

# DEA National Wind and Solar PV SEAs

To facilitate the efficient and effective rollout of wind and solar  
PV energy in SA

## Phase I Study Areas



environmental affairs

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# Identification of no-go areas (Negative Mapping)

**DEA National Wind and Solar PV SEAs**  
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energy in SA



**environmental affairs**

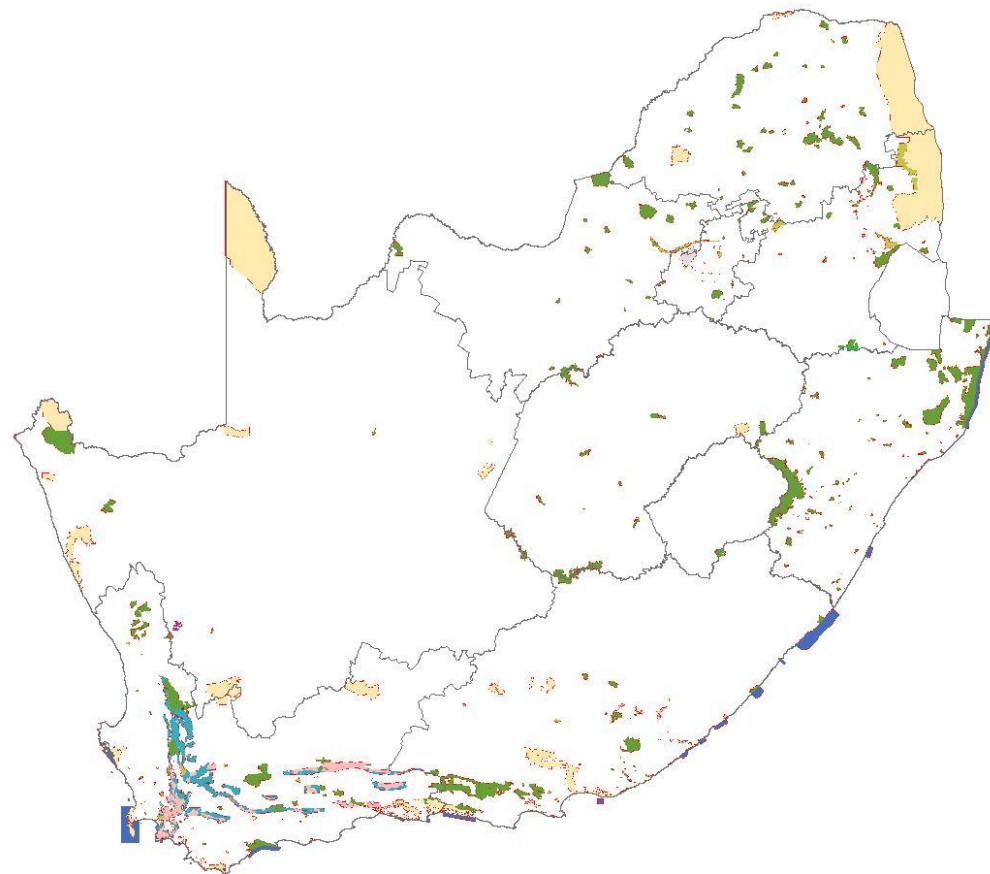
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# SANBI Protected Areas

## SANBI Core Protected Areas

Attributes	Wind Buffer	Solar Buffer
Forest Act Protected Areas	500m	500m
Island Reserves	500m	500m
Local Nature Reserves	500m	500m
Marine Protected Areas	500m	500m
Mountain Catchment Areas	500m	500m
National Botanical Gardens	500m	500m
Protected Environment	500m	500m
Provincial Nature Reserves	500m	500m
Special Nature Reserves	500m	500m
World Heritage Sites	500m	500m
National Parks	500m	500m



Source: SANBI, 2012 updated 2013

# SANBI CBAs and Threatened Ecosystems

## Remaining Threatened Ecosystems

Attributes	Wind Buffer	Solar Buffer
Critically Endangered Ecosystems	none	none
Endangered and Poorly Protected Ecosystems	none	none



Source: SANBI/Provinces, 2013 updated

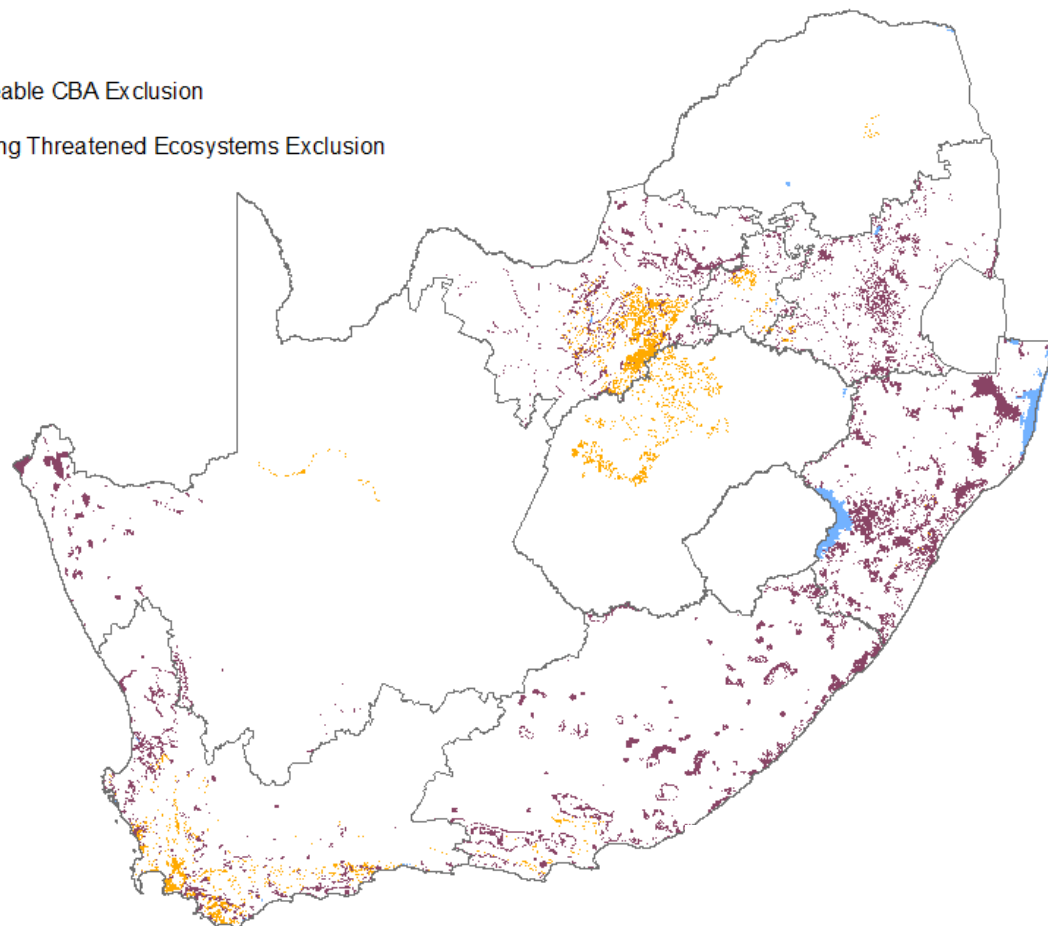
## Critical Biodiversity Areas (CBAs)

Attributes	Wind Buffer	Solar Buffer
Irreplaceable	none	none

Source: SANBI/Provinces, 2013 updated

### Legend

-  Irreplaceable CBA Exclusion
-  Remaining Threatened Ecosystems Exclusion





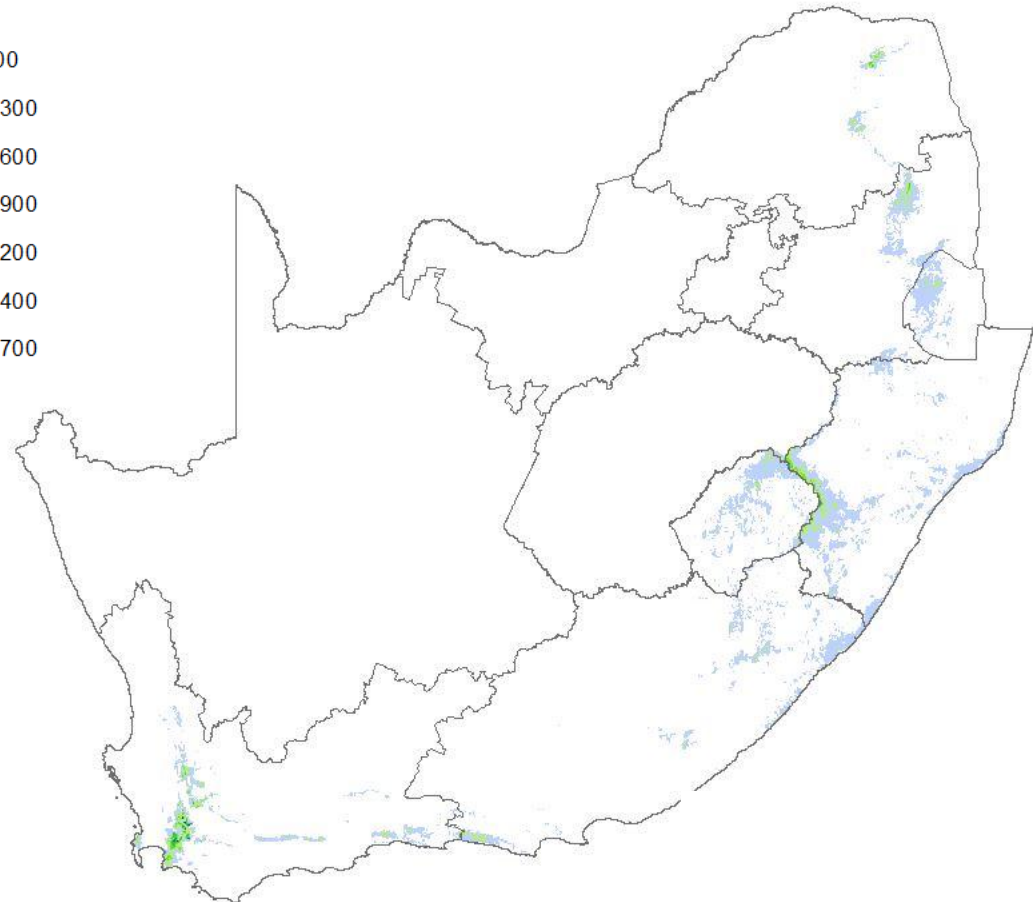
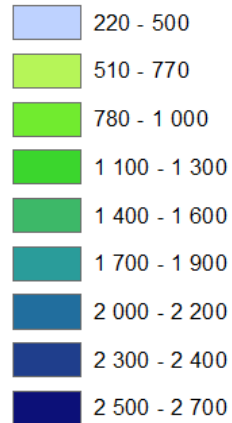
# SANBI/CSIR Strategic Water Source Areas

## Strategic Water Source Areas

Attributes	Solar Buffer
>135 mm/annum rainfall (8 % of country contributing 50% Rainfall)	not considered
>220 mm/annum rainfall (30 % of county's rainfall)	<b>none</b>

Source: SANBI/CSIR, 2013

value>220 mm/a

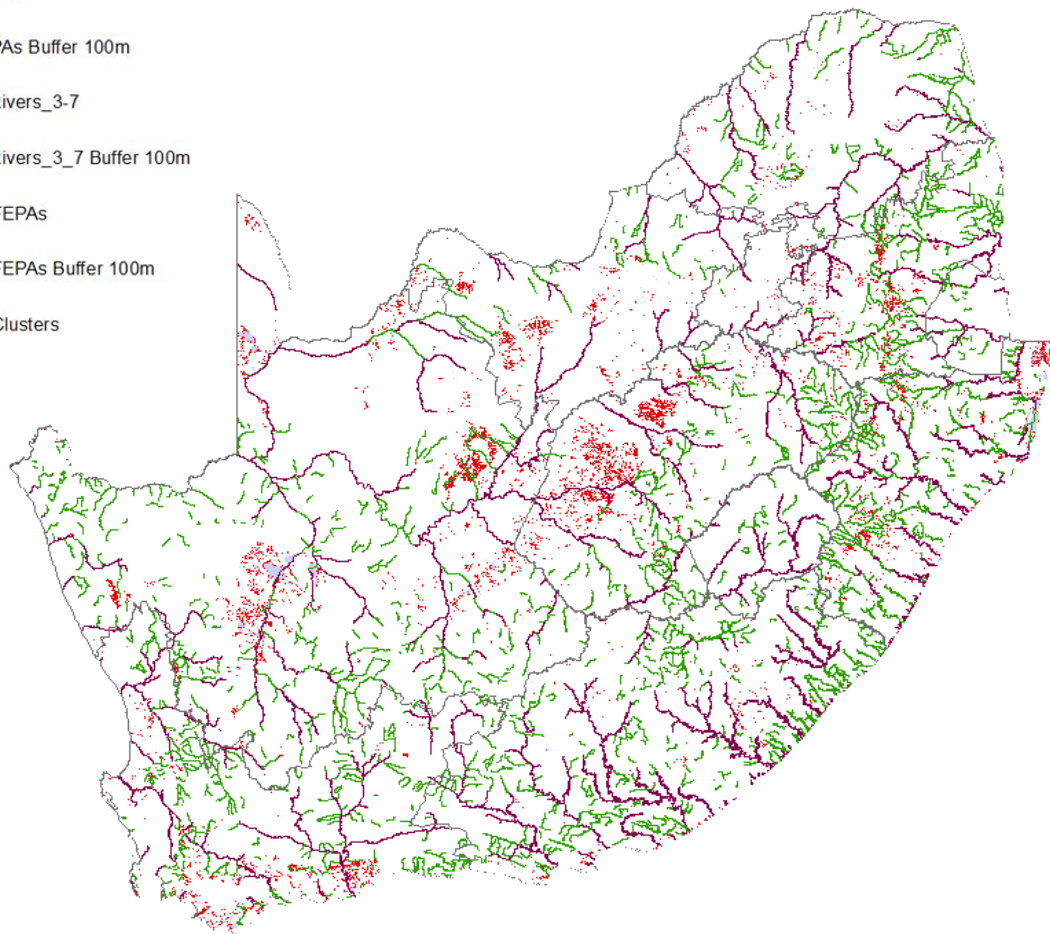
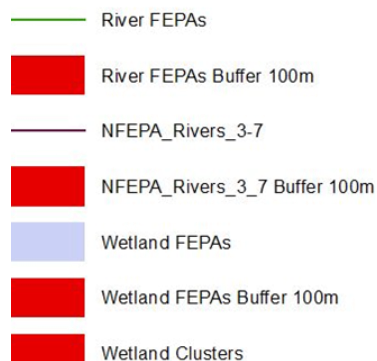


# SANBI/CSIR National Freshwater Ecosystem Priority Areas (NFEPA)

## National Freshwater Ecosystem Priority Areas

Attributes	Wind Buffer	Solar Buffer
River FEPAs	100m	100m
Rivers Order 3-7	100m	100m
Wetland FEPAs	100m	100m
Wetland clusters	none	none

Source: NFEPA: SANBI/CSIR, 2011



# Wetlands of International Importance (RAMSAR), Threatened Forest and Coastline (incl. Estuaries)

## RAMSAR

Attributes	Wind Buffer	Solar Buffer
Ramsar sites	500m	500m

Source: RAMSAR, 2013

## Threatened Forests

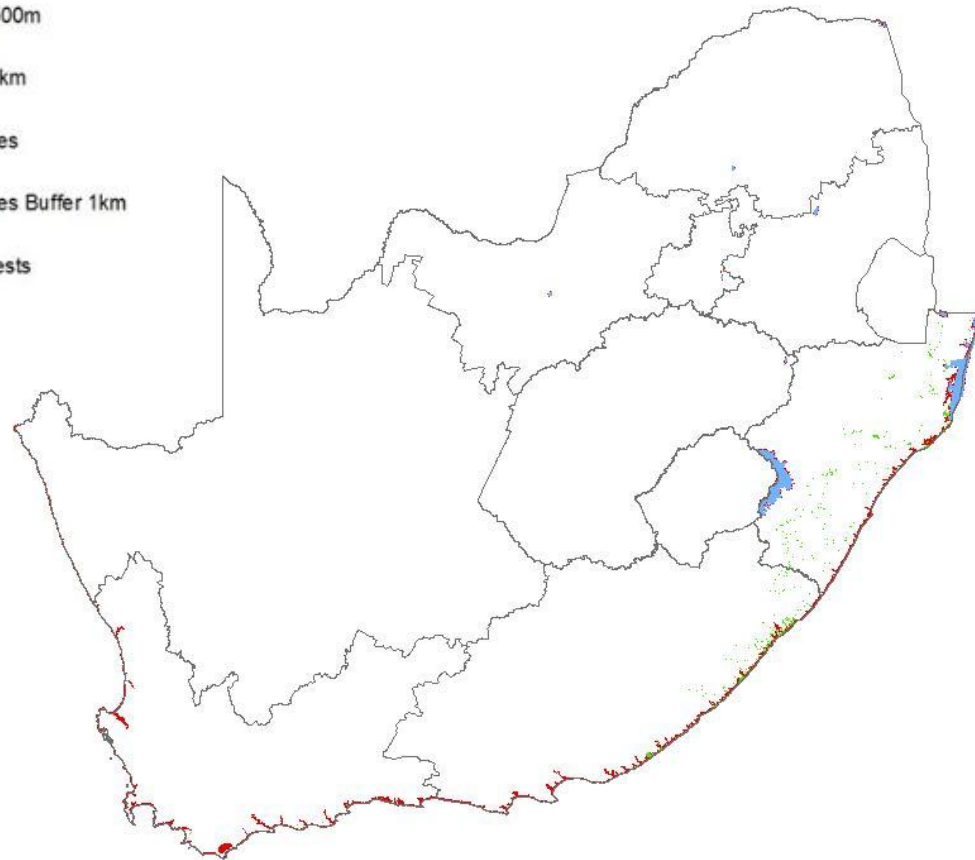
Attributes	Wind Buffer	Solar Buffer
Threatened Forests	500m	500m

Source: DAFF, 2013

## Coast (including estuaries)

Attributes	Wind Buffer	Solar Buffer
Coastline & Estuaries	1km	1km

Source: Coastline: DRDLR 50k Topo, 2006  
/ Estuaries: CSIR, SANBI 2009



# Birds and Bats: Wind

## Birds

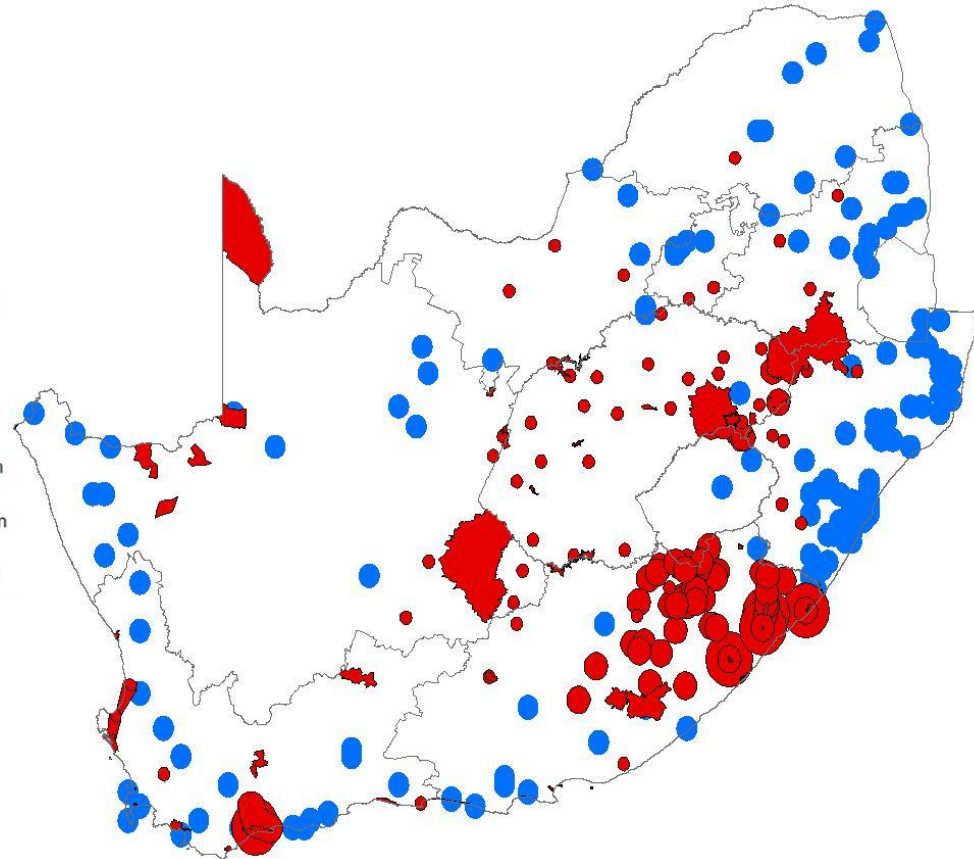
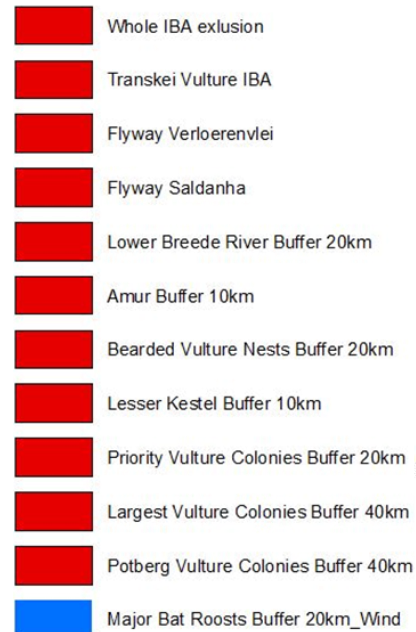
Attributes	Wind Buffer
Specific IBAs in whole	none
Amur colonies	10km
Bearded vulture nests	20km
Lesser Kestrel colonies	10km
Priority vulture colonies	20km
Largest vulture colonies	40km
Potberg vulture colonies	40km
Transkei vulture IBA	none
Saldanha flyway	none
Verlorenvlei flyway	none
Lower Breede River	20km

Source: Proposed Bird Exclusion Areas provided by BirdlifeSA - March 2013

## Bat

Attributes	Wind Buffer
Major Bat Roosts (> 500 bats)	20km

Source: Proposed Bat Exclusion Areas provided by EWT - March 2013



The following specialists are acknowledged for providing inputs to the bat exclusion map:  
 Kate MacEwan; Wendy White; John Power; Dean Pienke; David Jacobs; Leigh Richards; Kate Richardson; and Wanda Markotter

# Birds and Bats: Solar PV

## Birds

Attributes	Solar Buffer
Amur colonies	1km
Bearded vulture nests	2km
Lesser Kestel colonies	1km
Priority vulture colonies	2km
Largest vulture colonies	4km
Potberg vulture colonies	4km

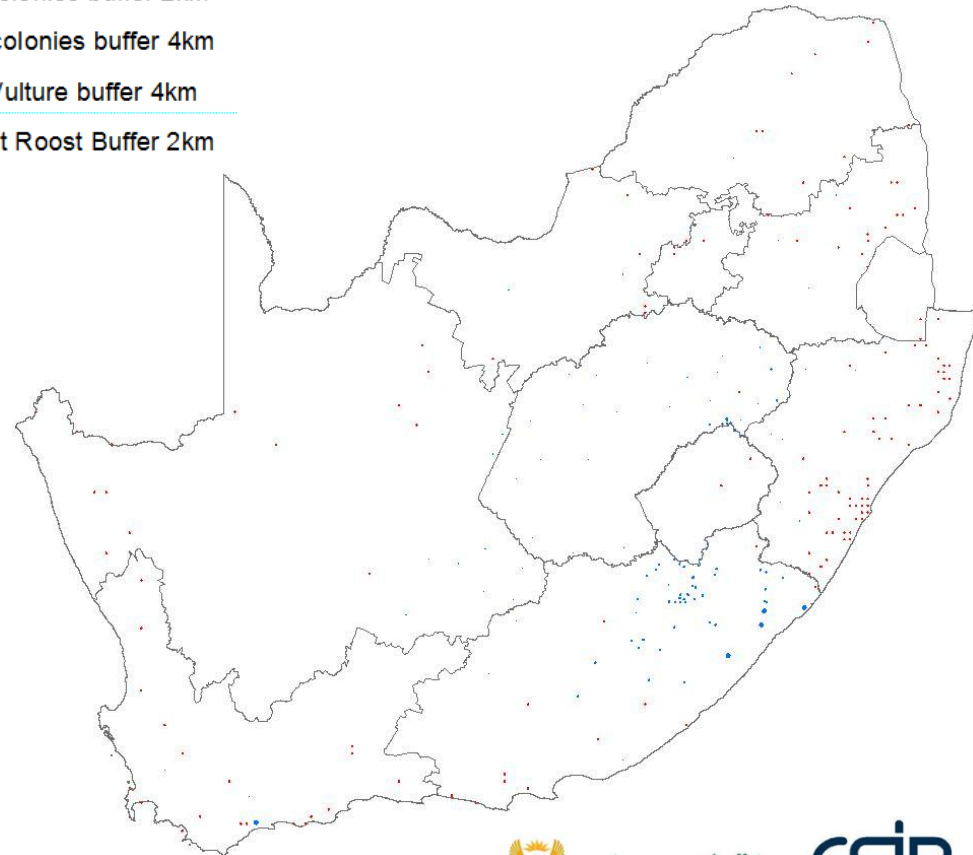
Source: Proposed Bird Exclusion Areas provided by BirdlifeSA  
- March 2013

- Bearded Vulture buffer 2km
- Amur buffer 1km
- Lesser Kestel buffer 1km
- Priority colonies buffer 2km
- Largest colonies buffer 4km
- PotbergVulture buffer 4km
- Major Bat Roost Buffer 2km

## Bat

Attributes	Solar Buffer
Major Bat Roosts (> 500 bats)	2km

Source: Proposed Bat Exclusion Areas provided by EWT - March 2013





# Land Use (1)

## Land Capability

Attributes	Wind Buffer	Solar Buffer
Class 1 - 3	none	none

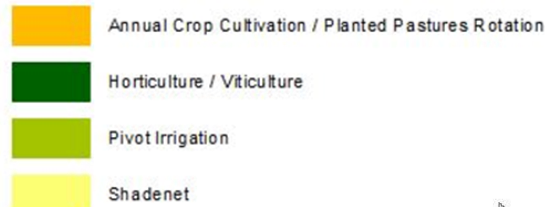
Source: DAFF, 2002

## Field Crop Boundaries

Attributes	Wind Buffer	Solar Buffer
Annual crop	not considered	none
Horticulture & Viticulture	none	none
Pivots	none	none
Shade net	none	none
Tea Plantations	none	none

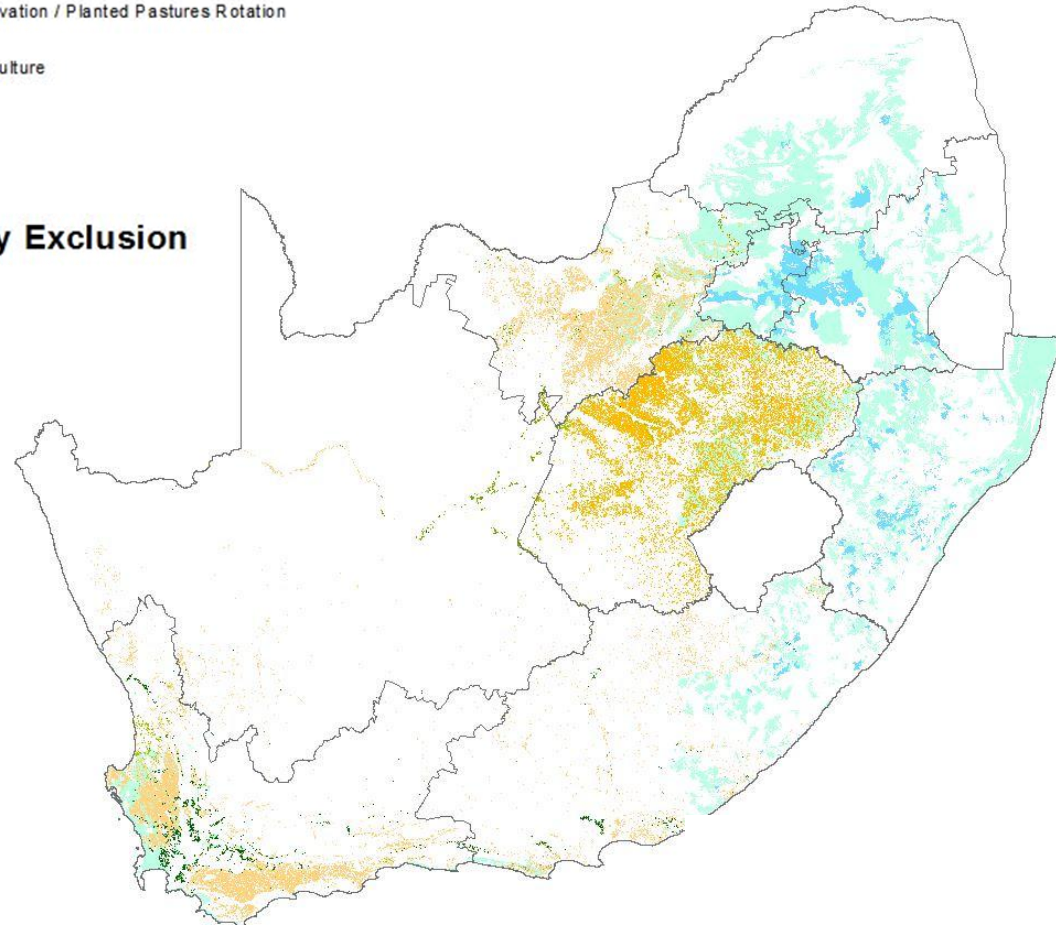
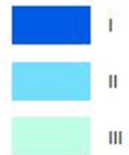
Source: DAFF, 2013

### Field Crop Boundaries



### Land Capability Exclusion

#### Land Capability



# Land Use (2)

## Square Kilometer Array

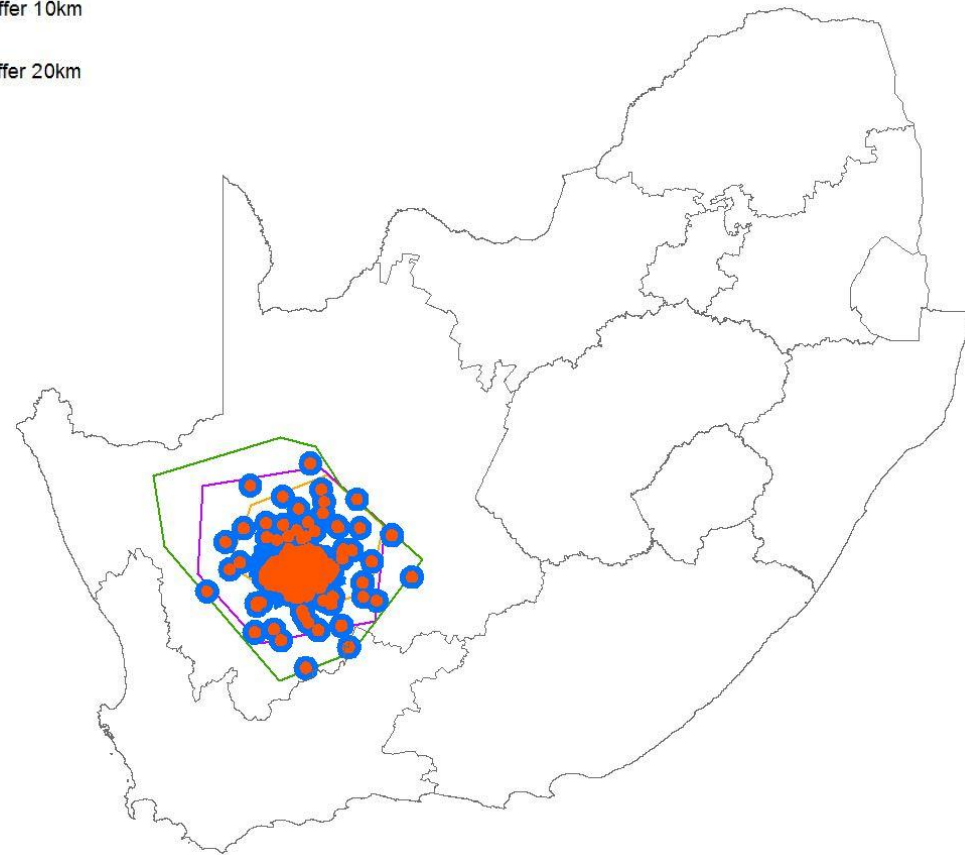
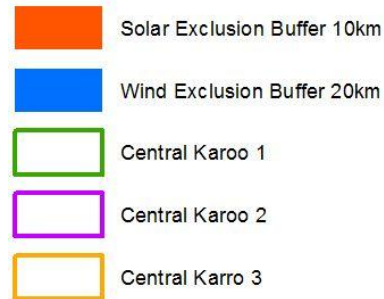
Attributes	Wind Buffer	Solar Buffer
Telescope Sites	20km	10km

Source: SKA, 2013

## South African Astronomical Observatory

Attributes	Wind Buffer	Solar Buffer
Astronomical Observatory	5km	5km

Source: DST, 2013





# Infrastructure (1)

## Roads

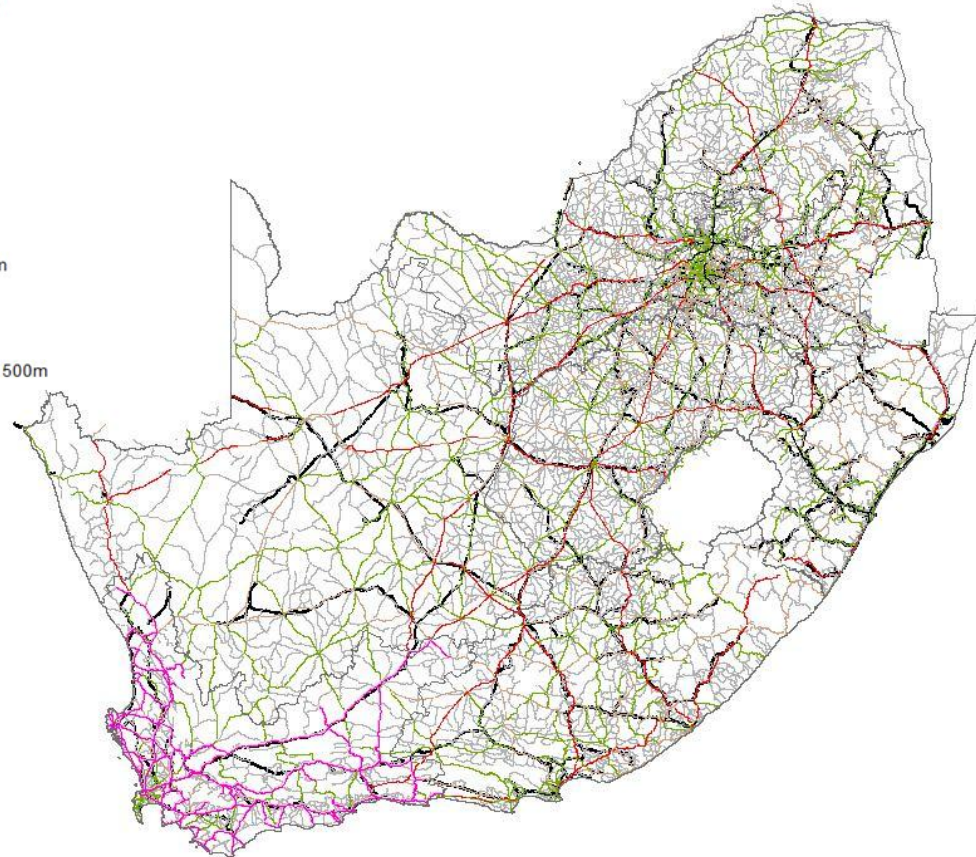
Attributes	Wind Buffer	Solar Buffer
Major Roads (national, arterial, main)	500m	500m
Secondary Roads (secondary)	500m	500m
Tourist Routes (WC)	2km	2km

Source: DRDLR 50k Topo, 2006

## Railway

Attributes	Wind Buffer	Solar Buffer
Railway	300m	300m

Source: DRDLR 50k Topo, 2006

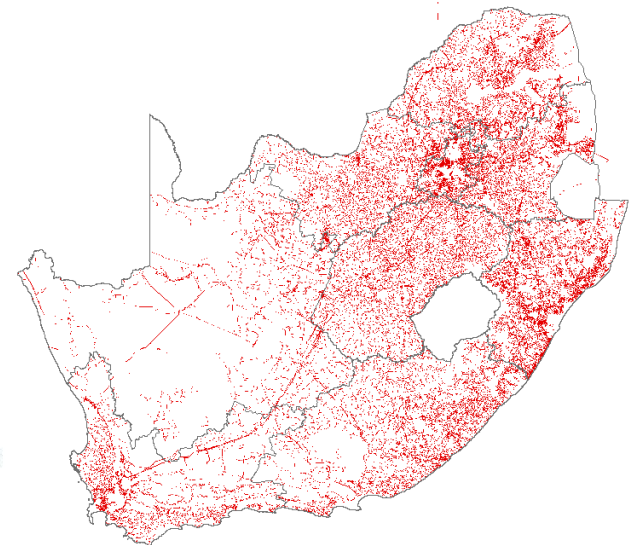


# Infrastructure (2)

## Power lines and substations

Attributes	Wind Buffer	Solar Buffer
Existing Transmission & Distribution + 2022 Planned Transmission	300m	300m

Source: Eskom, 2013

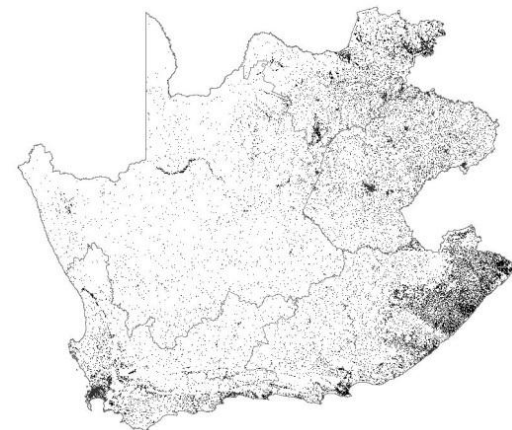


## Buildings

Attributes	Wind Buffer	Solar Buffer
Buildings	300m	300m

Source: SPOT Building Count, 2009

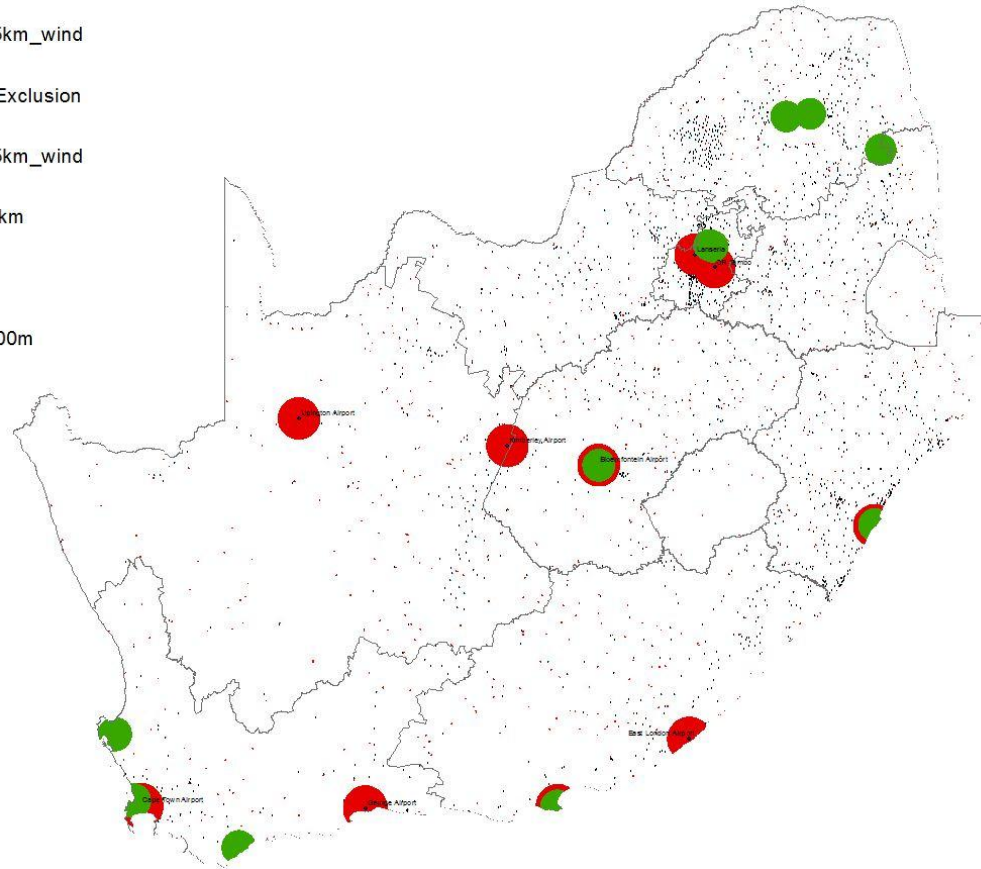
Buildings with 300 m buffer



# Infrastructure (3)

## Airports

Attributes	Wind Buffer
Major Airports	35km
Landing Strips	1km
Military Air force Bases	27 km



