

	TENDER SCOPE OF WORK Group Information Technology	Template Identifier	240-IT042	Rev	1
		Effective Date	April 2023		
		Review Date	April 2028		

Description of Request	The procurement of Load Forecasting Tool and 5-year licenses for Distribution and Transmission
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1. High level background

Eskom requires load forecasting application software for grid and network planning to predict the future electrical demand for its entire area of supply. Load forecasting is performed by both the Distribution (bottom-up forecast) and Transmission (top-down forecast) divisions.

The tool must operate in a centralised environment that will seamlessly integrate all the 9 Eskom Operating Units (OU) forecast into an aggregated national forecast to support both the grid planning department and the network planning departments within Transmission and Distribution.

The load forecasting tool must be able to integrate with the current and the future technologies within Eskom. The forecast tool must also have the functionality to consider the impact of Distributed Generation resources on the forecast.

2. Scope of work/Business requirements

2.1. Detailed description and volumes of the product requested

Distribution and Transmission are currently using a load forecasting tool that is not supported. The two divisions are now looking for a solution to replace the current system and provide new capabilities to the business.

The following requirements should be provided for, breakdown or decomposition of the functionalities of the Load Forecasting tool. The bidders should provide the high-level solution architecture diagram with descriptions. The bidders should provide cost decomposition as per the pricing schedule template, also provide an implementation approach and timelines (Timelines must be in MS Projects/Excel and PDF).

For all selected vendors a further demonstration of the solution will be required which will need to align to the use cases or Customer journeys as per the business requirements. The demonstrated solution should not be any alpha or beta versions but must be an officially released stable version. The solution can include Free and Open Source (FOSS) products.

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The technology changes will be covered in the contract, this also includes scalability of data usage, future cloud migration and any platform changes. The bidders should provide a 5 – 10 year technology roadmap.

Scope Diagram

The work package scope provides the high-level target architecture components that are expected to be impacted by the architecture engagement. It links the work package to the relevant business, information, application, and technology components that may be impacted:

- Add: New component to be added to the target architecture.
- Remove: Existing component to be removed from the target architecture.
- Change: Existing component to be modified in the target architecture.
- Re-use: Existing component to be re-used in its current format in the target architecture.

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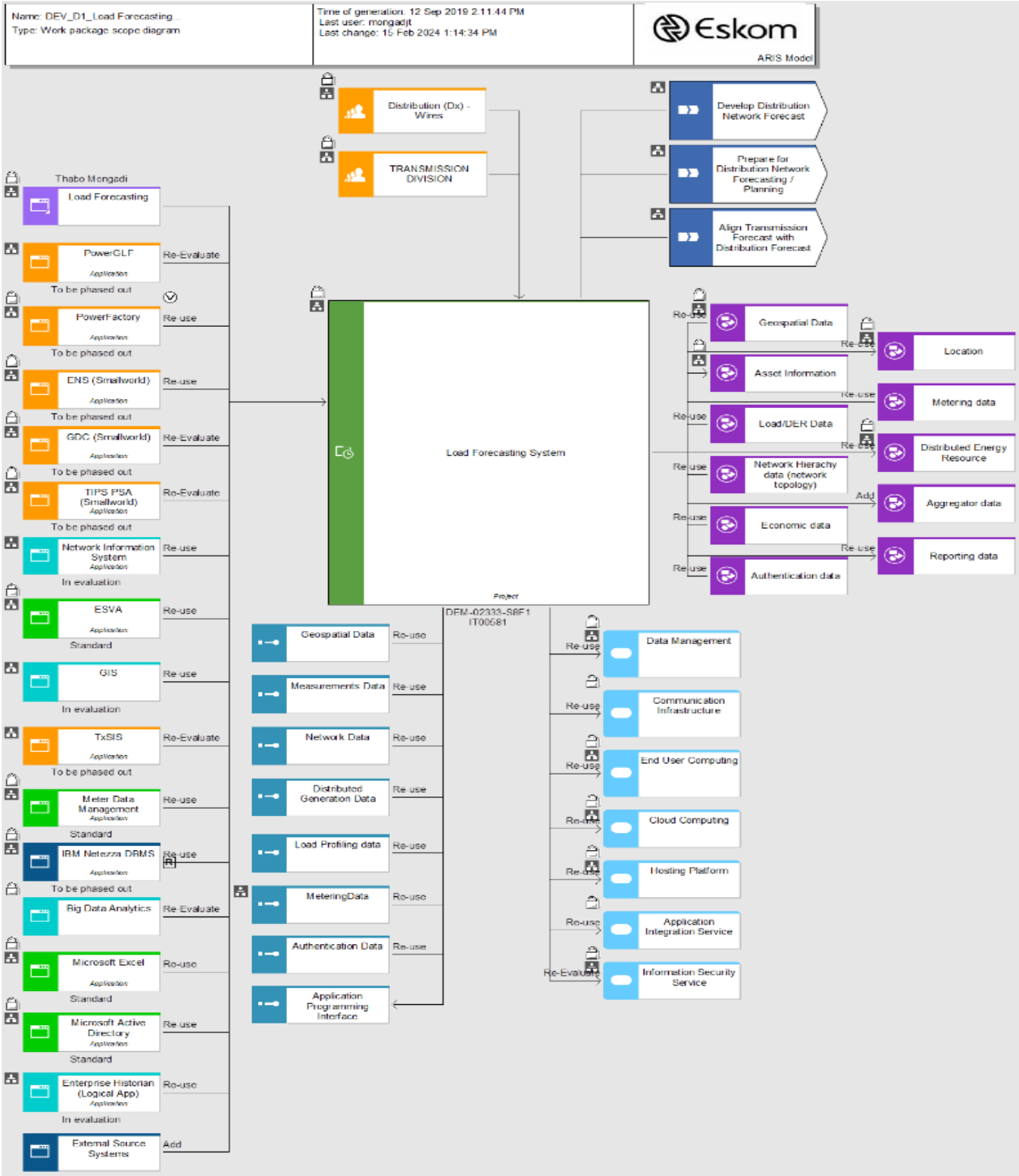


Figure 1: Application Flow Diagram

The application communication flow context provides a description of the flow of data between the Load Forecasting tool and other applications.

