Database.

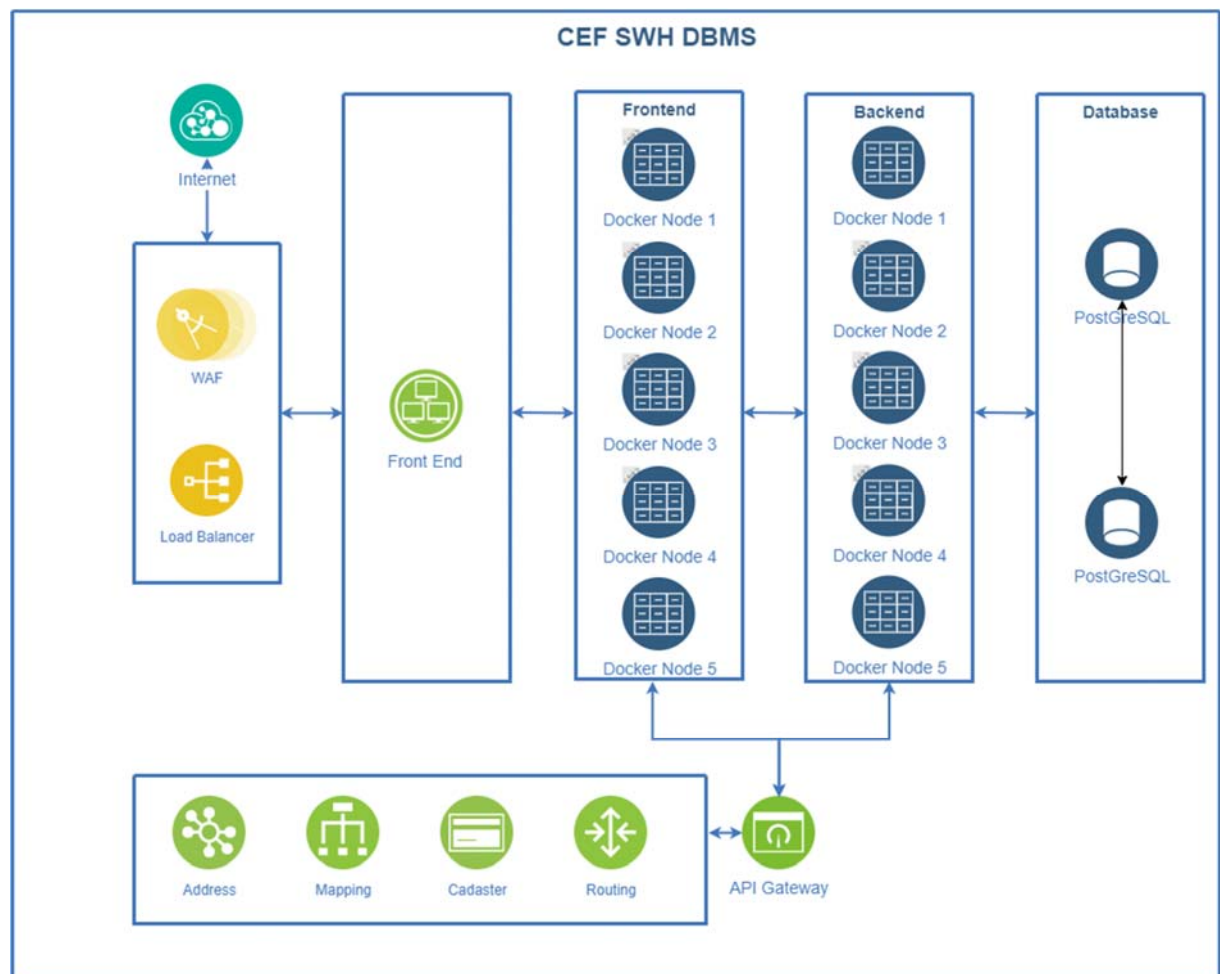
Both front and backend system consists of 5 nodes in a Docker cluster, with two PostgreSQL servers configured to provide redundancy.



The system requires a Web Application Firewall (WAF) as well as a Load Balancer to distribute load and cater for high usage.

External API calls are made to obtain Address, Mapping and Cadastre information.

The diagram below shows a schematic of the system components.



- **Software and Hardware Requirements**

- ✓ **Frontend Nodes**

5 Docker Nodes or Similar VM / Hardware equivalents

Operating System: Ubuntu 20 LTS

Minimum 4 CPU per Node



Minimum 8GB RAM per Node

Minimum 60GB SSD per Node

✓ **Backend Nodes**

4 Docker Nodes or Similar VM / Hardware equivalents

Operating System: Ubuntu 20 LTS

Minimum 4 CPU per Node

Minimum 8GB RAM per Node

Minimum 60GB SSD per Node

1 Docker Nodes or Similar VM / Hardware equivalents

Operating System: Windows Server 2022

Minimum 4 CPU per Node

Minimum 8GB RAM per Node

Minimum 60GB SSD per Node

✓ **Database**

2 PostgreSQL DB servers running on Ubuntu 20 LTS

Minimum 4 CPU per DB

Minimum 16 GB RAM per DB

Minimum 150GB Fast SSD per DB

Replication services and setup are required for full redundancy on the DB system.

The majority of the components run as Java applications (Java SE 17 LTS), with one component requiring Dot Net 6 and IIS.

The Dot Net component makes use of external data to provide Reverse Geocoding functionality.

Mapping, Address Searching / verification, Cadastre / Erven information and Municipal boundaries are obtained from external API calls to AfriGIS products.

Map routing is provided by the Google API.