



# DEA National Electricity Grid Infrastructure Strategic Environmental Assessment

IAIA Conference 2014  
29<sup>th</sup> August 2014  
Presenter: Marshall Mabin





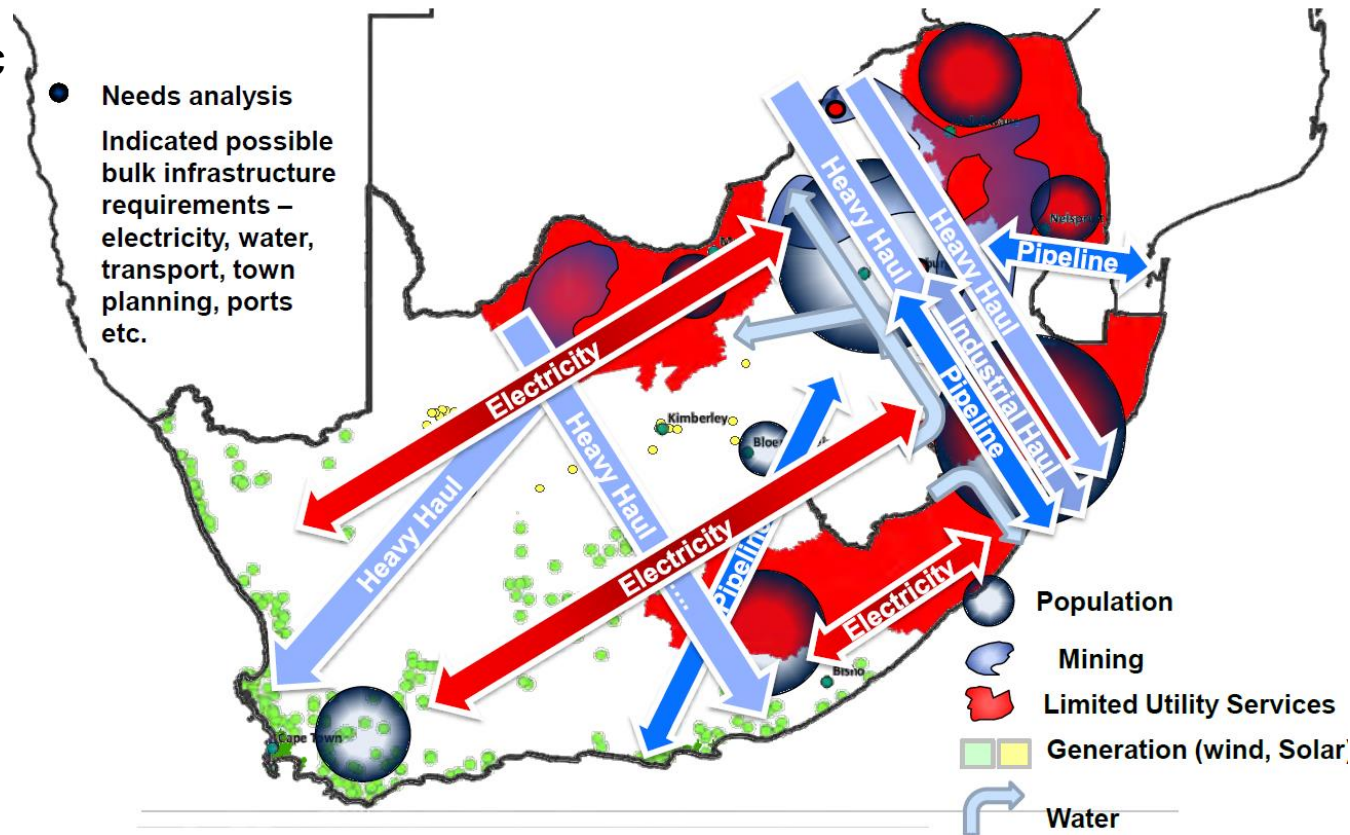
# Strategic Integrated Projects (SIPs)

From the spatial analysis of the country needs, 17 (+1) Strategic Integrated Projects (SIPs) have been identified.