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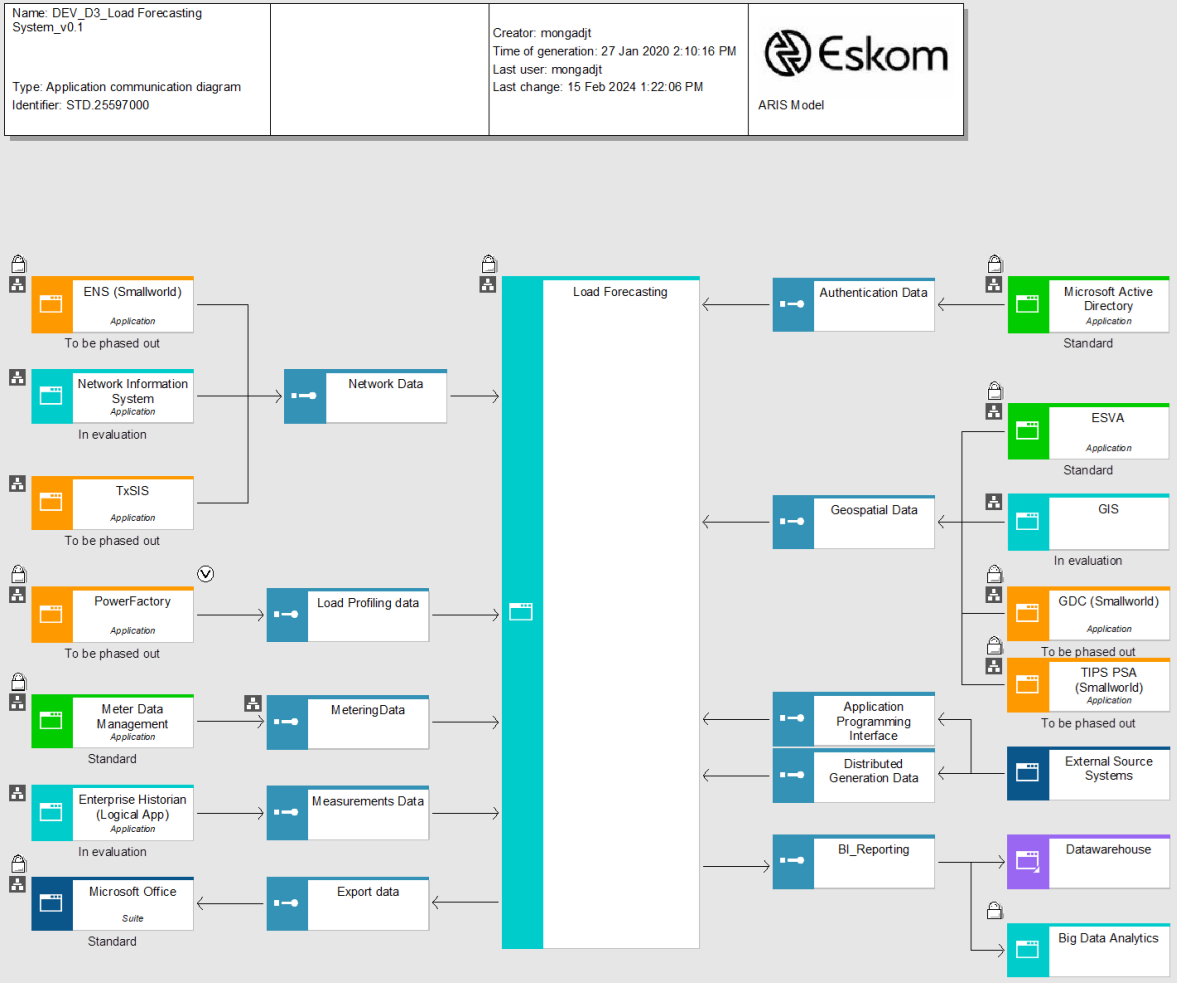


Figure 2: Application Flow diagram

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The scope shall include:

Deliverable	Description
Functional Specifications and Detailed Design	Deliver Functional Specifications and Detailed (Physical) design based on the User Requirement Specification and Logical Design provided as part of this RFP.
	Facilitate review and approval of the design as required by Eskom methodology and governance. Ensure cyber security compliance and integration end points. The Tenderer is required to render solution architect services to this project which includes making sure that architecture approval is gained before build and again before go-live.
Integration	Analyse, design, develop, test, and deploy integration solutions based on the designs. External interfaces to integrate using Oracle Fusion 12c and IBM WebSphere (Data Power), thus the vendor should be well skilled to work with the mentioned technologies. The Integration Centre of Excellence (ICOE) governance process must be followed for all approvals. Kindly reference "SOA Workgroup artefacts". All diagrams and processes are to be captured in the Sparx Enterprise Architect (EA). All CIM message artefacts (including Mapping Document) to be placed in the Eskom defined CIM SVN. All code to be placed in Eskom defined Code SVN repository All artefacts to be placed in the Eskom share point.
	Sparx Enterprise Architecture and Altova XMLSpy licences are to be provided by the Vendor for the staff that will be executing the formulation or updating of the Diagrams and Process during the Design