Source: DRDLR 50k Topo, 2006; and CRSES/SADF, 2013

## Telecommunication towers

Attributes	Wind Buffer	Solar Buffer
Telecommunication towers >20 m	500m	500m

Source: CAA/CRSES, 2012




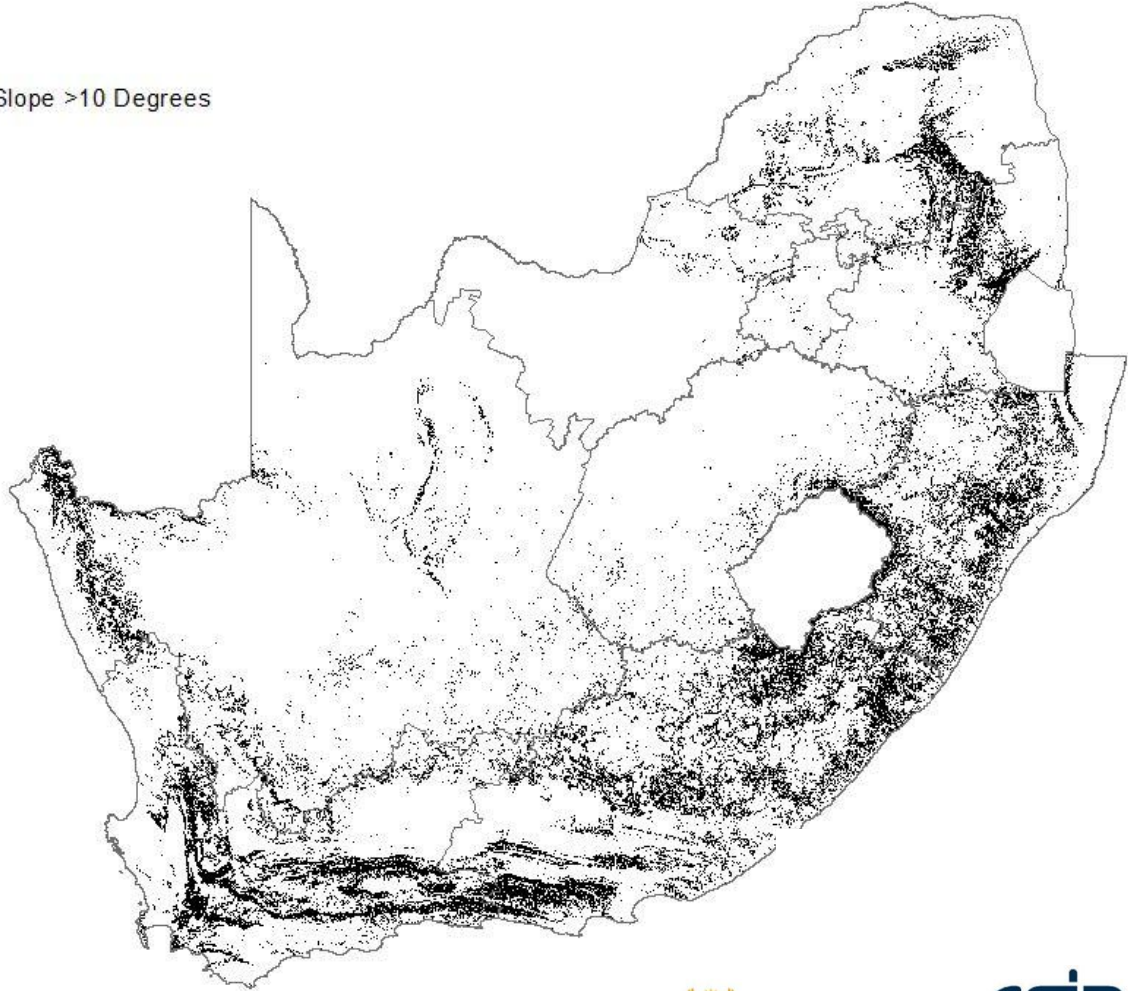
# Technical

## Slope

Attributes	Wind Buffer	Solar Buffer
Slope >10%	none	none

Source: RSA 20m DEM, 2002

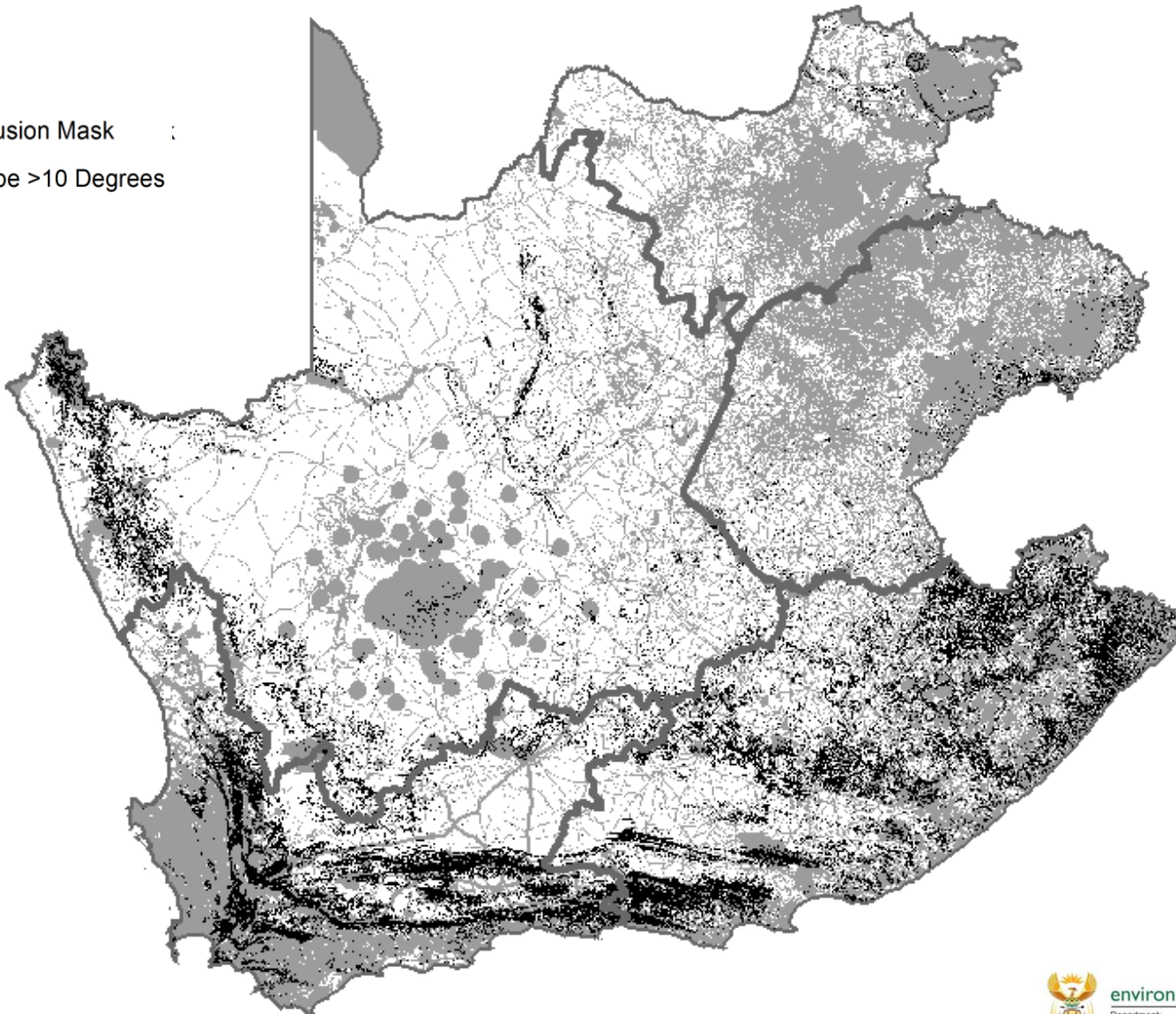
 Slope >10 Degrees



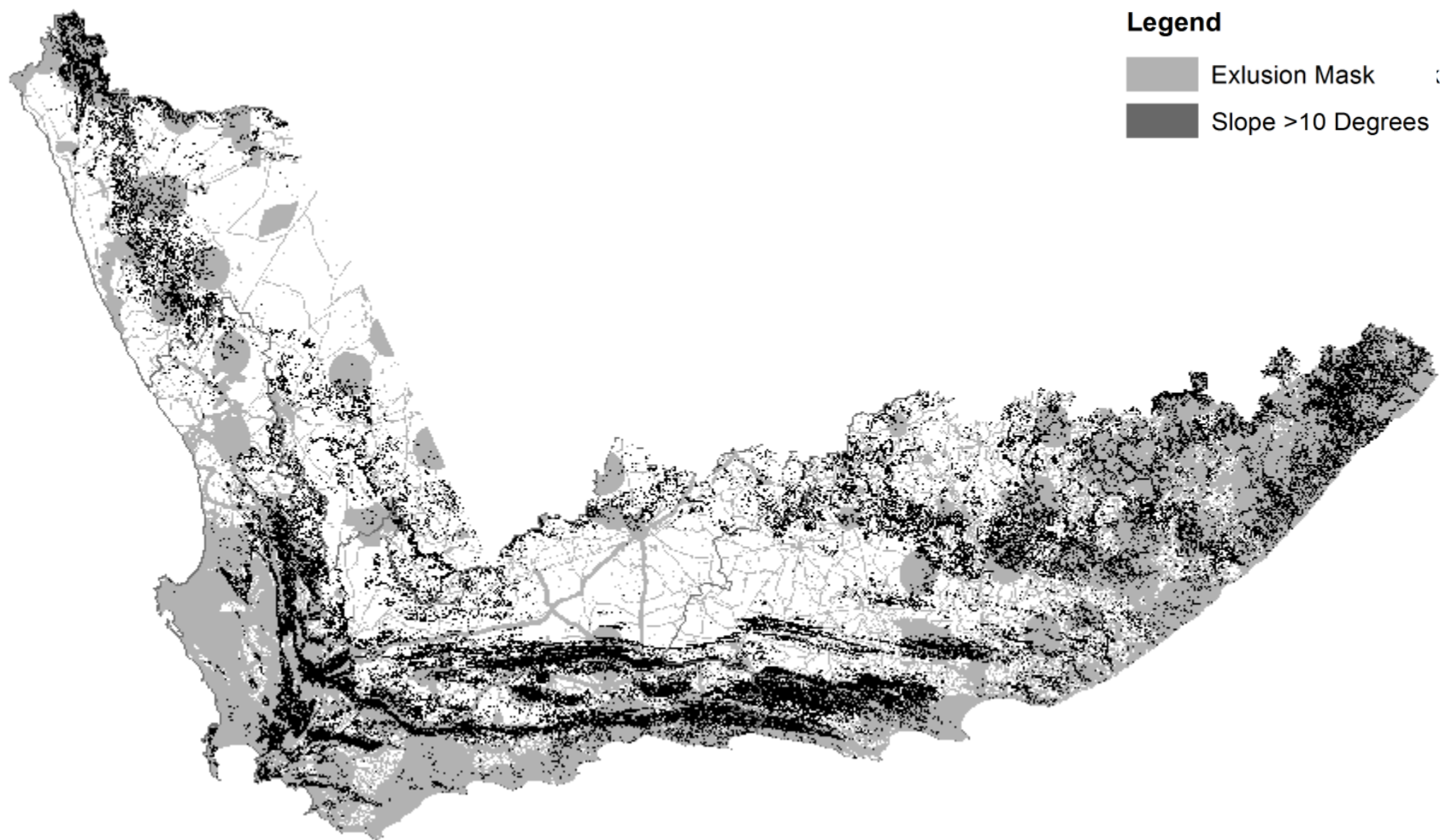
# Exclusion Mask: Solar

## Legend

- Exclusion Mask
- Slope >10 Degrees



# Exclusion Mask: Wind



# Determination of Development Potential

(Positive Mapping)

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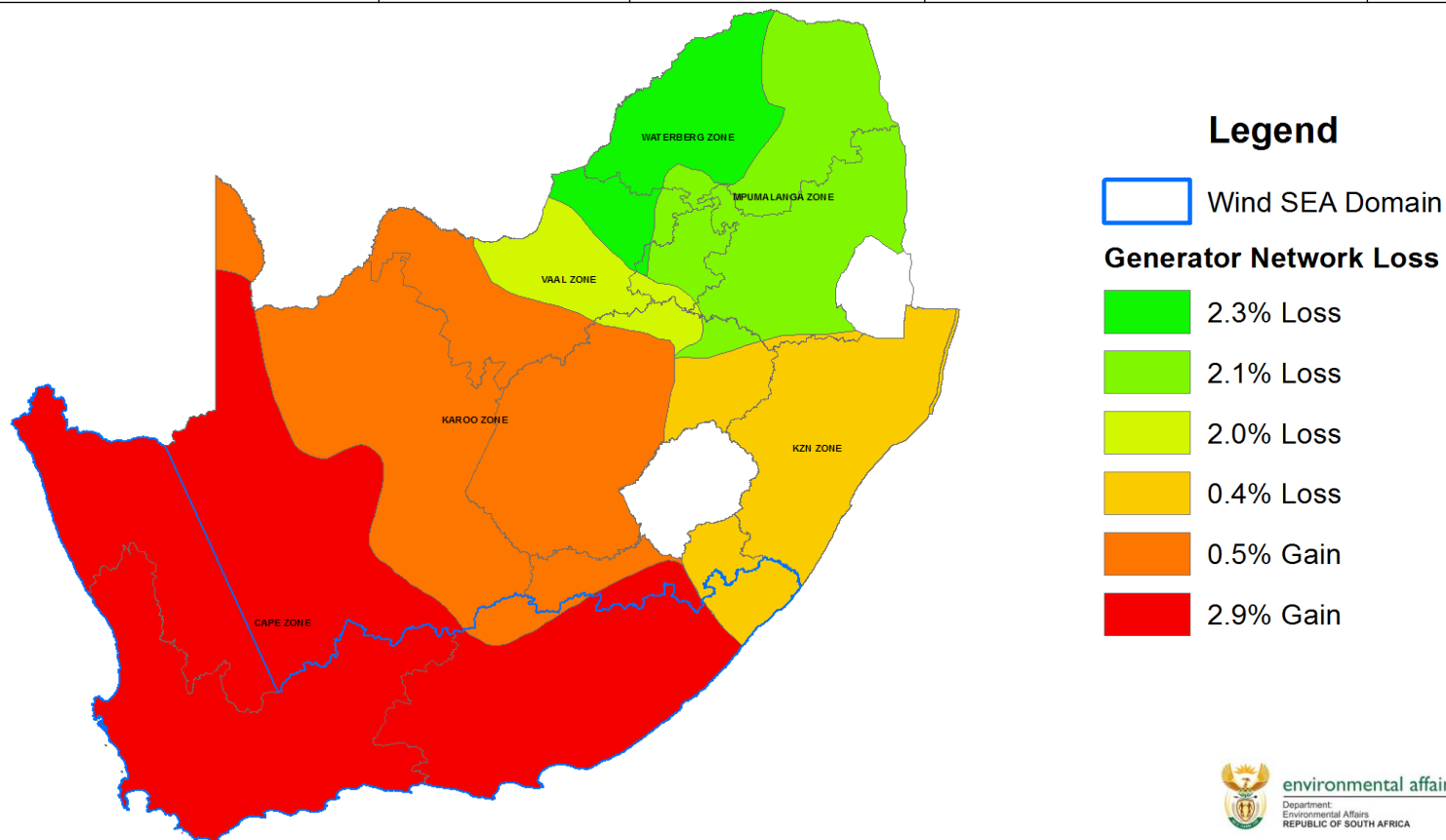


# Determination of Development Potential

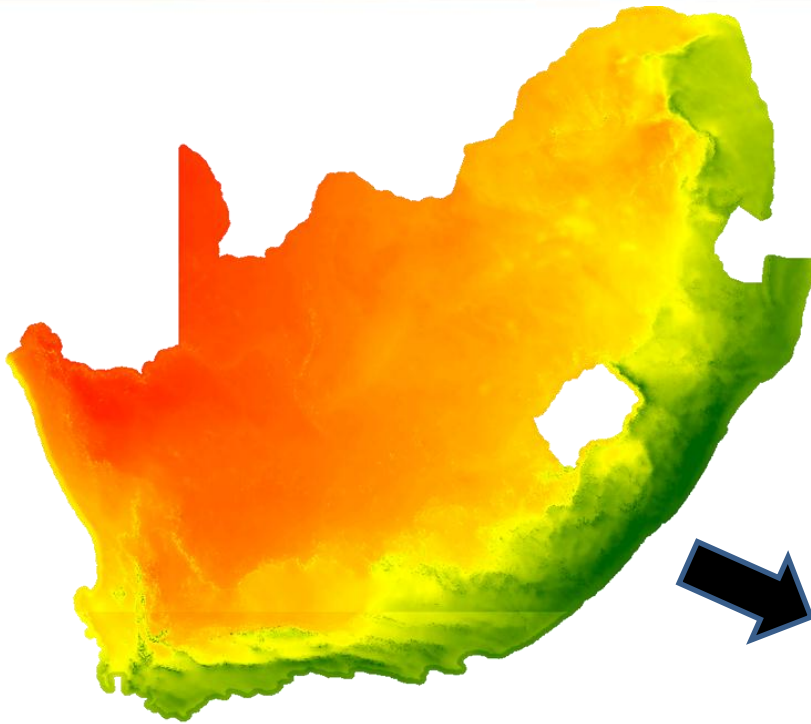
- **Pull factors considered through normalization of resource to determine development potential**
- **Normalization Criteria (pull factors):**
  1. Generator network losses;
  2. DTI proposed renewable energy related Strategic Economic Zones (SEZs);
  3. Industrial ports;
  4. Solar and Wind corridors;
  5. Seat of local municipalities with high social need; and
  6. Network capacity (as per GCCA substation).
- **Normalization by adding or subtracting development potential percentiles**

# Generator Network Loss Normalization (1)

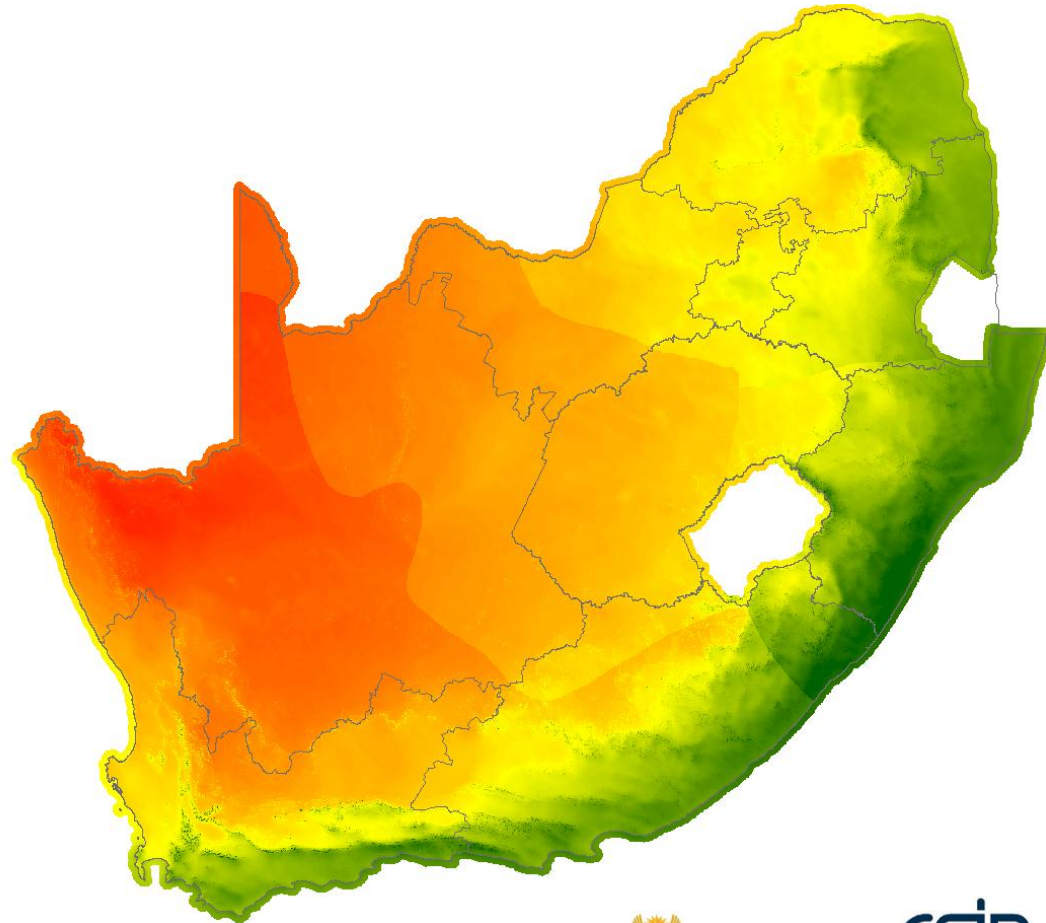
Eskom Network Losses (Wind & Solar)	Zones	Normalization Factor	Data Source	Scale
	Cape	+2.9%	Eskom 2013/14 Tariffs & Charges	National
	Karoo	+0.5%		
	Kwazulu-Natal	-0.4%		
	Vaal	-2%		
	Mpumalanga	-2.1%		
	Waterberg	-2.3%		



# Generator Network Loss Normalization (2\_Solar)



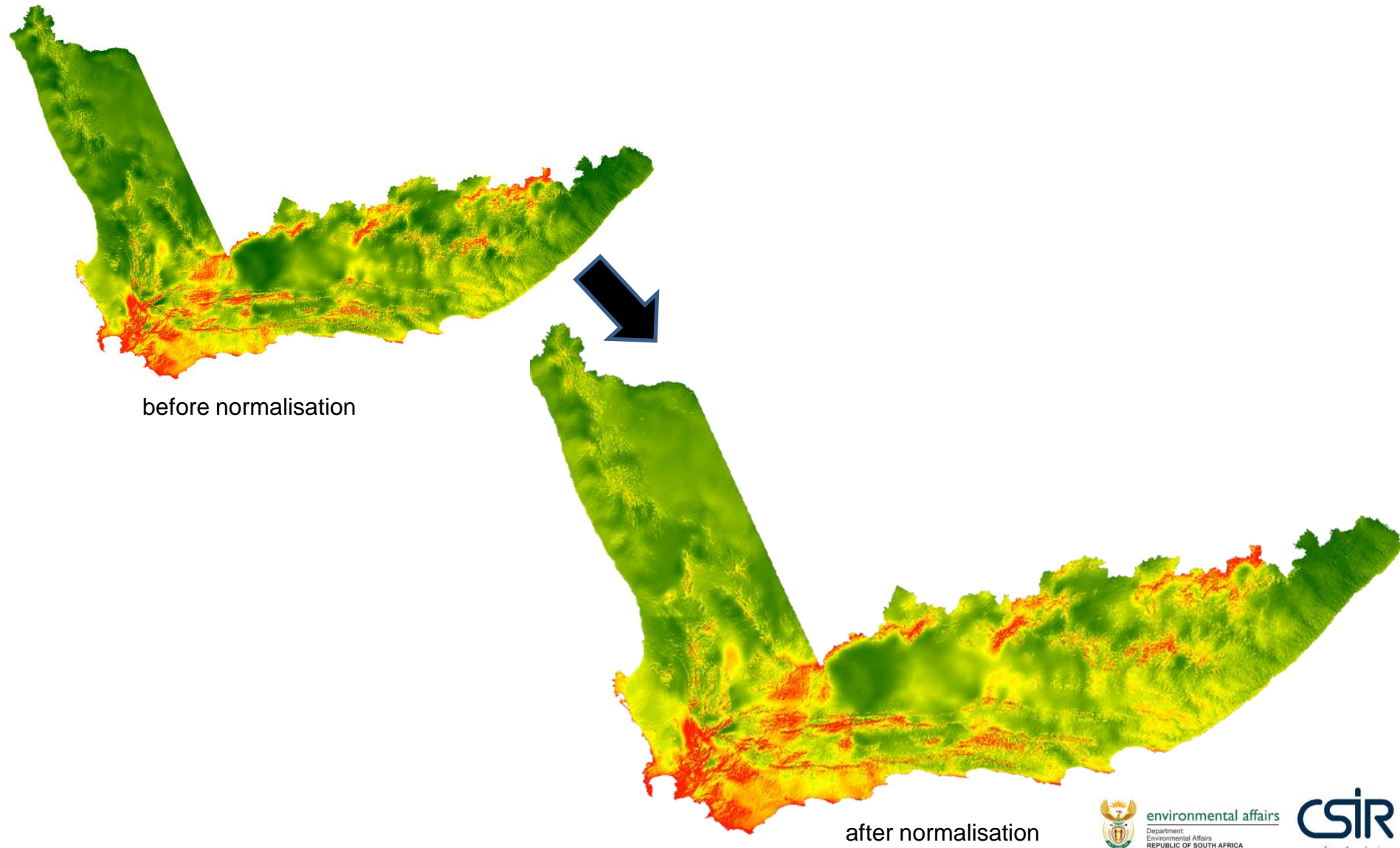
before normalisation



after normalisation



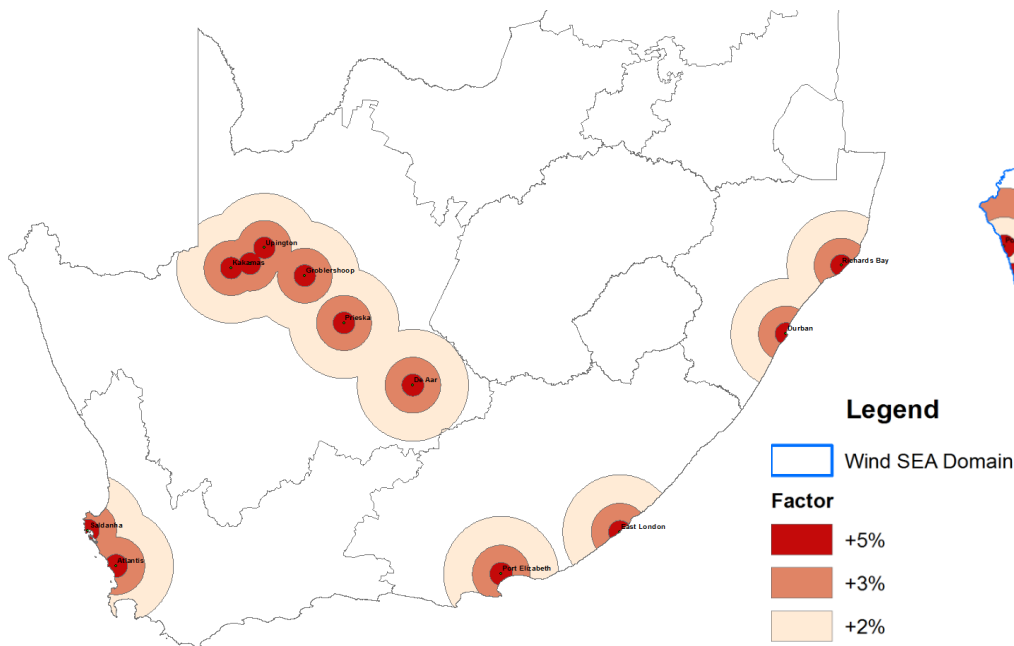
# Generator Network Loss Normalization (3\_Wind)



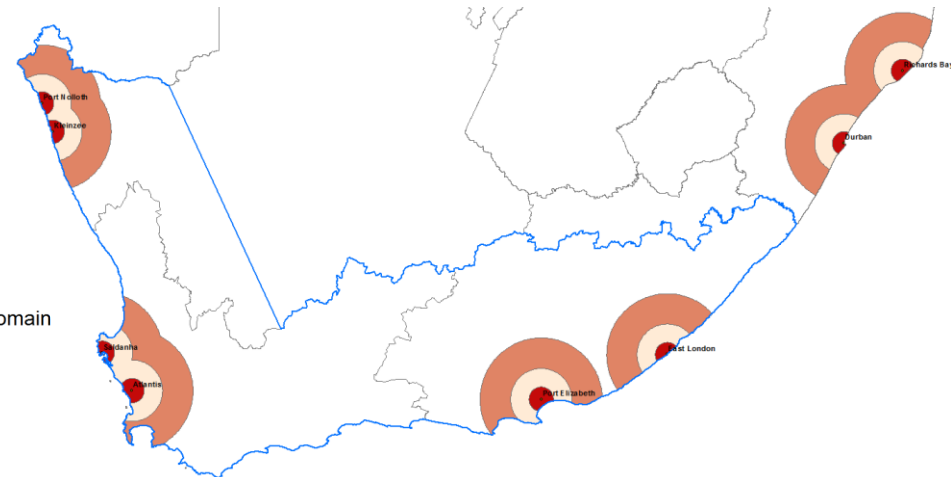
# SEZs, Industrial Ports and Corridors Normalization (1)

<b>DTI Proposed RE SEZ (<u>Wind &amp; Solar</u>):</b> Atlantis, <b>NC Solar Corridor (<u>Solar only</u>):</b> Upington, Kakamas, Keimoes, Groblershoop, Prieska & De Aar <b>NC Wind Corridor (<u>Wind only</u>):</b> Port Nolloth & Keinzee) and <b>Industrial Ports (<u>Wind &amp; Solar</u>):</b> Saldanha, Port Elizabeth, East London, Durban & Richards Bay)	Distance	Normalization Factor	Data Source	Scale
	< 20km	+ 5 %	<b>SEZs:</b> Special Economic Zones Planning presented to the Portfolio Committee on Trade and Industry on 26 April 2013. <b>Solar and Wind Corridor:</b> Northern Cape Provincial Spatial Development Framework 2012.	National
	20 – 50km	+ 3 %		
	50 - 100km	+ 1 %		
	> 100km	+ 0%		

## Solar



## Wind



# Seats of Local Municipalities with High Social Need Normalization <sup>(1)</sup>

## Seats of local municipalities with high social need (Wind & Solar):

**EC:** Bizana, Engcobo, Flagstaff, Idutywa, Libode, Molteno, Mount Frere and Port St Johns

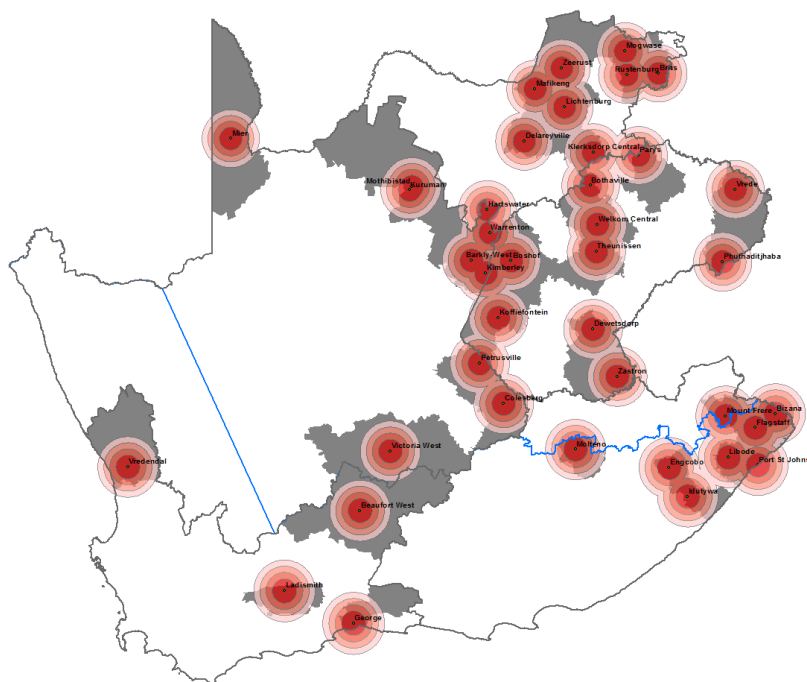
**FS:** Zastron, Boshof, Reitz, Bothaville and Bultfontein

**NC:** Barkly-West, Colesberg, Hartswater, Mier, Petrusville, Warrenton, Kimberley, Victoria West, Mothibistad and Kuruman

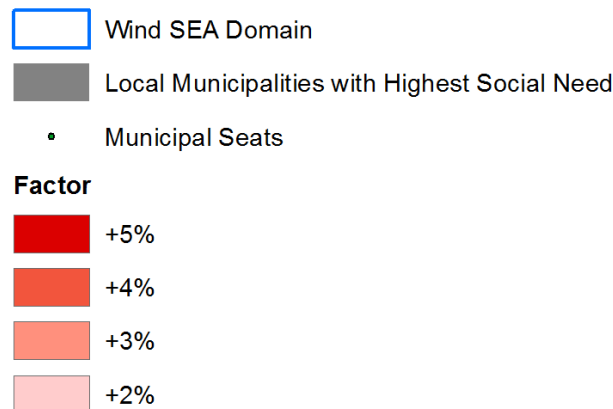
**NW:** Mafikeng, Klerksdorp, Delareyville, Lichtenburg, Brits, Zeerust, Rustenburg and Mogwase

**WC:** Beaufort West, Ladismith, Vredendal, George

Distance	Normalization Factor	Data Source	Scale
0 – 20km	+ 5 %	<b>FS:</b> Draft Free State Rural Development Plan 2013. <b>EC:</b> Regional Global Insights Data 2013 <b>NC:</b> Northern Cape Provincial Spatial Development Framework 2012. <b>WC:</b> Growth Potential Study of Towns in the Western Cape (Van der Merwe et al. 2004) and revision thereof in 2010 <b>NW:</b> North West Provincial Spatial Development Framework 2008.	WC, NC, FS, EC, NW
20 - 30km	+ 4 %		
30 - 40km	+ 3 %		
40 - 50km	+ 2 %		
> 50km	+ 0 %		



## Legend





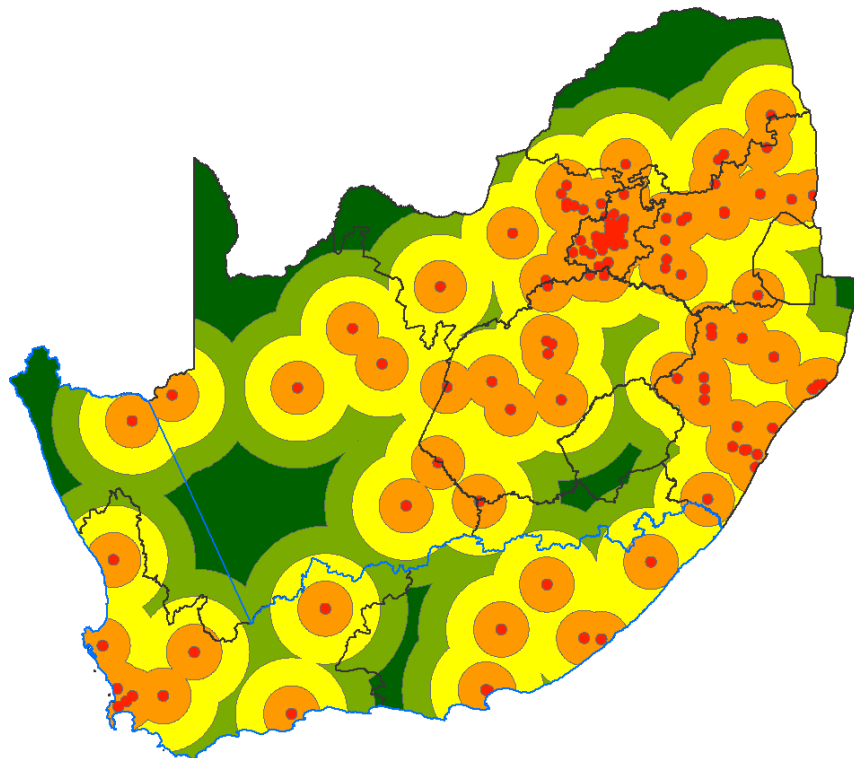
# Network Capacity Normalization (1)

## Network Capacity 2016 Transmission Substations (Wind & Solar)

### Assumptions:

- 1) Substations in areas with Area Stability Limit >1000MW included;
- 2) Substations with Transformer N-1 Limit indicated as N/A were assigned the Busbar N-1 Limit;
- 3) Substations with only one transformer were assigned that transformer's capacity; and
- 4) Substations with Transformer limit as determined >100MW included.