The SIPs cover a range of economic and social infrastructure.

All nine provinces are covered, with emphasis on poorer provinces.

Needs analysis of infrastructure to support economic development and trade whilst simultaneously addressing the needs of the poor



# Three energy related SIPs

## SIP 8: Green energy in support of the South African economy

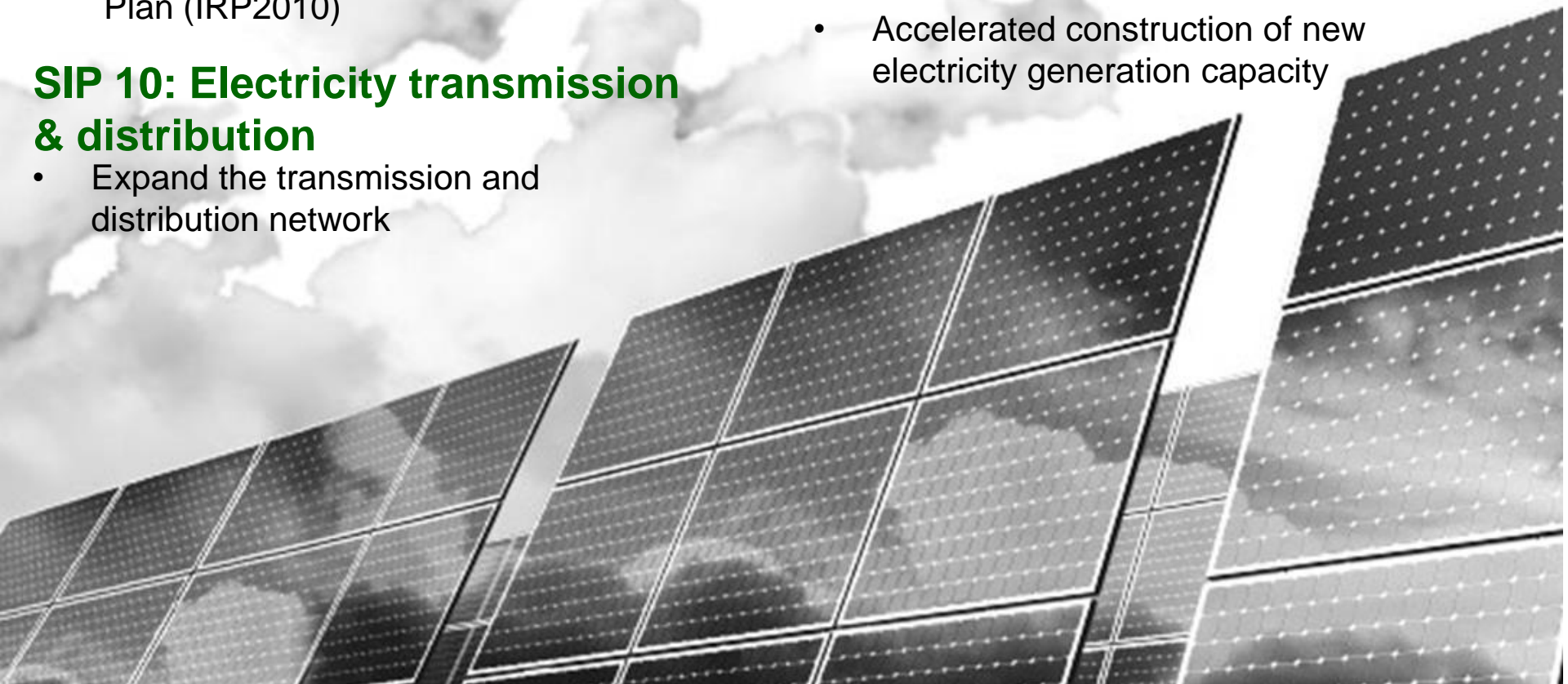
- Roll out of the Integrated Resource Plan (IRP2010)