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	The following are the integration and Testing activities and artefacts to be produced and presented at the committee for approval and sign off:
	Business test case document. Integration specification document. Mapping Document. CIM message artefacts including WSDL's and XSD's. Code and unit testing review. Deployment Guide. SIT testing review of results in ALM. SIT test case sign-off. Performance testing review of results in ALM. Performance testing sign-off. Pre-transfer documents for go-live approval. Test requirements in ALM. Test cases and results in ALM. Defects managed in ALM. Test plan Document. Non-functional Test plan document. Test closure reports documents. Performance test scripts and results.
	Provide an Integration message modeller to complete the following: Analysis of message requirements. Model or update integration message which follow a Common information model. Create payloads and envelopes. Generate xsd, message model and model dictionary.
	All testing requirements must cover all identified interfaces that have been identified.
Build and Deploy	Provide test cases, Unit Testing on the Development (DEV) environment, deploy base solution to the Development, Quality

	Assurance, Pre-Production, Production, and Disaster Recovery environments prior to go-live.
	Ensure all environments are updated following successful test conclusion. Compile go-live plan. Ensure the solution obtains the necessary governance approvals:
	Architecture Design Review Committee for pre-transfer, Change Review Management Committee (CRMC), Go/No-Go pack and decision by Group IT General Manager and Data take-on and Go-Live in PROD environment. Code to be checked into Eskom's code repository. Any development or APIs exposed outside the integration platform will be developed using Eskom software development technology standards such as .NET technologies, JAVA, Python.
Test	All testing activities will be managed in the Eskom approved testing tools. (ALM, UFT and Loadrunner) The testing team must provide unit test results before resuming the next cycle/level of testing as per defined entry and exit criteria. A signed off test closure report is required before a test milestone is completed. The following testing and testing milestones must be completed: • Unit Testing – test results from the Tenderer's team. This cycle of testing must be done on the development environment. • System Integrated Testing, Functionality testing (in QA – end to end functional testing and integration testing. That means testing with other systems and ensuring that all requirements have been successfully configured). This testing must be driven & executed by the Vendor but must include Eskom staff for

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	completeness & authenticity. This cycle of testing must be done on the QA (testing) environment • Non-Functional Testing (performance testing and disaster recovery testing). This testing must be driven & executed by the Vendor but must include Eskom staff for completeness & authenticity. This cycle of testing must be done on the pre-production environment • User Acceptance Testing (Testing by the Eskom customer team that the system is working and meets requirements). This testing must be driven by the Tenderer but must be executed by Eskom staff for completeness & authenticity. This cycle of testing must be done on the pre-production environment
	The testing team must complete Disaster Recovery Testing on the Disaster Recovery (DR) environment and complete and Vulnerability Testing.
	The testing team must adhere to the Eskom's TCoE testing standard to be provided as part of the RFP document.
	All the levels will require an internal Eskom resource unless communicated otherwise. The vendor will be required to sign-off knowledge transfer acceptance certificate as part of every deliverable to ensure knowledge is transferred throughout the process and does not need to wait until the end of the project.
Stabilise and handover	Ensure adoption and good performance of the solution. Provide support to stabilise the solution. Conclude handover to business. Conclude handover to support. Close-out the project.
Monitoring	The solution to be monitored using Eskom systems monitoring tools for support.
Project Management	Deliver project documentation required by the Eskom Group IT PMO. This includes but is not limited to:

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	Detailed integrated schedule. Weekly progress reports. Payment schedule forecast and actuals tracking against it. Delivery Acceptance Certificates with supporting approved test details. Provide information required by Eskom team members in order to facilitate governance of the project and its deliverables. Integrate the current application support teams into the project delivery team. Deliverable Breakdown Structure indicating all fixed cost deliverables with the cost of each deliverable and the total cost of all deliverables.
	List of deliverables and responsibilities that the Tenderer view as being excluded from their scope of delivery. Payment schedule for all deliverables in the Deliverable Breakdown Structure. A payment schedule must be provided for all deliverables on a fixed-cost basis. During execution deliverables will be evaluated by Eskom and a Deliverable Acceptance Certificate issued when approved. Approved deliverables can then be invoiced. Projected monthly cash flow. Summarise the payment schedule provided per month.
	A Project schedule in MS Project format OR Excel format that contain all costed deliverables as milestones and also include activities to deliver such milestones. The top level work breakdown in the schedule must reflect the Software Delivery Life Cycle stages (Design; Build, Test, Train, Deploy, Stabilise – after go-live support).
Other Responsibilities	Dependencies and pre-requisites on Eskom must be clearly stipulated. Total man-hours and skill of all Tenderer resources combined. An organogram and a list of all the team members of the Tenderer that will deliver the proposed project including the following information for each and every team member:
	Name and surname, Confirmation that person is a current employee of the Tenderer. Role of person on the proposed team, Description of Education with supporting certificates as

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	proof. Relevant Experience and Skills. Relevant product certification/s achieved with supporting certificates as proof.
	Explanation of Tenderer's experience on Eskom's current environment where relevant and motivation why Tenderer is best positioned to deliver on this project. Indicate all other pre-requisites and, or exclusions that must be addressed before the start of the project with clear timelines.
	All deliverables produced on this contract shall become the property of Eskom with Eskom holding sole rights to it. All deliverables shall be provided in maintainable format for each evaluation (i.e. editable documents; source code and scripts).
	Project change control refers to the changes in project Scope, Time and Cost. Changes will follow the process below. Changes must be approved by the Requester, Business Owner, Impacted Project Manager, Project Delivery Portfolio Manager, and Project Sponsor. Depending on the scale of the change, other approvals external to the project may be required. Guidance in this regard will be provided by the Project Portfolio Manager. Approved changes must be noted in steering committee minutes.
	The Tenderer must include the response to this request the applicable resource cost rate/s that shall be used to calculate cost of such changes.
Security	Refer to the "240-170007584 Rev 2 - Web Services Security Standard.pdf" Document.
	Account Registration and verification of users. Authentication security capability for administration, support and management need to use Eskom username standard. Employees can use same org credentials. Input verification and validation should be supported for all the credentials.
	Property-Role based authentication. Authentication should be token based.