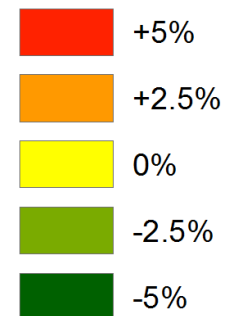
Distance	Normalization Factor	Data Source	Scale
< 10 km	+ 5 %	Eskom Generation Connection Capacity Assessment of the 2016 Transmission Network 2013 (GCCA-2016)	National
10 - 50 km	+2.5 %		
50 - 100 km	+ 0 %		
100 – 150 km	- 2.5 %		
> 150 km	- 5 %		



## Legend

Wind SEA Domain

### Factor





# Network Capacity Normalization (2)

Further assumptions (from GCCA):

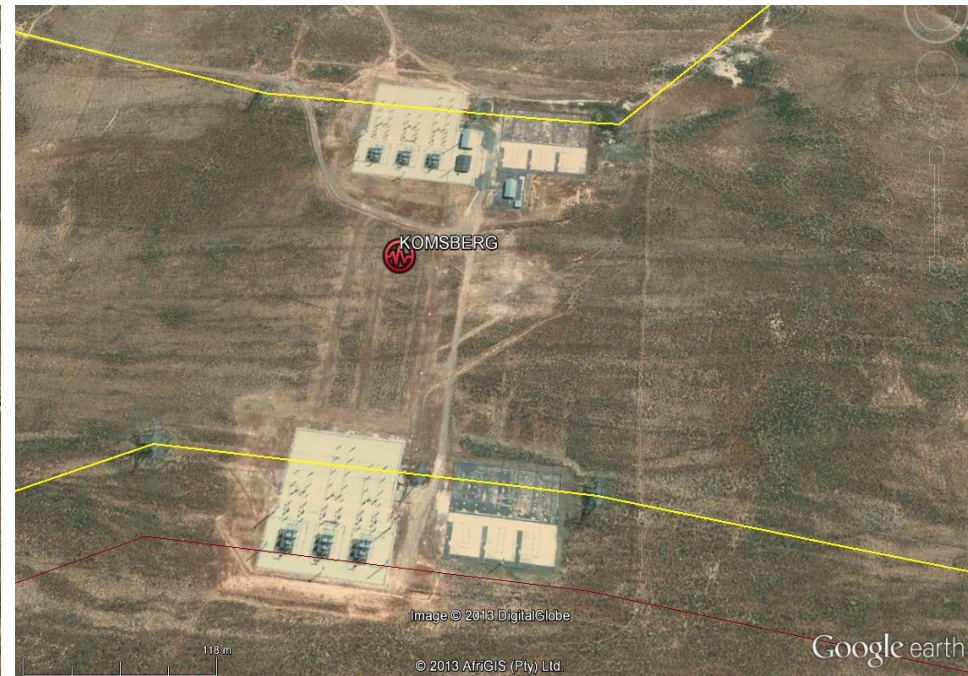
5) In the Northern Cape Victoria, Komsberg, Krono and Helios are only 400 kV series capacitor switch stations

6) In the Western Cape Kappa (Koruson) and Omega (Sterrekus) are the new 765/400 kV substations.

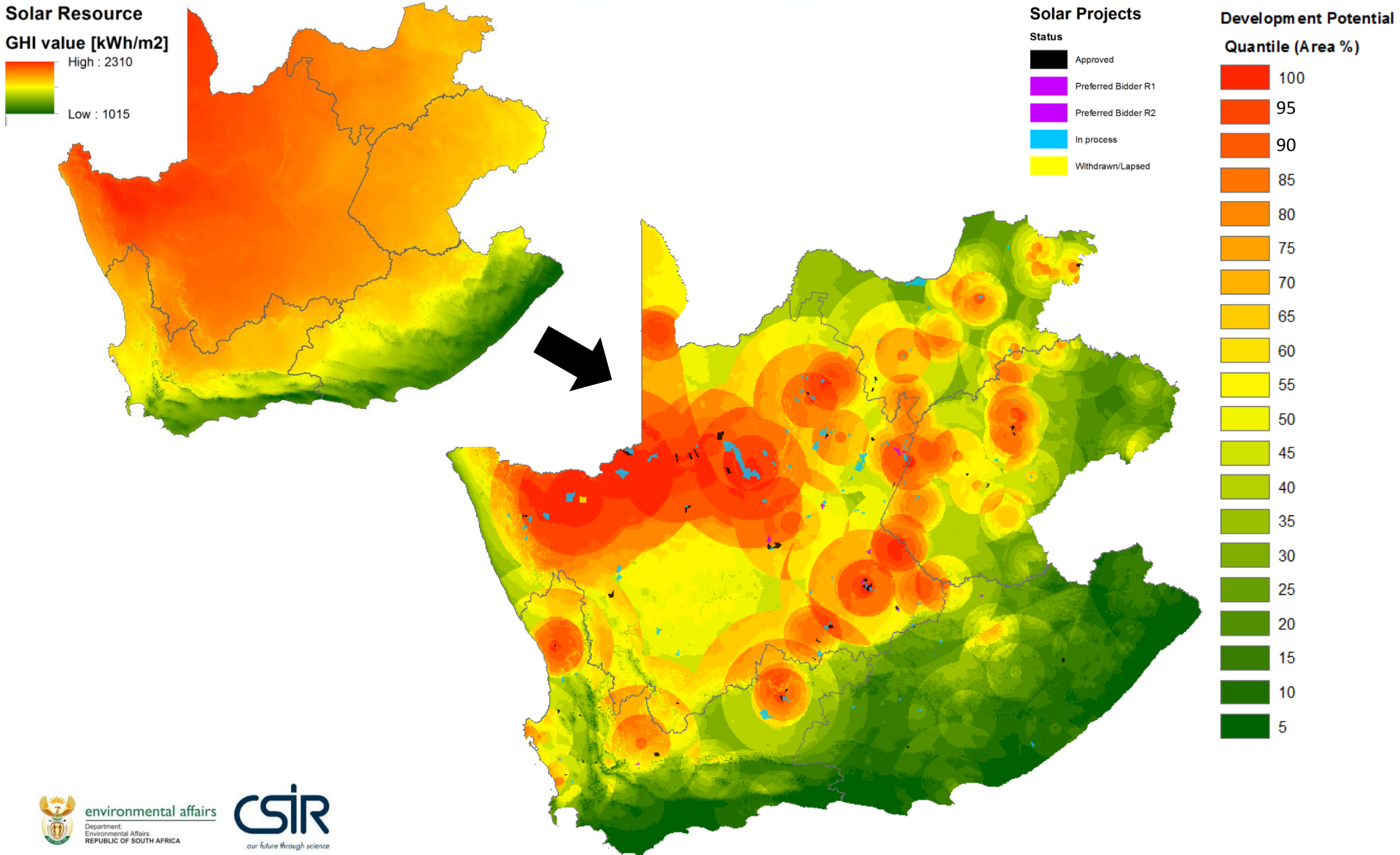
Substation available for connection



Series capacitor switch station not available for connection:



# Final Development Potential (1\_Solar)





# Final Development Potential (2\_Wind)

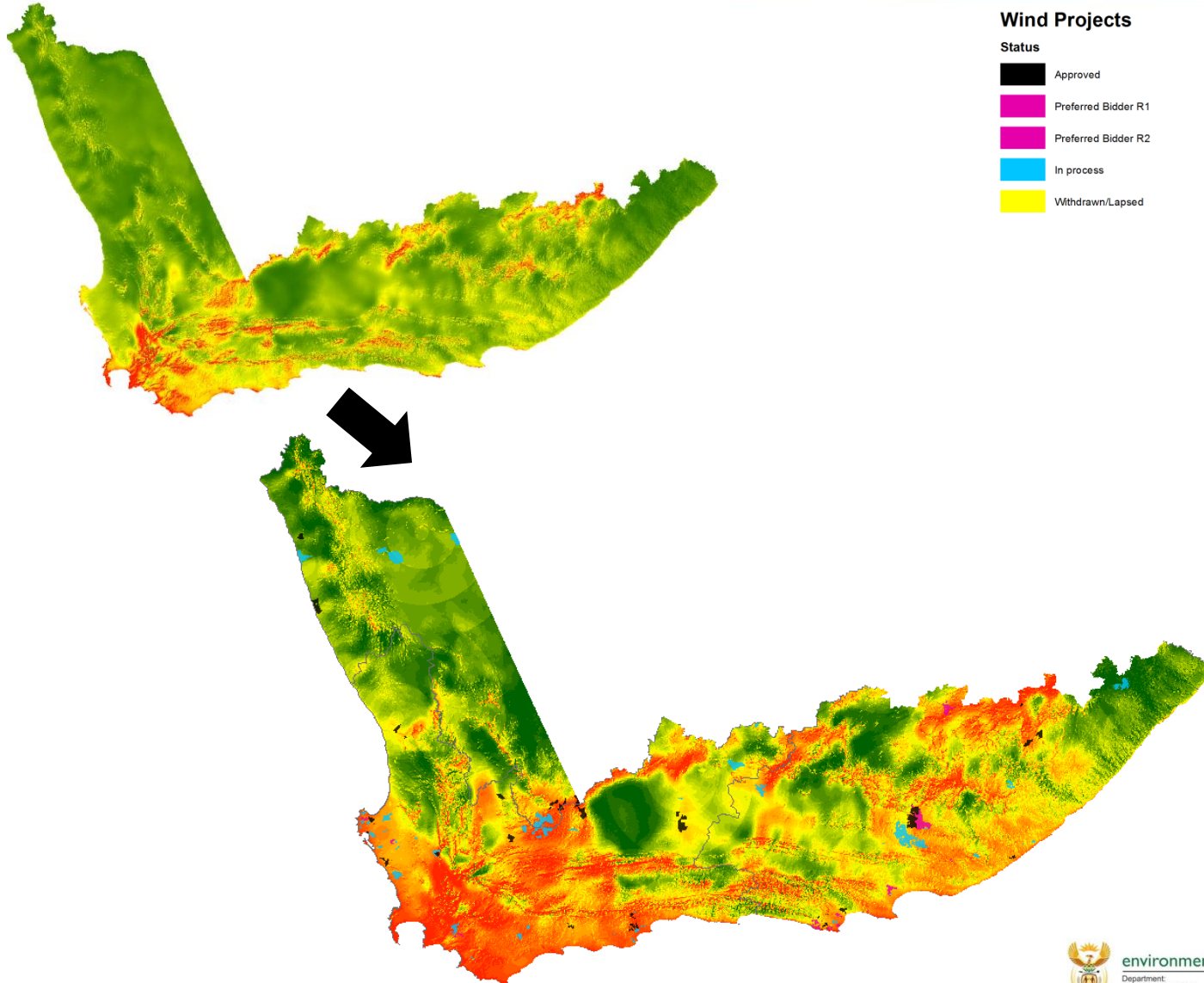
## Legend

### Power Density

W/m<sup>2</sup>

High : 9198

Low : -33



## Wind Projects

### Status

- Approved
- Preferred Bidder R1
- Preferred Bidder R2
- In process
- Withdrawn/Lapsed

## Development Potential

### Quantile (Area %)

- 100
- 95
- 90
- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5

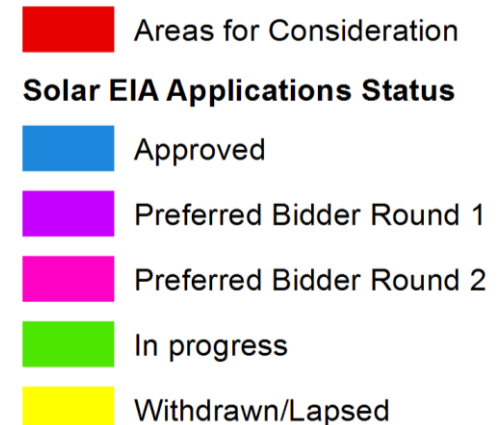
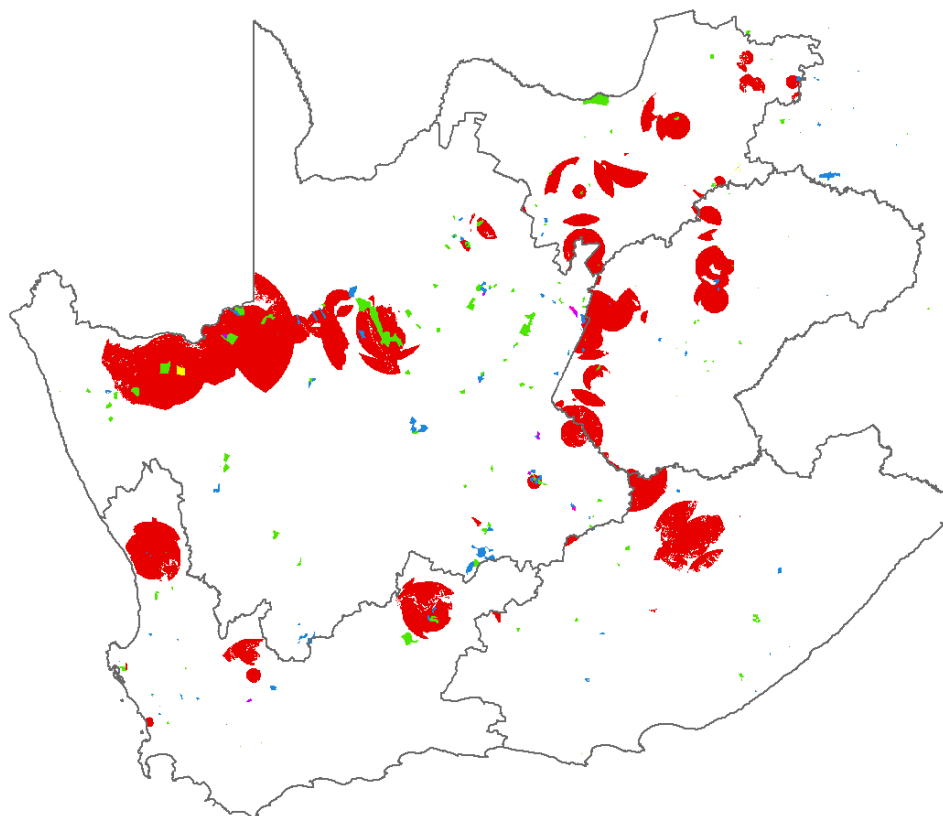


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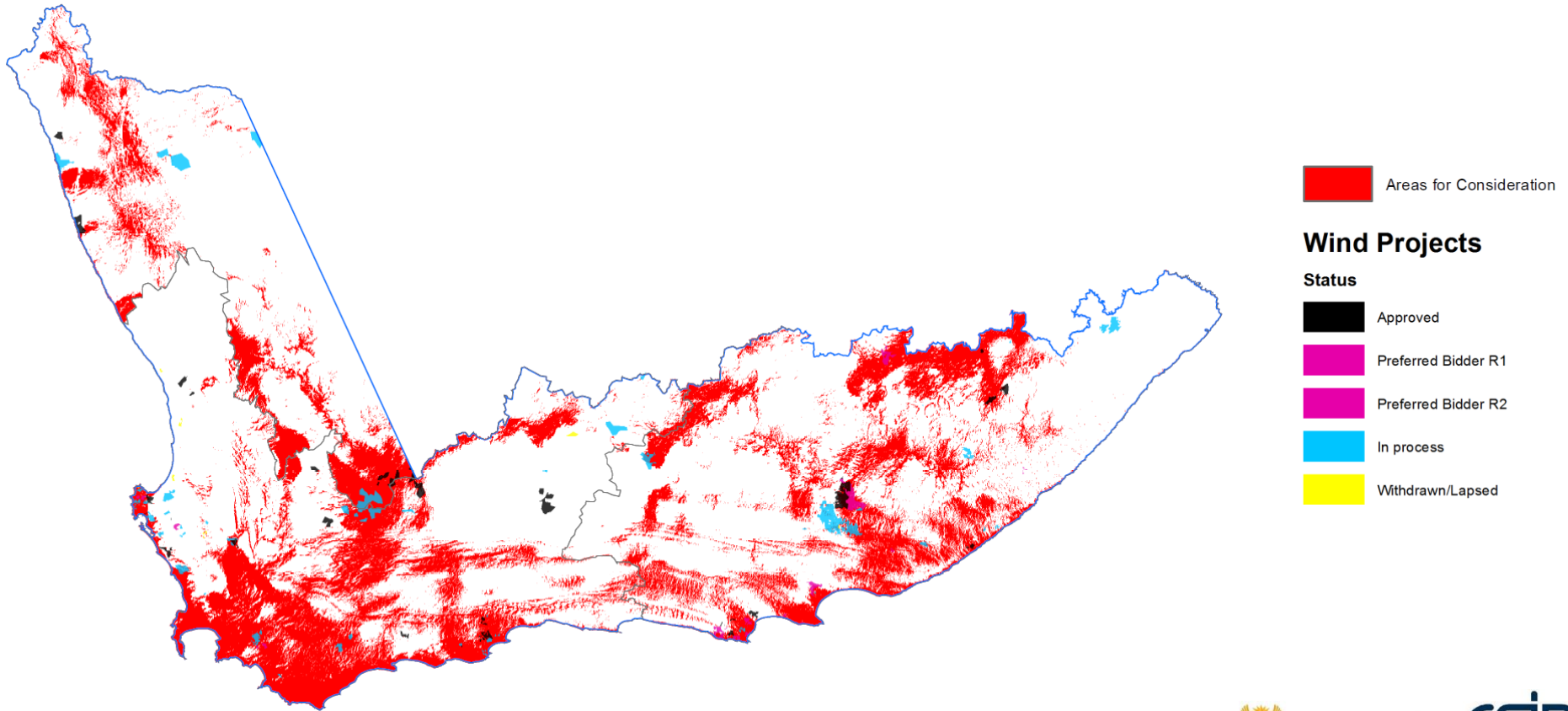
# Identification of Top Development Potential Per Province (1\_Solar)

Identification of top development potential per province ( <b>Solar</b> )	Province	Percentage of province with feasible resource (GHI>1850 kWh/m <sup>2</sup> )	Area Considered (Top Development Potential)	Scale
	Northern Cape	100%	10%	Provincial
	North West	100%	10%	
	Free State	100%	10%	
	Western Cape	78%	8%	
	Eastern Cape	50%	5%	



# Identification of Top Development Potential Per Province (2\_Wind)

Identification of top development potential per province ( <b>Wind</b> )	Province	Percentage of province with feasible resource (PD>400 W/m2)	Area Considered (Top Development Potential)	Scale
	Western Cape	24%	35%	Provincial
	Eastern Cape	8%	25%	
	Northern Cape	2%	15%	



# Wind Study Areas

## DEA National Wind SEA

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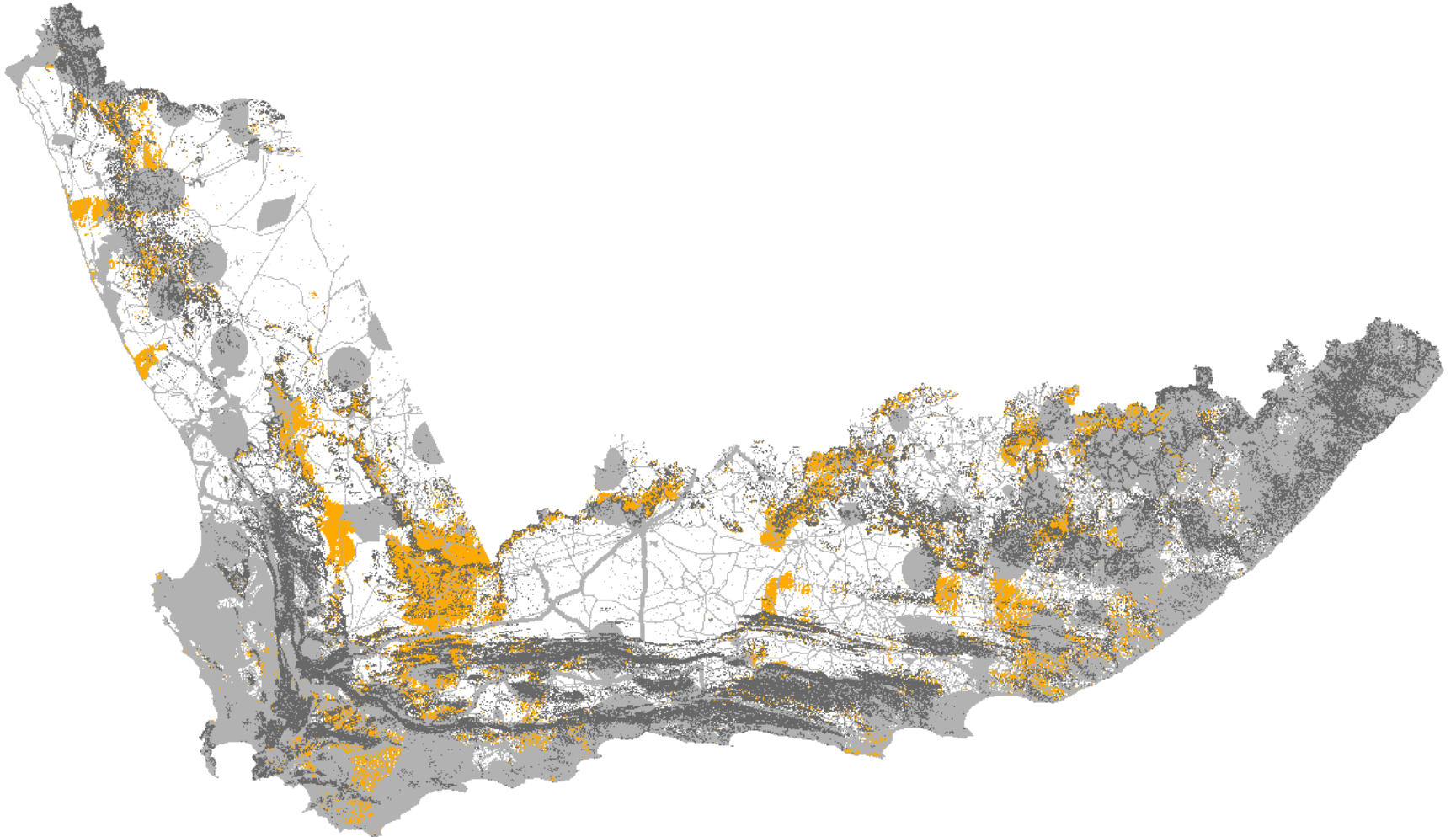


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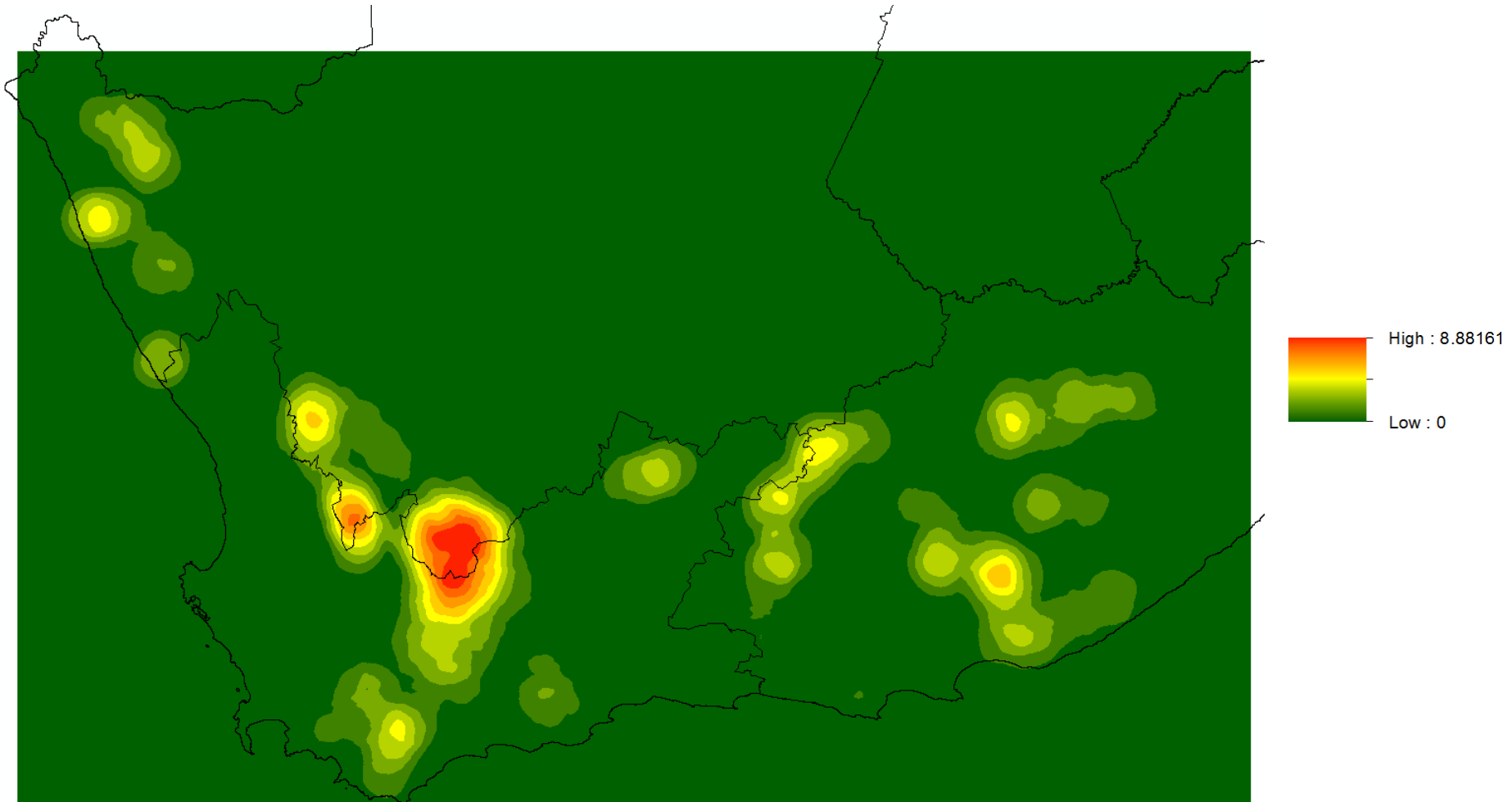
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# High Wind Development Potential with Exclusion Mask

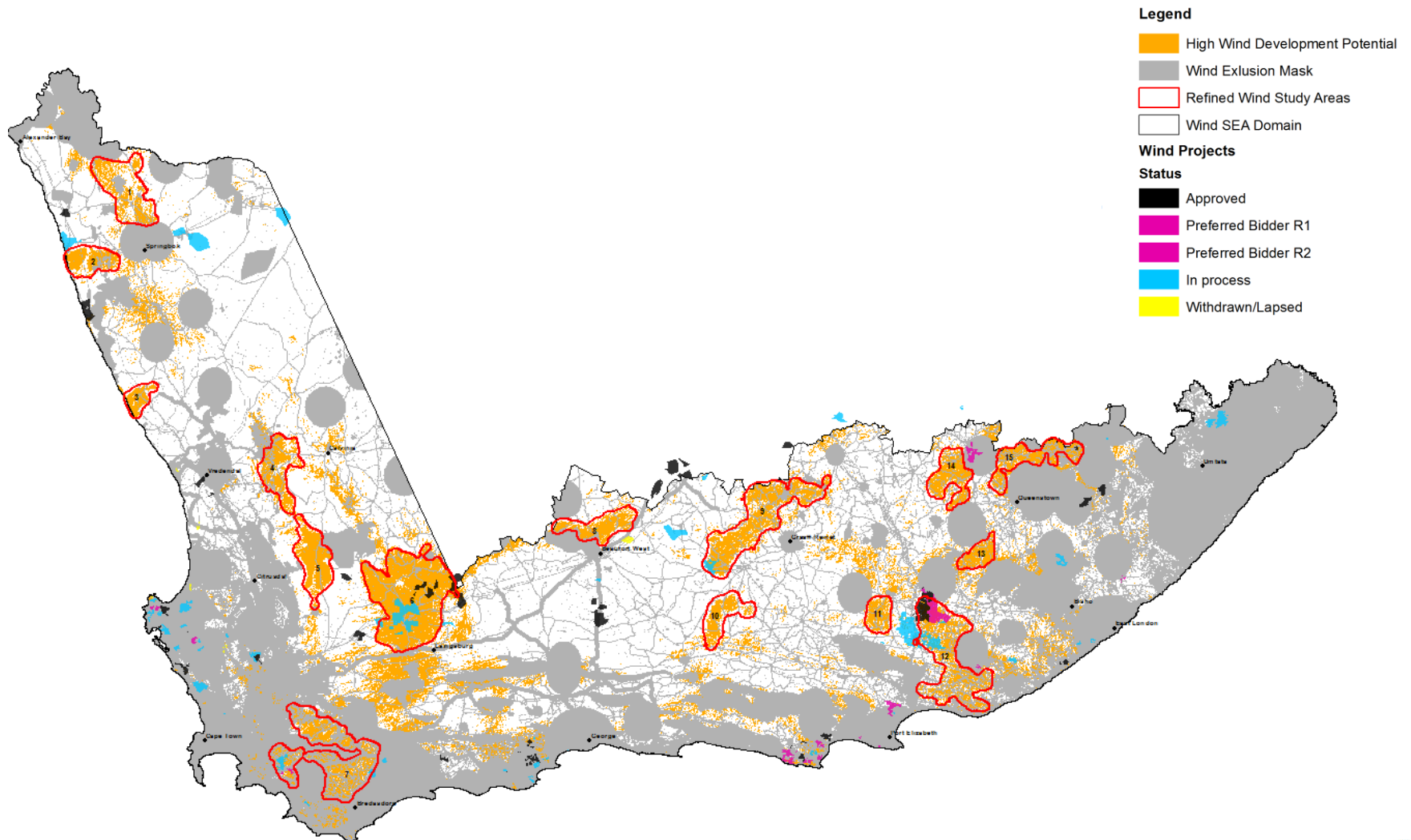




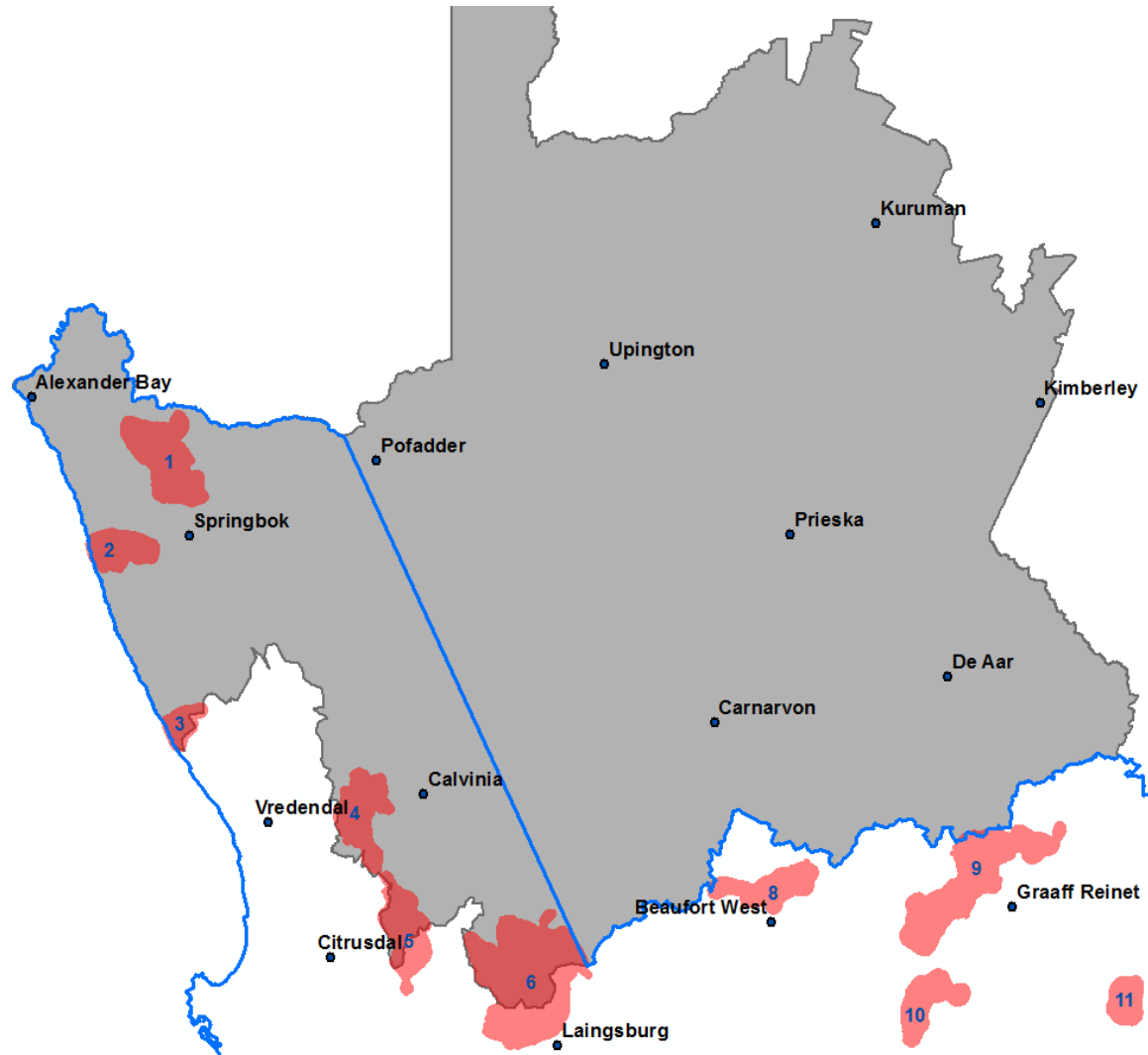
# 20km Radius Available High Development Potential Wind Cluster Analysis



