2019

STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE EXPANSION OF ELECTRICITY GRID INFRASTRUCTURE IN SOUTH AFRICA

PART 1

Background to the Electricity Grid Infrastructure Expansion Strategic Environmental Assessment

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PART 1. BACKGROUND TO THE ELECTRICITY GRID INFRASTRUCTURE EXPANSION STRATEGIC ENVIRONMENTAL ASSESSMENT

1.1 Introduction

The final Electricity Grid Infrastructure (EGI) Power Corridors (Figure 3) assessed as part of the 2016 EGI Strategic Environmental Assessment (SEA) were gazetted for implementation on 16 February 2018 in Government Gazette 41445, Government Notice 113. The Gazette documented notice given by the Minister of Environmental Affairs of alternative procedures to be followed when applying for environmental authorisation for large scale electricity transmission and distribution development activities, identified in terms of section 24(2)(a) of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) in the identified Strategic Transmission Corridors (i.e. areas declared as geographical areas of strategic importance).

Developers proposing to submit applications for Environmental Authorisations for large scale electricity transmission infrastructure within any of the five Strategic Transmission Corridors, that trigger Listed Activity 9 of Listing Notice 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended), or any other listed and specified activities that are necessary for the realisation of such infrastructure and facilities, would need to follow a Basic Assessment (BA) Process in terms of the 2014 EIA Regulations (as amended), as opposed to a full Scoping and EIA Process, which is required for all activities listed in Listing Notice 2.

Therefore, the outcome of the 2016 EGI SEA was the streamlining of the Environmental Authorisation process for EGI related development within any of the five Strategic Transmission Corridors.

Linked to the above, to support the objectives of the Strategic Integrated Project (SIP) 10, to accelerate the planning for EGI as part of the Integrated Resource Plan (IRP), and to ensure that when required, Environmental Authorisations are not a cause for delay, the Department of Environmental Affairs (DEA), Department of Energy (DoE), and Department of Public Enterprises (DPE), as well as iGas, Eskom and Transnet, have commissioned the Council for Scientific and Industrial Research (CSIR) to undertake a SEA to expand the Gazetted EGI corridors. The CSIR was appointed in April 2017 and is undertaking the SEA in collaboration with the South African National Biodiversity Institute (SANBI). Refer to Figure 1 for a breakdown of the SEA Project Team.

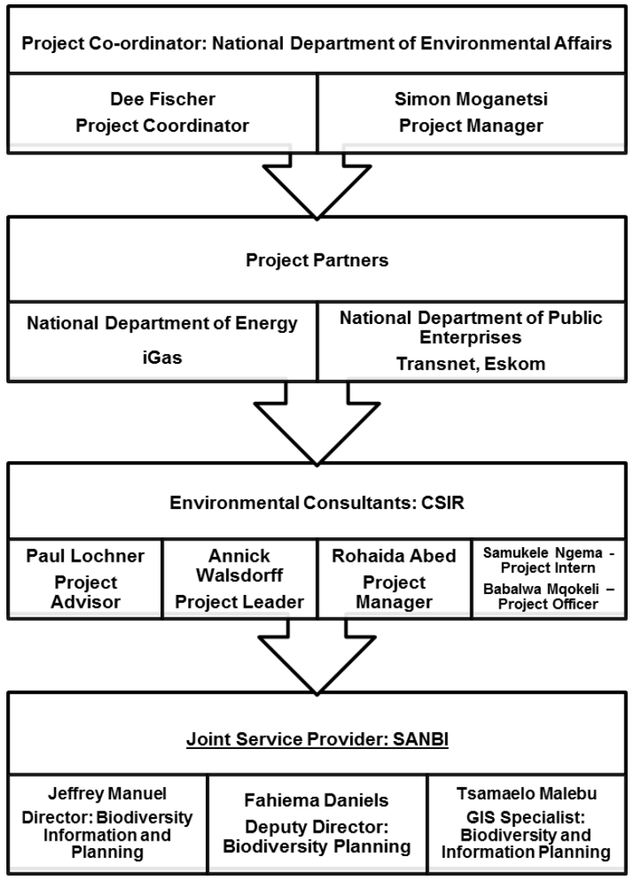

Figure 1: SEA Project Team

Eskom wishes to expand the Gazetted EGI corridors in order to support potential business cases extending to Mozambique and Namibia, as well as to facilitate potential import and export of power in these regions. Specifically, the Expanded Eastern EGI Corridor is required for interconnecting with Mozambique for possible imports due to anticipated high gas generation. In addition, the Expanded Western EGI Corridor is required for interconnection with Namibia for possible gas to power generation, as well as the facilitation of Renewable Energy integration.