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	Authentication Token e.g. OAuth2 and SAML2,etc.
	Threat Protection
	E2E Encryption: Data must be encrypted in transit Data must be encrypted at rest Data must be protected while in use.
	Strict adherence to the Protection of Personal Information Act, No 4 of 2013
Cloud	Cloud infrastructure provisioning for QA, Pre-prod, Development Production and Disaster Recovery. Service provider to ensure provisioning is done for QA, and other environments which will be needed for development, testing, training, and go-live as and when required. Eskom is going to continue with changes as and when needed by Business so the provisioning of these environments when required is important.
	ALL CLOUD SERVICE PROVIDERS to adhere to Eskom ITO-Schedule Q – SUPPLEMENTARY TERMS FOR CLOUD COMPUTING

High level Requirements

Load/DER forecasting tool is to be used in Distribution (Dx) network planning as the primary demand forecasting tool also used by Transmission (Tx) grid planning and energy forecasting departments. This makes use of the Dx Planning Outputs as a Grid Code requirements for this purpose.

The following are High level requirements:

- Represent the existing and planned network in a form of a hierarchy
- Represent load and Distributed Generation geographically and geospatially
- Handling of load profile and day type
- Calculate the load forecast
- Display the forecast results
- Input data and data exchange
- GIS capabilities
- View/Edit object attributes data

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- Copy and Paste data
- Display multiple screens
- Display object forecast horizon
- Update the next base year
- Technical Requirements
- Forecasting Algorithm
- Access control

Detailed Requirements below:

Functionality grouping	BRS Number	Functionality	Business Rule No and Description	Weight
Represent the existing and planned network hierarchy	BRS 1-1	Ability to represent both the existing and planned network in a hierarchy tree from feeder T-off (sub-feeder level) summing to the substation busbar which summate to the main transmission substation, to the Eskom region (Operating Unit) and to the national level.		Show Stopper (P1 C6)
	BRS 1-2	Ability to incorporate both the load profile and the Distributed Generation inputs (including variable renewable energy) in the network hierarchy.		Show Stopper (P1 C6)
	BRS 1-3	Ability to incorporate elements such as battery storage, electric vehicle, energy efficiency, Demand Side Management etc. in the forecast		Critical (P1 C5)
	BRS 1-4	The system must enable the network hierarchy to be disaggregated into separate study areas for separate load forecasting capabilities.		Show Stopper (P1 C6)
	BRS 1-5	The network summation hierarchy must represent the electrical network topology in the form of a parent-child association.		Show Stopper (P1 C6)
	BRS 1-6	The network summation hierarchy's parent-child association must allow nodes to have both loads/DER and nodes as children.		Show Stopper (P1 C6)
	BRS 1-7	In the network summation hierarchy, loads/DER must have one or more load/DER portion depending on the category.		Show Stopper (P1 C6)

	BRS 1-8	Load/DER portions must be viewable and editable.		Show Stopper (P1 C6)
	BRS 1-9	The network summation hierarchy must enable the user to customise its structure and elements (Transformers, Feeders, Lines, Substations, Load/DER)		Show Stopper (P1 C6)
	BRS 1-10	There must be a unique identifier for each element. The unique Identifier used in the NIS (Network Information System) Functional Location must also be used on the load forecasting application software tool.		Show Stopper (P1 C6)
	BRS 1-11	Ability to identify the element type (i.e., Transformer/Line etc) in the network summation hierarchy		Show Stopper (P1 C6)
	BRS 1-12	The summation hierarchy must show status icons for every object. Status: "calculated" or "not calculated" / "no results".	BR 1: A clear indication of an object status is required.	Show Stopper (P1 C6)
	BRS 1-13	The network summation must be done at all levels of the network. The summation of demand forecasts at load/DER portion level must be available for the Daily, Seasonal and annual profiles at all hierarchy levels.		Show Stopper (P1 C6)
	BRS 1-14	The ability to set the granularity of the profiles selected. (Minutes, Hourly etc)		Show Stopper (P1 C6)
	BRS 1-15	The network node summation must be done in real-time as and when updates are done, and calculations must always include annual maximum demand and annual daily profile (for each day type) of both real and apparent power.		Critical (P1 C5)
	BRS 1-16	The network node summation must store and display the calculated load/DER portion make-up per node.		Important (P1 C3)
	BRS 1-17	The network summation hierarchy's default display year must always be the base forecast year.		Show Stopper (P1 C6)