## SIP 10: Electricity transmission & distribution

- Expand the transmission and distribution network

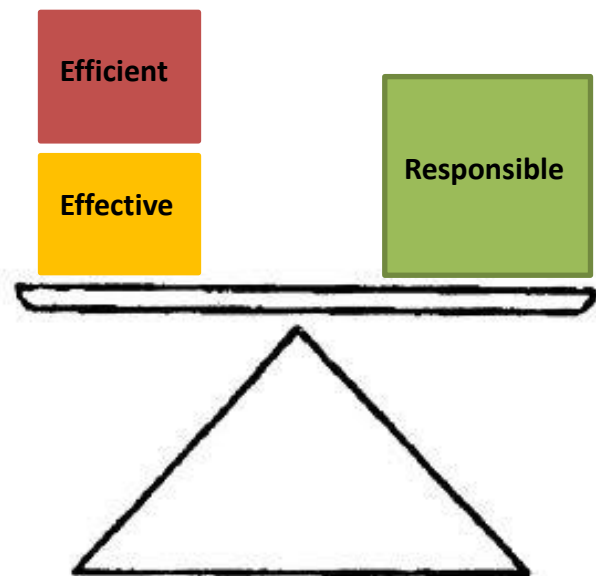
## SIP 9: Electricity generation to support socioeconomic development

- Accelerated construction of new electricity generation capacity



# Vision and Objectives of SEA

Vision for the SEA: *Strategic Electrical Grid Infrastructure (EGI) is expanded in an environmentally **responsible** and **efficient** manner that responds **effectively** to the country's economic and social development needs.*



## Objectives of the SEA:

- Identify strategic corridors for future Electrical Grid Infrastructure (EGI) expansion.
- Determine high level suitability from an environmental, economic and social perspective.
- Streamline the authorisation process for EGI within the corridors.
- Enable Eskom greater flexibility when undertaking land negotiation.
- Enable upfront strategic investment
- Promote collaborative governance between authorising authorities.
- Develop a site specific development protocol.