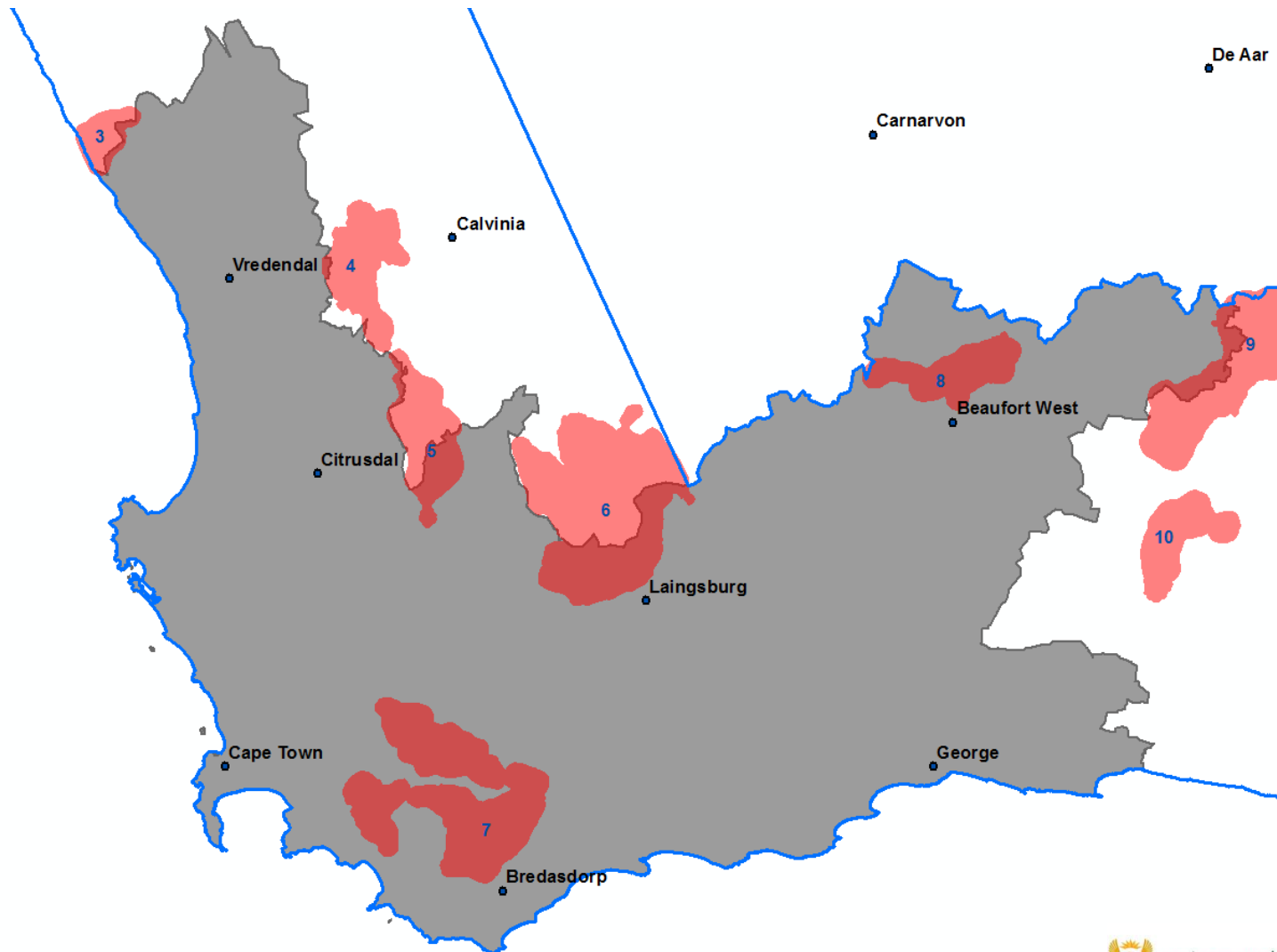
# Wind Study Area Boundary Refinement



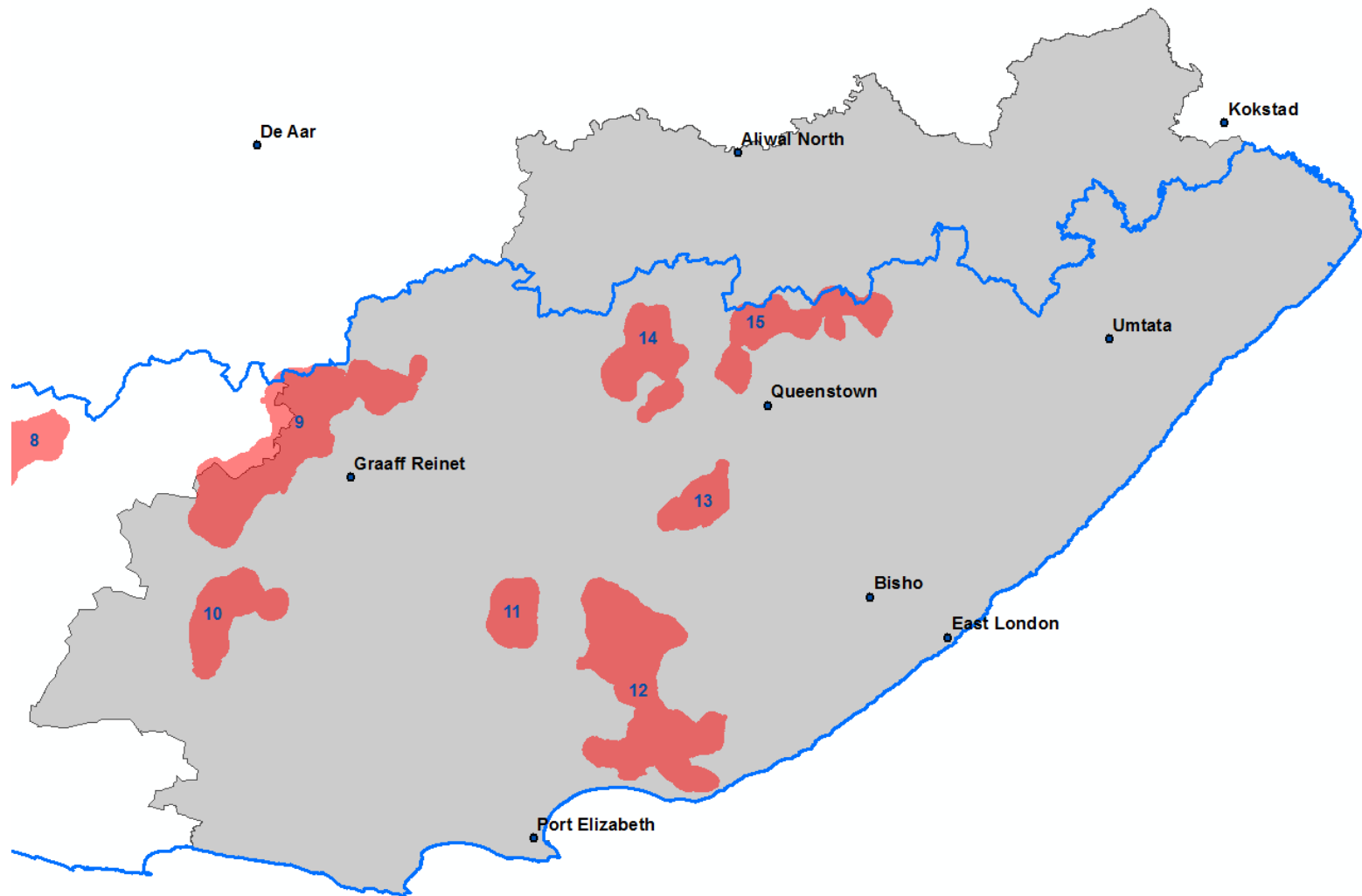
# Wind Study Areas : Northern Cape



# Wind Study Areas : Western Cape



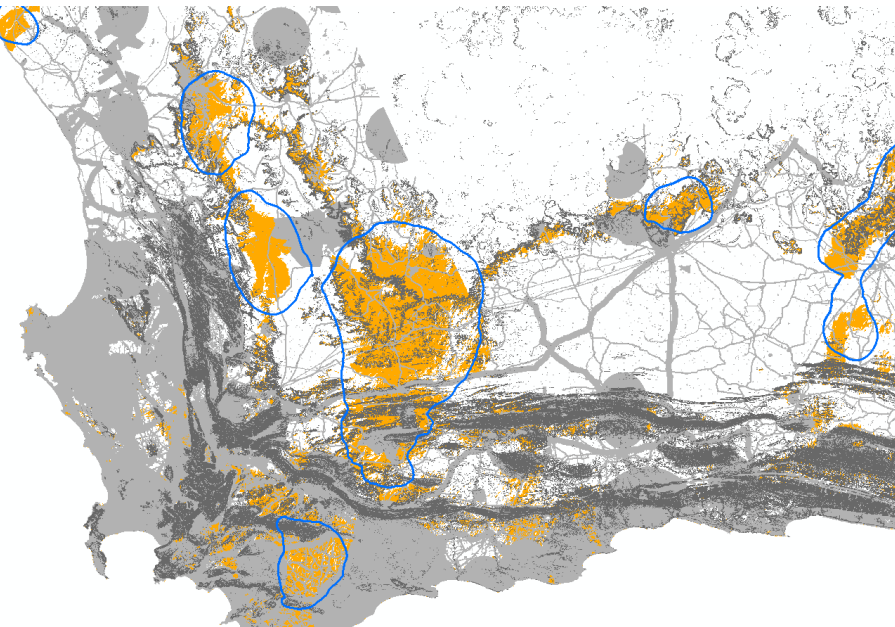
# Wind Study Areas : Eastern Cape



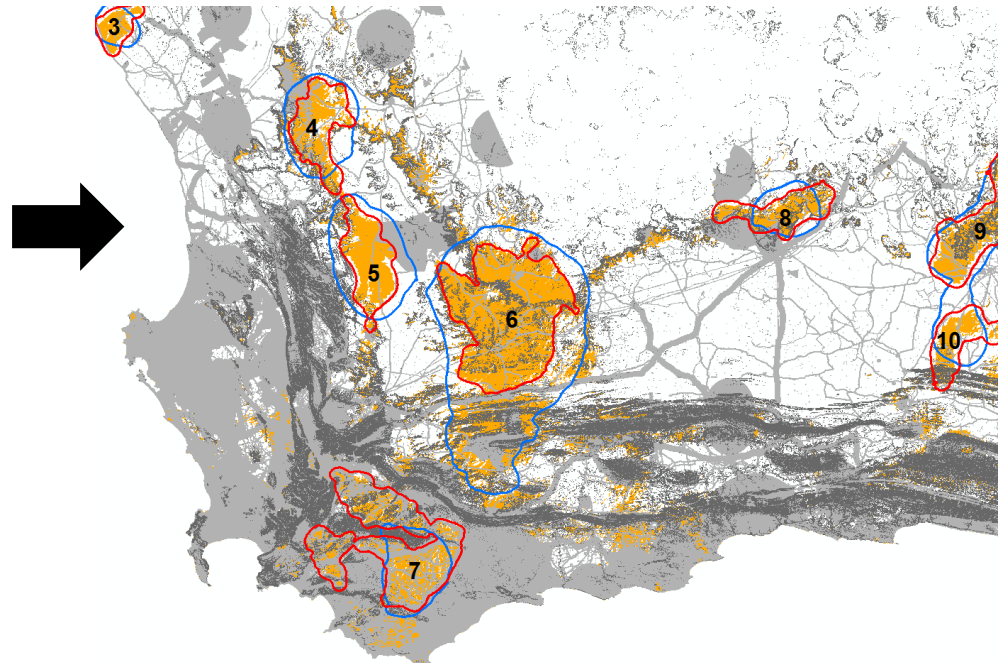


# Study Area Boundary Refinement

## 20km Cluster Identification

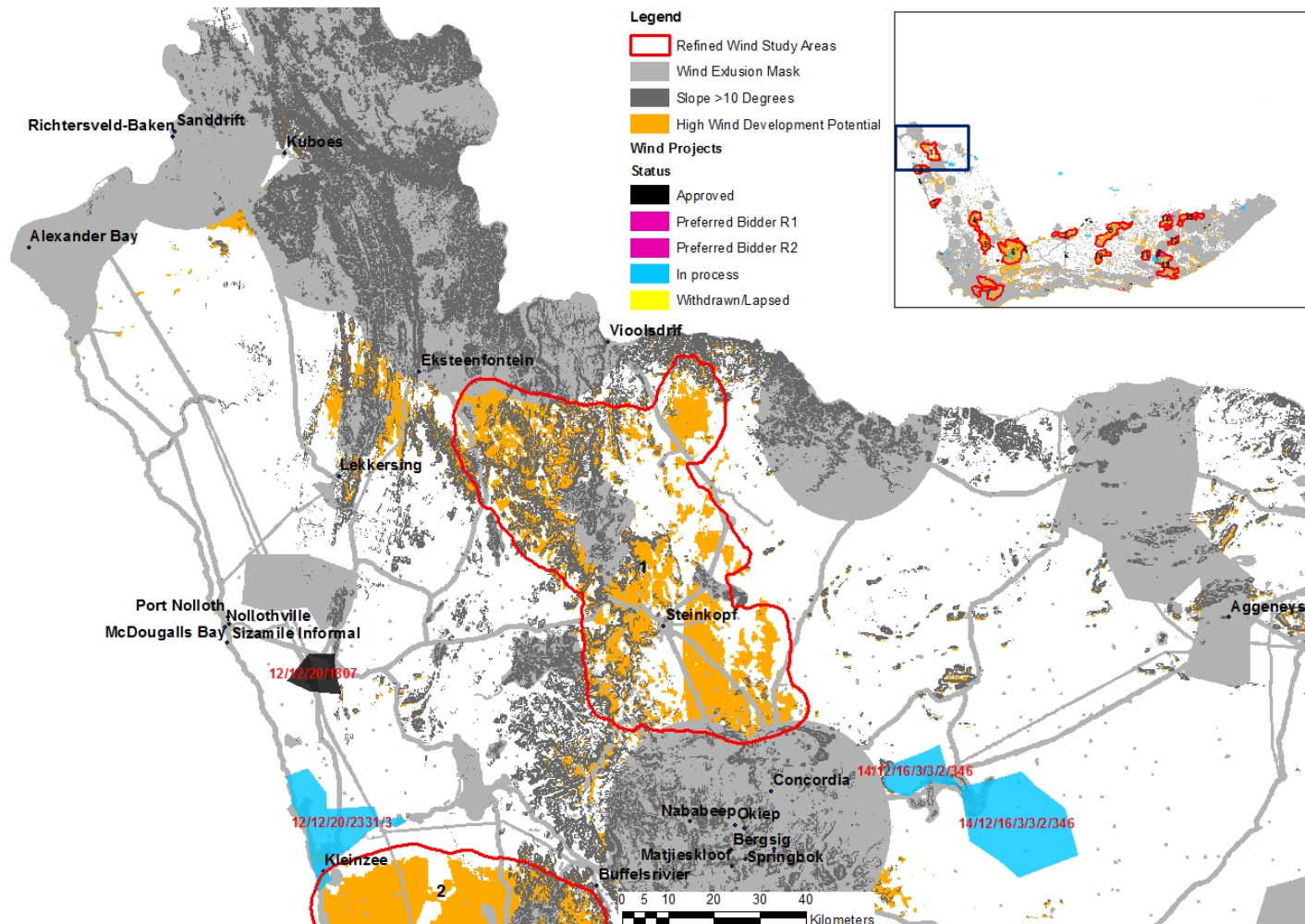


## 5km Cluster Boundary Refinement



# Wind Study Area 1: Steinkopf

(1: Development Potential)



# Wind Study Area 1: Steinkopf

(2: Resource, cadastral & existing applications)

## Wind Speed

m/s

High : 24.3003



Low : 0.889041

Refined Wind Study Areas

## Wind Projects

### Status

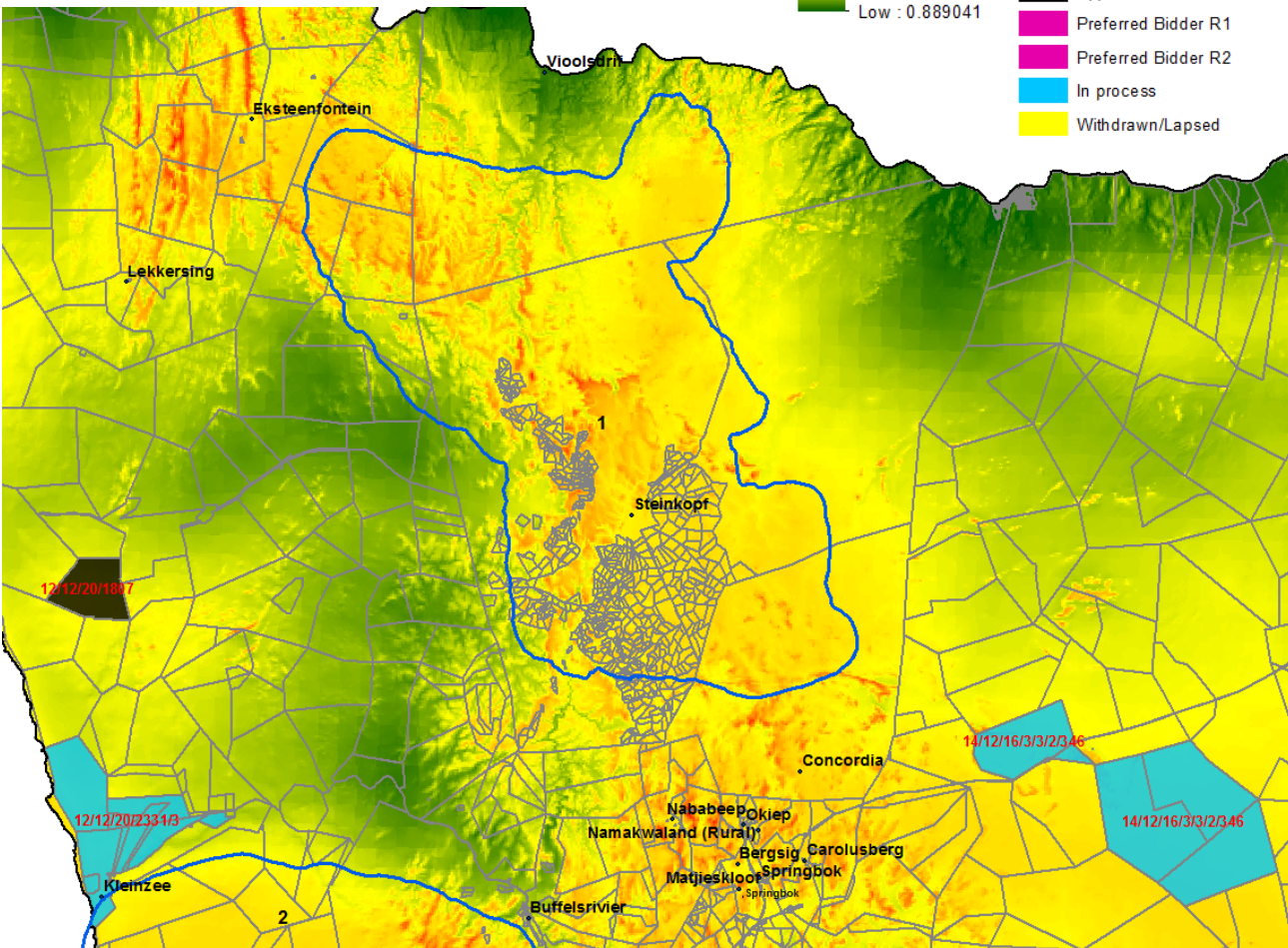
Approved

Preferred Bidder R1

Preferred Bidder R2

In process

Withdrawn/Lapsed



Area: 2731 km<sup>2</sup>

Afri GIS Land Portions (within 300 m of Boundary): ± 624 (town erfs included)

Mean power density 100 m above ground level: 186 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 5.72 ms<sup>-1</sup>

Nearest Study Area: 35 km South, Study Area 2: Kleinsee

## Existing Applications:

1. Project Blue WEF 76 MW 50 km SW (in Process);
2. Kangnas WEF 75 MW 20 km SE (In Process); and
3. Kannikwa Vlake WEF 120 MW 50 km west (Approved)



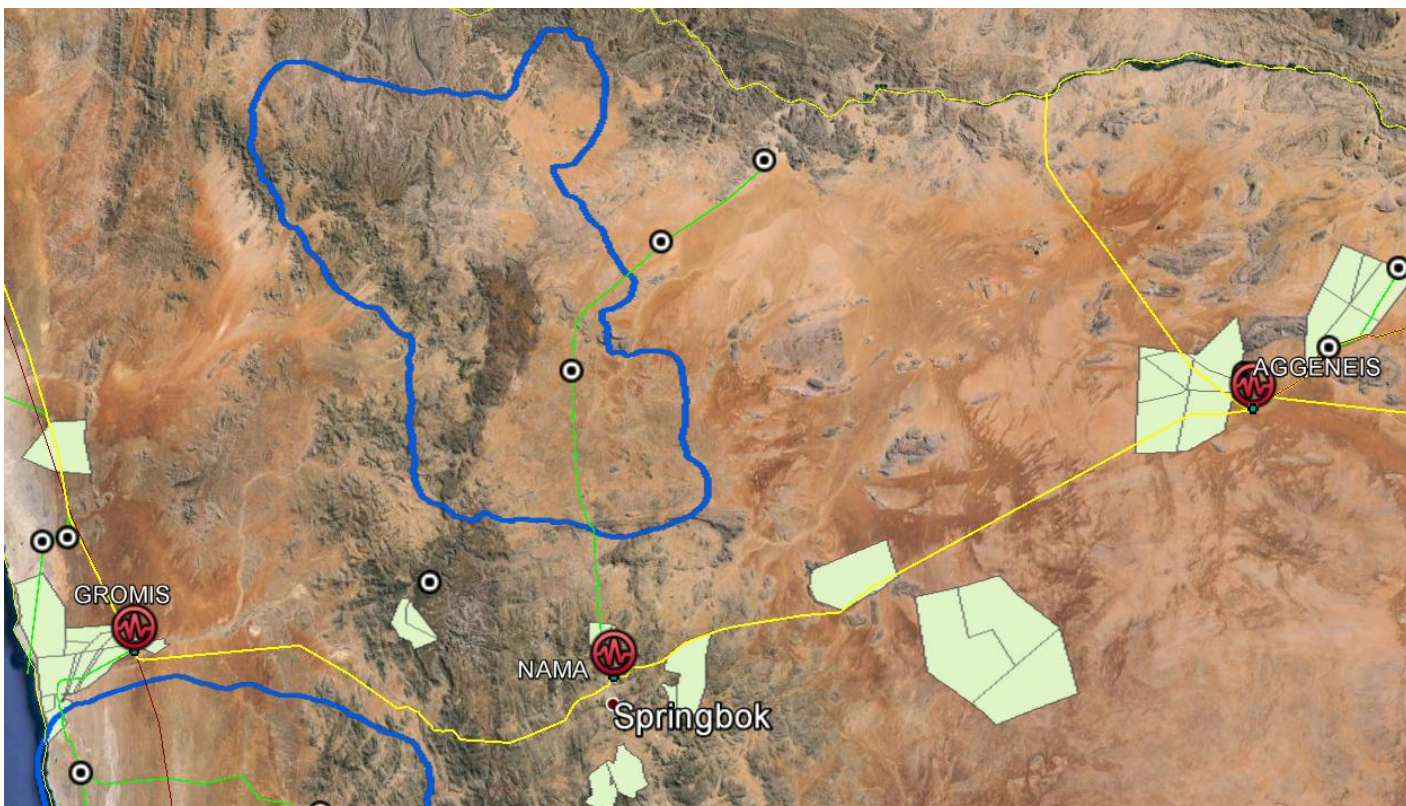
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# Wind Study Area 1: Steinkopf

(3: Eskom network)



**Eskom Area Limit: Namaqualand;  
1235 MW**

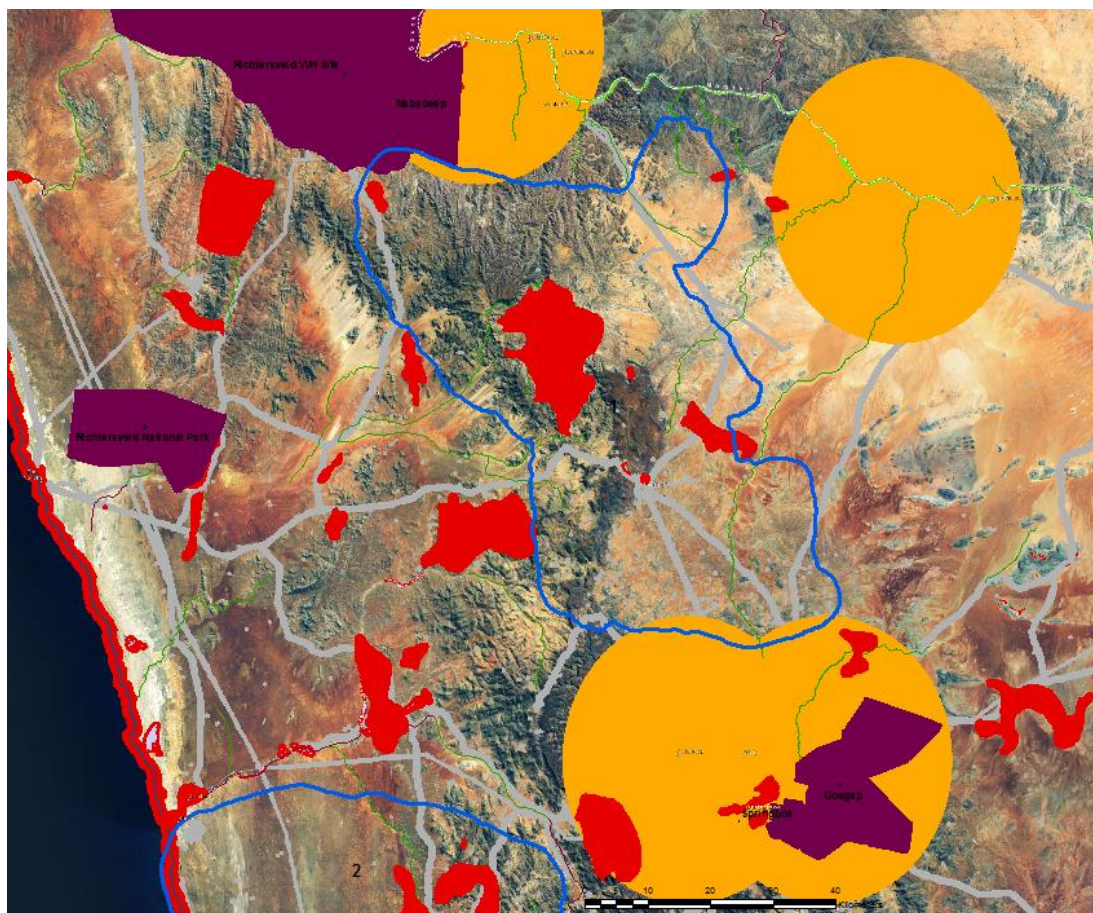
## **Nearest HV Substations:**

1. Gromis 50 km SE (2\*40 MW transformers, 33 MW busbar, 0 MW committed);
2. Nama, 23 km S (2\*80 Transformers, 37 MW Busbar, 0 MW committed)
3. Aggeneis 90 km E (2\*315 MW + 2\*80 MW transformers, 121 MW + 98 MW busbar, 0 MW committed)






**Three 66 kV substations in and around site**

# Wind Study Area 1: Steinkopf

(4: Key environmental sensitivities)



## Legend

-  Refined Wind Study Areas
-  Wind Exclusion Mask
-  Protected Areas Buffer 500m
-  Irreplaceable CBA Exclusion
-  Major Bat Roosts Buffer 20km\_Wind

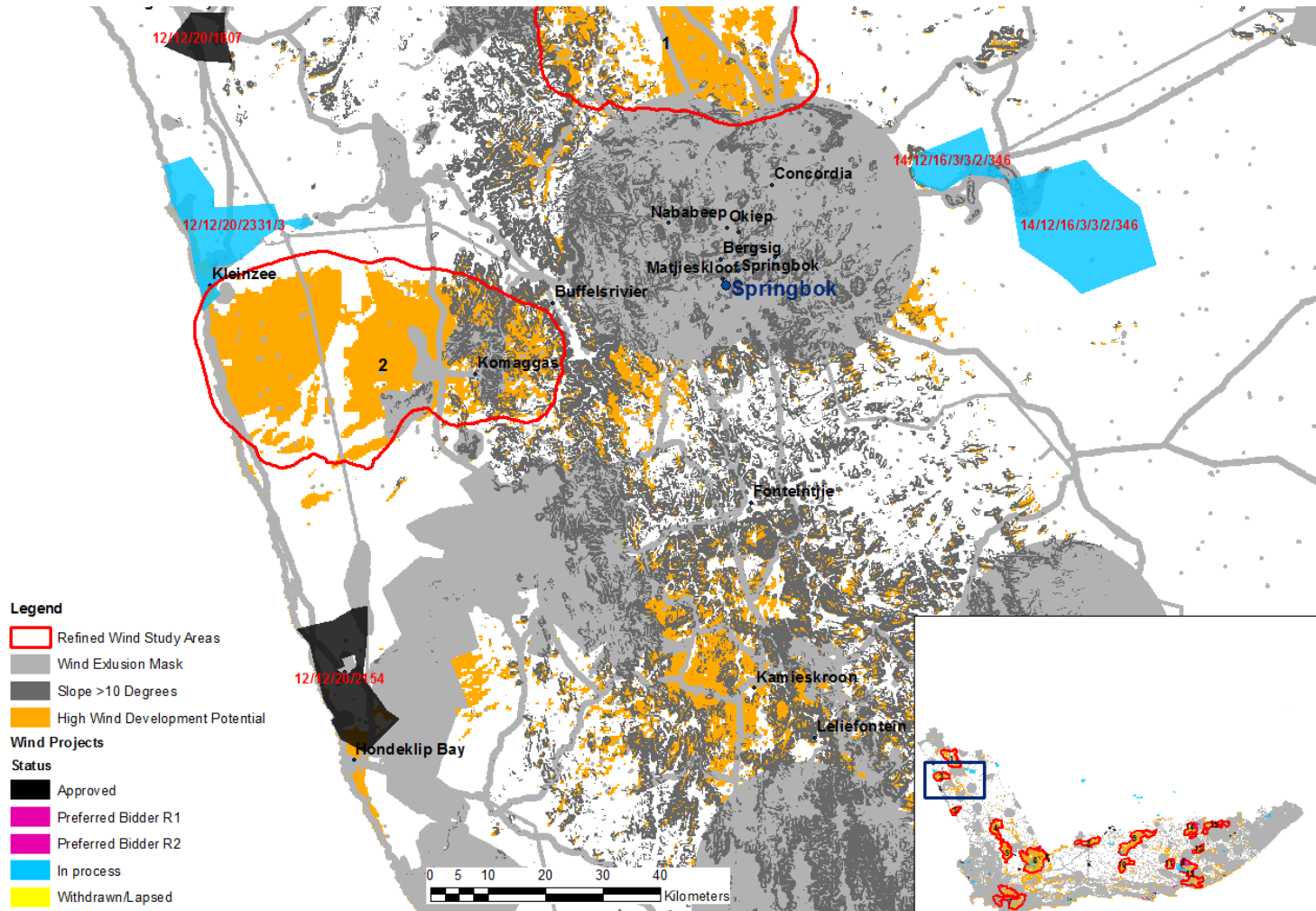
## Key Sensitivities:

1. Major Bat roosts to the north and south;
2. Richtersveld World Heritage Site bordering to north;
3. Goegap Nature Reserve 20 km to south;
4. Richtersveld National Park 50 km to west; and
5. Irreplaceable CBAs inside



# Wind Study Area 2: Kleinzee

(1: Development Potential)



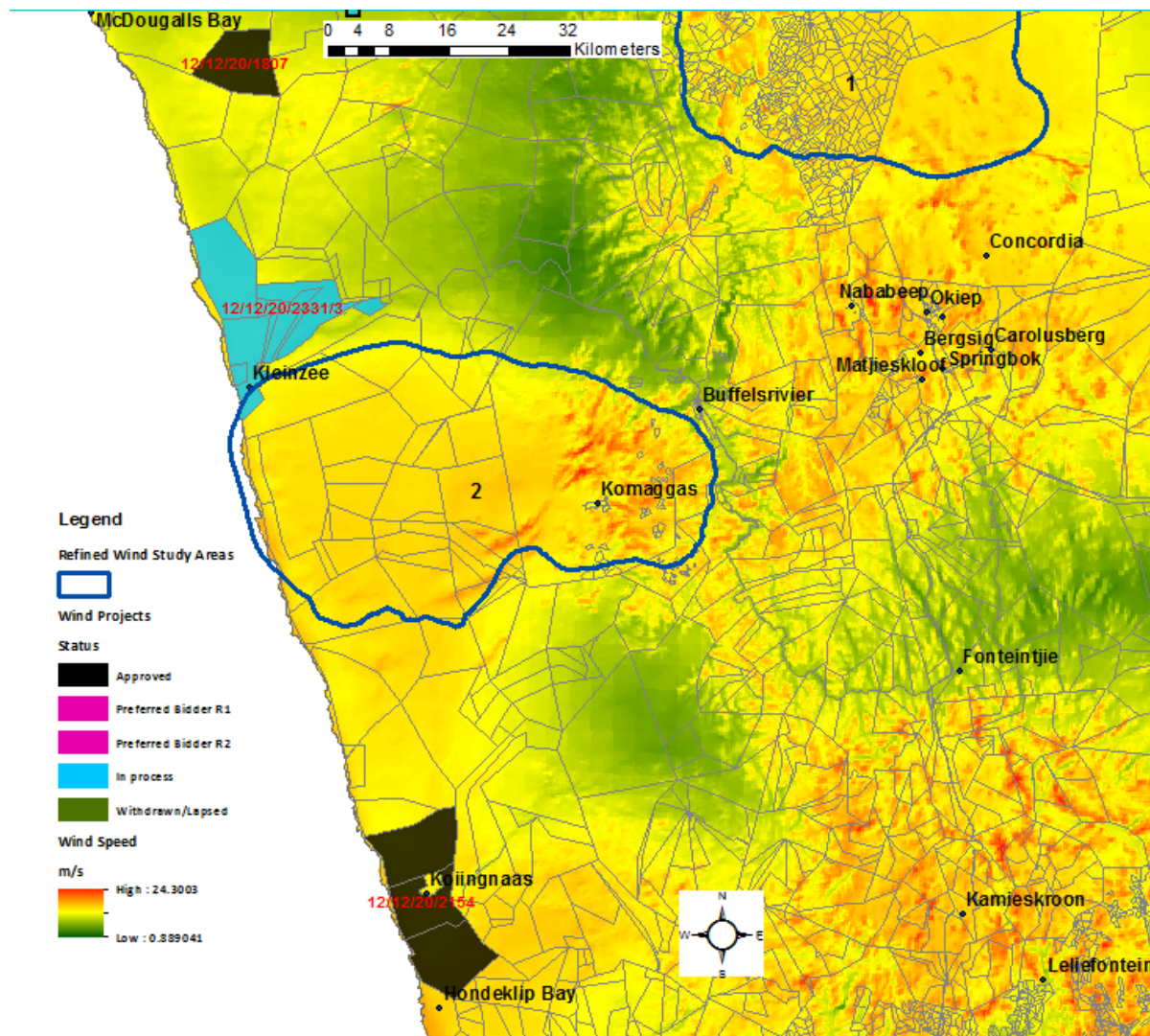
Area: **1315 km<sup>2</sup>**

Afri GIS Land Portions:  **$\pm 80$**

Mean power density 100 m above ground level:  **$197 \text{ Wm}^{-2}$**

Mean wind speed 100 m above ground level:  **$5.9 \text{ ms}^{-1}$**

# Wind Study Area 2: Kleinzee (2: Resource, cadastral & existing applications)



Area: 1315  $\text{km}^2$

Afri GIS Land Portions:  $\pm 80$

Mean power density 100 m above ground level:  $197 \text{ Wm}^{-2}$

Mean wind speed 100 m above ground level:  $5.9 \text{ ms}^{-1}$

Nearest Study Area:

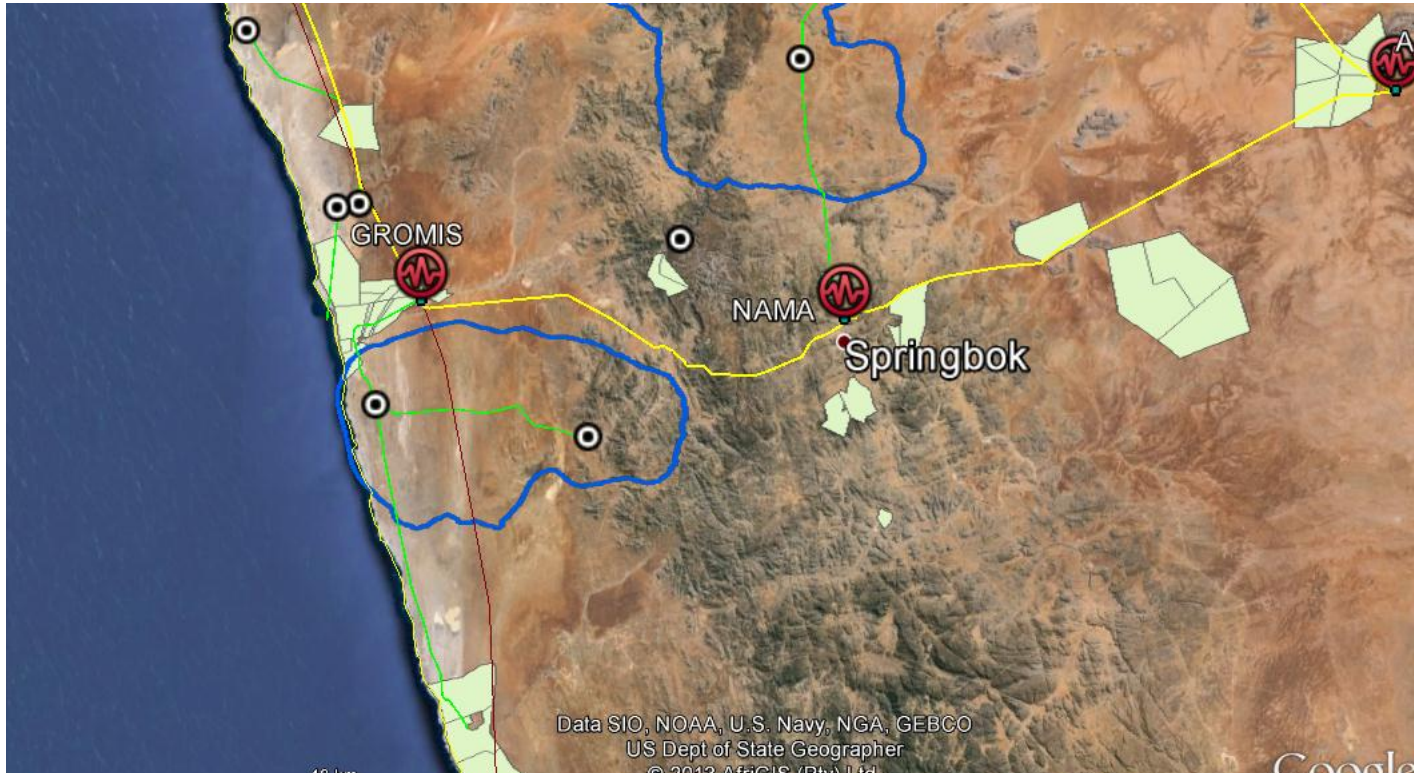
1. Study area 1: Steinkopf 35 km north east

Existing Applications:

1. Kannikwa Vlake WEF 120 MW 35 km north (approved);
2. Koingnaas WEF 7 MW 25 km south (approved)
3. Project Blue WEF 76 MW in north of study area

# Wind Study Area 2: Kleinzee

(3: Eskom network)



**Eskom Area Limit:**  
Namaqualand; 1235 MW

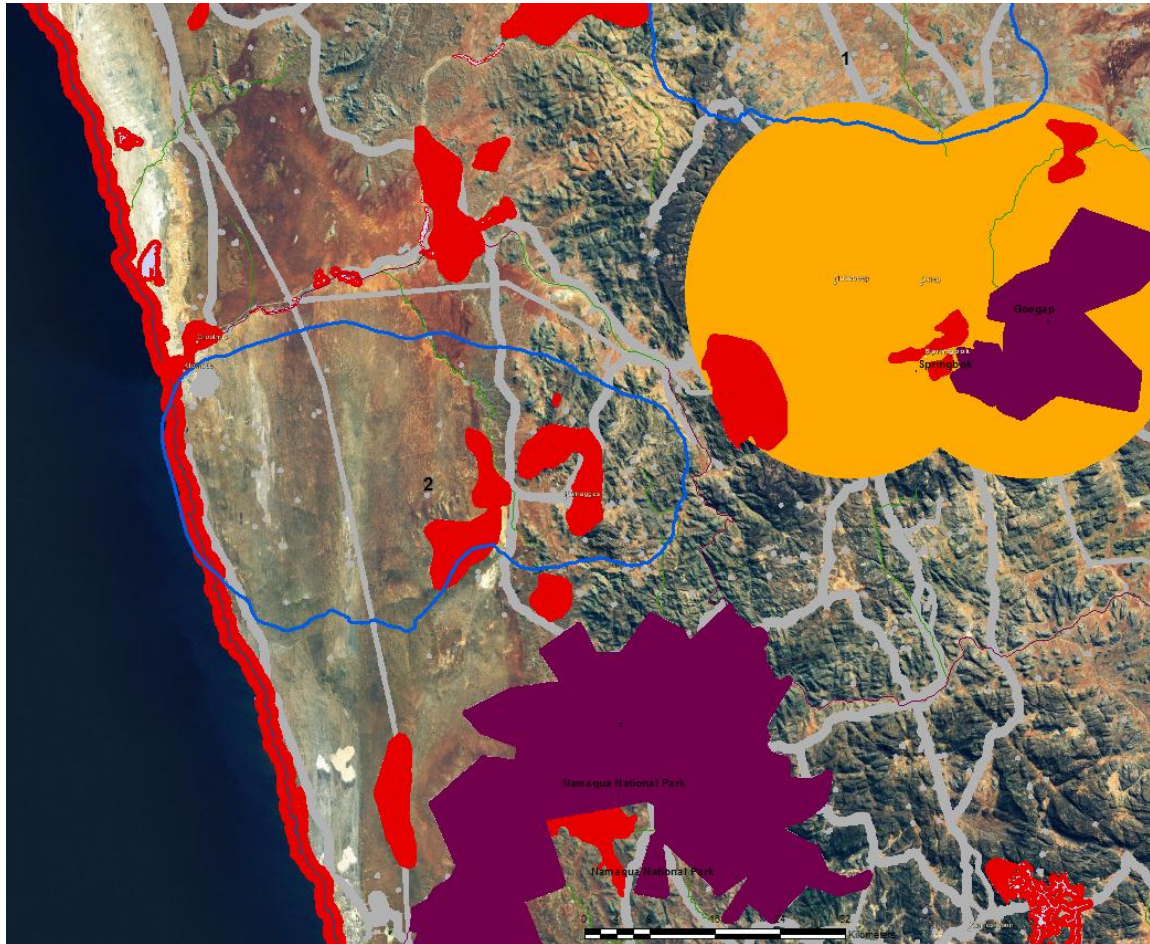
**Nearest HV Substations:**

1. Gromis 5 km North (2\*40 MW transformers, 33 MW busbar, 0 MW committed);
2. Nama, 30 km East (2\*80 Transformers, 37 MW Busbar, 0 MW committed)
3. Aggeneis 150 km north east (2\*315 MW + 2\*80 MW transformers, 121 MW + 98 MW busbar, 0 MW committed)






**Two 66 kV substations in study area, 3 more in vicinity.**



# Study Area 2: Kleinzee (4)



## Legend

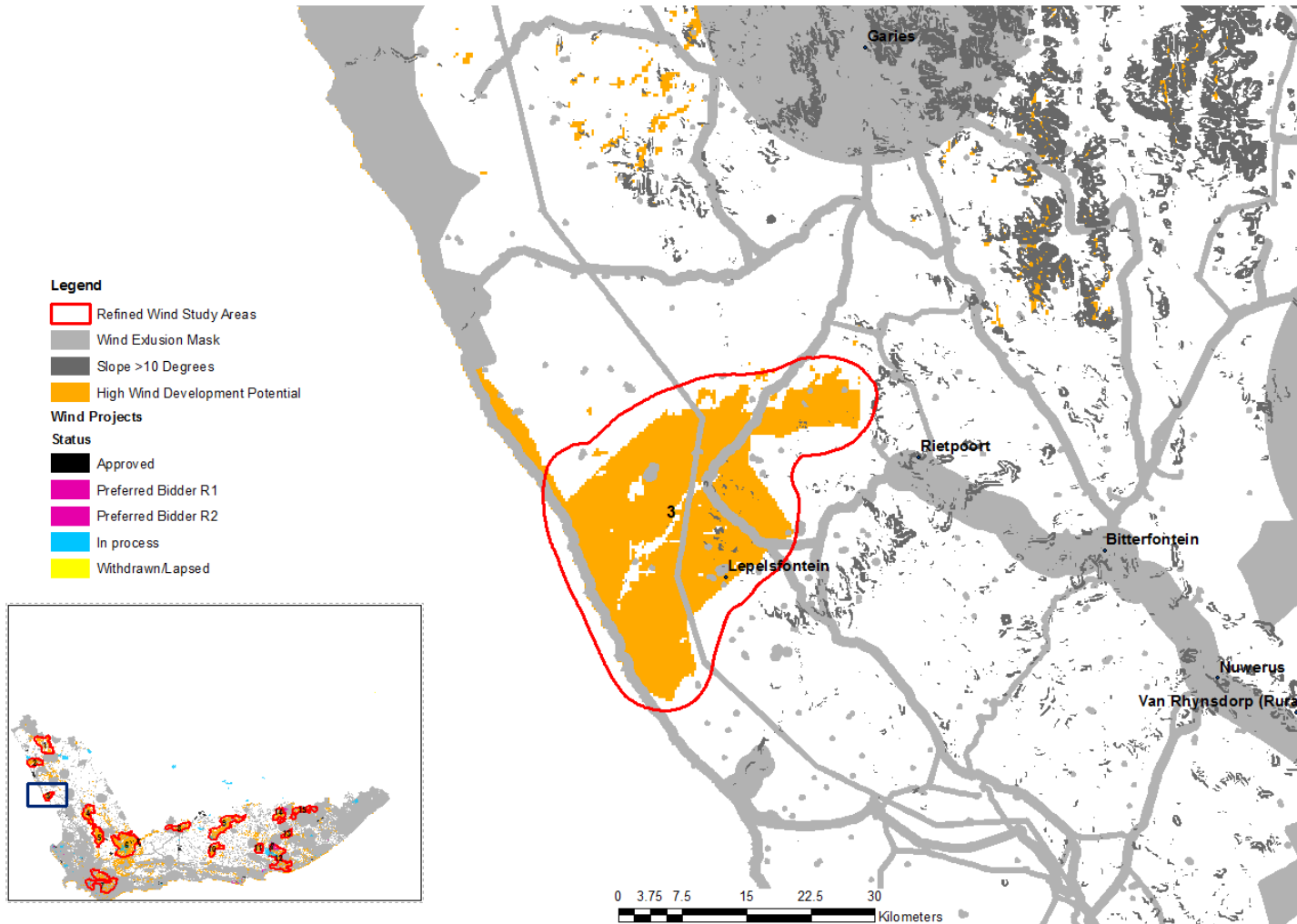
-  Refined Wind Study Areas
-  Wind Exclusion Mask
-  Protected Areas Buffer 500m
-  Irreplaceable CBA Exclusion
-  Major Bat Roosts Buffer 20km\_Wind