BRS 1-18	The network summation hierarchy must enable the user to select the display year.		Show Stopper (P1 C6)
BRS 1-19	The network summation hierarchy must enable the user to customize the network hierarchy for any year in the forecast horizon by dragging and dropping or cutting and pasting loads and nodes or any appropriate mechanism. This is to be done to emulate future network topology changes in corresponding future years.		Show Stopper (P1 C6)
BRS 1-20	During customization, the network summation hierarchy must enable the movement of elements and all its children to the new parent for all years from the selected year to the end of the forecast horizon.	BR 2: The network summation hierarchy must prompt the user prior to executing a move.	Show Stopper (P1 C6)
BRS 1-21	The network hierarchy must enable the user to navigate its structure.		Show Stopper (P1 C6)
BRS 1-22	The network hierarchy must enable the user to manually zoom to an elements associated GIS representation or to use an auto zoom function.		Show Stopper (P1 C6)
BRS 1-23	The network hierarchy must enable the user to toggle an auto zoom function.		Show Stopper (P1 C6)
BRS 1-24	When selecting an element in the hierarchy, its associated details must be displayed.		Show Stopper (P1 C6)
BRS 1-25	The load/DER portion makeup view must be accessible for a selected element in the summation hierarchy.		Show Stopper (P1 C6)
BRS 1-26	The network hierarchy must enable the user to create new unlinked (not linked to a GIS polygon) load/DER.		Show Stopper (P1 C6)
BRS 1-27	The network hierarchy must enable the user to create new elements.	BR 3: An element must always be assigned a distinct name	Show Stopper (P1 C6)
BRS 1-28	The network hierarchy must enable the user to link and/or unlinked GIS polygon load/DER		Show Stopper (P1 C6)
BRS 1-29	The network hierarchy must enable the user to create alternative views (portfolios).		Show Stopper (P1 C6)

		The alternative views can be study areas such as Network Development Plans area, which are not necessarily aligned to a Main Transmission Subsystem.		
	BRS 1-30	The network hierarchy must enable the user to find items through smart searching of all name and description attributes		Show Stopper (P1 C6)
	BRS 1-31	Ability to represent the load/DER forecast both geographically as well as according to the different load/DER profiles.		Show Stopper (P1 C6)
	BRS 1-32	Load/DER must be modelled at customer level and be able to summate via the network hierarchy (The forecasting application system must allow users to calculate the load/DER forecast at any level on the hierarchy).		Show Stopper (P1 C6)
	BRS 1-33	Distributed Energy Resource (including variable renewable energy) profiles need to be represented as part of the network hierarchy. Information should contain Load profiles, Generation profiles, Resource profile (wind and solar profiles) Battery storage charges and discharged cycles and have the ability to provide the net outcome per element.		Show Stopper (P1 C6)
Handling of load profile and day type	BRS 2-1	Capability to import perspectives from PSA and other tools to portray Geospatial overlays		Show Stopper (P1 C6)
	BRS 2-2	Capability of translating forecast information into Geospatial overlays. Such information as, power factor, growth rate, Load/DER, Load/availability factor, Energy densities etc.		Show Stopper (P1 C6)
	BRS 2-3	Spatial granularity of load/DER representation must be defined at customer level.		Show Stopper (P1 C6)
	BRS 3-1	Ability to use the Eskom load/DER profile information when modelling the load behaviour considering daily, seasonal and weather variations.	BR 4: load/DER Classes/entities/clusters must refer to sector specific collections (for an example: residential, commercial, industrial) of subclasses only.	Show Stopper (P1 C6)

	BRS 3-2	Ability to customise the load subclasses to reflect customer behavioural and technology changes.		Show Stopper (P1 C6)
	BRS 3-3	Ability to enable the user to view and edit attributes created for generic classes and subclasses.		Show Stopper (P1 C6)
	BRS 3-4	Ability to enable user to view class and subclass information.		Show Stopper (P1 C6)
	BRS 3-5	The system must only allow system administrators to add and edit class and subclass data. Access control must be implementable.		Show Stopper (P1 C6)
	BRS 3-6	Detailed profiles and forecast attributes must be defined at load/DER subclass level		Show Stopper (P1 C6)
	BRS 3-7	Load/DER profiles and growth curves must be re-useable		Show Stopper (P1 C6)
	BRS 3-8	The load/DER profiles must be defined for each subclass for a variety of timeframe.		Show Stopper (P1 C6)
Calculate the load/DER forecast	BRS 4-1	The tool response time must provide an efficient algorithm to run forecast calculations real-time at all levels of the network hierarchy fast and effectively.		Show Stopper (P1 C6)
	BRS 4-2	Due to the nature of the large amount of data that will be needed the solution should have the capacity to handle large data sets effectively		Show Stopper (P1 C6)
	BRS 4-3	Ability to implement Mathematical growth models (Including but not limited to): - Gompertz-curve (s-curve), - Hierarchical Recursive Gompertz-curve fit (HRGF), - Historical trending/curve fitting, - Percentage growth, - Fixed annual increment, - and customer number (Electrification). These are all required at small-area level (spatial forecasts)		Show Stopper (P1 C6)

Display the forecast results	BRS 4-4	The system must have the ability to continuously update Element level summations for uncalculated Elements and provide results.	BR 5a: The load/DER forecasting calculations must be performed real-time as and when updates are made. BR 5b: The calculation must still take place even when there is an uncalculated Element, and the results must be returned.	Show Stopper (P1 C6)
	BRS 4-5		BR 6: The load/DER forecasting calculations must be performed real-time as and when updates are made	Show Stopper (P1 C6)
	BRS 4-6	Where a load/DER portion has invalid forecast parameters the load/DER summation must still take place and must set the parent summation levels as calculated (remove "no-results" flag), but the specific load/DER objects which have portions with invalid forecast parameters must remain marked as uncalculated. The above approach must be done to ensure time is not wasted on recalculating these "no-results" branches.	BR 7: The load /DER forecasting calculations must be performed in real-time as and when updates are made	Show Stopper (P1 C6)
	BRS 4-7	When summing nodes in the network hierarchy daily load/DER profiles should be used. When different conditions (Summer, Winter, Low load, peak load etc) are summated, appropriate factoring should be applied (coincident factor etc) between different load classes and profiles.		Show Stopper (P1 C6)
	BRS 4-8	The tool should be capable of calculating the energy at any given node/element in the network hierarchy for any specified time (day, week, month, year)		Show Stopper (P1 C6)
	BRS 5-1	The tool must allow flexibility to show and analyse forecast in terms of:		Show Stopper (P1 C6)