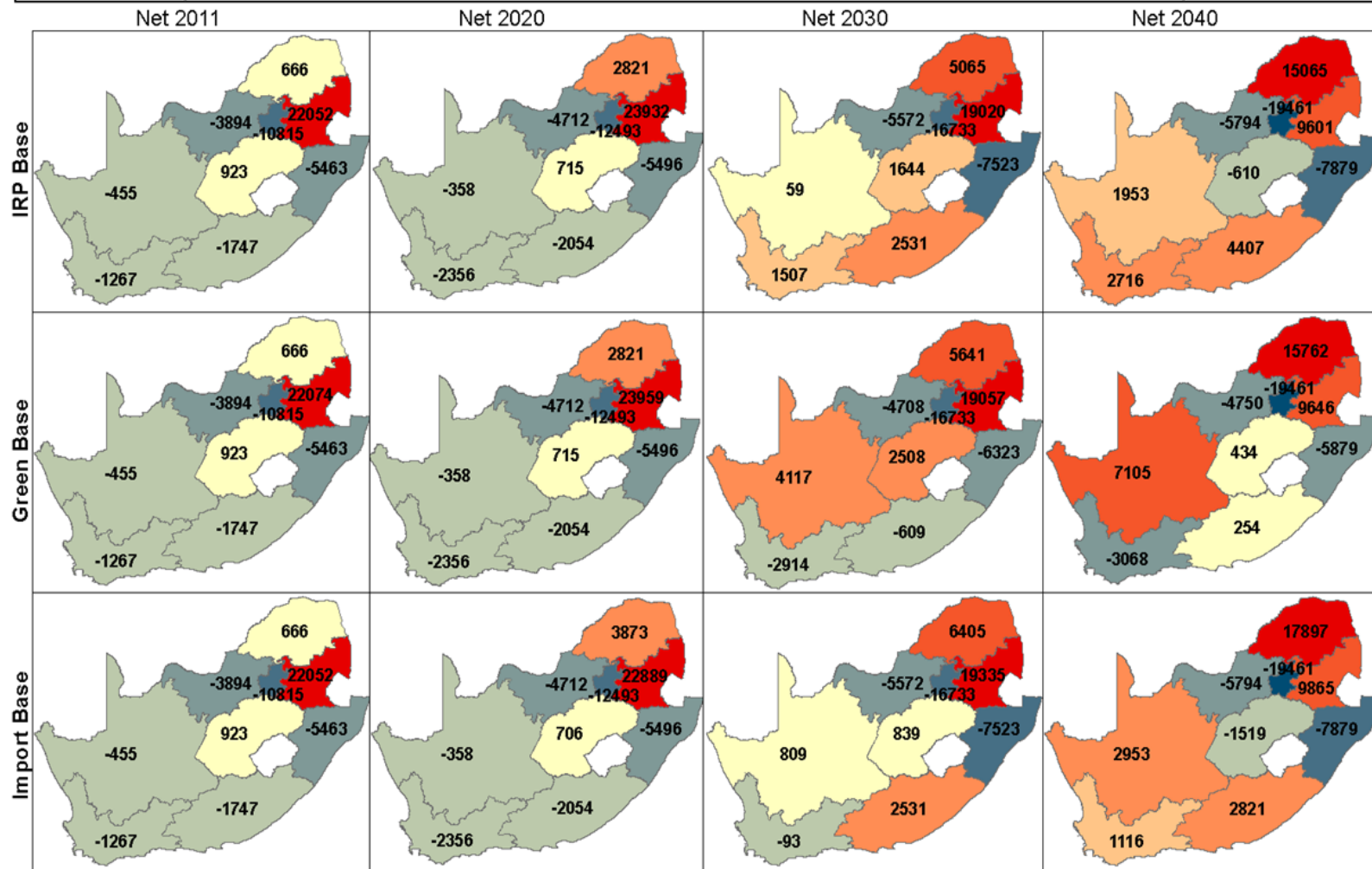
# Identifying Strategic Corridors for EGI

- Eskom Strategic Grid Plan Study: Formulates long term strategic transmission corridor requirements fro South Africa
- 20 year horizon, extended to 30 years for purposes of this study
- Based on range of generation scenarios, and associated strategic network analysis
- Three future scenarios considered:
  - **The IRP 2010 base Scenario**
    - Extended to 2040
  - **Increased Renewable Scenario**
    - Replace nuclear component with RE base generation equivalent
  - **Increased Import Scenario**
    - Double imported power by 2030
- Energy power demand and supply deficit and excesses was assessed for each scenario
- Assessed per provinces and within Provinces
- Results identify potential grid expansion requirements