The current SEA therefore builds onto the previous 2016 EGI SEA Report, cited as DEA (2016[1]).For purposes of consistency and continuity, a similar process and methodology to that adopted in the 2016 EGI SEA Process was followed in this EGI Expansion SEA (which is the subject of this report). For information on the EGI SEA rationale, study objectives, legal framework, project information and approach adopted during this SEA, refer to the 2016 EGI SEA Report (DEA, 2016), which is available on the following website: https://egi.csir.co.za/?page_id=1375. Only where the process has been slightly amended for this EGI Expansion SEA, has the relevant updated information been provided in this report.

1.2 Legal Framework

The key pieces of legislation that enable the identification and implementation of Power Corridors include the NEMA, Infrastructure Development Act (Act 23 of 2014), and the Spatial Planning and Land Use Management Act (Act 16 of 2013) (SPLUMA). The applicability and description of these pieces of legislation are captured in the 2016 EGI SEA Report (DEA, 2016). However, it is also important to capture the importance and relevance of the IRP. Key legislation is also described in the Specialist Studies in Part 3 of this SEA Report.

1.2.1 Integrated Resource Plan

The IRP 2010-30 was promulgated in March 2011, and at the time, it was considered a "living plan" to be updated frequently by the DoE. Since the promulgation of the IRP 2010-30, there have been a number of developments in the energy sector in South and Southern Africa, and the electricity demand outlook changed from that projected in 2010. As an update to the 2010-30 IRP, the DoE published Assumptions and Base Case documents for public comment in 2016. According to these documents, there is a significance placed on pursuing a diversified energy mix in South Africa, which "reduces reliance on a single or a few primary energy sources" (DoE, 2016[2]). In August 2018, the DoE published an updated Draft IRP for public comment. The updated report was focused on ensuring security of supply, as well as reduction in the cost of electricity, negative environmental impact (emissions) and water

[1] Department of Environmental Affairs, 2016. Strategic Environmental Assessment for Electricity Grid Infrastructure in South Africa. CSIR Report Number: CSIR/02100/EMS/ER/2016/0006/B. Stellenbosch.
[2] Department of Energy (November 2016). Integrated Resource Plan Update Assumptions, Base Case Results and Observations Revision 1. Pretoria.

usage (DoE, 2018[3]). One of the main implications of the Draft IRP 2018 and updated process is that the progression and level of new capacity developments needed up to 2030 should be reduced compared to that noted in the 2010-30 IRP (DoE, 2018). It was also concluded that additional detailed studies be undertaken to inform the update of the IRP, and this includes, but is not limited to, undertaking a detailed analysis of the options for gas supply to identify the technical and financial risks and mitigation measures needed for an energy mix that is dominated by Renewable Energy and Gas post 2030 (DoE, 2018). The DoE further states that natural gas presents the most significant potential in the energy mix.

Table 1: Draft IRP 2018: Proposed Updated Plan for the Period Ending 2030 (Source: DoE, 2018)

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)
Embedded Generation Capacity (Generation for own use allocation)

Refer to Table 1 and Figure 2, which indicates that the 2018 Draft IRP (DoE, 2018) calls for the generation capacity of a **total** of 19 400 Megawatts (MW) from renewable energy sources (i.e. Solar PV and Wind only (excluding Hydropower, Storage Schemes and CSP)) by 2030. This value includes 1 474 MW and 1 980 MW of currently installed capacity for Solar PV and Wind, respectively. In addition, the current installed capacity for Gas / Diesel is 3 830 MW, with an additional capacity of 8 100 MW by 2030 (equating to 11 930 MW capacity by 2030). As indicated in Figure 2 and Table 1, in terms of the future total installed capacity mix (as a percentage), coal represents the highest percentage, followed in descending order by Gas/Diesel, Wind, Solar PV, Hydro, Pumped Storage, Nuclear, CSP and Other. Based on the 2018 Draft IRP, the **current installed capacity** (i.e. as at 2018) of gas, wind and solar PV respectively represent approximately 5.06 %, 2.61 % and 1.95 % of the **future energy mix (i.e. future installed capacity)**.

[3] Department of Energy (August 2018). Integrated Resource Plan 2018 (Draft). Pretoria.