	• Graphs – forecast to be visualized using graphs. • Profiles – there must be flexibility to view the load/DER profile for a selected part of the network. • Profiles – there must be flexibility to view the energy resource profile for a selected part of the network. • Spatial view – users must have an option to view results for a selected spatial area (like a municipality, network development area, etc). • National view – the results must be viewable at all network/spatial levels including the national view. • Study area view – the results must portray the forecast for the disaggregated area under review.		
BRS 5-2	The graph and data view must be a combined floating window. The window must be a dockable window and give the user an option to dock, undock or close.	BR 8: When the user is working on the data view window, the graph views must not close but rather display the changes currently made from the data view.	Show Stopper (P1 C6)
BRS 5-3	The graph and data view must have a default display of the demand growth forecast, base year profile and underlying annual demand growth data.		Show Stopper (P1 C6)
BRS 5-4	The user must have the ability to customize the graph style		Show Stopper (P1 C6)
BRS 5-5	The underlying data series must be expandable to show the results at load/DER class and load/DER subclass level.		Show Stopper (P1 C6)

BRS 5-6	The result data view can be customised to show apparent power Kilo-Volt-Ampere (kVA) or real power (kW), Power factor, Energy(kWh). The default power is the apparent power (kVA).		Show Stopper (P1 C6)
BRS 5-7	Ability to enter external forecast at levels such as MTS, Provincial (Operating Unit) and national for alignment and validation purposes (Municipality forecast, Integrated Resource Plan (IRP) forecast). To be displayed in the same window adjacent to each other to enable comparison.		Show Stopper (P1 C6)
BRS 5-8	Capability to present forecasting information system in a "Dashboard" format.		Show Stopper (P1 C6)
BRS 5-9	The forecasting tool must be able to take such relationships that will be provided in a form of regression models. Based on the developed relationships, the forecasting tool must provide for scenarios such as impact of increased population growth, increased mortality rate, etc on the forecasted demand. The ability to model the effect of such external influences on the forecast such as: • Economy, • Political decision making • and climate influences		Show Stopper (P1 C6)
BRS 5-11	The ability to perform and provide model validation functionality		Show Stopper (P1 C6)
BRS 5-12	Capability to provide comprehensive data analysis and reporting including the following: • Custom forecast reports (selectable per network equipment or economic sector), • geographic data export (shapefiles), scenario definition based on spatial, economic and		Show Stopper (P1 C6)

		trending data, graphical display of results, Forecast reporting (.doc, .pdf, .csv, .xlsx) for any defined network object, geographical area or sector.		
	BRS 5-13	Capability to enable scenario-based modelling or interface with the existing scenario-based modelling applications, to display the effect introduced by: • DSM (Demand Side Management and Energy Efficiency), • DG (Distributed Generation), • SPV (Solar Photo-voltaic), • EV (Electrical Vehicles), • RE (Renewable energy), Alternative energy sources, and disruptive energy efficiency measures.	BR 9: should be implemented on a small area basis (zone level).	Show Stopper (P1 C6)
Input data and data exchange	BRS 6-1	Ability to take geo-spatially referenced input data manually/imported, as well as Microsoft Excel data from the following sources (but not limited to): • Measured data (MV90 or STAT Metering, MDMS, SCADA and EMS TEMSE) • Measured data for all Distributed Generation (including variable renewable energy) resources. (The data will be sourced from EMS TEMSE) • Offline maps (such as Shape files) (such as Town and Regional Planning information and including economic (e.g., Gross Domestic Product (GDP), Gross value add, population growth, Inflation, Consumer		Show Stopper (P1 C6)

	- Price Index (CPI), Commodities, etc) - Online maps (Web-based maps) in a geo-spatial format available on the internet		
BRS 6-2	Capability of data integration such as hourly metering and generation data to obtain network behaviour.		Show Stopper (P1 C6)
BRS 6-3	Ability to exchange data with the following systems (but not limited to): - Power System Simulation tool (DigSilent PowerFactory) - Integrated Planning Solution (SmallWorld TIPS) - GIS (Eskom Enterprise GIS) - Microsoft Excel - Online map - ReticMaster - SAWS for climate monitoring - TEMSE (EMS /MDMS) - Enterprise Spatial Viewer and Analysis (ESVA), - SCADA - MV90 - Active Directory		Show Stopper (P1 C6)
BRS 6-4	Ability to export load/DER profile, spatial data and load/DER forecast to power system simulation tools (PowerFactory and ReticMaster).		Show Stopper (P1 C6)
BRS 6-5	Ability to import the existing network information from Integrated Planning Solution (SmallWorld TIPS).		Show Stopper (P1 C6)
BRS 6-6	Ability to import the network information from SmallWorld TIPS to match it with planned network hierarchy to enable write-outs for Power Systems Simulation Tool (PSST).		Show Stopper (P1 C6)
BRS 6-7	The system must enable the user to import/export data from/to a GIS system.	BR 10: The load forecasting tool must be able to read the	Show Stopper (P1 C6)