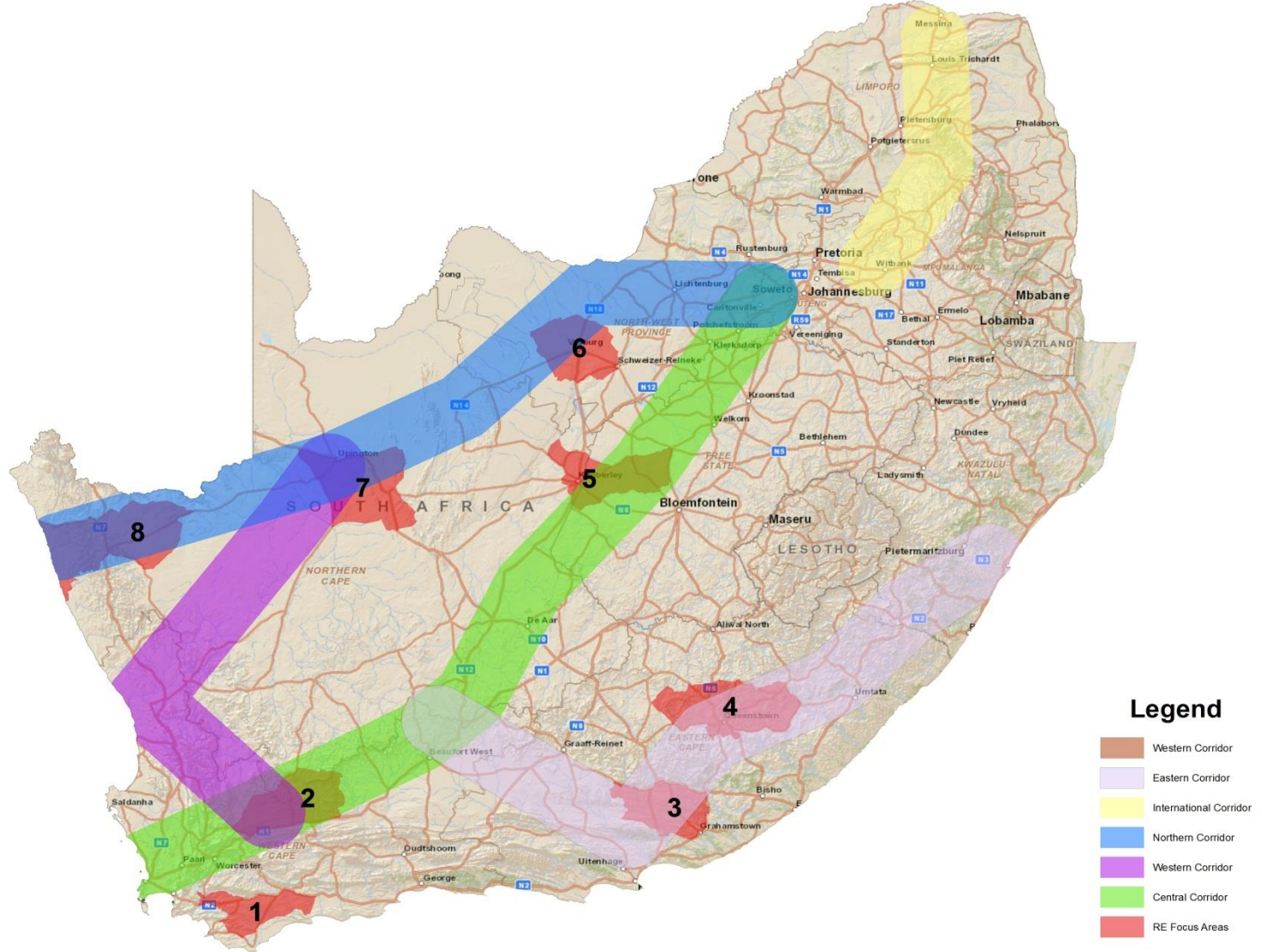


# Comparing Demand Balances for each Generation Scenario

## DEMAND BALANCE PROGRESSION FOR EACH SCENARIO (Installed Generation less Maximum Demand in MW)



# National Electrical Grid Infrastructure SEA\_Working Corridors



0 90 180 360 540 720 Kilometers



Date: 03/02/2014

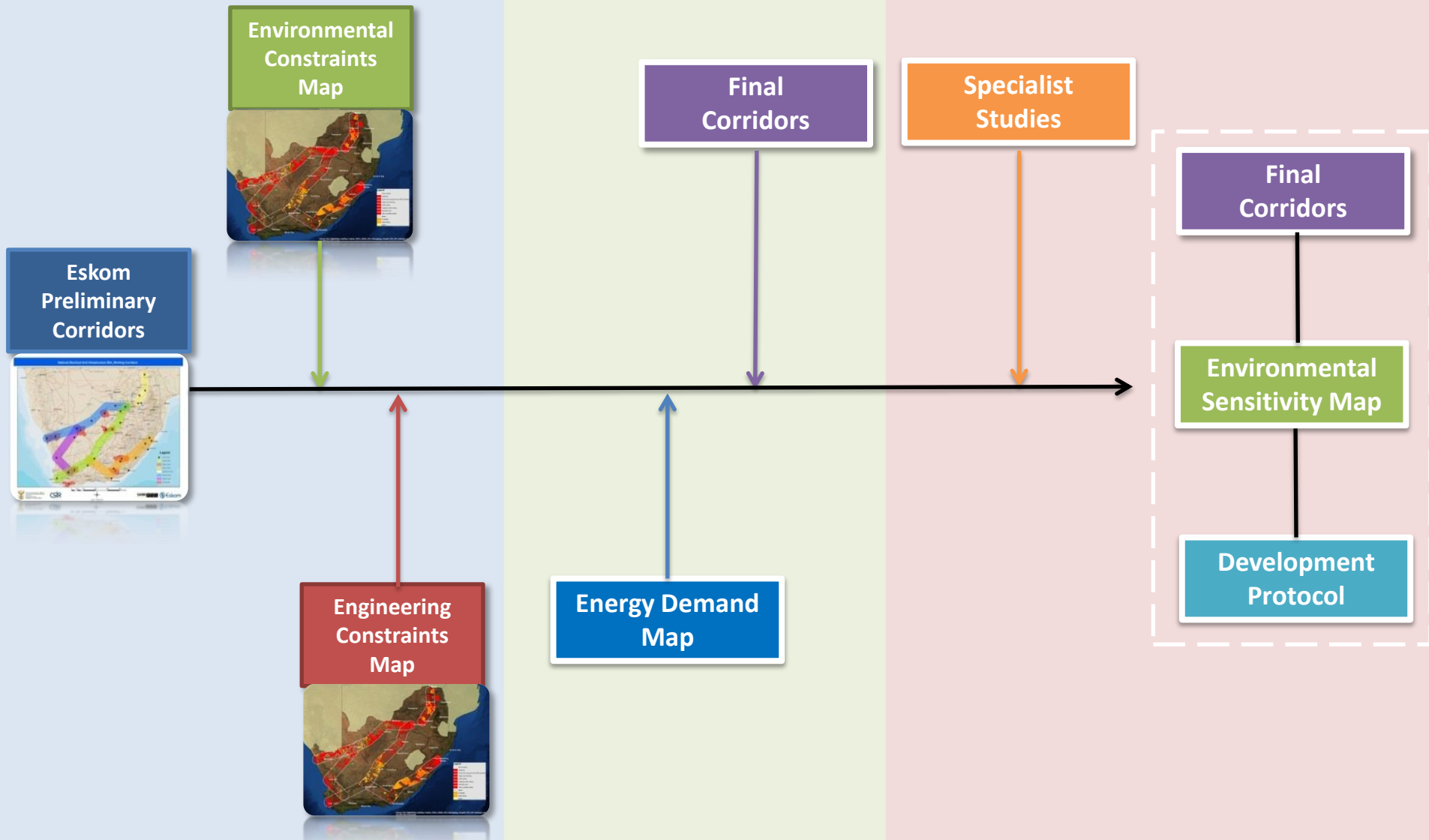


# EGI SEA APPROACH

## Phase I (Jan-Aug 14)

## Phase II (Aug – Feb 15)

## Phase III (Mar-Dec 15)



Participation

# Corridor Refinement Mapping Process

## Two Constraint (Negative) Mapping Components

### 1. Environmental: Impact of 'Transmission Infrastructure on the Environment'

Biophysical	Cultural	Socio- Economic
Protected Areas	Natural Heritage Sites	Square Kilometre Array
Endangered Habitats	Archaeological Sites	Game Farms



### 2. Engineering: Impact of 'Environment on Transmission Infrastructure'

- *'A feature (natural or unnatural) which represents a significant cost to Eskom when developing or operating transmission line infrastructure on or in proximity to that feature'.*

Agriculture	Infrastructure	Biophysical
Pivot	Mining Areas	Slope
Sugar Cane	Build Up Areas	Coast