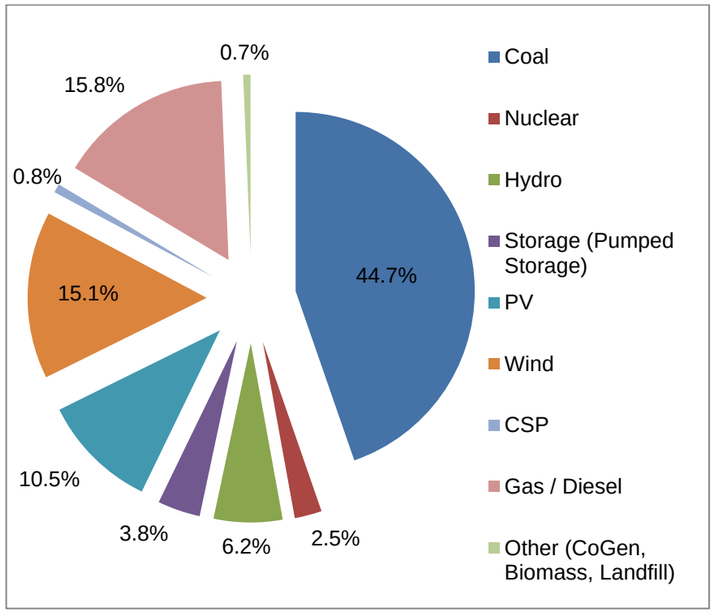

Figure 2: Graph indicating percentages of the future installed capacity mix (taking into consideration Installed Capacity as at 2018; Committed/Already Contracted Capacity; and New Additional Capacity (IRP Update)) based on the Draft IRP (DoE, 2018).

1.3 Process Overview

The process followed to identify and assess the Power Corridors is briefly summarised below and discussed in detail in Part 2 of this SEA Report. Figure 4 illustrates the SEA Process and Figure 5 illustrates the process of the SEA from the inception until the project specific Environmental Authorisation process.

1.3.1 Context

As noted in the 2016 EGI SEA Report (DEA, 2016), the SEA Process attempts to add spatial context to national level policies, plans and programmes. In particular, it can be considered as a link between the objectives of the National Development Plan (NDP 2030) and the primary EGI projects required to make this plan a reality. The SEA will allow for proactive investment as well as faster and more coordinated permitting procedures. This will ensure that priority grid infrastructure projects are implemented more effectively, whilst maintaining the highest level of environmental assessment and protection. Transmission and distribution lines are being considered in this assessment.

Furthermore, it should be noted that the SEA Process is undertaken at a strategic level and cannot replace the requirements for project level Environmental Assessment. The high-level environmental, social and economic data utilised to identify the 100 km wide corridors and undertake environmental pre-assessment of the corridors, is not sufficient for project-level decision making. The SEA should therefore be considered as a scoping level exercise used to identify key potential impacts. Additional assessment will be necessary at a project level to determine the significance of impacts and inform required management actions.

As illustrated in Figure 4, the SEA Process consists of the following phases, which are briefly described below (with detailed information included in Part 2 of the SEA Report):

- Inception and Eskom Preliminary Corridors;
- Phase 1: Constraints Mapping;
- Phase 2: Utilisation Mapping;
- Phase 3: Pinch Point Analysis (Corridor Refinement);
- Phase 4: Scoping Level Pre-Assessment (i.e. Environmental Assessment of the Corridors); and
- Phase 5: Gazetting and Decision- Making Framework.

A series of focus group and sector specific meetings, and workshops with key authorities and stakeholders were held during the SEA Process in order to gather information from major electricity users, and important business and government stakeholders, and to seek feedback on the constraints mapping and location of the corridors. In this regard, the first Authority and Public outreach was undertaken in November 2017 at strategic locations across the country, including Cape Town, George, East London, Durban, Johannesburg and Springbok. A second Authority and Public Outreach was undertaken towards the end of Phase 4, in October 2018, to present the findings of the specialist studies and draft refined corridors. The same locations visited during Round 1 of the outreach were visited during Round 2, with Upington and Port Elizabeth added as additional locations.

1.3.2 Inception and Eskom Preliminary Corridors

1.3.2.1 Inception

The SEA Process began in April 2017 and a project specific website (https://gasnetwork.csir.co.za) and email address (gasnetwork@csir.co.za) were created to ensure that stakeholders are able to access project specific information and download reports available for comments. An Expert Reference Group (ERG) and Project Steering Committee (PSC) were also convened during the Inception Phase, with assistance from the DEA.

The PSC comprises authorities with a legislated decision-making mandate for EGI development in South Africa. The ERG consists of, but is not limited to, all PSC members, as well as representatives from environmental and conservation bodies, Non-Government Organizations, research institutions and industry. The ERG provides assistance and technical knowledge, as well as insights with respect to the issues relevant to specific sectors.

1.3.2.2 Eskom Preliminary Corridors

Eskom identified the need to expand two of the Gazetted EGI Power Corridors. As such, two 100 km wide preliminary corridors were used as the starting point of the SEA. The preliminary corridors were identified by Eskom and were based on the results of a detailed Eskom Strategic Grid Plan Study. The study considered a number of possible future generation and load scenarios, and in so doing, identified the need for five national transmission infrastructure corridors to facilitate the balancing of South Africa's electricity supply and demand needs up to 2040. The corridors are orientated on a number of strategic anchor points (substations) identified by Eskom as critical future load injection points.