GIS Capabilities			following file formats but not limited to: • .shp, • .jpg, • .png, • .tiff, • .dgn, • .wfs, • .wms, • .gpk , • .gdb, • SDO Geometry, • Oracle GeoRaster • etc	
	BRS 6-8	The GIS environment must enable a user to export load/DER polygons in the GIS view window to spatial datasets with various demand profiles.		Show Stopper (P1 C6)
	BRS 6-9	The GIS environment must enable a user to export load/DER polygons in the form of spatial data appropriate to the required system.		Show Stopper (P1 C6)
	BRS 6-10	Ability to import/export Excel spreadsheets files to/from the load forecasting tool.		Show Stopper (P1 C6)
	BRS 6-11	Ability to interface with web map services or web feature services.		Show Stopper (P1 C6)
	BRS 7-1	The GIS interface must provide a spatial interface to the user.		Show Stopper (P1 C6)
	BRS 7-2	The GIS interface must enable the user to create and select polygons that are linked to elements or element collections.		Show Stopper (P1 C6)
	BRS 7-3	The GIS interface must provide basic GIS Navigation functionality.	BR 11: Coordinate must be entered in one of the two formats: Decimal Degree: 24.4254677999343 - 25.5812394074721 or Degrees, Minutes Seconds: 24° 25' 32"E - 25° 34' 52"N	Show Stopper (P1 C6)
	BRS 7-4	The GIS styling for all generic items must be preconfigured for all users.	BR 12: The GIS styling must conform to the Eskom standards	Show Stopper (P1 C6)
	BRS 7-5	The initial styling setup for all GIS objects must include	BR 13: Each user must be able to customise	Show Stopper

		load/DER polygons, element geometry, Web map services and Web feature services.	their initial styling setup to suit their own preferences.	(P1 C6)
	BRS 7-6	Labelling of load/DER polygons must be preconfigured for all users.	BR 14: This functionality must provide full customization and be performed by the system administrator.	Show Stopper (P1 C6)
	BRS 7-7	Users must have the ability to toggle the labelling of load/DER polygons		Show Stopper (P1 C6)
	BRS 7-8	Spatial datasets must be available in the GIS interface.		Show Stopper (P1 C6)
	BRS 7-9	The GIS editor must enable the user to manually create and split load/DER polygons.		Show Stopper (P1 C6)
	BRS 7-10	The GIS editor must enable the user to merge load/DER polygons.		Show Stopper (P1 C6)
	BRS 7-11	The GIS editor must enable the user to edit load/DER polygons by moving, adding, or deleting polygon vertices.		Show Stopper (P1 C6)
	BRS 7-12	The GIS editor must have a snapping functionality to prevent users from having gaps between adjacent polygons.	BR 15: Wall-to-wall representation of the load/DER polygons is required for the forecasted area.	Show Stopper (P1 C6)
	BRS 7-13	The GIS editor must include a data information tool that enables a "pop-up" that contains attribute data.		Show Stopper (P1 C6)
	BRS 7-14	The GIS environment must include a measuring tool.		Show Stopper (P1 C6)
	BRS 7-15	The GIS interface must have the functionality to create and explode multipart polygons.		Show Stopper (P1 C6)
	BRS 7-16	The GIS interface must support the creation of load/DER polygons based on imported spatial data.		Show Stopper (P1 C6)
	BRS 7-17	The GIS interface must have functionality to count the number of objects from an external shape file that falls within a selected load zone.		Show Stopper (P1 C6)
View/Edit object attributes data	BRS 8-1	An attribute information editor must provide the standard interface through which the user is enabled to edit element,		Show Stopper (P1 C6)

	load/DER object or load/DER portion attributes.		
BRS 8-2	An attribute editor must be populated with the data associated with the object selected in the summation hierarchy.		Show Stopper (P1 C6)
BRS 8-3	If the user selects a linked load /DER polygon in the GIS, the linked load/DER object must be selected in the network summation hierarchy and the related load/DER object data must be loaded in an attribute editor.		Show Stopper (P1 C6)
BRS 8-4	An attribute editor must enable the user to view and update forecast data for elements, load/DER objects and load/DER portions.		Show Stopper (P1 C6)
BRS 8-5	The solution must enable the user to view the load/DER forecast data in the form of a table and the graph.		Show Stopper (P1 C6)
BRS 8-6	A load/DER portion must always have at least one set of forecast parameters applicable for the forecast horizon.		Show Stopper (P1 C6)
BRS 8-7	An attribute editor must enable the user to insert additional forecast parameters in a chosen period.		Show Stopper (P1 C6)
BRS 8-8	An attribute editor must initiate a forecast recalculation real-time whenever a load/DER portion attribute is changed.		Show Stopper (P1 C6)
BRS 8-9	An attribute editor must enable the user to select, if subclass parameters from the library or manual input forecast parameters are to be used		Show Stopper (P1 C6)
BRS 8-10	An attribute editor must enable the user to select from the following forecast methods (but not limited to): - Fixed Increment - Fixed increment (in kVA or kW) - Fixed Percentage - Fixed percentage - Customer - After Diversity Maximum Demand (ADMD) per		Show Stopper (P1 C6)

Copy and Paste data		customer (kVA/customer) per unit growth curve - Customer - Small Scale Embedded Generation (SSEG) per customer(kW) per customer per unit growth curve - Spatial - Saturation load/DER per hectare (kVA/hectare. kW/hectare) per unit growth curve - Trend - Number of historical year data to use for trend - Manual - Enter annual demand/Generation data (kVA or kW) for every year in forecast horizon		
	BRS 8-11	The load/DER object and higher-level elements to which an edited load/DER portion summates must be marked as uncalculated upon a portion edit. It shall remain flagged until it gets calculated by the tool automatically or by the user.		Show Stopper (P1 C6)
	BRS 8-12	When a user changes forecast parameters and are not valid (a forecast cannot be calculated), the user must be warned that the forecast could not be completed.		Show Stopper (P1 C6)
	BRS 8-13	Ability to access the historical data from the load forecasting tool.		Show Stopper (P1 C6)
	BRS 8-14	In the forecasting tool, elements and load/DER object editors must include a functionality to maintain a unique identifier Plant Slot ID (PSID) for external datasets.		Show Stopper (P1 C6)
	BRS 9-1	It must be possible for a user to copy the data range from the forecasting tool to the Windows clipboard for all application components where a range of data is available.		Show Stopper (P1 C6)
	BRS 9-2	It must be possible for a user to paste a range copied from MS Excel or similar applications, into the forecasting tool		Show Stopper (P1 C6)