## Key Sensitivities:

1. Coastal Zone;
2. Major Bat roosts to the NE;
3. Namaqua National Park 10 km S;
4. Goegap Nature Reserve 35 km E; and
5. Irreplaceable CBAs inside

# Wind Study Area 3: Lepelsfontein

(1: Development Potential)



Area: 668 km<sup>2</sup>

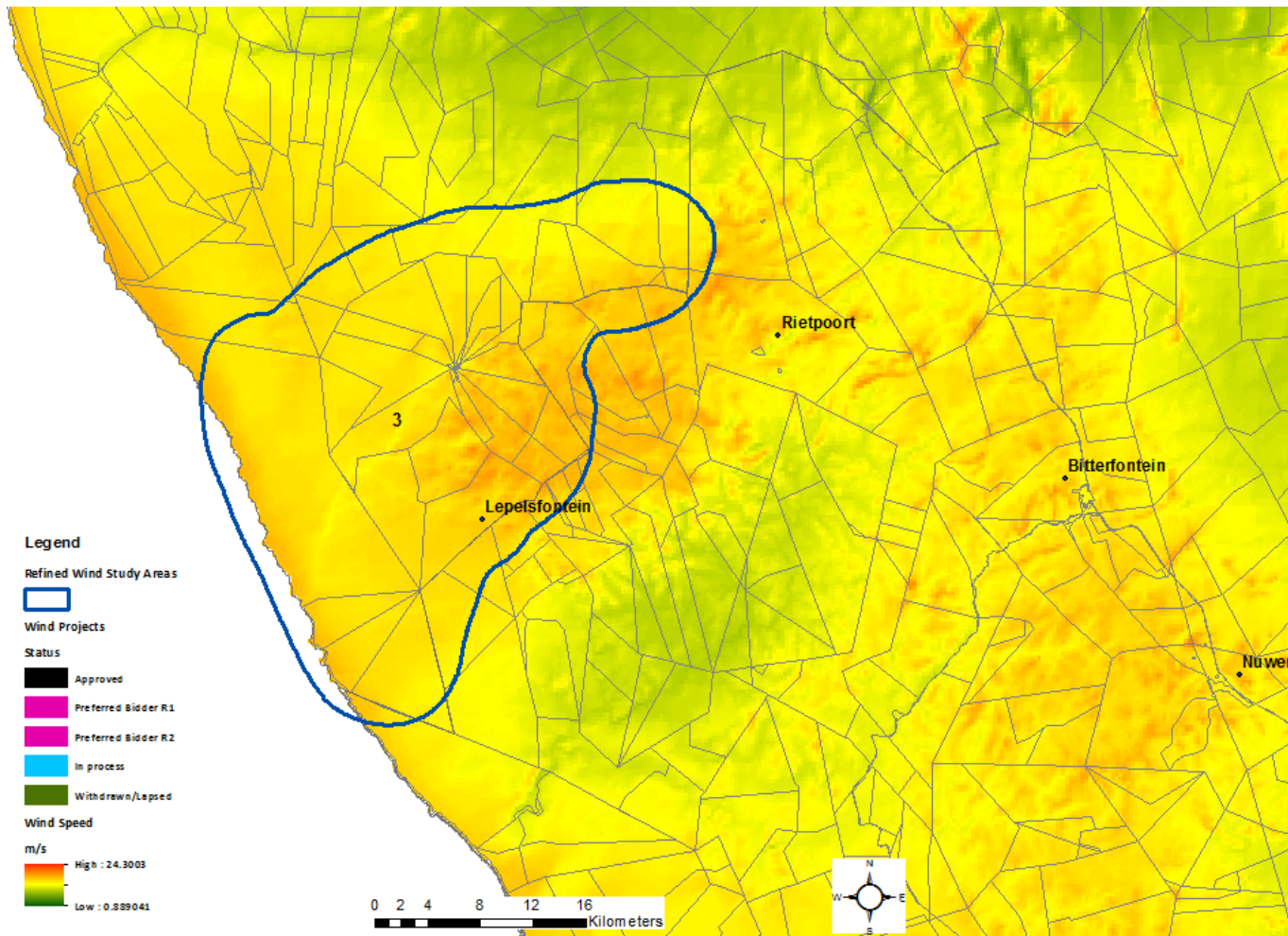
Afri GIS Land Portions: ± 77

Mean power density 100 m above ground level: 194 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 5.9 ms<sup>-1</sup>



# Wind Study Area 3: Lepelsfontein (2: Resource, cadastral & existing applications)



Area: 668  $\text{km}^2$

Afri GIS Land Portions:  $\pm 77$

Mean power density 100 m above ground level:  $194 \text{ Wm}^{-2}$

Mean wind speed 100 m above ground level:  $5.9 \text{ ms}^{-1}$

Nearest Study Area:

1. Study area 4: Nieuwoudtville 150 km south east ;
2. Study Area 2: Kleinsee 150 km north.

Existing Applications:

1. none

# Wind Study Area 3: Lepelsfontein

(3: Eskom network)



**Eskom Area Limit:**  
On border of Namaqualand  
(1235 MW) and West Coast  
(2616 MW)

**Nearest Substations:**

1. Juno 90 km south (2\*120 MW transformers, 441 MW busbar, 109 MW committed)

132 kV substation 15 km south of study areas

New (2022) 400 kV line running through site



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



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# Wind Study Area 3: Lepelsfontein (4)



## Legend

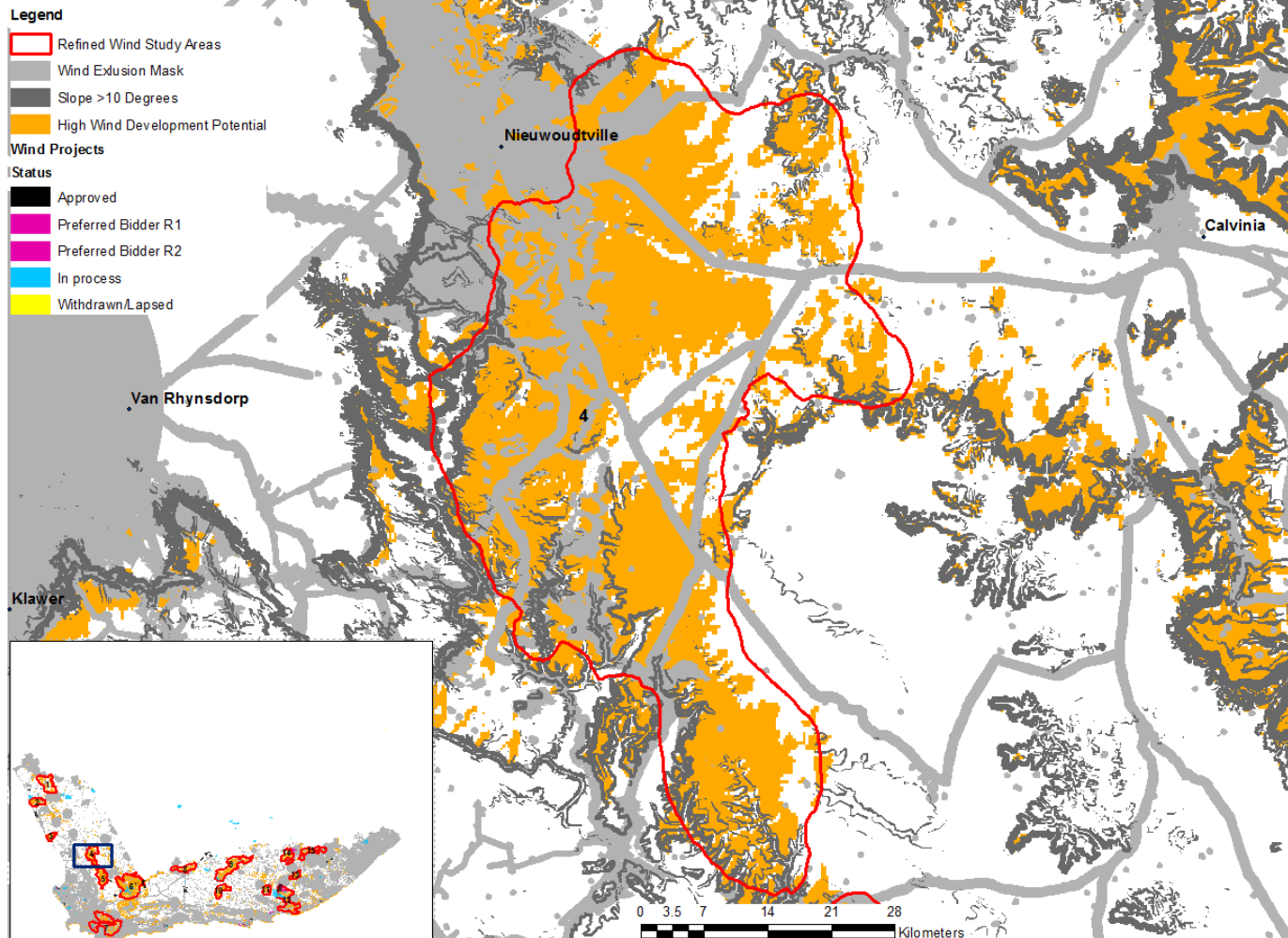
-  Refined Wind Study Areas
-  Wind Exclusion Mask
-  Protected Areas Buffer 500m
-  Irreplaceable CBA Exclusion
-  Major Bat Roosts Buffer 20km\_Wind

## Key Sensitivities:

1. Accessibility;
2. Coastal Zone;
3. Namaqua National Park 15 km N; and
4. Very few irreplaceable CBAs inside.

# Wind Study Area 4: Nieuwoudtville

(1: Development Potential)



Area: 1826 km<sup>2</sup>

Afri GIS Land Portions: ± 320

Mean power density 100 m above ground level: 192 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.1 ms<sup>-1</sup>

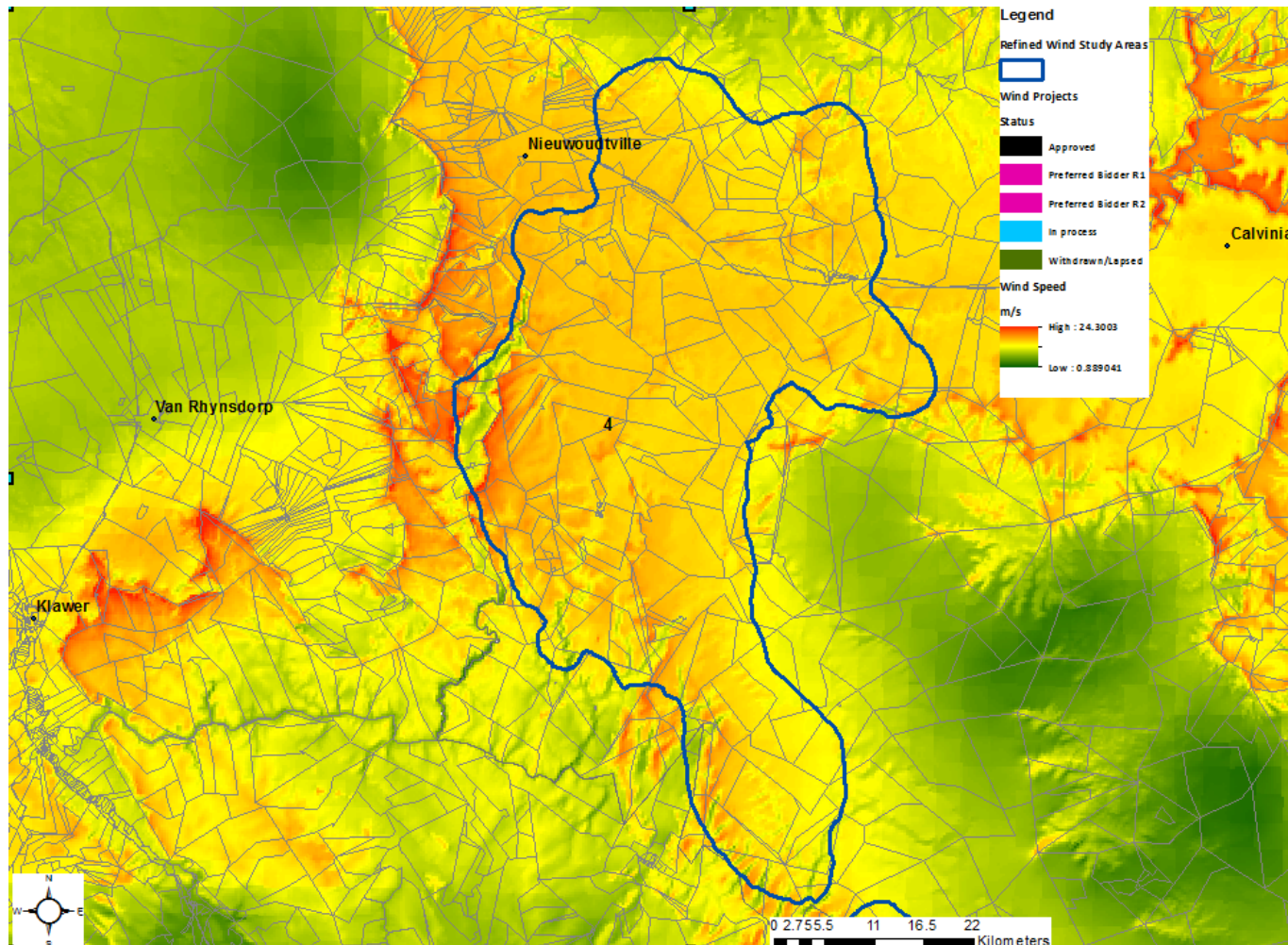


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# Wind Study Area 4: Nieuwoudtville (2: Resource, cadastral & existing applications)



Area: 1826 km<sup>2</sup>

Afri GIS Land Portions: ± 320

Mean power density 100 m above ground level: 192 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.1 ms<sup>-1</sup>

Nearest Study Area:

1. Study area 5: Tankwa Karoo 5 km south east

Existing Applications:

1. none



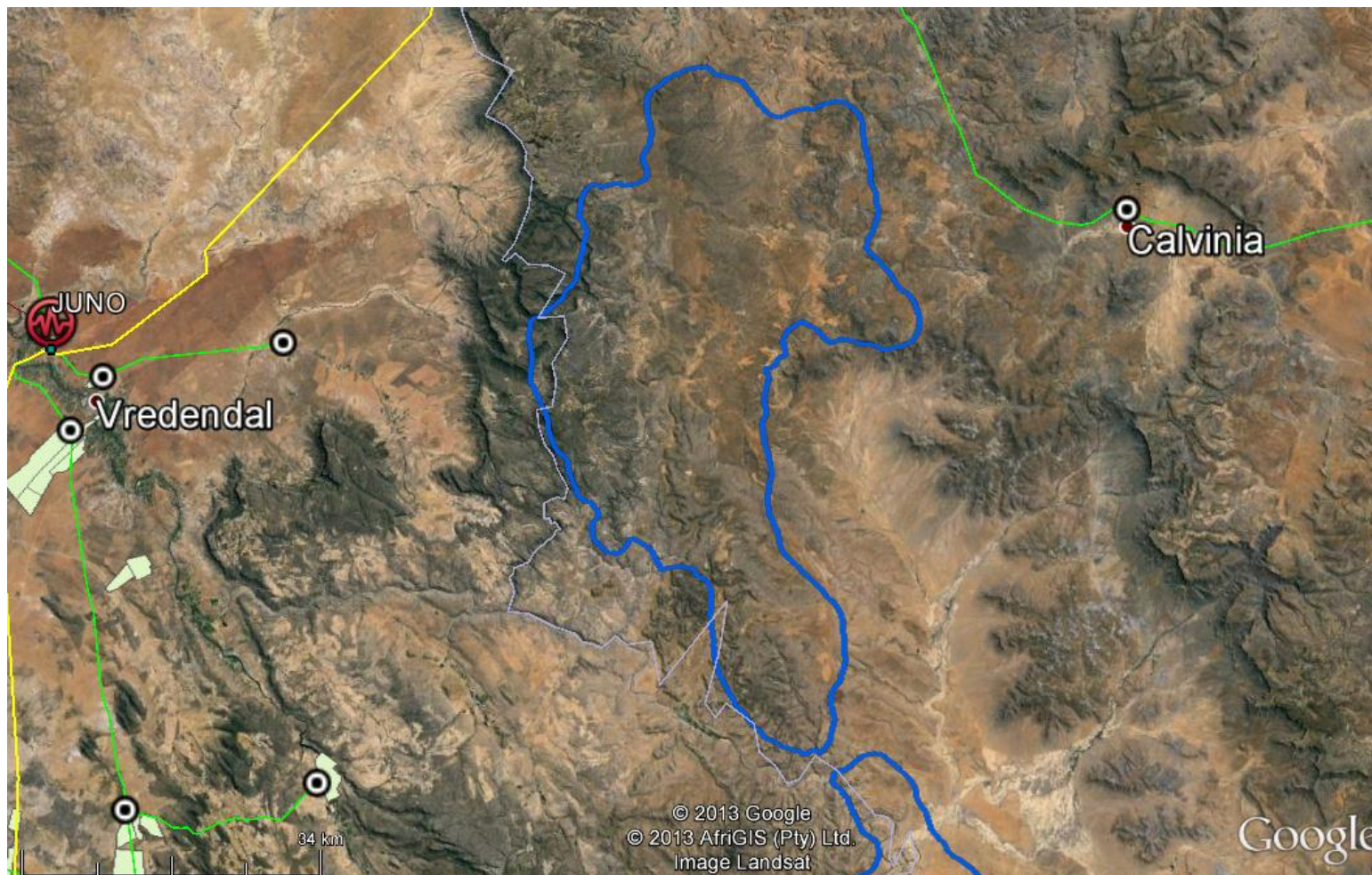
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# Wind Study Area 4: Nieuwoudtville

(3: Eskom network)



**Eskom Area Limit:**  
West Coast (2616 MW)

**Nearest Substations:**

1. Juno 70 km west (2\*120 MW transformers, 441 MW busbar, 109 MW committed)

3 \* 66 kV  
Substations >30 km from study area

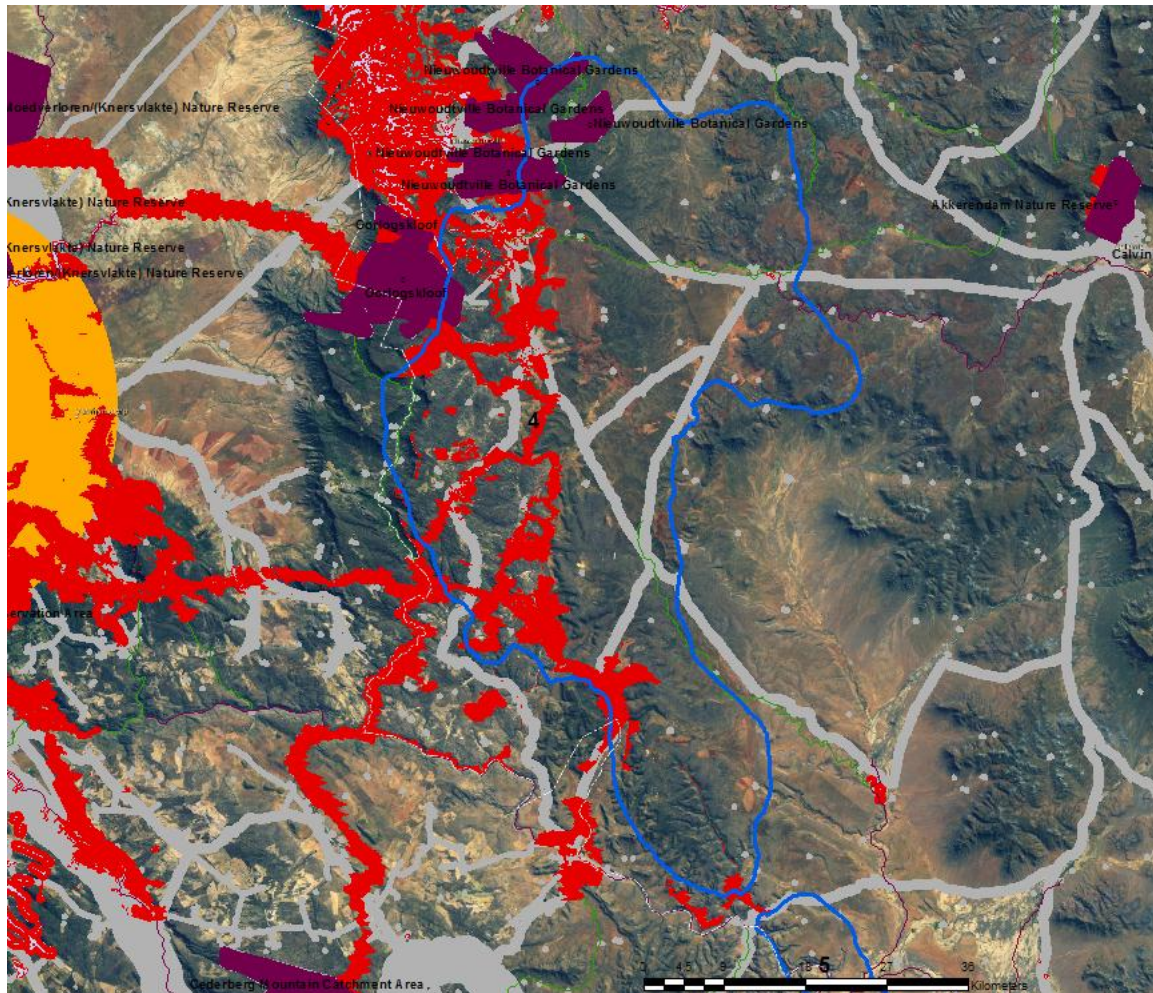


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# Wind Study Area 4: Nieuwoudtville (4)



## Legend

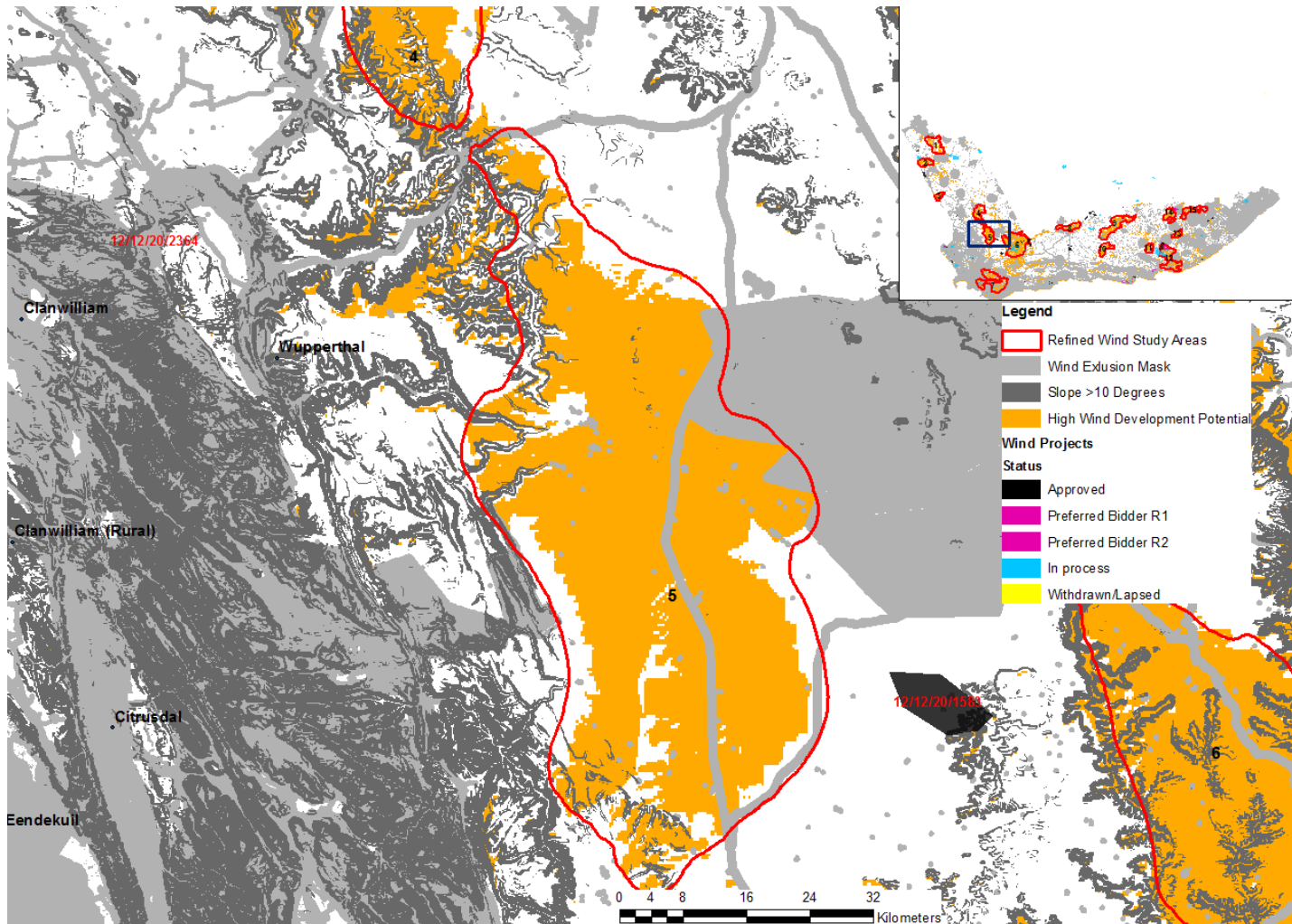
- Refined Wind Study Areas
- Wind Exclusion Mask
- Protected Areas Buffer 500m
- Irreplaceable CBA Exclusion
- Major Bat Roosts Buffer 20km\_Wind

## Key Sensitivities:

1. Nieuwoudtville Botanical Garden in northern part;
2. Oorlogskloof Provincial Nature Reserve in north western part; and
3. Irreplaceable CBAs inside

# Wind Study Area 5: Tankwa Karoo

(1: Development Potential)



Area: 1872 km<sup>2</sup>

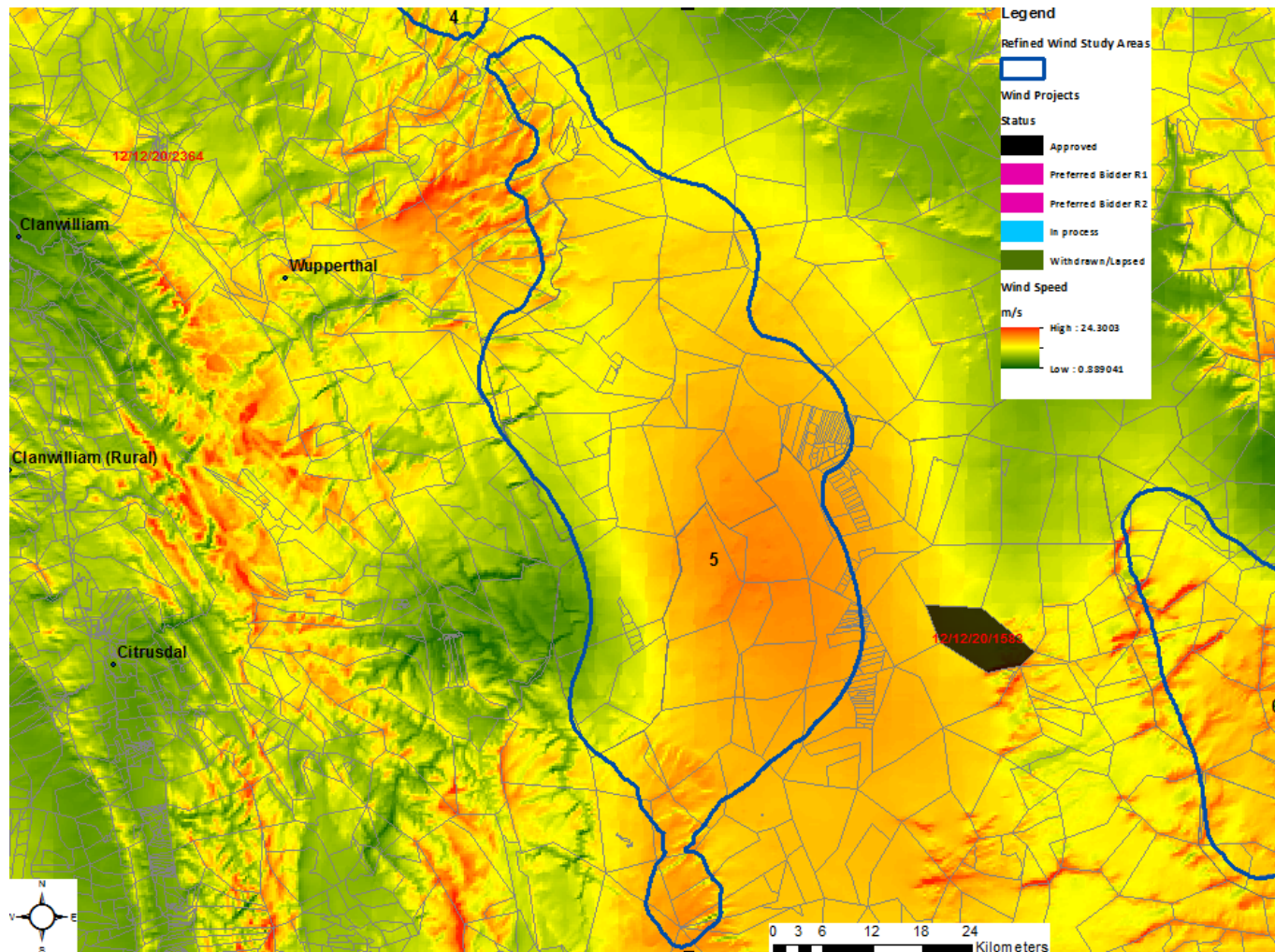
Afri GIS Land Portions: ± 174

Mean power density 100 m above ground level: 290 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.1 ms<sup>-1</sup>



# Wind Study Area 5: Tankwa Karoo (2: Resource, cadastral & existing applications)



Area: 1872 km<sup>2</sup>

Afri GIS Land Portions: ± 174

Mean power density 100 m  
above ground level: 290 Wm<sup>-2</sup>

Mean wind speed 100 m  
above ground level: 6.1 ms<sup>-1</sup>

Nearest Study Area:

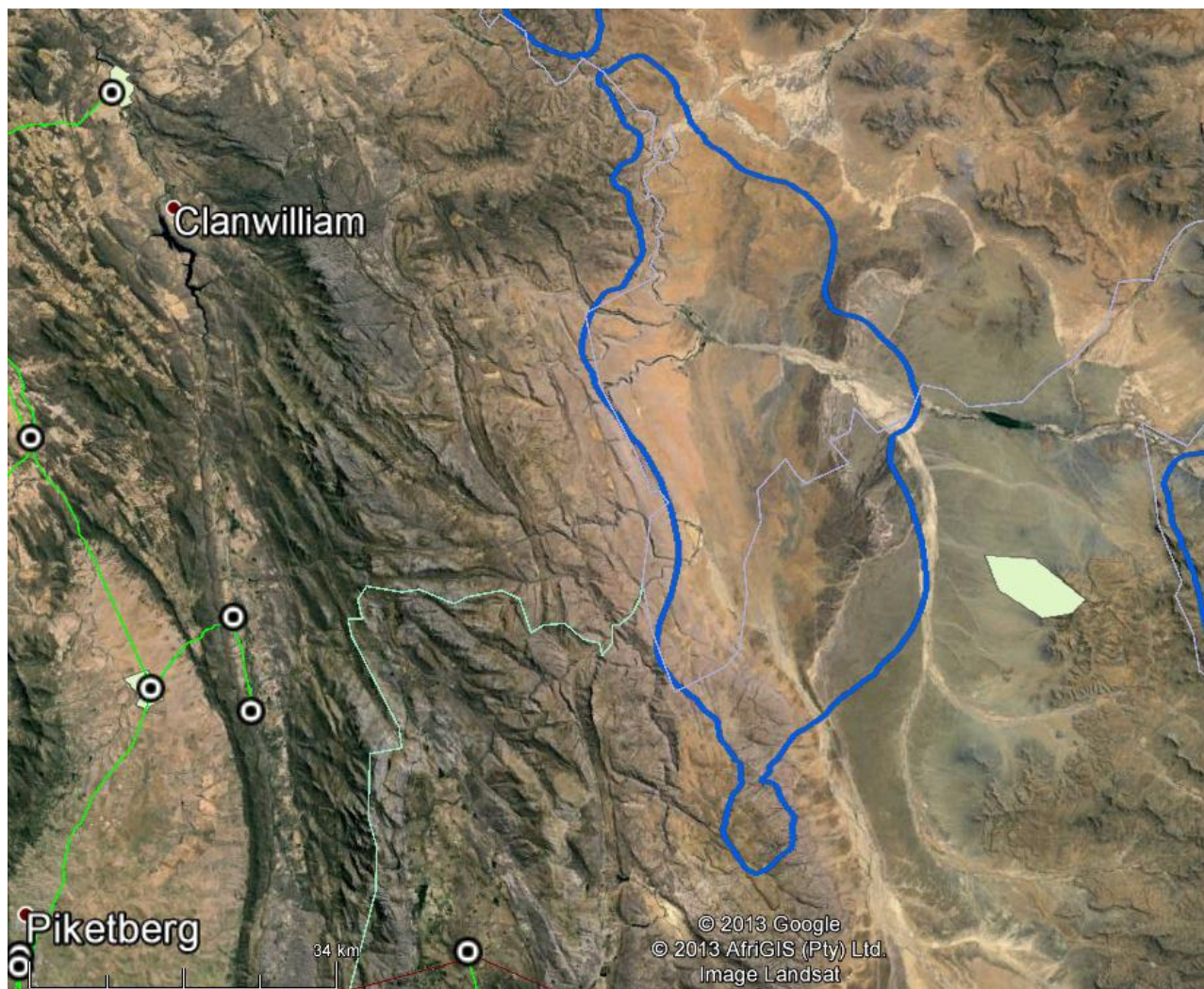
1. Study area 6: Sutherland  
35 km east
2. Study area 4:  
Nieuwoudtville 5 km north  
east

Existing Applications:

1. Suurplaat WEF 120 MW 5  
km east of study area  
(approved)
2. Koekenaap WEF 20 MW 50  
km west of study area

# Wind Study Area 5: Tankwa Karoo

(3: Eskom network)



**Eskom Area Limit: On border between West Coast (2616 MW) and Southern Cape (3318 MW)**

**Nearest Substations:**

1. Kappa 60 km south (1\*2000 MW transformer, 926 MW busbar, 0 MW committed)

**3 \* 66 kV substation > 30 km from study area**

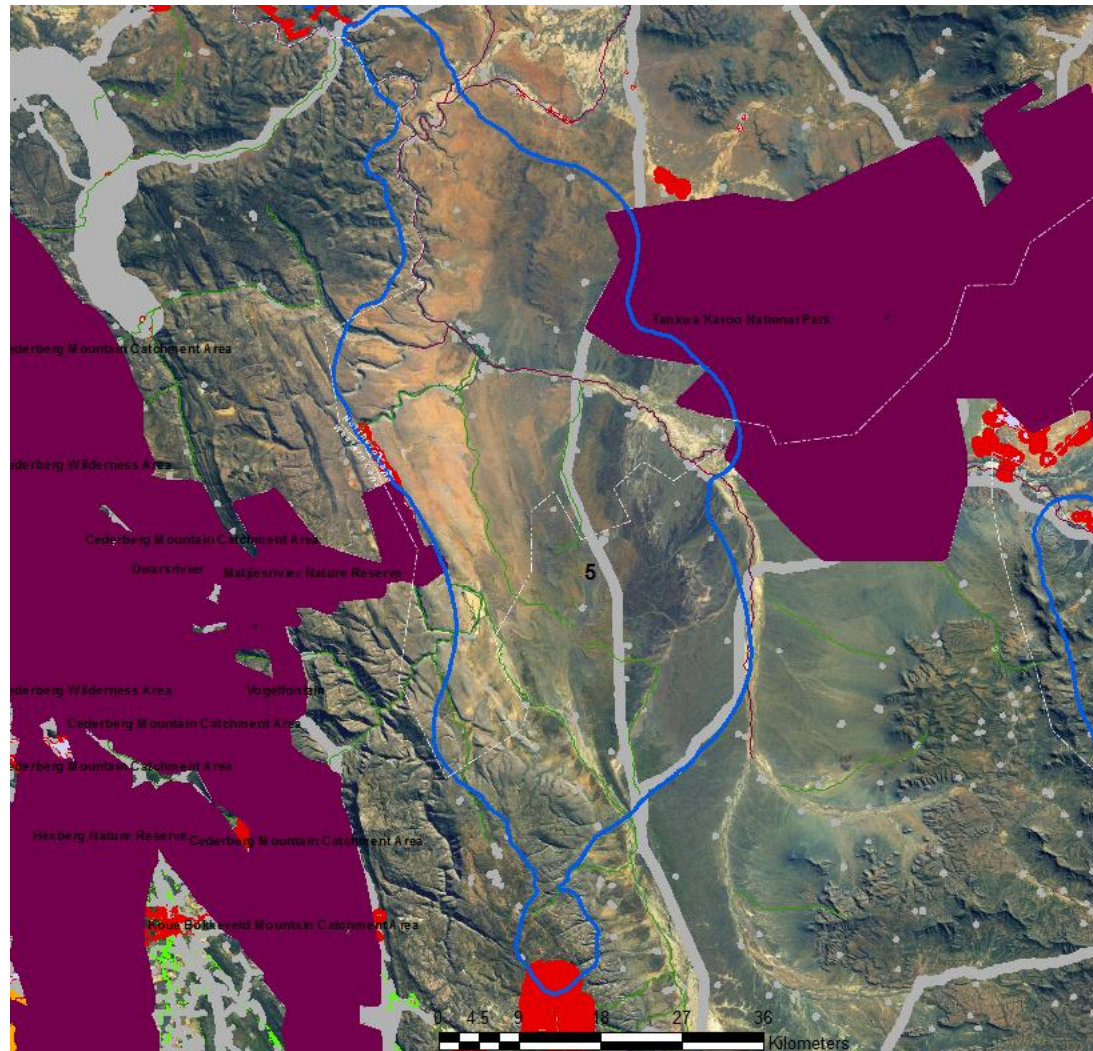


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# Wind Study Area 5: Tankwa Karoo (4)