The corridors are illustrated in Figure 3. The corridors are titled as follows:

- The Expanded Eastern EGI Corridor; and
- The Expanded Western EGI Corridor.

1.3.3 Phase 1: Constraints Mapping

Phase 1 involved identifying key environmental sensitivities and engineering constraints in terms of EGI development. Environmental sensitivities in the context of this process were regarded as environmentally sensitive features, which may be negatively impacted by EGI development, such as Protected Areas, known bird habitats or wetlands. Engineering constraints are environmental features, which are likely to impact upon the development of EGI. These are features, which developers preferably avoid when planning an EGI development due to the increased cost of constructing and or maintaining the infrastructure in these areas, such as, but not limited to, seismicity, steep slopes, geology, and coastal and estuarine areas. Where applicable, additional and updated environmental data layers have been incorporated in the wall to wall environmental sensitivity and engineering constraints maps developed as part of the 2016 EGI SEA (DEA, 2016)

The outputs of Phase I included updated wall to wall environmental sensitivity and engineering constraints maps, highlighting areas of sensitivity and constraints across four tiers (i.e. Very High, High, Medium and Low).

1.3.4 Phase 2: Utilisation Corridors

Phase 2 involved identifying areas both inside and adjacent to (within a 25 km buffer either side of (except on the coastal extremity)) the preliminary corridor boundaries where transmission infrastructure development might be best utilised. Utilisation was considered from both a bulk load and bulk generation perspective. Information was gathered from a range of sources including national, provincial and local government spatial planning documentation.

This was supplemented with information gathered through consultation with government and industry on spatial plans for load and generation activities. Utilisation was represented spatially in terms of load and generation potential scored in MW at a 20 km by 20 km grid cell resolution. The output of this exercise is to use the planning category maps to refine the draft refined corridors (at the end of Phase 4 – Scoping Level Pre-Assessment) with the aim to maximise overlap with areas of highest utilisation potential, and to ensure that the corridors are aligned with areas that best represent where transmission infrastructure might be best utilised in the future. The final refinement of the corridors will be undertaken without compromising environmental sensitivities, engineering constraints and linkages to critical anchor points.

1.3.5 Phase 3: Pinch Point Analysis

The Pinch Point Analysis consists of refining the corridors and involves aggregating the spatial information captured in Phases 1 and 2 to determine optimal placement of the corridors from both an 'opportunities' and 'constraints' perspective i.e. where opportunities are maximized whilst ensuring suitable transmission routing alternatives are available from a constraints and sensitivities (both environmental and engineering) perspective. Results from the specialist assessments and stakeholder review process will also be considered when undertaking the final pinch point exercise. The objective of this task is to determine whether any pinch points, significantly constrained areas, exist at any position within the corridors.

Two Pinch Point Analyses will be undertaken as part of this SEA Process, as described below:

- A first draft pinch point analysis was undertaken to refine the preliminary corridors based on the outputs of Phase 1 (i.e. the Sensitivity and Constraints Maps). This task led to the Draft Refined Corridors (which have been assessed by the Specialists); and
- Based on the outputs of Phase 2 (i.e. Utilisation Mapping),Phase 4 (Scoping Level Pre-Assessment i.e. the specialist studies), as well as the inputs provided by stakeholders based on a review of the specialist studies, a final pinch point analysis will be carried out to determine the Final Refined Corridors.

1.3.6 Phase 4: Scoping Level Pre-Assessment

Phase 4 includes Specialist Studies (or Scoping Level Pre-Assessments, as referenced in the 2016 EGI SEA Report), which involved scoping level pre-assessments and sensitivity mapping within the two Expanded EGI Corridors. Specialists were required to review, validate and enhance the draft environmental constraints/sensitivities map for a range of environmental aspects (as described below). The spatial sensitivity of further aspects including defence, aviation, agricultural capability and SKA were confirmed in consultation with the relevant authorities. Sensitivity maps were produced for all the specialist studies, excluding the Seismicity and Socio-economic Assessments.

The following Specialist Assessment Studies have been commissioned as part of the SEA:

- Biodiversity and Ecology (Terrestrial and Aquatic Ecosystems, and Species, including Bats and Avifauna);
- Visual Impacts;
- Impacts of seismicity; and
- Socio-Economic Impacts.

Feedback is also provided on the impact of the EGI on Agriculture, Defence, Civil Aviation and Heritage.

The Specialist Assessment Studies are currently being released to stakeholders for a 30-day comment period via the project website. Following this review period, based on the inputs from specialists and stakeholders, the draft refined corridors will be adjusted and finalised for consideration by Cabinet.