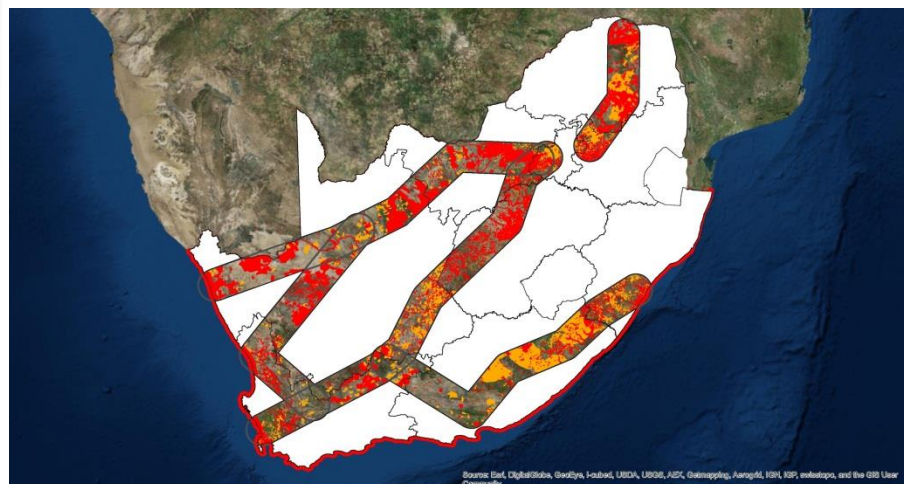
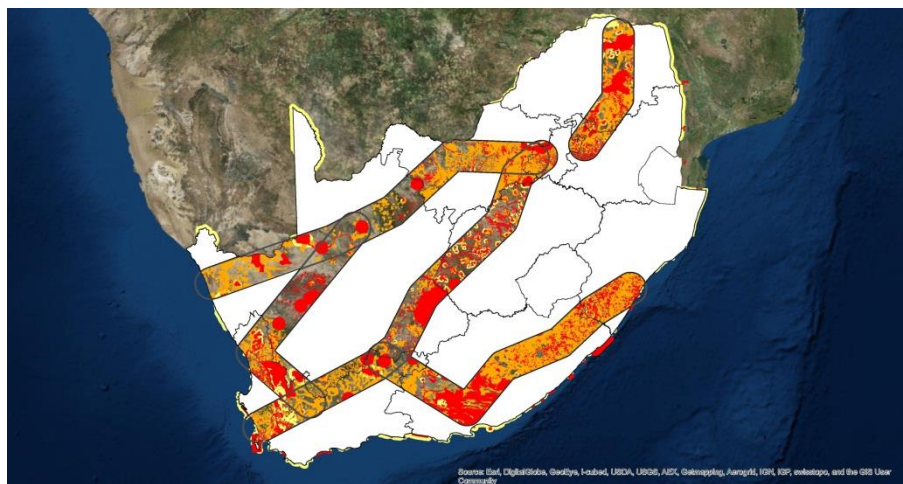
# Constraints Categorisation and Draft Mapping Outputs

## Environmental Constraints Categories

Level of Constraint	Description
<b>Very High</b>	The area is rated as extremely sensitive to the negative impact of development. As a result the area will either have <b>very high conservation value, very high existing/ potential socio-economic value or hold legal protection status.</b>
<b>High</b>	The area is rated as being of high sensitivity to the negative impact of development. As a result the area will either have <b>high conservation value and or existing/potential socio-economic value.</b>
<b>Medium</b>	The area is rated as being of medium sensitivity to the negative impact of development. As a result the area will either have <b>mediums levels of conservation value and or medium levels of existing/potential socio-economic value.</b>
<b>Low</b>	Area is considered to have low levels of sensitivity in the context of electricity grid infrastructure development.