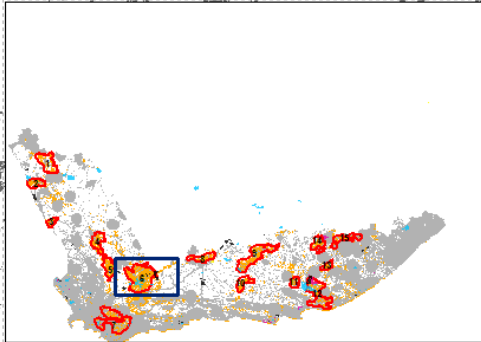
## Legend

- Refined Wind Study Areas
- Wind Exclusion Mask
- Protected Areas Buffer 500m
- Irreplaceable CBA Exclusion
- Major Bat Roosts Buffer 20km\_Wind

## Key Sensitivities:

1. Tankwa Karoo National Park to East;
2. Mathiesrivier Nature Reserve, Cederberg Wilderness Area, and others to West.

## (1: Development Potential)

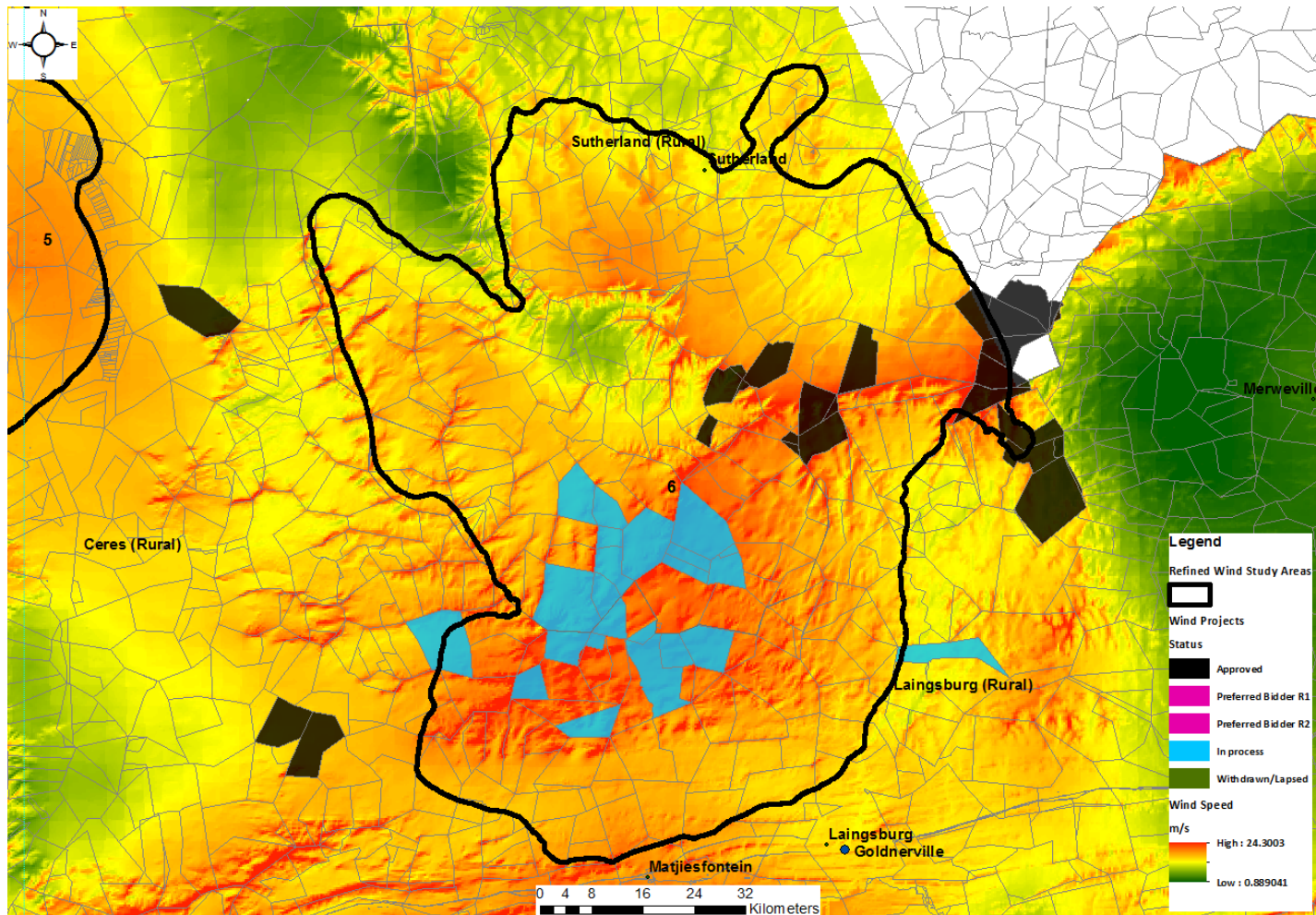


**Afri GIS Land Portions:**  
**± 385**

Mean wind speed 100  
m above ground level:  
6.7 ms<sup>-1</sup>



# Wind Study Area 6: Sutherland (2: Resource, cadastral & existing applications)



Area: 5903 km<sup>2</sup>

Afri GIS Land Portions: ± 385

Mean power density 100 m above ground level: 404 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.7 ms<sup>-1</sup>

Nearest Study Area:

1. Study area 5: Tankwa Karoo  
35 km west

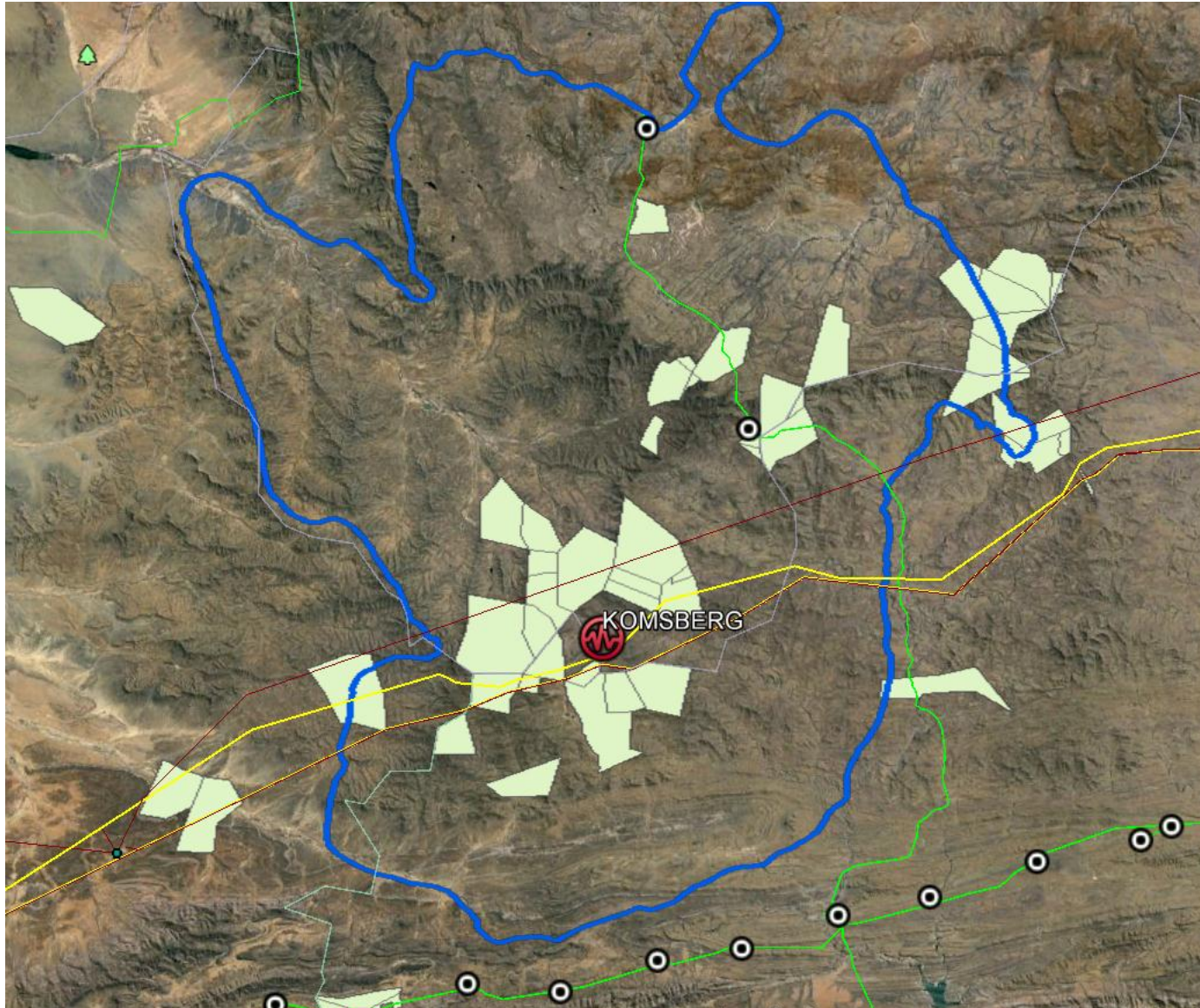
Existing Applications:

1. Suurplaat WEF 120 MW in east of study area (approved)
2. Sutherland WEF 811 MW in study area (approved);
3. Perdekraal WEF 140 MW (approved);
4. Roggeveld WEF 750 MW in study area (in process);
5. Komsberg WEF 300 MW in study area (in process);
6. Hidden Valley WEF 150 MW in study area (in process)



# Wind Study Area 6: Sutherland

(3: Eskom network)



**Eskom Area Limit: Southern Cape (3318 MW)**

#### **Nearest Substations:**

1. Kappa 35 km east (1\*2000 MW transformer, 926 MW busbar, 0 MW committed)
2. Komsberg in study area, but only a series capacitor switch station and not suited for connection;
3. 2 \* 66 kV substation in study area; and
4. Several 132 kV substations just south of study area.

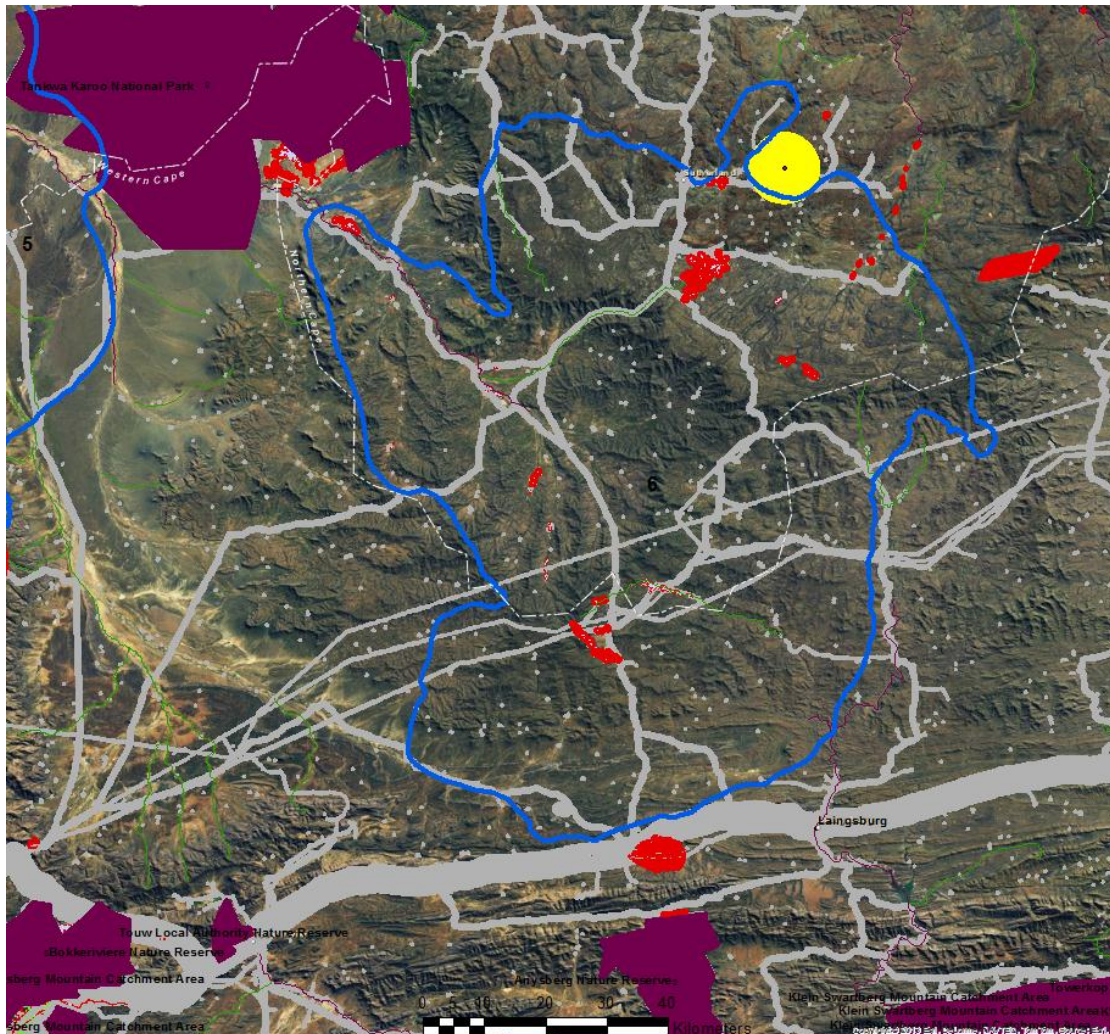


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




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# Wind Study Area 6: Sutherland (Key Environmental Sensitivities\_4)



## Legend

-  Refined Wind Study Areas
-  Wind Exclusion Mask
-  Protected Areas Buffer 500m
-  Irreplaceable CBA Exclusion
-  Major Bat Roosts Buffer 20km\_Wind
-  SALT Buffer 5km

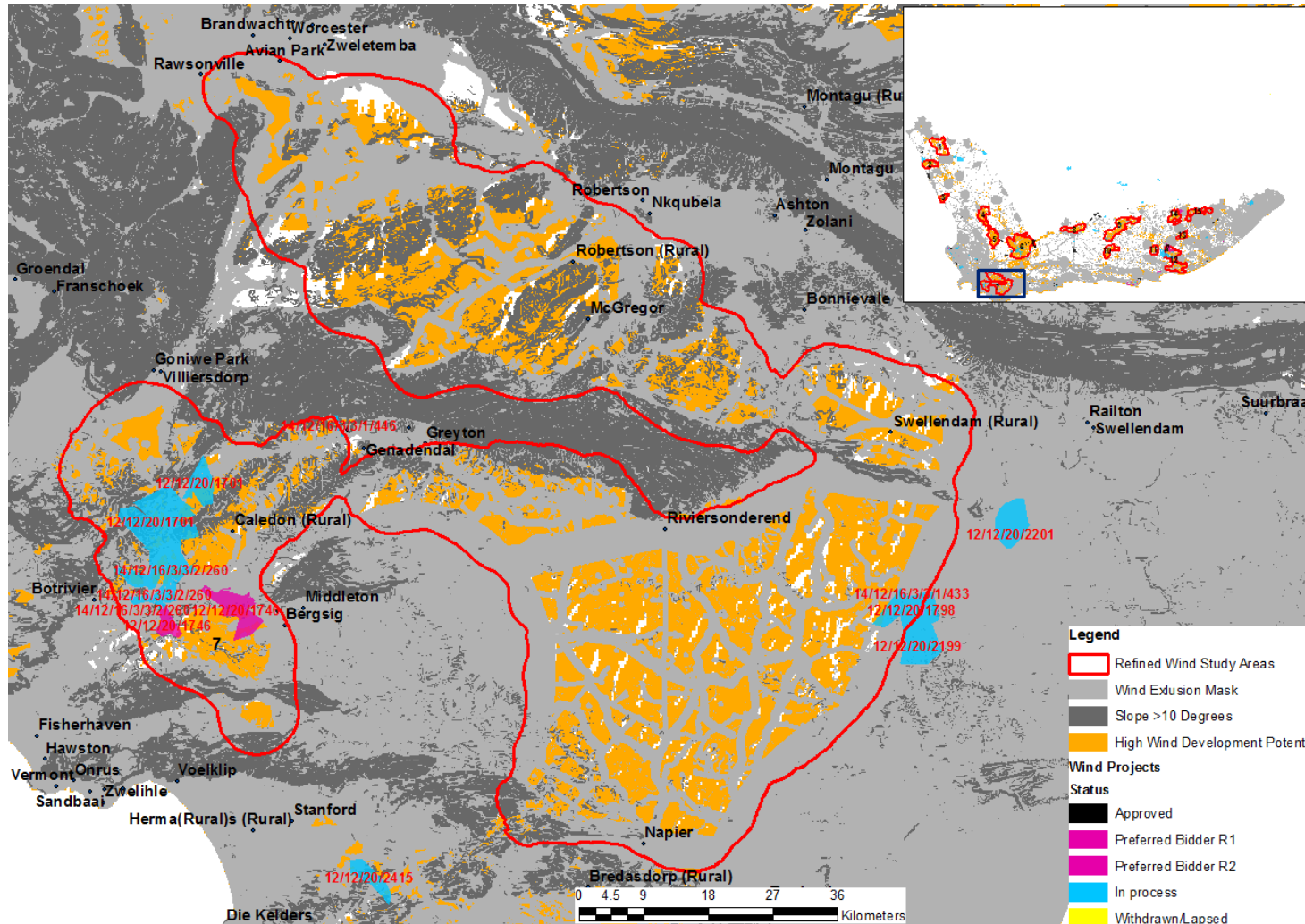
## Key Sensitivities:

1. Tankwa Karoo National Park 10 km NW;
2. Anyberg Nature Reserve 15 km S; and
3. Few irreplaceable CBAs inside;



# Wind Study Area 7: Beede River Valley/Overberg

(1: Development Potential)



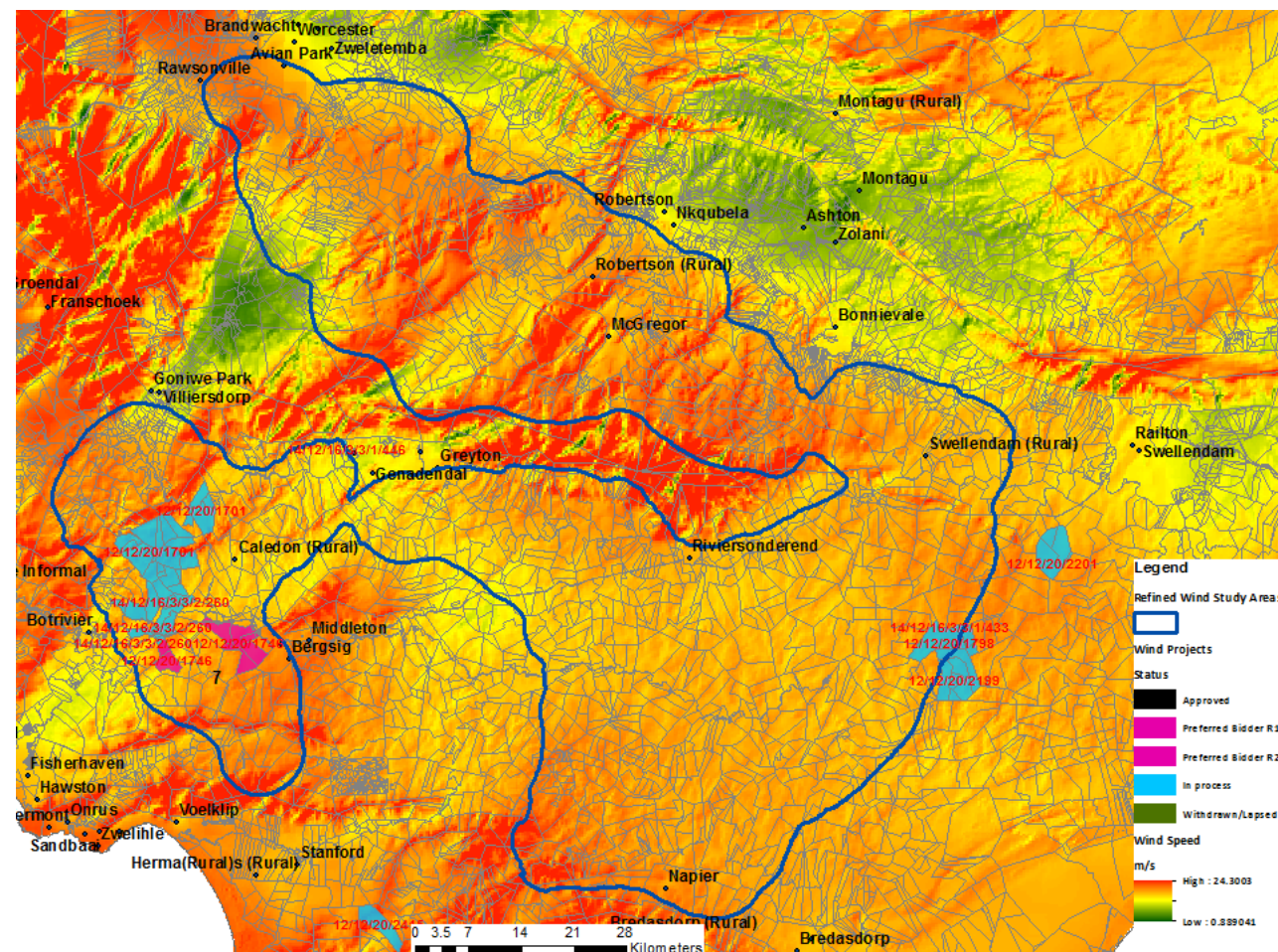
Area: 4600 km<sup>2</sup>

Afri GIS Land Portions: ± 2900

Mean power density 100 m  
above ground level: 532  
Wm<sup>-2</sup>

Mean wind speed 100 m  
above ground level: 6.9 ms<sup>-1</sup>

# Study Area 7: Beede River Valley/Overberg (2: Resource, cadastral & existing applications)



Area: 4600 km<sup>2</sup>

Afri GIS Land Portions: ± 2900

Mean power density 100 m above ground level:  
532 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.9 ms<sup>-1</sup>

Nearest Study Area:

1. Study area 6: Sutherland 100 km north

Existing Applications:

1. Caledon WEF 300 MW in south western part of study area (in process);
2. Langhoogte WEF 110 MW in south western part of study area (in process);
3. Klipheuwel/Dassiefontein WEF 26 MW in south western part of study area (round 1 preferred bidder);
4. Walker Bay WEF 18 MW 20 km south (in process);
5. Uitkyk/Excel WEF 143 MW in south western part of study area (approved);
6. Heidelberg WEF 30 MW in south eastern part of study area (approved);
7. Goereesoe WEF 30 MW on south eastern border of study area (in process)
8. Kluitjieskraal WEF 5 km east of study area unknown MW (in process)
9. Roma WEF in western part of study area unknown MW (in process).



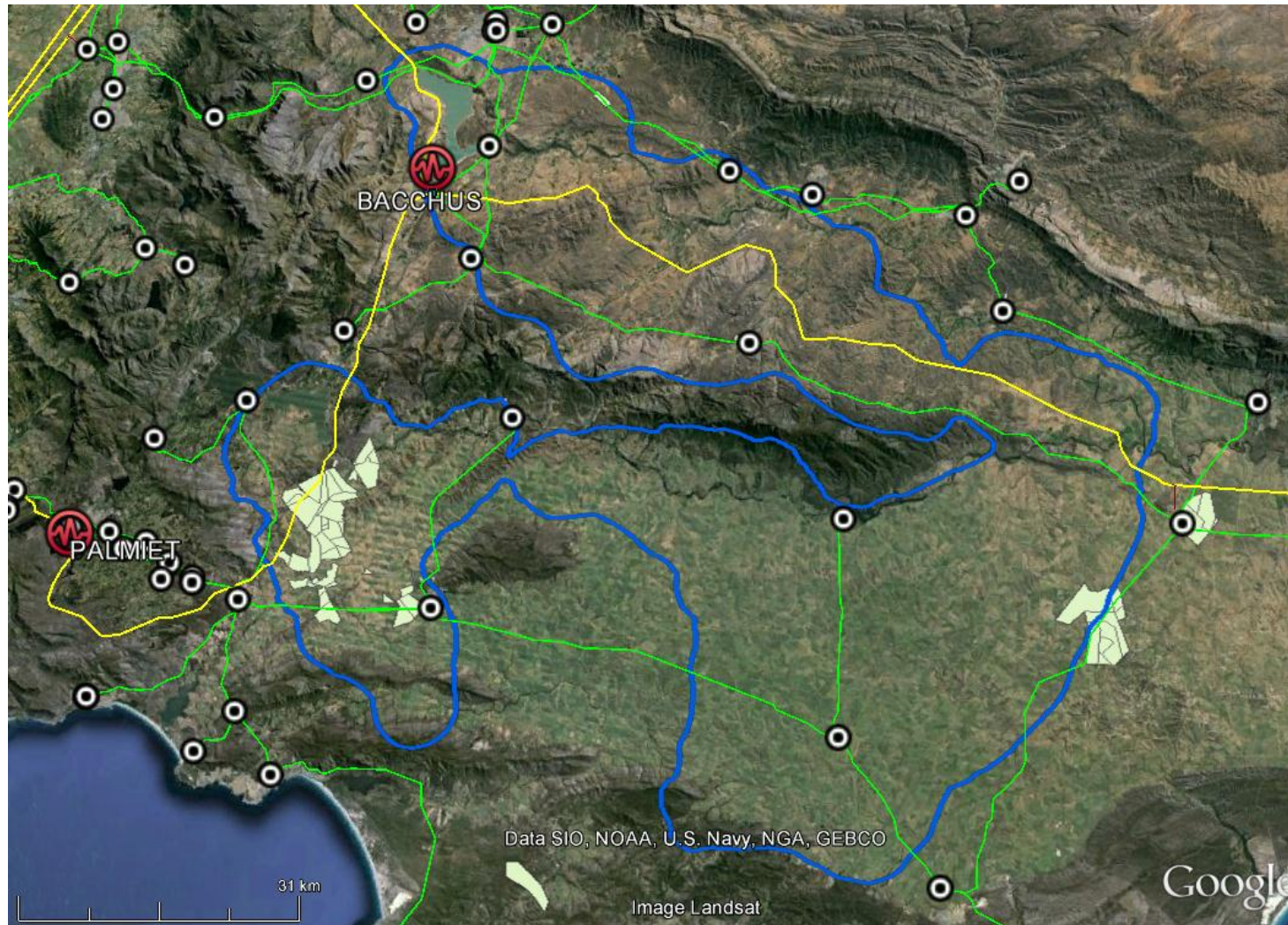
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# Wind Study Area 7: Beede River Valley/Overberg

(3: Eskom network)



**Eskom Area Limit: on border of Southern Cape (3318 MW) and Peninsula (3251)**

**Nearest Substations:**

1. Bacchus in north west of study area (2\*500 MW transformer, 940 MW busbar, 62 MW committed)

Several 132 & 66 kV substations in and around study area.

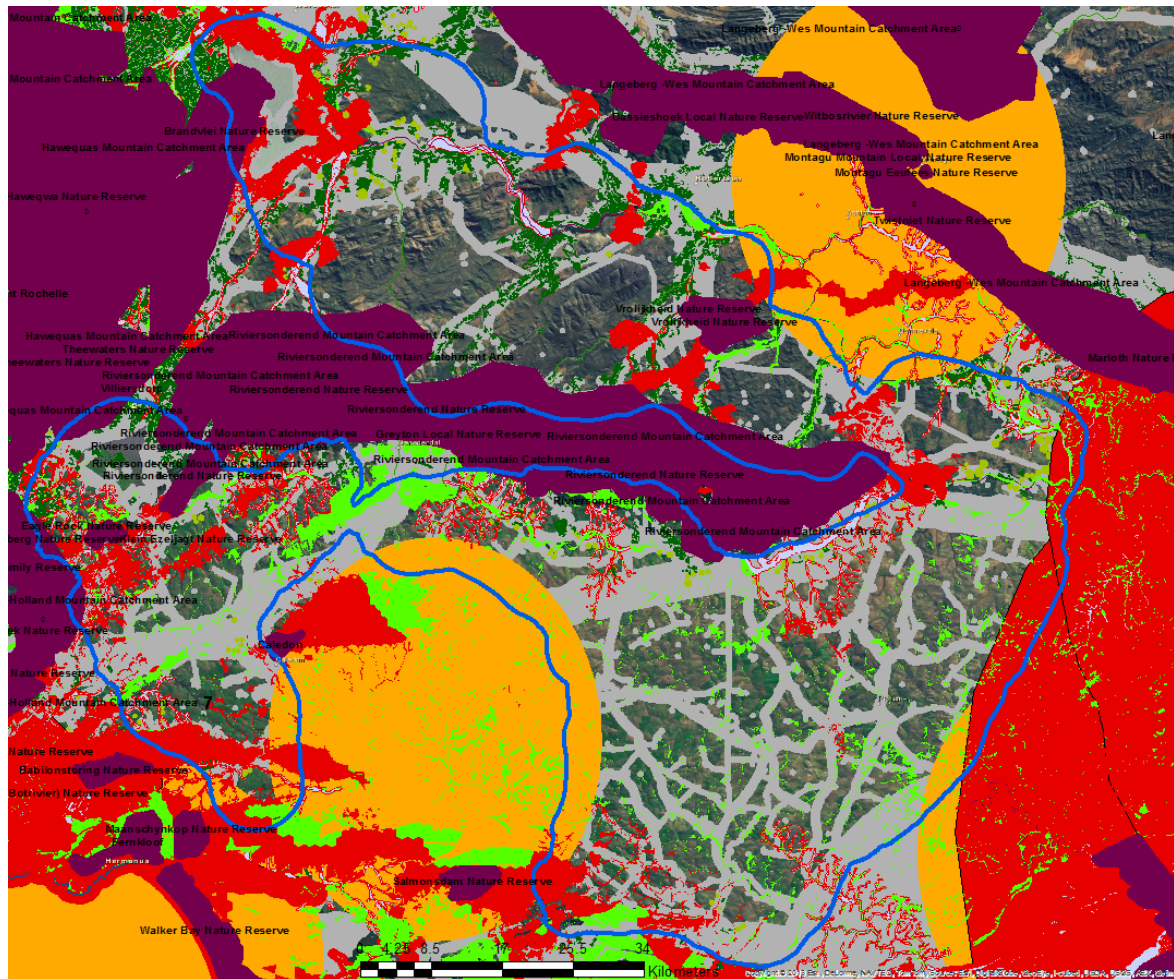


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# Wind Study Area 7: Beede River Valley/Overberg (4)



## Legend

- Refined Wind Study Areas
  - Wind Exclusion Mask
  - Protected Areas Buffer 500m
  - Irreplaceable CBA Exclusion
  - Major Bat Roosts Buffer 20km\_Wind
  - Remaining Threatened Ecosystems Exclusion
- Field Crop Boundaries**
- Horticulture / Viticulture
  - Pivot Irrigation
  - ShadeNet

## Key Sensitivities:

1. Major Bat roosts to the north and south;
2. Several Nature Reserves and Mountain Catchment Areas to in and around site;
3. Important bird areas to south and east,
4. Rivers and wetlands;
5. Agriculture;
6. Infrastructure;
7. Overberg Military Air Force Base to South East;
8. Critically endangered remaining



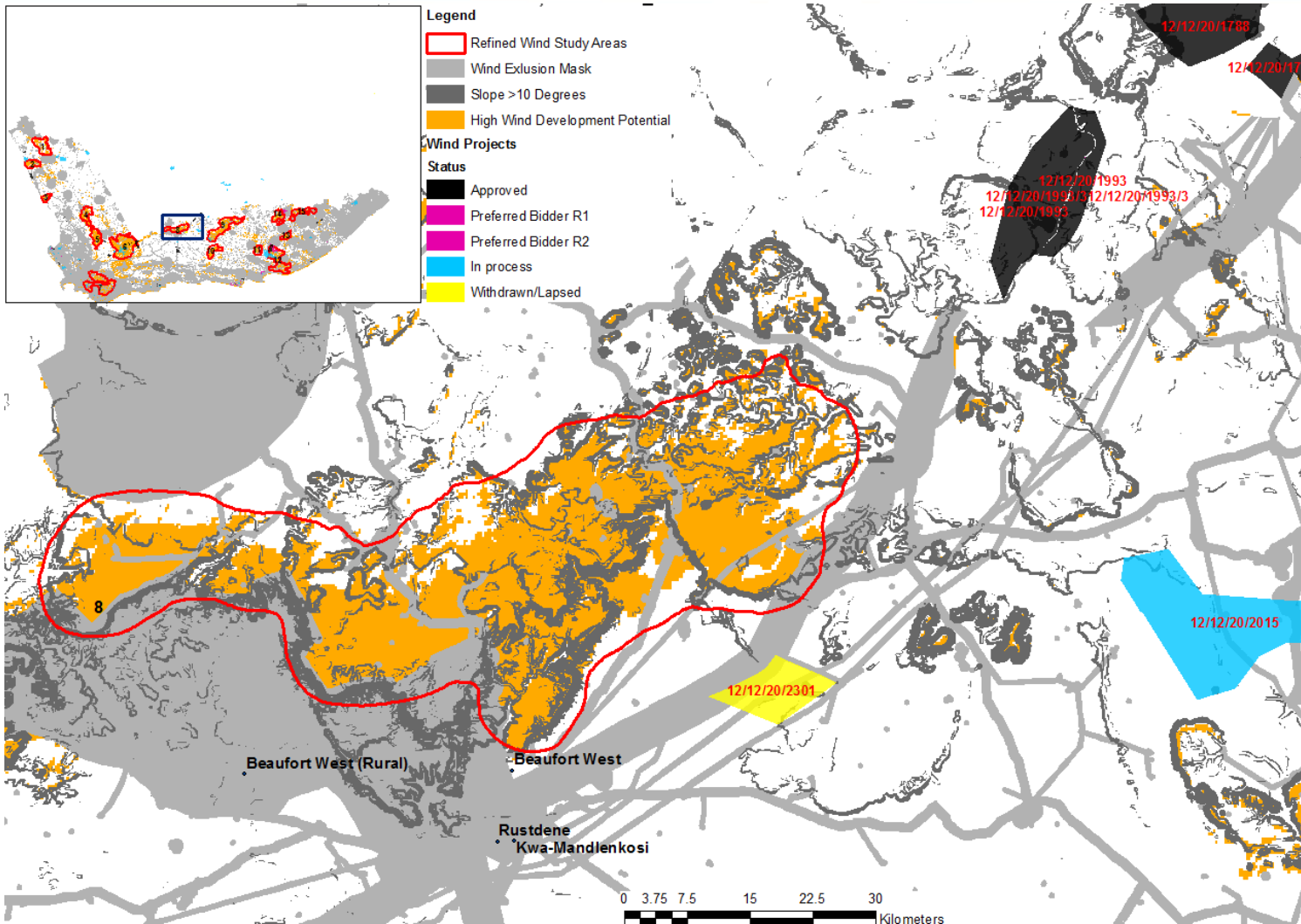
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# Wind Study Area 8: Beaufort West

(1: Development Potential)



Area: 1516 km<sup>2</sup>

Afri GIS Land Portions: ± 131

Mean power density 100 m above ground level: 377 Wm<sup>-2</sup>

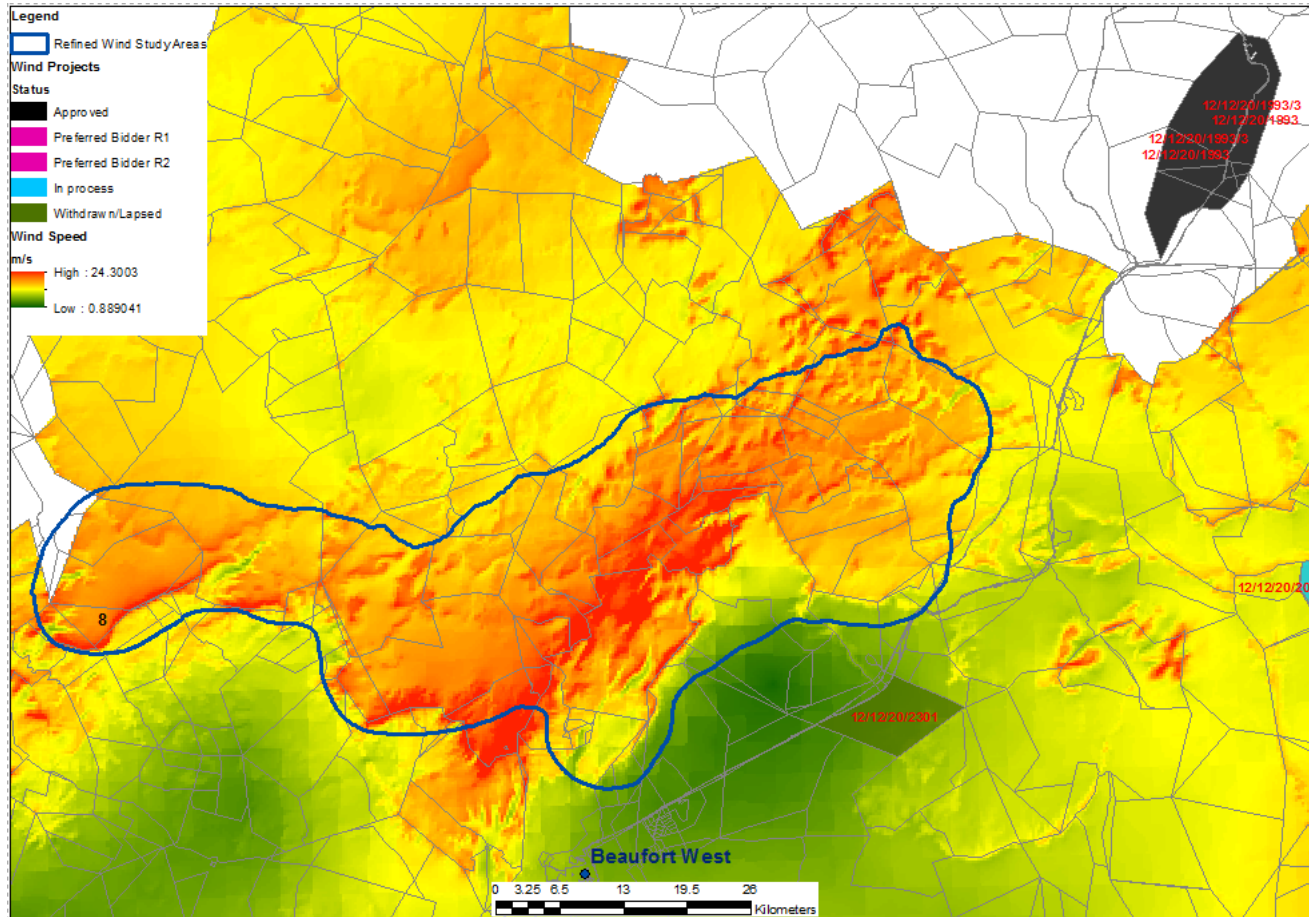
Mean wind speed 100 m above ground level: 6.6 ms<sup>-1</sup>



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# Wind Study Area 8: Beaufort West (2: Resource, cadastral & existing applications)



Area: 1516 km<sup>2</sup>

Afri GIS Land Portions: ± 131

Mean power density 100 m above ground level: 377 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 6.6 ms<sup>-1</sup>

Nearest Study Area:

1. Study area 9:Aberdeen/Graaf-Reinet/Murraysburg 90 km east

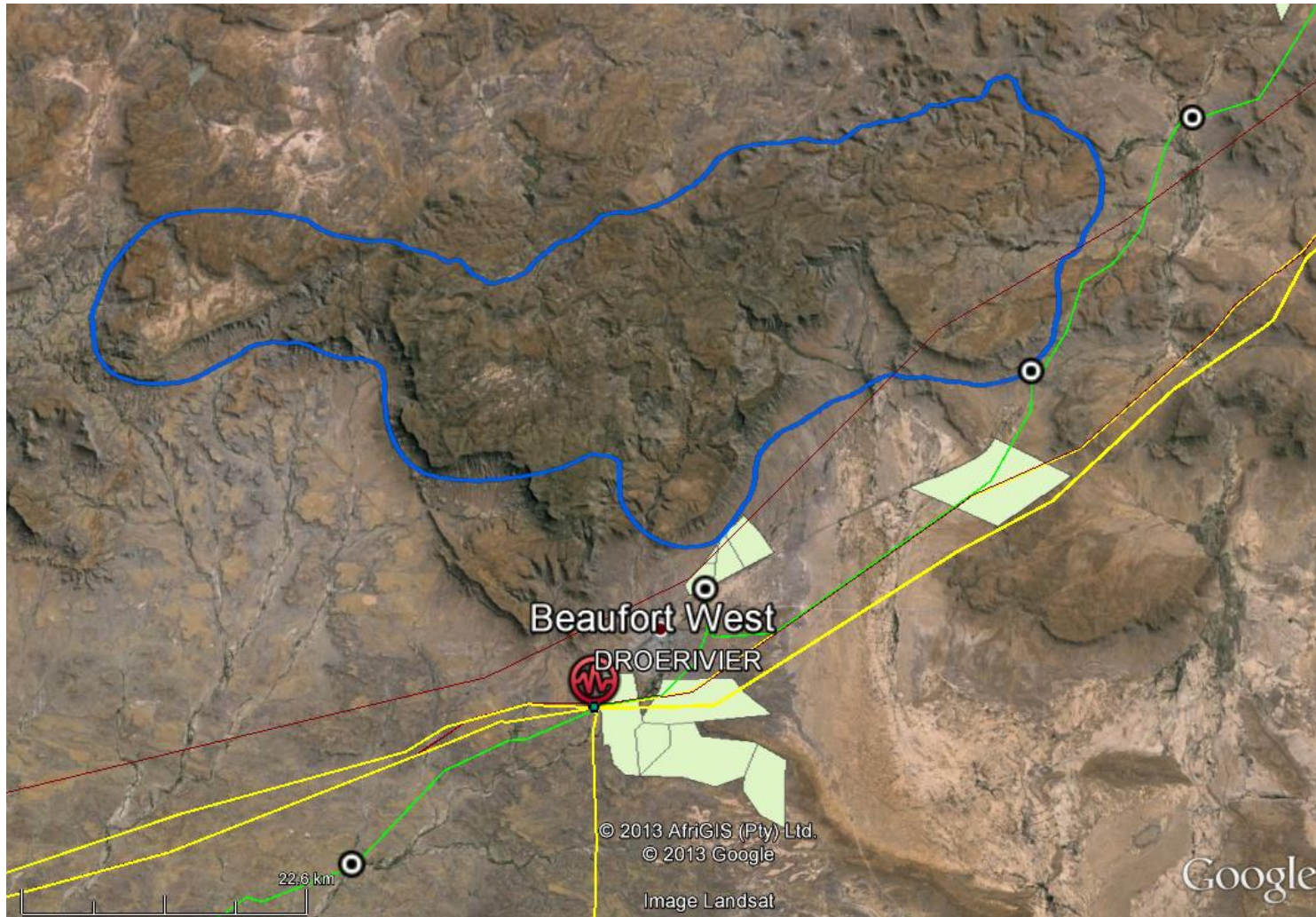
Existing Applications:

1. Beaufort West WEF unknown MW 5 km south (withdrawn/lapsed)
2. Poortjie we WEF 363 MW 35 km east (in process)
3. Nobelsfontein WEF 50 MW 25 km north east



# Wind Study Area 8: Beaufort West

(3: Eskom network)



**Eskom Area Limit: on border of Southern Cape (3318 MW) and Karoo (2398 MW)**

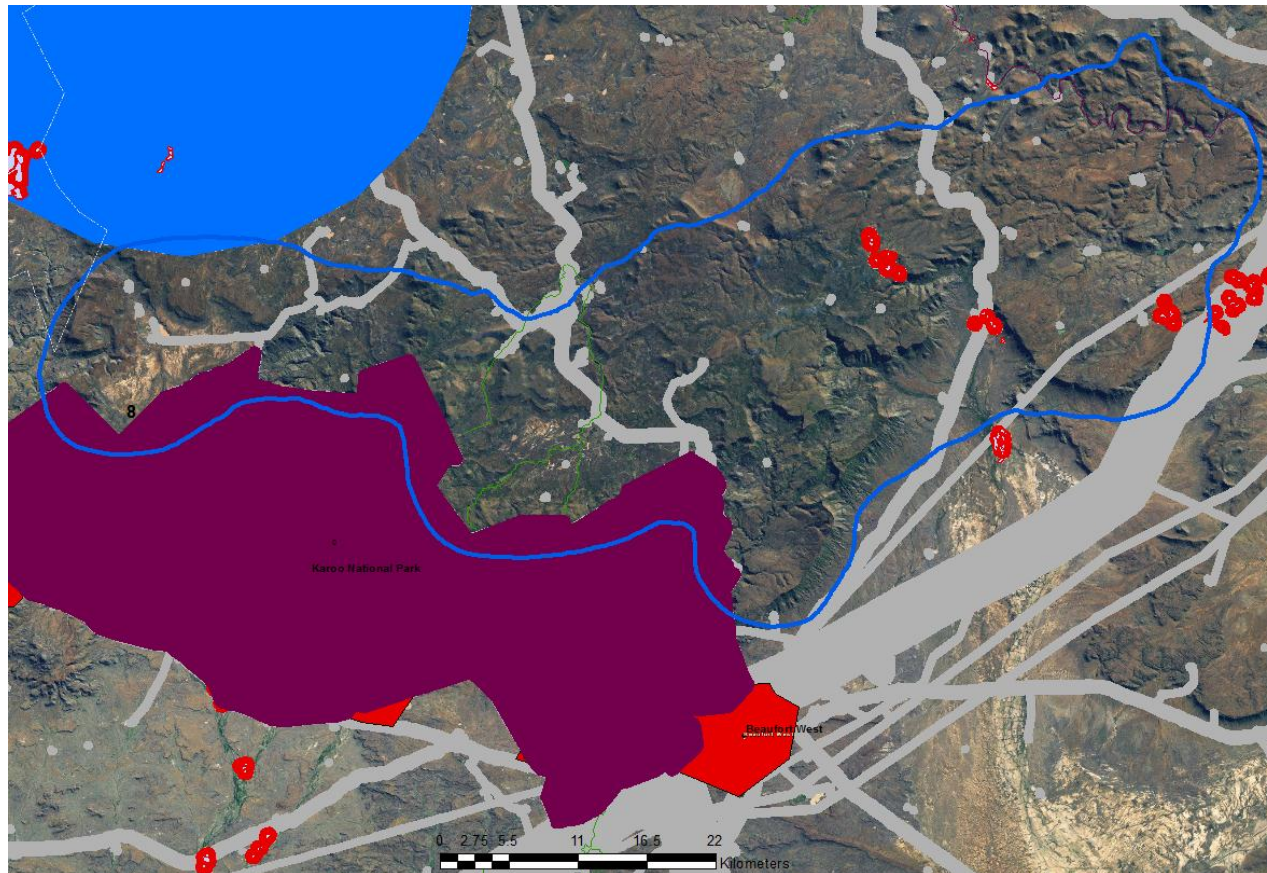
**Nearest Substations:**

1. Droerivier 20 km south (2\*120 MW transformer, 953 MW busbar, 0 MW committed)

**3 \* 132 kV substations <10 km from study area**



# Wind Study Area 8: Beaufort West (4)



## Legend

- Refined Wind Study Areas
- Wind Exclusion Mask
- Protected Areas Buffer 500m
- Irreplaceable CBA Exclusion
- SKA Telescope Site Wind Exclusion Buffer 20km

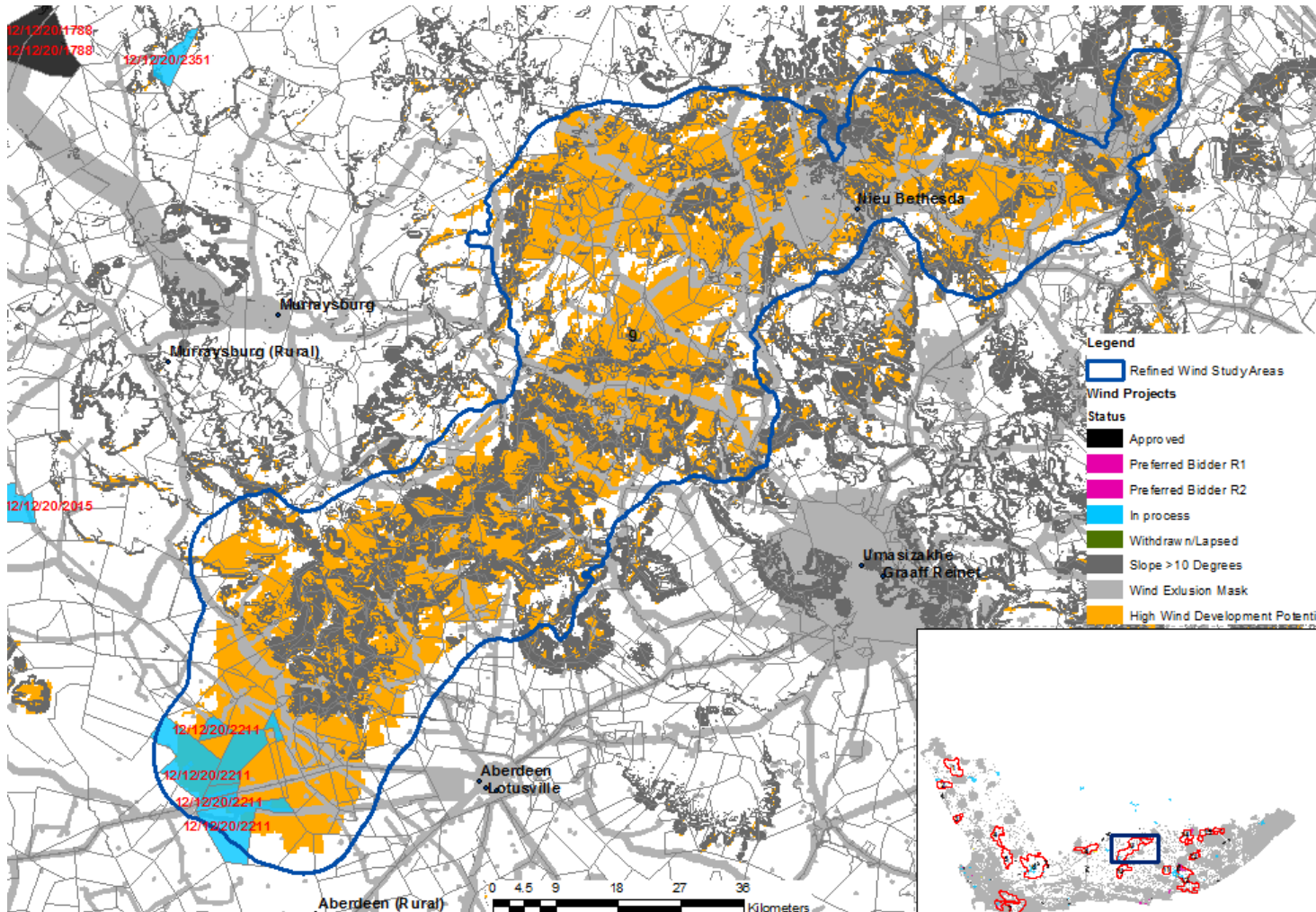
## Key Sensitivities:

1. Beaufort West National Park to SE;
2. SKA telescope site to NW;
3. Irreplaceable CBAs inside



# Wind Study Area 9: Aberdeen/Graaf-Reinet/Murraysburg

(1: Development Potential)



Area: 4095 km<sup>2</sup>

Afri GIS Land Portions: ± 700

Mean power density 100 m above ground level: 493 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 7.03 ms<sup>-1</sup>

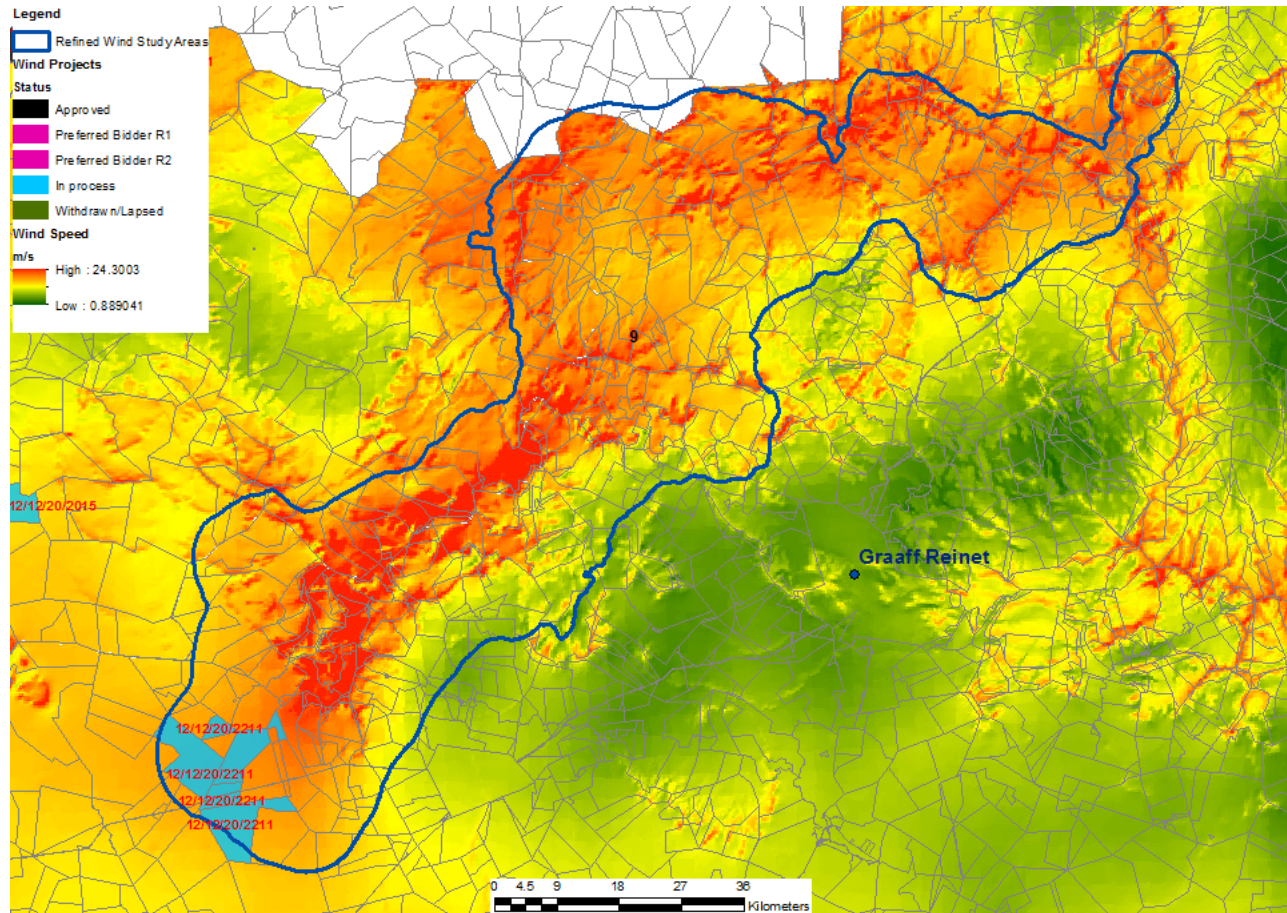


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# Wind Study Area 9: Aberdeen/Graaf-Reinet/Murraysburg

(2: Resource, cadastral & existing applications)



Area: 4095 km<sup>2</sup>

Afri GIS Land Portions: ± 700

Mean power density 100 m above ground level: 493 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 7.03 ms<sup>-1</sup>

Nearest Study Area:

1. Study area 10: Aberdeen/Willowmore 20 km south

Existing Applications:

1. Aberdeen WEF 200 MW in south of study area (in process)
2. Poortjie Wes WEF 363 MW 25 km west (in process)
3. Victoria West Wind & Solar 135 MW 60 km north west (approved)
4. Bakenskop WEF unknown MW 50 km south west (in process)



# Wind Study Area 9: Aberdeen/Graaf-Reinet/Murraysburg

(3: Eskom network)



Eskom Area Limit: Port Elizabeth (3523)

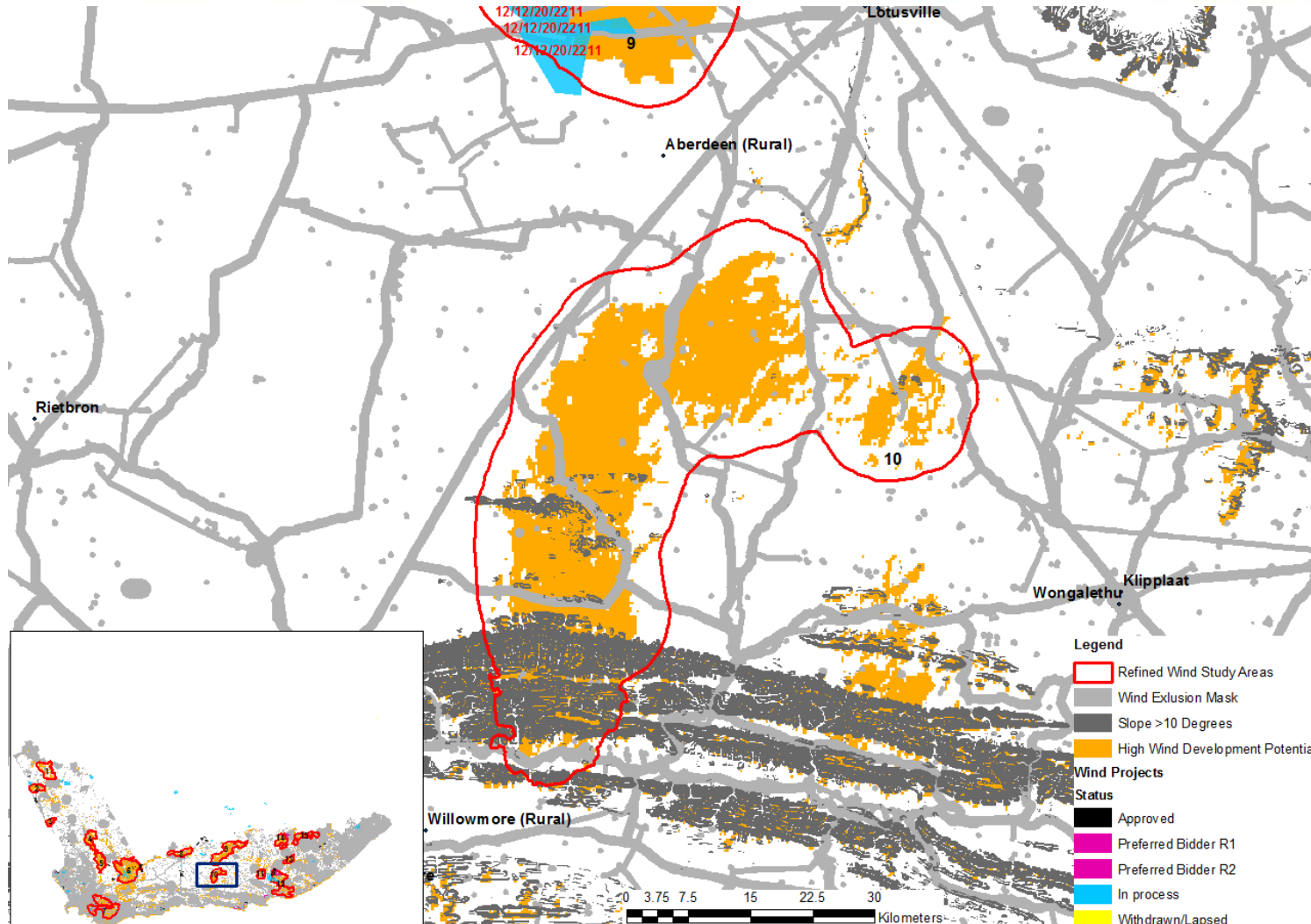
## Nearest Substations:

1. Droerivier 120 km west (2\*120 MW transformer, 953 MW busbar, 0 MW committed)
2. Victoria 80 km NW, but only a series capacitor switch station and not suited for connection;
3. GCCA data for Gamma (80km) & Iziko (30km) not available, Eskom to elaborate;

3\*66 & 2\*132 kV substations  
<40km from study area

# Wind Study Area 10: Aberdeen/Willowmore

(1: Development Potential)



Area: 1342 km<sup>2</sup>

Afri GIS Land  
Portions: ± 180

Mean power  
density 100 m  
above ground level:  
355 Wm<sup>-2</sup>

Mean wind speed  
100 m above ground  
level: 6.45 ms<sup>-1</sup>



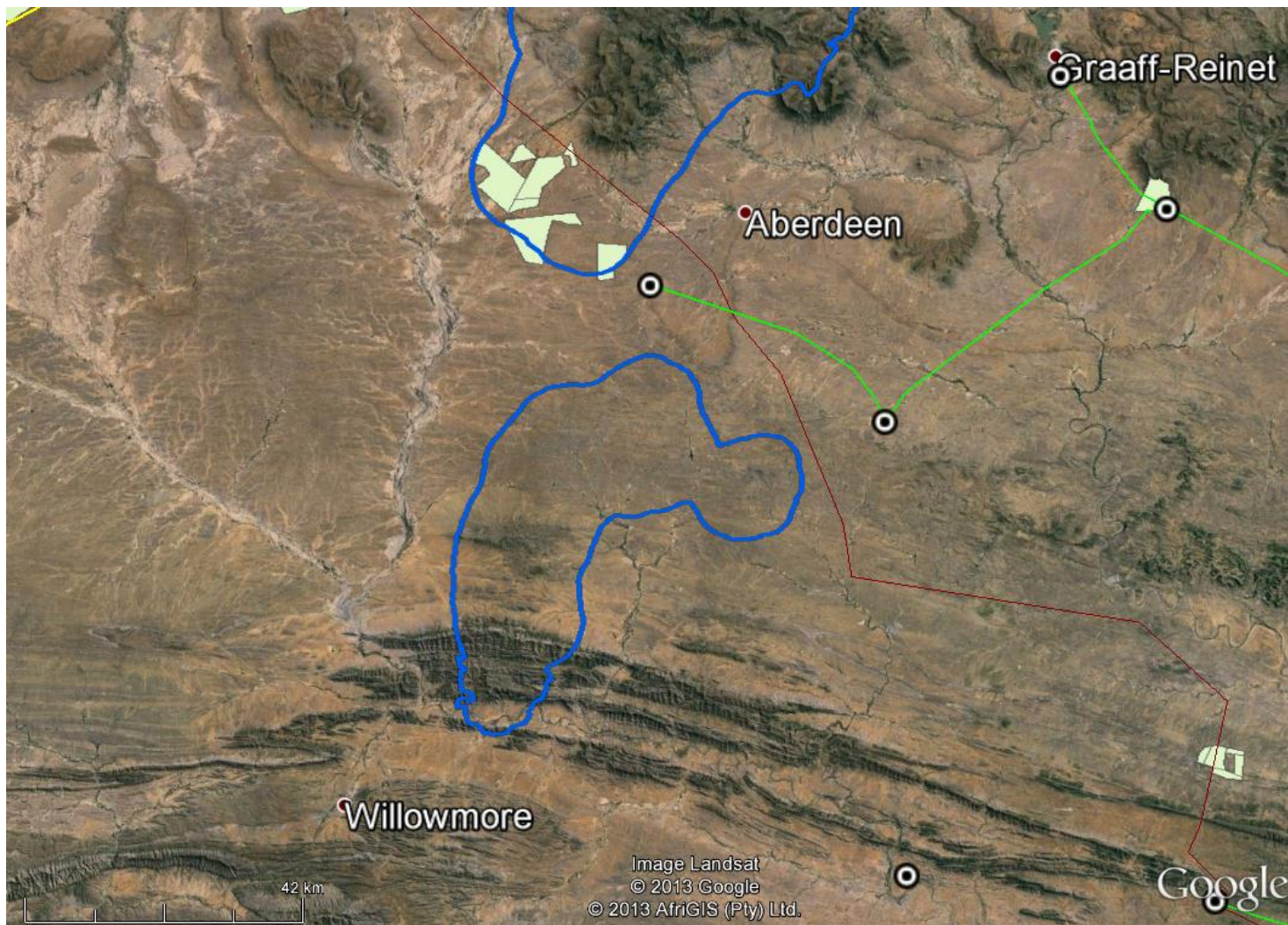
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# Wind Study Area 10: Aberdeen/Willowmore

(3: Eskom network)



Eskom Area Limit: Port Elizabeth (3523)

Nearest Substations:

1. Droerivier 140 km north west (2\*120 MW transformer, 953 MW busbar, 0 MW committed)

2\* 66kv substations <15 km from study area



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



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# Wind Study Area 10: Aberdeen/Willowmore (4)



## Legend

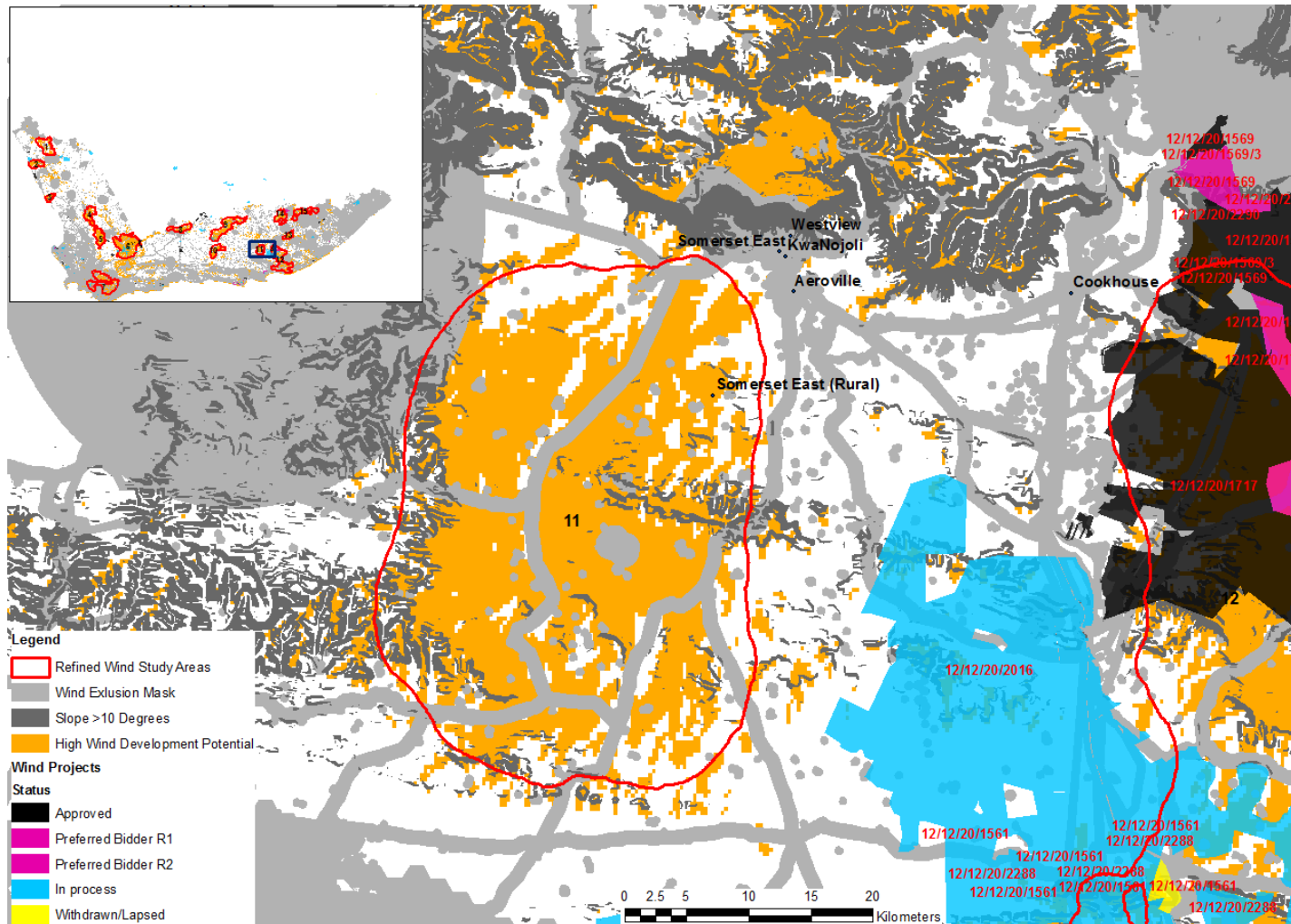
-  Refined Wind Study Areas
-  Wind Exclusion Mask
-  Protected Areas Buffer 500m
-  Irreplaceable CBA Exclusion
-  Major Bat Roosts Buffer 20km\_Wind

## Key Sensitivities:

1. No major sensitivities

# Wind Study Area 11: Somerset East

(1: Development Potential)



Area: **777 km<sup>2</sup>**

Afri GIS Land Portions:  
**± 122**

Mean power density  
100 m above ground  
level: **301 Wm<sup>-2</sup>**

Mean wind speed 100  
m above ground level:  
**6.33 ms<sup>-1</sup>**

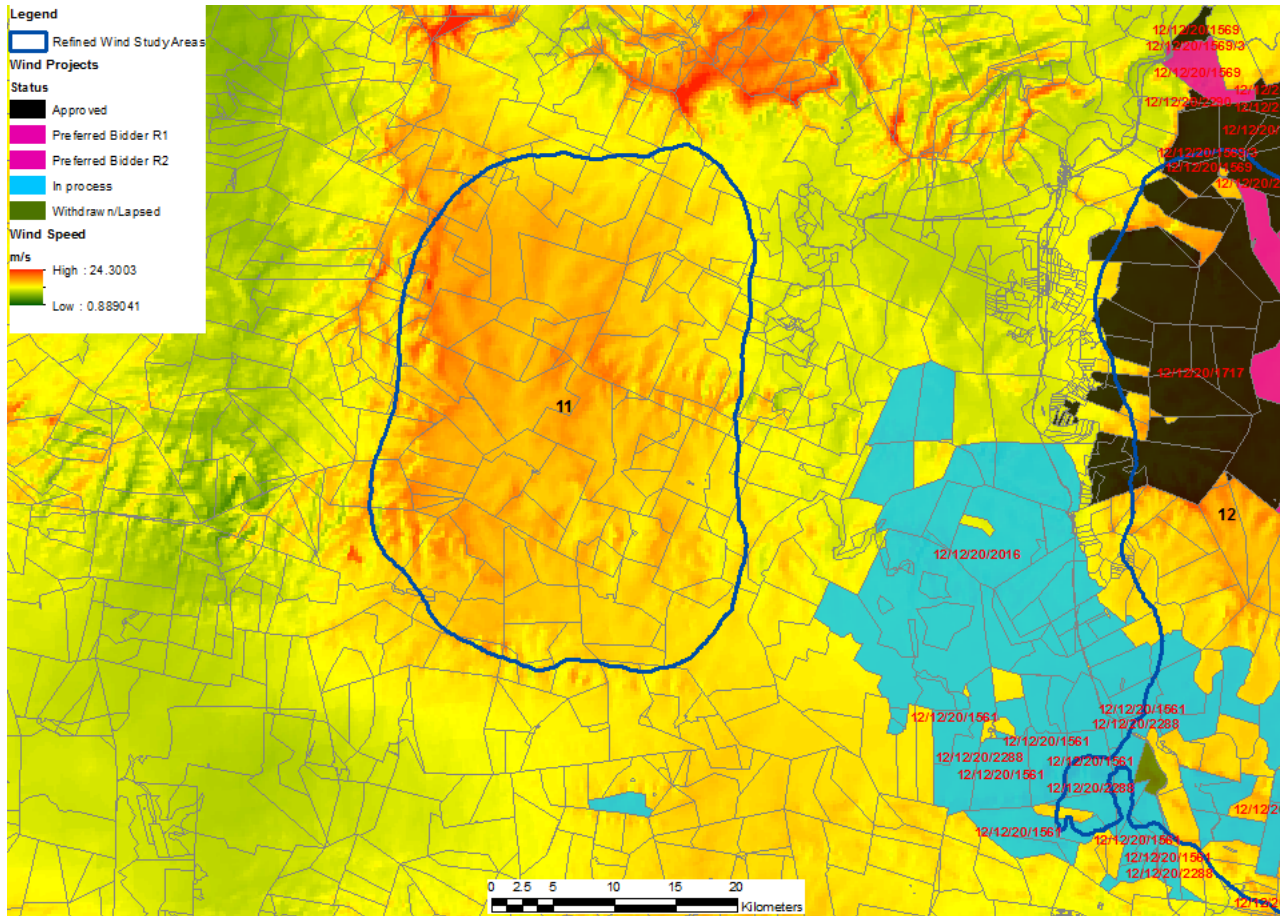


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## Wind Study Area 11: Somerset East (2: Resource, cadastral & existing applications)



**Area: 777 km<sup>2</sup>**

**Afri GIS Land Portions: ± 122**

**Mean power density 100 m above  
ground level: 301 Wm<sup>-2</sup>**

**Mean wind speed 100 m above ground level: 6.33 ms<sup>-1</sup>**

**Nearest Study Area:**

- 1. Study area 12:**  
**Alexandria/Grahamstown/Cook**  
**house 25 km east**

### Existing Applications:

- 1. Terra WEF 30km east 55MW  
(approved)**
- 2. Cookhouse WEF 30 km east 135  
MW (round 1 preferred bidder)**
- 3. Amakhala Emoyeni WEF 138  
MW 30 km east (round 2  
preferred bidder)**
- 4. Riebeeck East WEF 30 km east  
(withdrawn/lapsed)**

# Wind Study Area 11: Somerset East

(3: Eskom network)

Eskom Area Limit: Port Elizabeth (3523)

## Nearest Substations:

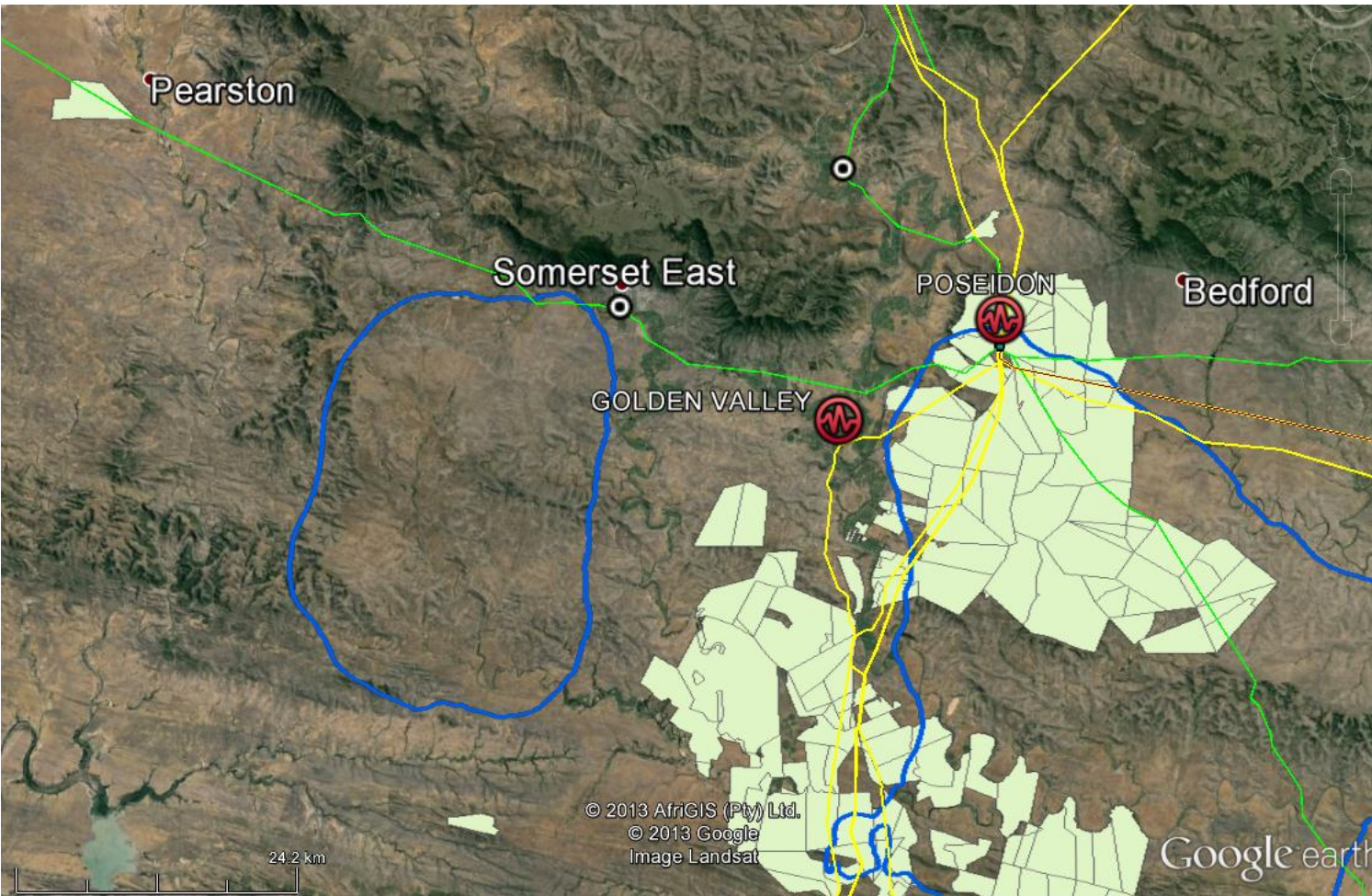
1. Poseidon 40 km east (Poseidon 1\_1: 1\*500 MW transformer, 881 MW busbar, 0 MW committed) (Poseidon 1\_2: 2\*500 MW transformer, 881 MW busbar, 161 MW committed) (Poseidon 2\_1: 2\*125 MW transformers, 329 MW busbar, 0 MW committed) (Poseidon 2\_2 1\*80 & 1\*40 MW transformers, 0 MW busbar, 0 MW committed)
2. Data on Golden Valley substation (20km east) not available in GCCA, Eskom to elaborate.