1.3.7 Phase 5: Gazetting and Decision- Making Framework

Phase 5 will translate the outputs from Phase 4 into environmental management measures and recommended planning interventions to ensure that long term energy planning is considered within spatial development plans.

The outputs of the SEA (i.e. final corridors, final corridor environmental constraints/sensitivities map, Environmental Management Programme, Standards/Norms and Development Protocols) will be released for public comment through publication in the Government Gazette. The gazetting process is envisaged to take place in the second quarter of 2020.

As part of the 2016 EGI SEA (DEA, 2016), the CSIR compiled the following Environmental Management Programme (EMPr) documents to guide the construction of the EGI:

- Generic EMPr for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure; and
- Generic EMPr for the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity.

On 2 May 2018, the Minister of Environmental Affairs respectively published the abovementioned EMPrs in Government Notices 162 and 163 for public comment in terms of Section 24(5) of the NEMA, and Regulations 19(4) and 23(4) and Appendix 4 of the 2014 EIA Regulations (as amended).

As part of this SEA, the project team, including the specialists, has provided formal comments on the abovementioned EMPrs (in Government Notices 162 and 163) for consideration by the DEA. It is planned that the Gazetted EMPrs will also be applied to EGI infrastructure development within the expanded corridors, and updated (where required).

1.4 Procedure of Environmental Assessment within the EGI Corridors: Objectives and Vision

One of the key points that the DEA has realised over time is that unless developers plan with the environment in mind, it is not really considered as a priority. This SEA is ensuring that the environment is brought to the forefront as a priority in planning. One of the outcomes of this SEA is therefore to ensure that environmental approvals for such infrastructure within the corridors are not a cause for delay towards development, whilst still maintaining and ensuring the highest levels of environmental rigour.

To ensure that EGI development within the corridors are not a cause for delay, the DEA is proposing that such development is exempt from the need to obtain Environmental Authorisation in terms of the NEMA. This approach is being discussed with various SEA Project Team members, Authorities and key Stakeholders. Complete exemption from the Environmental Authorisation process can only be achieved if there is compliance with prescribed Norms or Standards. These will, as a fundamental minimum, request for a level of site verification and site Environmental Assessment to be conducted.

It however remains critical to ensure that any environmental management instrument, Norm or Standard, or EMPr developed as part of this SEA Process is comprehensive and environmentally rigorous, whilst still maintaining practicality and feasibility.

One of the objectives of this SEA Process is also to enable the developers the flexibility to consider a range of route alternatives within the pre-assessed corridors to avoid land negotiation issues and to submit a pre-negotiated route to the Competent Authority. As noted above, this has currently been achieved for the development of EGI within any of the five Strategic Transmission Corridors gazetted in February 2018 (GN 113 in Government Gazette 41445), for which (a) a pre-negotiated route can be submitted to the DEA, and (b) a BA procedure needs to be followed in compliance with the 2014 EIA Regulations (as amended) instead of a full Scoping and EIA process previously triggered by such activities. This new streamlined environmental assessment process also includes a reduced decision-making timeframe for the Competent Authority (i.e. 57 days as opposed to 155 days). Several factors served as motivation for the abovementioned streamlining of the Environmental Assessment Process, including the fact that the development of linear EGI is a well-known type of development, and the DEA has previously considered and issued Environmental Authorisation for numerous applications in this regard. Therefore, the type of issues and impacts linked to a proposed EGI development is well understood and would apply across many EGI development applications.

Feedback on the above suggested approach for the development of EGI within the proposed expanded EGI corridors is sought from the stakeholders, and a final informed decision will be taken as to whether the exemption from Environmental Authorisation with compliance with the EMPr and Standards will be adopted. Overall, this EGI Expansion SEA is taking the post-SEA Application Process one-step further as compared to the 2016 EGI SEA, which resulted in streamlining of the Environmental Authorisation Process (as discussed above).

1.5 EGI SEA Report Structure

The Final SEA Report will comprise six parts. Parts 1 to Part 4 describe the approach and main outputs of the EGI Expansion SEA Process. Part 5 of the report describes the process for utilising the SEA outputs to plan strategically including the role of key stakeholders (developers, Environmental Assessment Practitioners, Competent Authorities, and Commenting Authorities) in the context of the proposed streamlined Environmental Authorisation Process or exemption thereof. Part 6 will include updates to the generic EMPr (if required). Figure 6 illustrates the structure of the SEA Report.

It is important to reiterate that the SEA Process has not been completed yet, Phase 4 (refer to Section 1.3.6) still needs to be finalised following the stakeholder review process.

As such, the following documents are currently available for stakeholder information and in support of the Specialist Assessment Reports:

- Part 1: Background to the EGI Expansion SEA (i.e. this chapter); and
- Part 2: Identification of the Power Corridors.