## Engineering Constraints Categories

Level of Constraint	Description	BCI Rating
<b>Very High</b>	The lifetime cost associated with development in this area is greater than 50% the BCI.	>1.5X
<b>High</b>	The lifetime cost associated with development in this area is between 20% and 50% greater than the BCI.	1.2X-1.5X
<b>Medium</b>	The lifetime cost associated with development in this area is between 0 % and 20% greater than the BCI.	1X-1.2X
<b>Low</b>	The lifetime cost associated with the development of transmission infrastructure is inline with the BCI.	X





# Corridor Refinement Mapping Process

## Transmission Demand (Positive) Mapping

- Determining where the energy is needed;
- Information gathering will comprise:
  - Desktop review of local government and provincial planning documentation;
  - Industry bulk energy user/producer workshop and exercise;
  - Consultation with local government;
  - Engagement with national departments;
- Information to be digitised into GIS format.



## Corridor Refinement

- Interpretation of constraints maps and demand map to determine optimal location of corridors- paths of least resistance and maximum benefit

Demand Layer



Engineering Constraints Layer



Environmental Constraints Layer

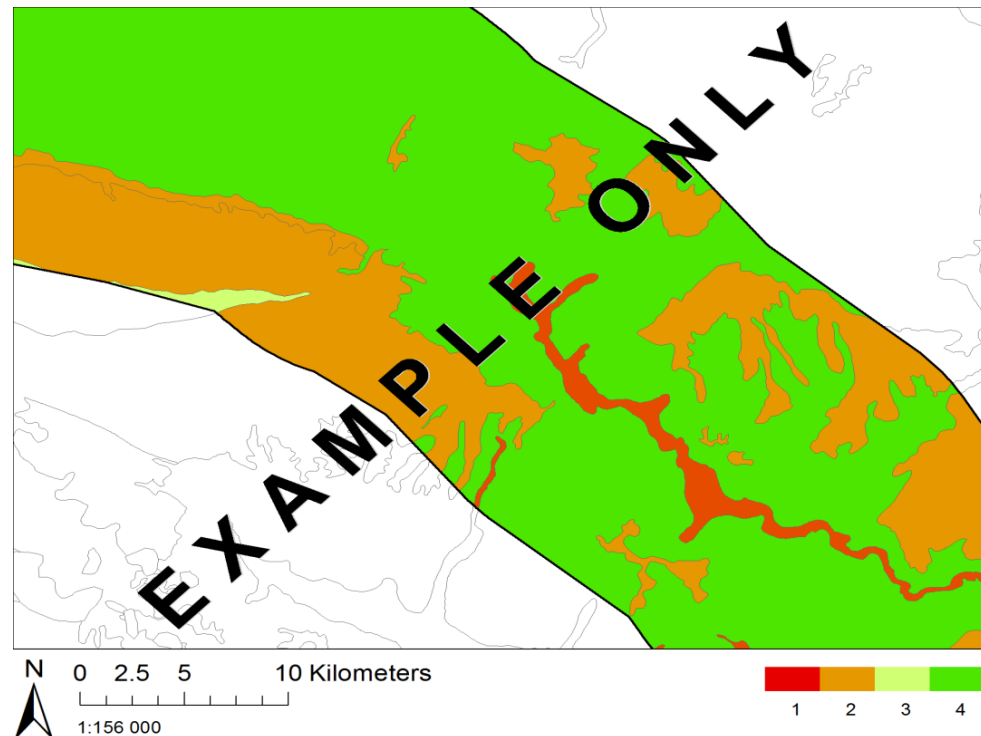


Optimal Corridor  
Positioning

# Phase III

- **Specialist Studies**

- Undertake scoping level assessment of area within the corridors;
  - Ecological Assessment
  - Bird Assessment
  - Heritage Assessment
  - Landscape Assessment
- Create sensitivity map for each assessment type in each of the corridors
- Assist in the creation of the development protocol
  - Specifies minimum assessment requirements
  - Proposed mitigation measures





# Cabinet Approval Process



# Thank you for your attention

DEA National Electricity Grid Infrastructure SEA  
to facilitate the efficient and effective expansion of key strategic  
transmission infrastructure in South Africa

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