		attribute range for all application components where a range of data is used.		
Display multiple screens	BRS 10-1	It must be possible for the forecasting tool to open multiple screens which must be linked to the same underlying data. This implies that selecting an object on the forecast tool interface will select the same object (and related data) in all other interfaces.		Show Stopper (P1 C6)
Display Object forecast horizon	BRS 11-1	Functionality must be available to a user to indicate visually the element and its location in the network hierarchy over the forecast horizon. This includes changes in network topology.		Show Stopper (P1 C6)
	BRS 11-2			Show Stopper (P1 C6)
Update the base forecast year	BRS 12-1	Ability to update the next base year.	BR 16: When updating the base forecast year, the following updates must be done: • base load values at load portion level • Shift of customer numbers for customer-based forecasts • Shift of load portion make-up corresponding to base year shift • Shift of measured values (if implemented) in correspondence to base year shift • Shift of measured values (4 series – installed, firm, Transmission forecast, another forecast) • Shift of trend data	Show Stopper (P1 C6)

			- Shift of custom % growth curve data - Shift of manual forecast data The 'new' last year of the forecast horizon can be generated by means of extrapolation.	
Technical Requirements	BRS 13-1	Ability to interface with free service maps e.g., Google maps, Open Service Maps (OMS)	BR 17: All data and information shall comply with the organisational data integrity and information security policies.	Show Stopper (P1 C6)
	BRS 13-2	Ability to source wind and solar resource profiles from published sources such as the Wind Atlas and other reputable solar irradiation sources. Wind and solar resources' profiles must be available at a minimum of 15 minutes resolution with an option increase to an hour, month, season or year		Show Stopper (P1 C6)
Forecasting Algorithm	BRS 14-1	The system must have a capability to forecast spatially, what is likely to happen in an area based on some known information that will be provided by the user. Such information will be provided by means of spatially referenced data (offline, online or both). Example: there is a small airport that the government is planning to upgrade to an international airport. Currently, there are no developments around this airport. To the east of the airport, there is a dam that extends over 400 hectares. The tool must be able to take such information and give spatial predictions of the future developments in this area, such as these: - The road linking airport to town will be widened from single lane to two lanes, street lights and traffic lights. - Warehouse developments around the airport.		Show Stopper (P1 C6)

Access Control		- Accommodation and conference facilities around the dam. - More accommodation along the road that links the airport and town.		
	BRS 14-2	Quantities: The system must be able to forecast quantities based on the space available, learning from similar set-ups in the country, etc.		Show Stopper (P1 C6)
	BRS 14-3	Time: The system must be able to phase forecast developments over a period of time		Show Stopper (P1 C6)
	BRS 14-4	Converting to kVA and kW: Based on the subclass data and using similar developments as source of information, the system must convert the development information into electrical demand.		Show Stopper (P1 C6)
	BRS 14-5	Scenario Analysis: Scenario Requirement 1: The system must provide more than 1 probable scenario with the probability/ranking of such scenarios. Such scenarios may be based on spatial: e.g.: no developments allowed around the dam, more accommodation & conference facilities to take place further away from town, etc.		Show Stopper (P1 C6)
	BRS 14-6	Scenario Requirement 2: The system must allow the user to apply/activate alternative energy <i>behind the meter</i> scenarios (e.g., Photovoltaic (PV), gas, wind, Battery Energy Storage System (BESS), energy efficiency.		Show Stopper (P1 C6)
	BRS 15-1	The solution should enable a forecast workflow mechanism that includes change monitoring and forecast approval. The forecast approver must be able to see the changes they are approving. Such changes must be accompanied by a system-generated summary of what is to be approved.		Show Stopper (P1 C6)

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	BRS 15-2	Users must be assigned login credentials to use the system. The credentials must be the same ones used when logging into the Eskom IT system		Show Stopper (P1 C6)
	BRS 15-3	The system must have capability to allocate different access levels to the users: read only, read, and write for the whole database, read, and write for selected areas/collection of elements		Show Stopper (P1 C6)
	BRS 15-4	The system must keep a log of all changes made by the logged in user.		Show Stopper (P1 C6)

2.2. Training/Transfer of skills:

The table below shows the number of Eskom employees that must be trained:

Training	Training module	Number
End-users	Demand Load Forecasting	205
Support	Admin Training	6
Advanced	Business Admin Training	7

After contract award EAL will be informed of the training requirements and will be expected to manage the training process. (check the TEC doc) Advanced and End-User training for the first year quarterly, thereafter twice a year End-User training. Preferably in a classroom, booked in a centralised place (Gauteng, BUs to arrange). Vendor to provide comprehensive training material predominantly videos with supporting documents. Support training will be conducted online, there won't be any site visits.

3. Service Level Agreement requirements

The current load forecasting application software is classified as a business-critical system (Monday to Friday, 8x5) and therefore it will follow the business continuity plan.

The time it should take to recover the load forecasting system is 48 hours (Return to Service) and the time it should take to restore the data in case of a disaster is 2 days (Data loss).

Defect Category	Description	Acknowledgement and solution scoping	Resolution
Code defect	Are defect in code that result in the software not functioning properly or operating as designed. Code defect refer to software errors.	24hrs / 1 day	48 hrs / 2 days
Product defect	Third party software product anomalies, interoperability, and integration. Product defect refer to improper system operations	24 hrs / 1 day	48 hrs / 2 days
System defect	is a configuration fault, error or failure associated with embedded system software or custom build	16 hrs	16 hrs
Operation defect	defect related to user misunderstanding or incorrect use of the software and/or operational end-user error	Case by Case	Based upon agreed scope