The specialist studies released for stakeholder review are included in Part 3: Specialist Assessment and Additional Impacts:

- Integrated Biodiversity and Ecology (Terrestrial and Aquatic Ecosystems, and Species) Assessment Report ((including annexures of individual chapters);
- Visual Assessment Report;
- Seismicity Assessment Report;
- Socio-Economic Assessment Report;
- Additional Issues (Agriculture, Defence, Civil Aviation and Heritage);
- Appendix A: Specialist and Author Team Declarations of Interest; and
- Appendix B: Peer Review Sheets and Specialists Responses.

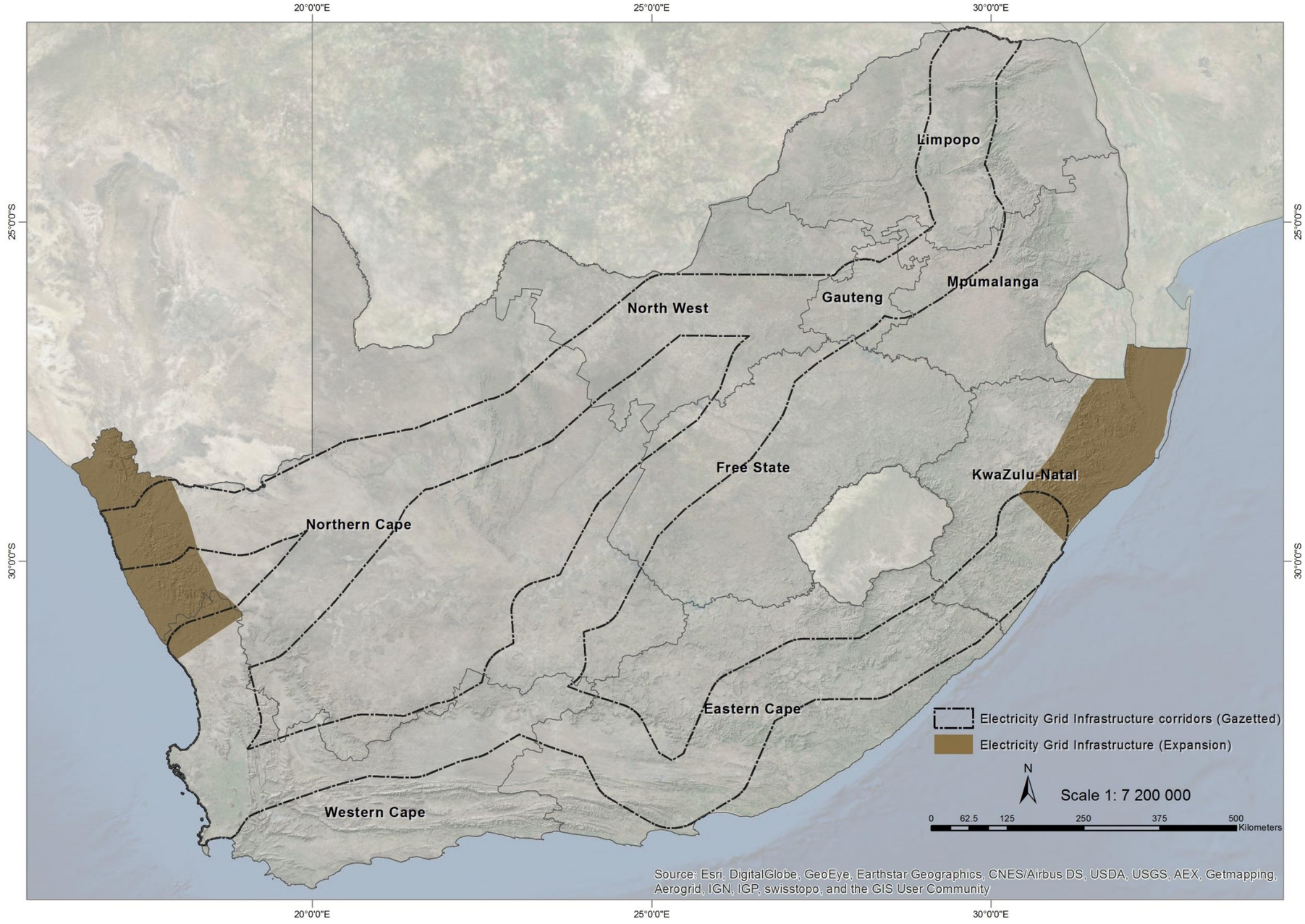

Figure 3: 2016 EGI SEA Gazetted Power Corridors (i.e. Strategic Transmission Corridors) and the Expanded Western and Eastern EGI Corridors

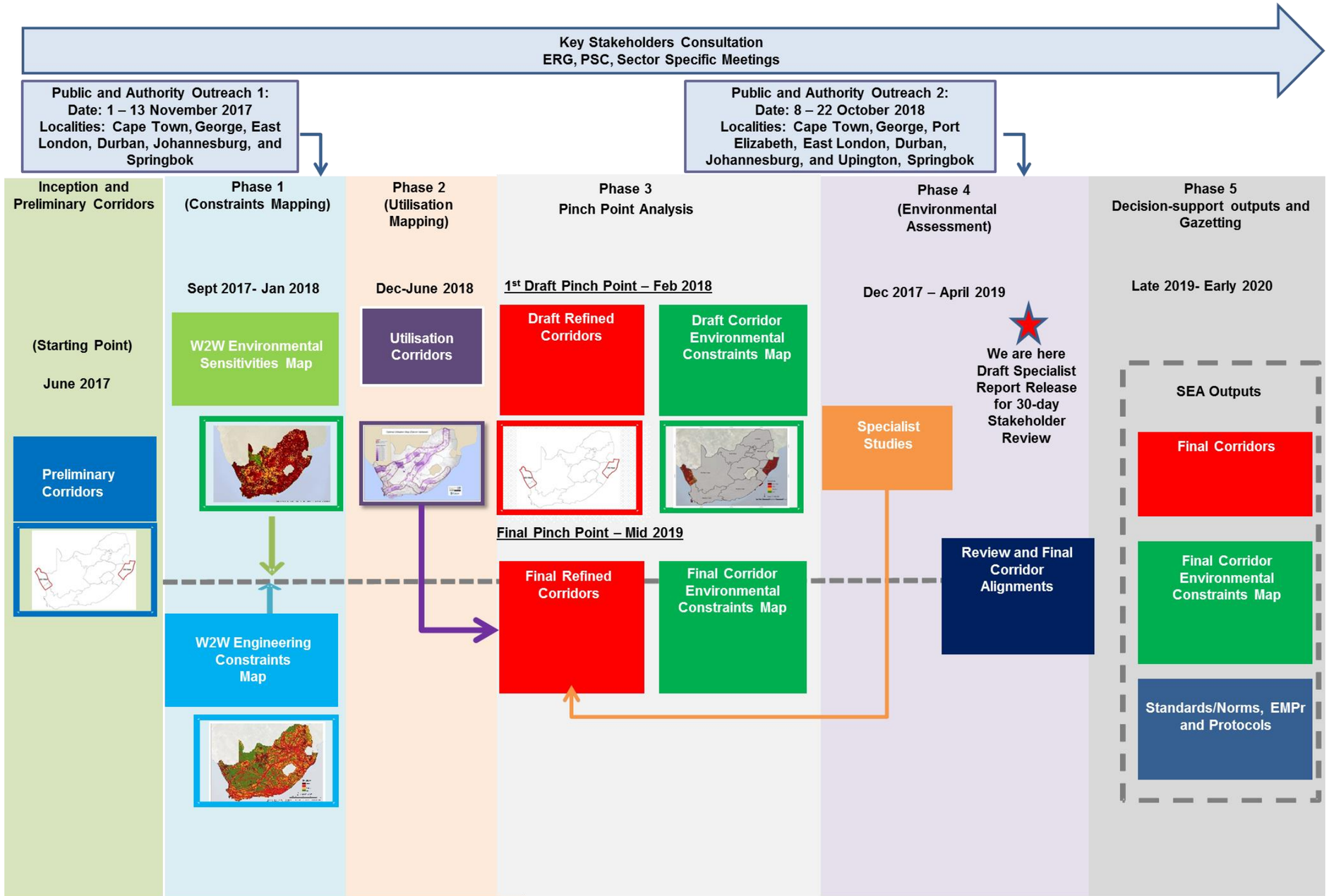

Figure 4: EGI Expansion SEA Process

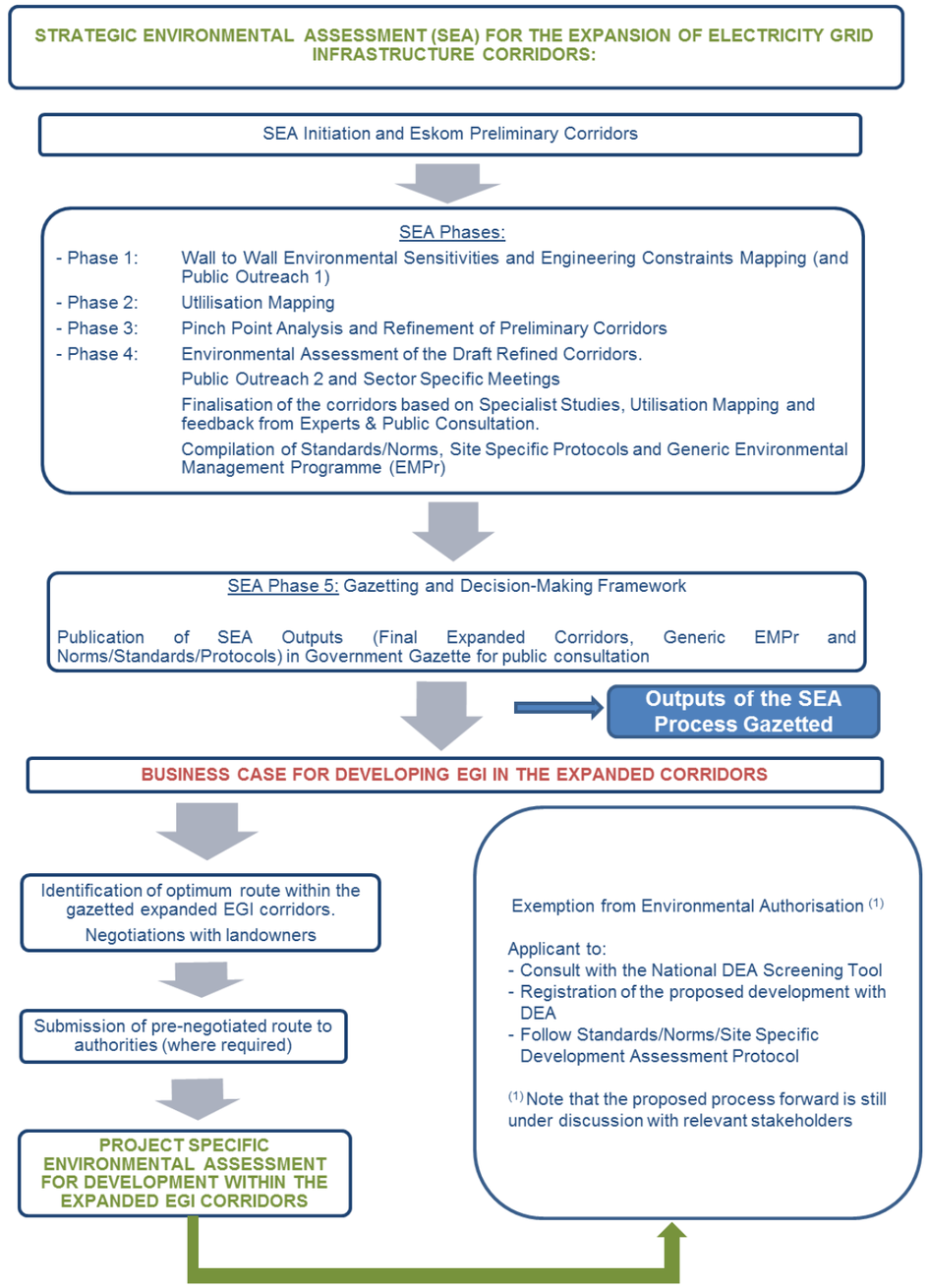

Figure 5: Expanded EGI SEA Process from Initiation to Project Specific Environmental Authorisation Process

PART 1	PART 2	PART 3	PART 4 *(TO BE COMPLETED FOLLOWING STAKEHOLDER REVIEW)*	PART 5 *(TO BE COMPLETED FOLLOWING STAKEHOLDER REVIEW)*	PART 6 *(TO BE COMPLETED FOLLOWING STAKEHOLDER REVIEW)*
SEA DEVELOPMENT				**SEA IMPLEMENTATION**	
BACKGROUND	**IDENTIFICATION OF EXPANDED EGI CORRIDORS**	**SENSITIVITY MAPS AND SPECIALIST STUDIES**	**EXPANDED EGI CORRIDORS**	**APPLICATION PROCESS INSIDE EXPANDED EGI CORRIDORS (I.E. EXEMPTION FROM EA[1])**	**ENVIRONMENTAL MANAGEMENT PROGRAMME FOR CONSTRUCTION**
- SEA Rationale - Objectives of the SEA - Legal Framework - Process Overview	- Eskom Preliminary EGI Corridors - Constraints Mapping - Utilisation Mapping - Corridor Refinement - EGI Corridors - Consultation Process	- Specialist studies - Additional Issues (Agriculture, Defence, Civil Aviation and Heritage) - Sensitivity Maps	- Final Pinch Point Analysis - Final Expanded EGI Corridors - Publication of SEA Outputs (i.e. Final Corridors, EMPr, Standards)	- Consult with the National DEA Screening Tool - Registration of the proposed development with DEA - Follow Standards/Norms/Site Specific Development Assessment Protocol (1) Note that the proposed process forward is still under discussion with relevant stakeholders	- Specialist site walk through - Final line profile - Update construction EMPR - Implement

Figure 6: EGI Expansion SEA Report Structure