One 66kV substation on study area boundary



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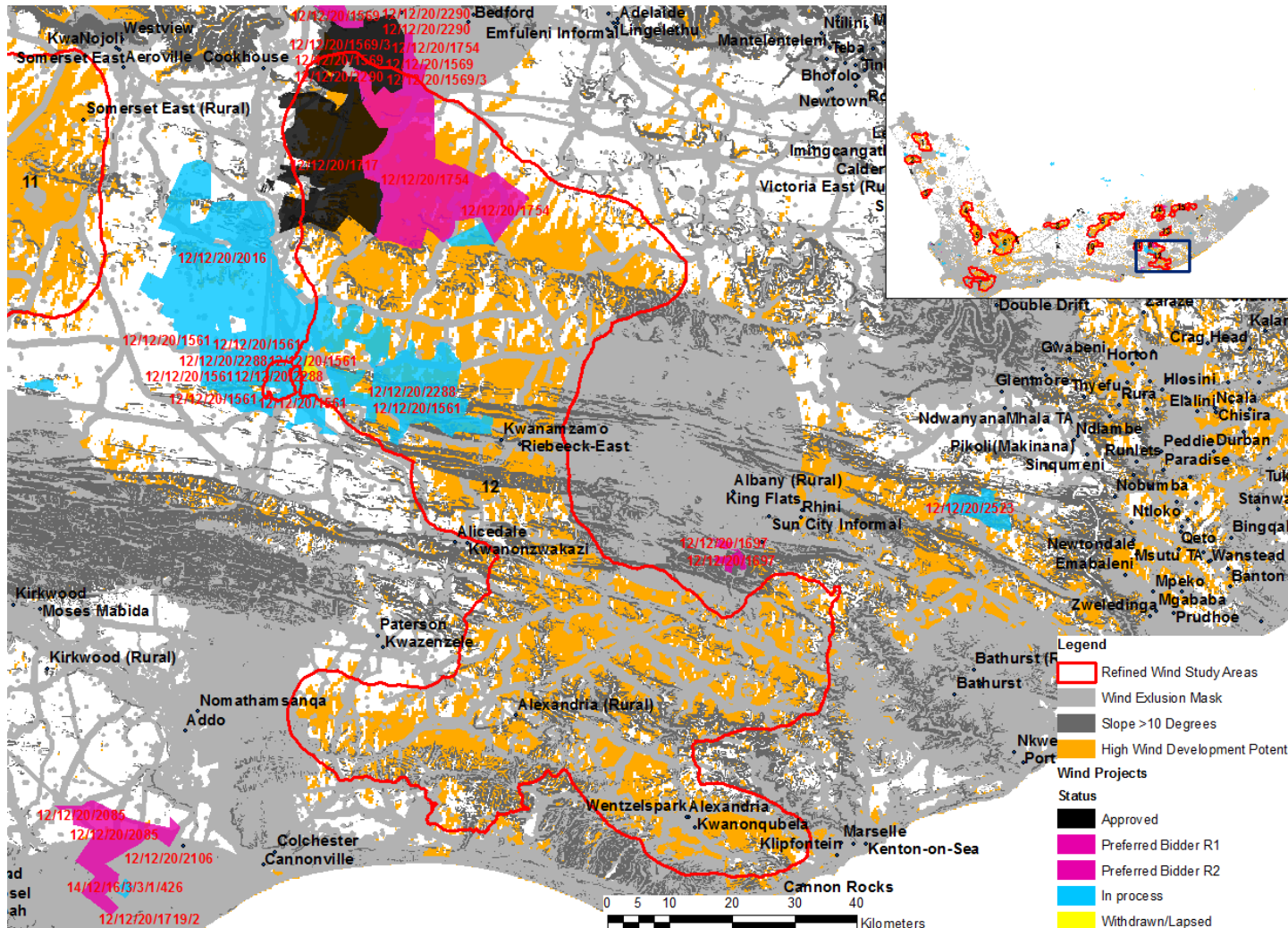
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# Wind Study Area 12: Alexandria/Grahamstown/Cookhouse

(1: Development Potential)



Area: 4000 km<sup>2</sup>

Afri GIS Land Portions:  $\pm$   
1400

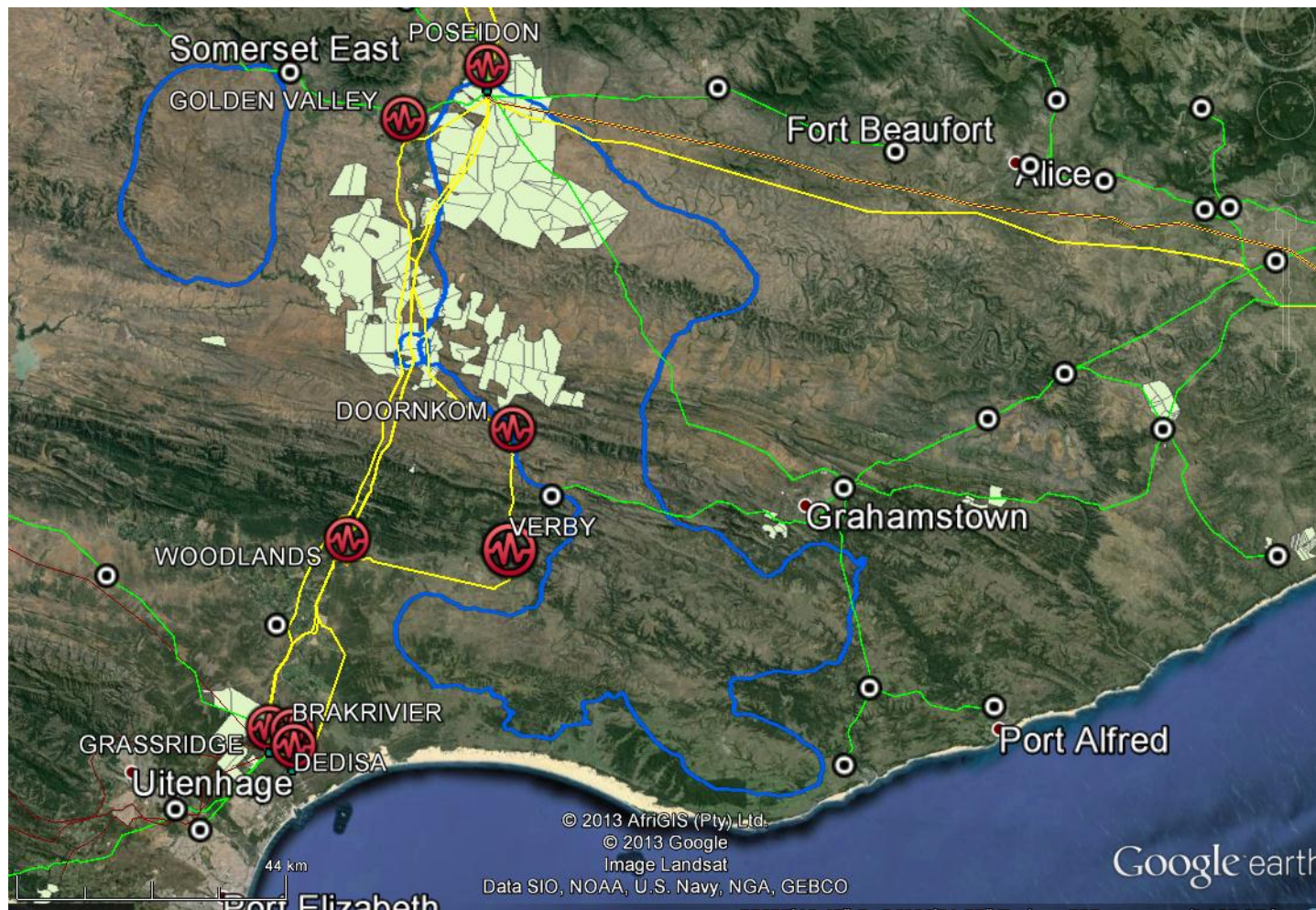
Mean power density 100  
m above ground level: 302  
Wm<sup>-2</sup>

Mean wind speed 100 m  
above ground level: 6.33  
ms<sup>-1</sup>



# Wind Study Area 12: Alexandria/Grahamstown/Cookhouse

## (3: Eskom network)



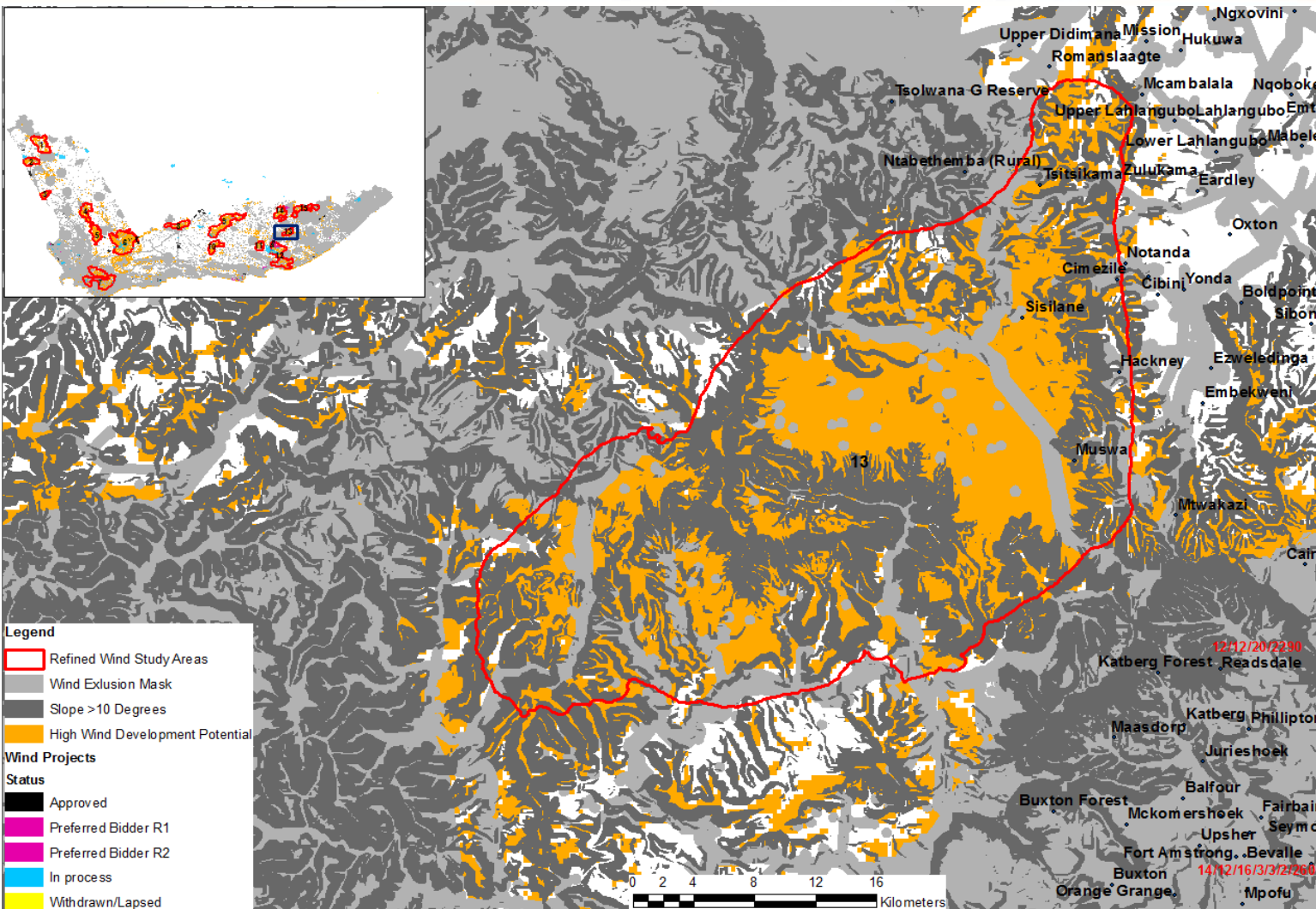
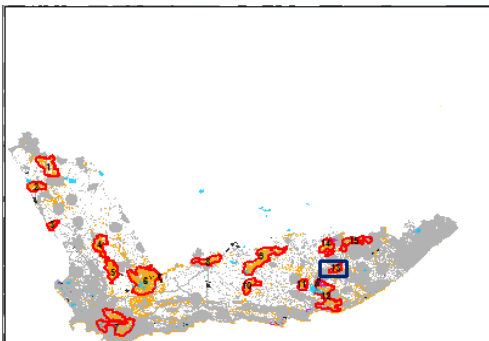
Eskom Area Limit: On border of Port Elizabeth (3523) and East London (3898 MW)

### Nearest Substations:

1. Poseidon in north of study area (Poseidon 1\_1: 1\*500 MW transformer, 881 MW busbar, 0 MW committed) (Poseidon 1\_2: 2\*500 MW transformer, 881 MW busbar, 161 MW committed) (Poseidon 2\_1: 2\*125 MW transformers, 329 MW busbar, 0 MW committed) (Poseidon 2\_2 1\*80 & 1\*40 MW transformers, 0 MW busbar, 0 MW committed)
2. Dedisa 30 km west (2\*500 MW transformers, 797 busbar, 0 MW committed)
3. Grassridge 1: 30 km west (2\*500 MW transformers, 905 MW busbar, 393 MW committed)
4. Grassridge 2: 30 km west, 2\*360 transformers, 413 busbar, 0 MW committed)

# Wind Study Area 13: Central Eastern Cape

(1: Development Potential)

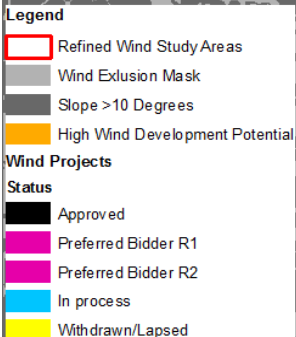


Area: 730 km<sup>2</sup>

Afri GIS Land Portions:  
± 200

Mean power density  
100 m above ground  
level: 514 Wm<sup>-2</sup>

Mean wind speed 100  
m above ground level:  
7.44 ms<sup>-1</sup>

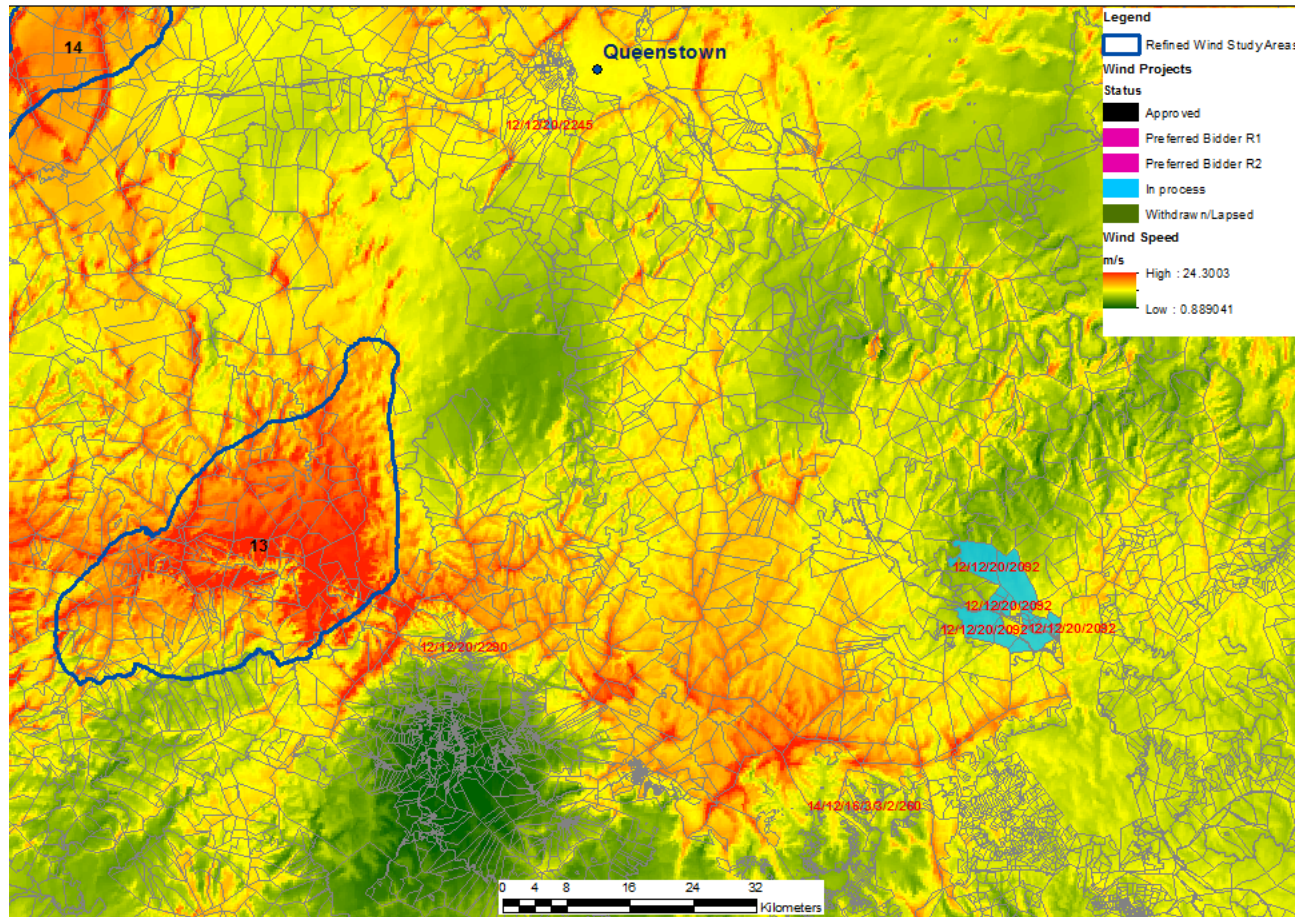


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# Wind Study Area 13: Central Eastern Cape (2: Resource, cadastral & existing applications)



**Area: 730 km<sup>2</sup>**

**Afri GIS Land Portions:  $\pm 200$**

**Mean power density 100 m above ground level: 514 Wm<sup>-2</sup>**

**Mean wind speed 100 m above ground level: 7.44 ms<sup>-1</sup>**

**Nearest Study Area:**

1. Alexandria/Grahamstown/Cookhouse 50 km south
2. Stormberg west 50 km north east

**Existing Applications:**

1. Cathcart's Gift WEF 215 MW 35 km north east (in process)
2. Coochoose II WEF 20 MW 15 km east (approved)
3. Sindiswa WEF unknown MW 70 km east



# Wind Study Area 13: Central Eastern Cape

(3: Eskom network)



**Eskom Area Limit: East London (3898 MW)**

## **Nearest Substations:**

1. Poseidon 50 km south west (Poseidon 1\_1: 1\*500 MW transformer, 881 MW busbar, 0 MW committed) (Poseidon 1\_2: 2\*500 MW transformer, 881 MW busbar, 161 MW committed) (Poseidon 2\_1: 2\*125 MW transformers, 329 MW busbar, 0 MW committed) (Poseidon 2\_2 1\*80 & 1\*40 MW transformers, 0 MW busbar, 0 MW committed)
2. Delphi 30 km north east (2\*120 MW transformers, 967 busbar, 97 MW committed)

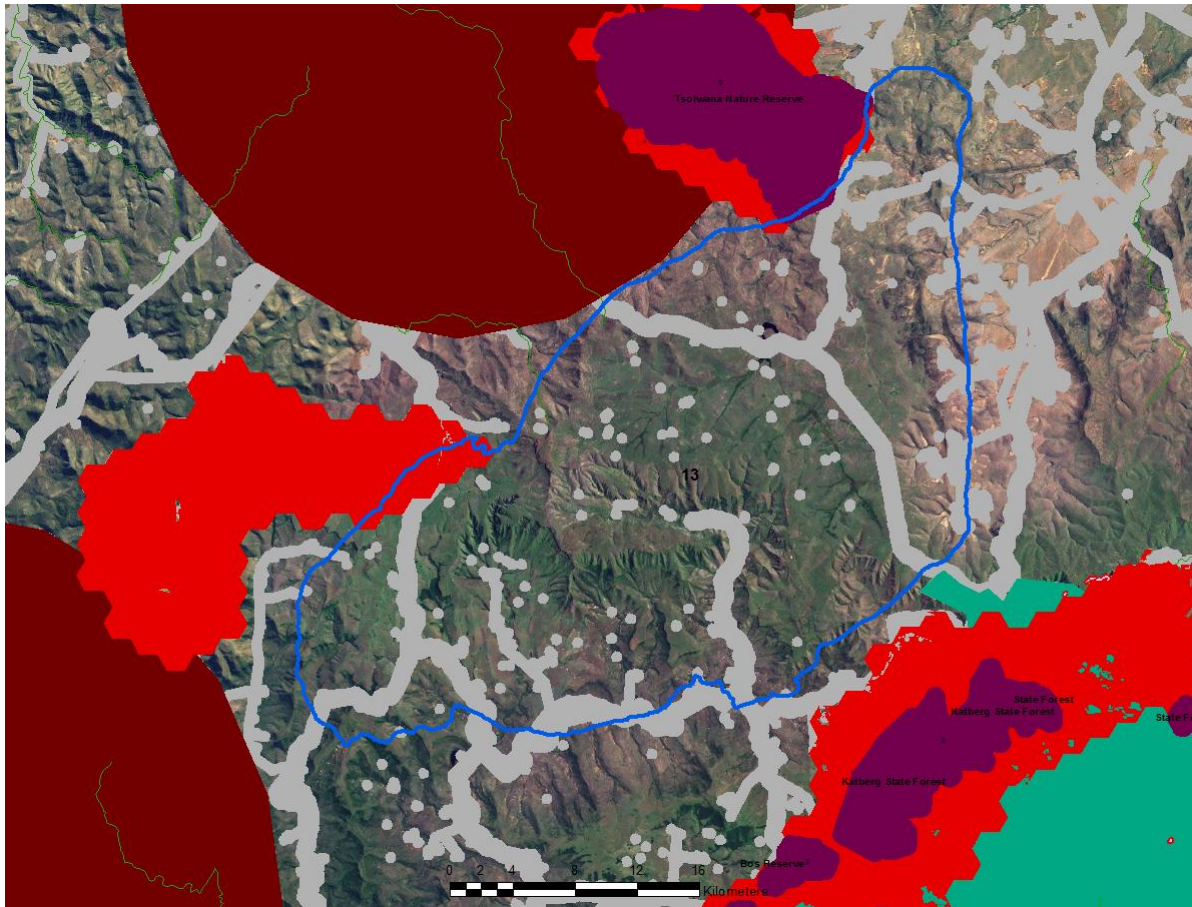
**3\*66kV substations <25km from study area**



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# Wind Study Area 13: Central Eastern Cape (4)



## Legend

- Refined Wind Study Areas
- Wind Exclusion Mask
- Protected Areas Buffer 500m
- Irreplaceable CBA Exclusion
- Major Bat Roosts Buffer 20km\_Wind
- Whole IBA exclusion
- Priority Vulture Colonies Buffer 20km

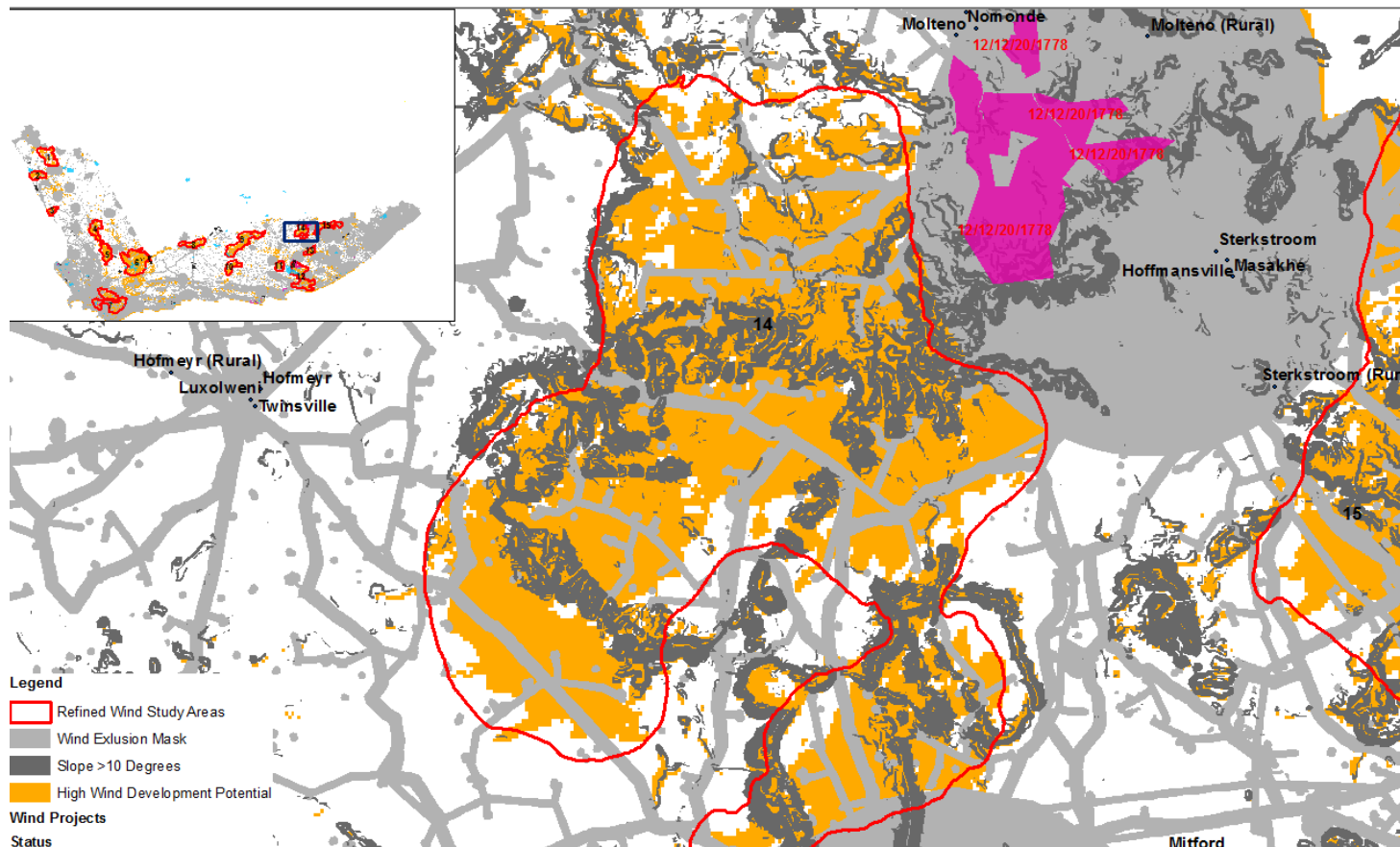
## Key Sensitivities:

1. Tsolwana Nature Reserve to North;
2. Priority Vulture Colonies to north and south west; and
3. Katberg state forest to south east.



# Wind Study Area 14: Stormberg West

(1: Development Potential)



Area: 1521 km<sup>2</sup>

Afri GIS Land Portions:  $\pm 380$

Mean power density 100 m  
above ground level:  $373 \text{ Wm}^{-2}$

Mean wind speed 100 m above  
ground level:  $7.31 \text{ ms}^{-1}$

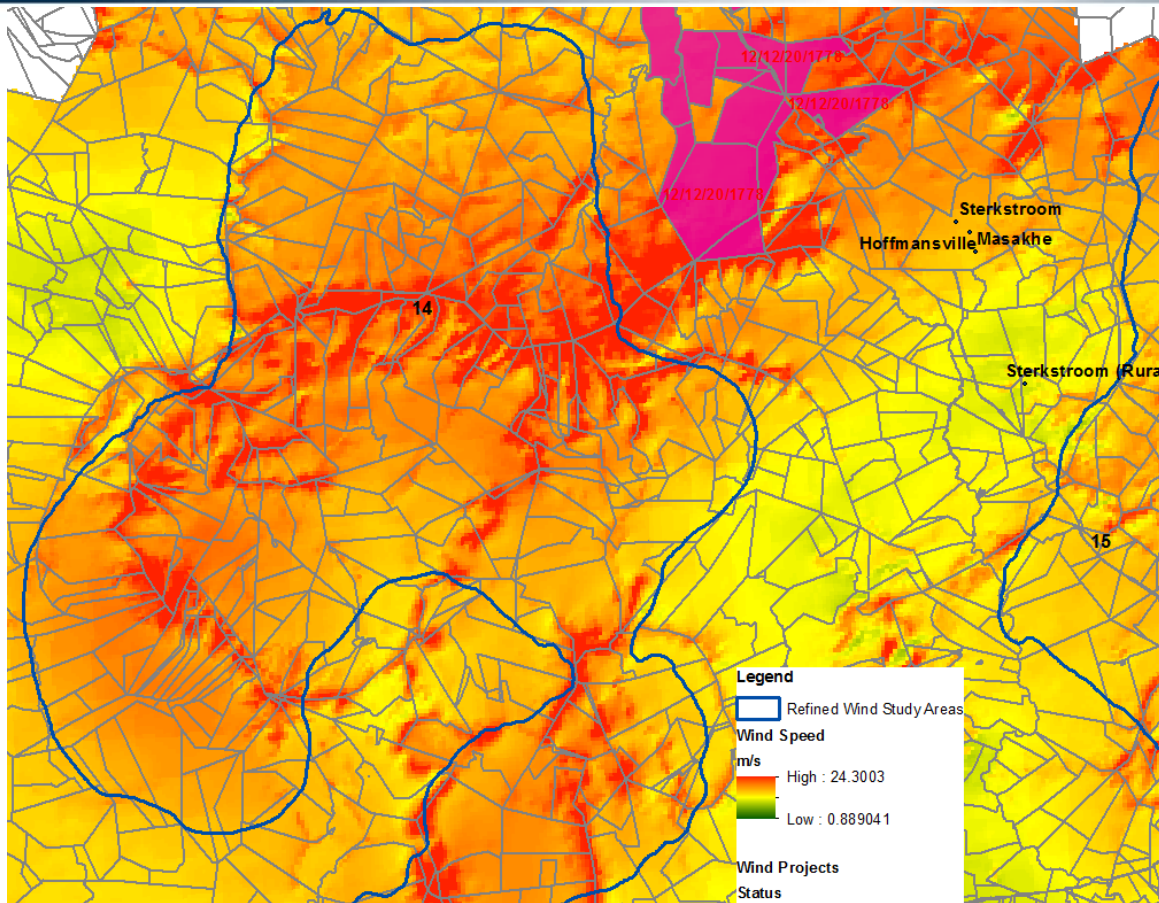


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# Study Area 14: Stormberg West (2: Resource, cadastral & existing applications)



Area: 1521 km<sup>2</sup>

Afri GIS Land Portions: ± 380

Mean power density 100 m above ground level: 373 Wm<sup>-2</sup>

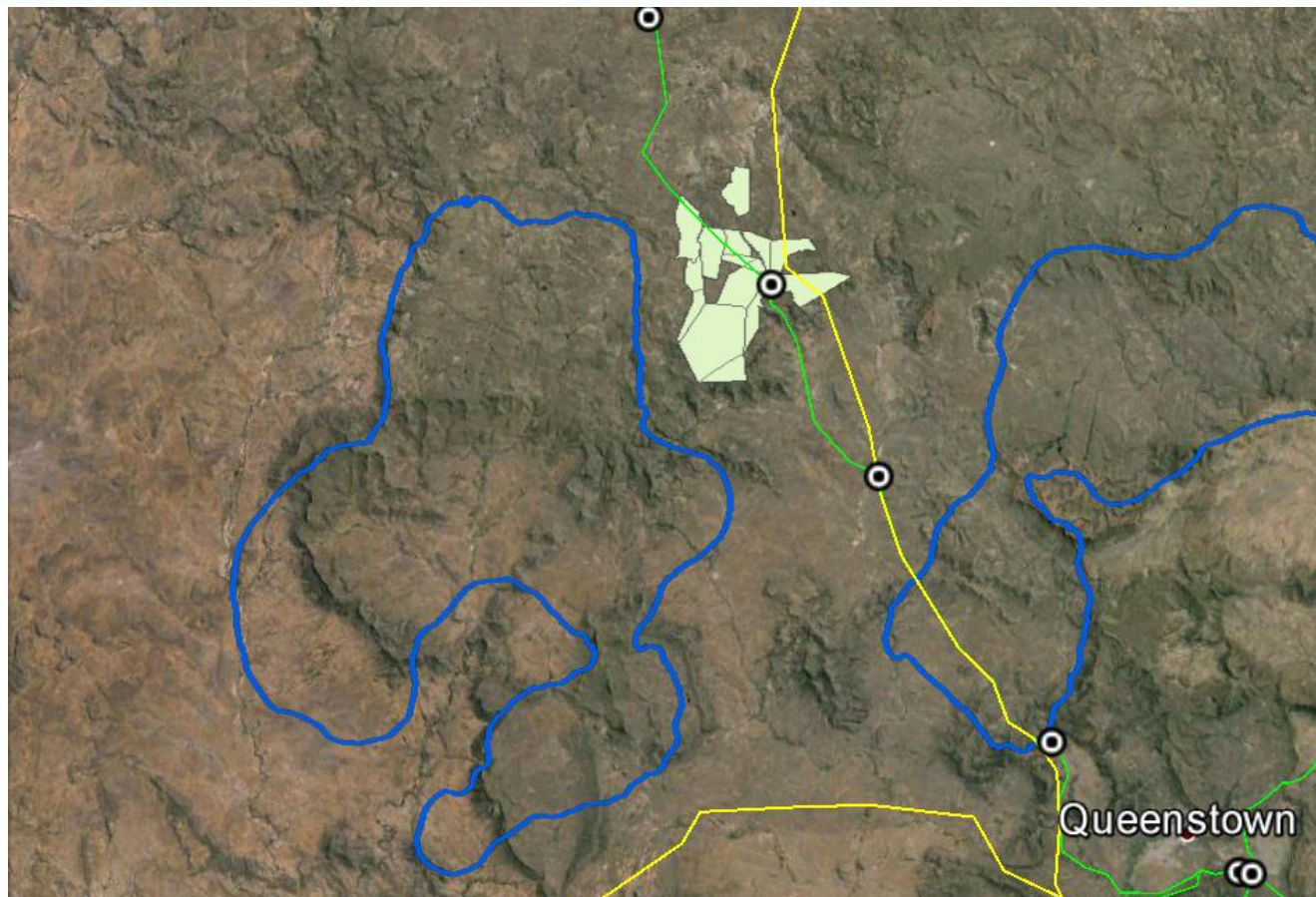
Mean wind speed 100 m above ground level: 7.31 ms<sup>-1</sup>

Nearest Study Area: Stormberg East 25 km east

Existing Applications: Dorper WEF 97MW 5 km to north east (preferred bidder round 1)

# Wind Study Area 14: Stormberg West

(3: Eskom network)



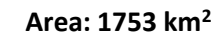
**Eskom Area Limit:** On border of Port Elizabeth (3523), East London (3898 MW) and Karoo (2398 MW)

**Nearest Substations:**

1. Delphi 50 km south east (2\*120 MW transformers, 967 busbar, 97 MW committed)

**3\*132kV substations <20km from study area**

### (1: Development Potential)



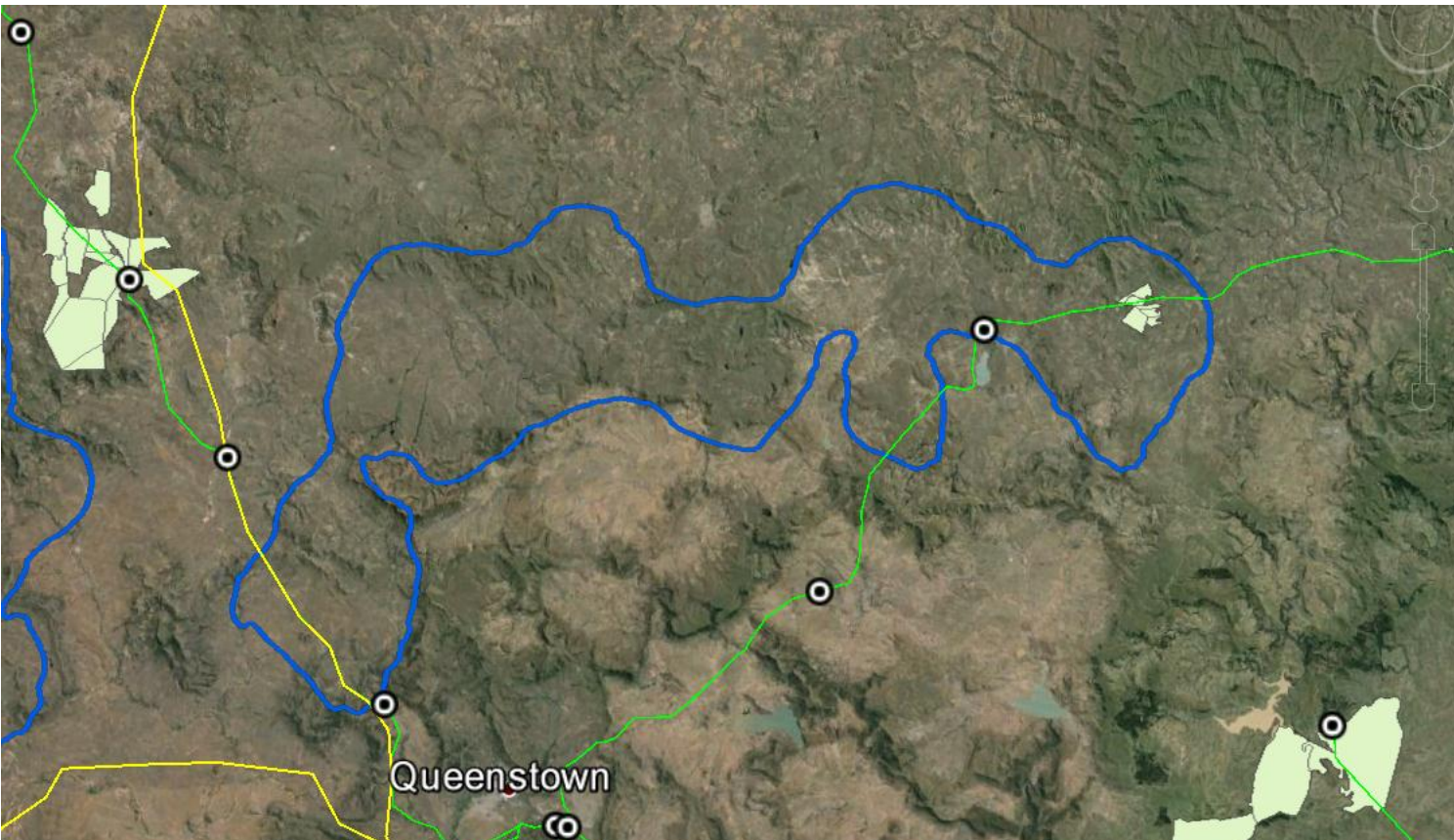
Mean power density 100 m  
above ground level: 477 Wm<sup>-2</sup>

Mean wind speed 100 m above ground level: 7.4 m.s<sup>-1</sup>



# Wind Study Area 15: Stormberg East

(3: Eskom network)



**Eskom Area Limit:** On border of Port Elizabeth (3523), East London (3898 MW) and Karoo (2398 MW)

## **Nearest Substations:**

1. Delphi 50 km south east (2\*120 MW transformers, 967 busbar, 97 MW committed)

**3\*132kV and 2\*66kV Substations <20km from study area**

# Wind Study Areas Summary

Number	Name	Area (km <sup>2</sup> )	Land Portions (indicative)	Mean Power Density (Wm <sup>-2</sup> )	Mean Wind Speed (ms <sup>-1</sup> )	Nearest Transmission Substation
1	Steinkopf	2731	624	186	5.72	Nama (23 km)
2	Kleinzee	1315	80	197	5.9	Gromis (5km)
3	Lepelsfontein	668	77	194	5.9	Juno (90 km)
4	Nieuwoudtville	1826	320	192	6.1	Juno (70km)
5	Tankwa Karoo	1972	174	290	6.1	Kappa (60 km)
6	Sutherland	5903	385	404	6.7	Kappa (35 km)
7	Beede River Valley/Overberg	4600	2900	532	6.9	Bacchus (in study area)
8	Beaufort West	1516	131	377	6.6	Droerivier (20 km)
9	Aberdeen/Graaf-Reinet/Murraysburg	4095	700	493	7	Droerivier (120 km)
10	Aberdeen/Willowmore	1342	180	355	6.45	Droerivier (140 km)
11	Somerset East	777	122	301	6.33	Poseidon (40 km)
12	Alexandria/Grahamstown/ Cookhouse	4000	1400	302	6.33	Poseidon (in study area)
13	Central Eastern Cape	730	200	514	7.44	Delphi (30 km)
14	Stormberg West	1521	380	373	7.31	Delphi (50 km)
15	Stormberg East	1753	740	477	7.4	Delphi (50 km)

# Solar PV Study Areas

## DEA National Solar PV SEA

To facilitate the efficient and effective rollout of solar PV energy in SA



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


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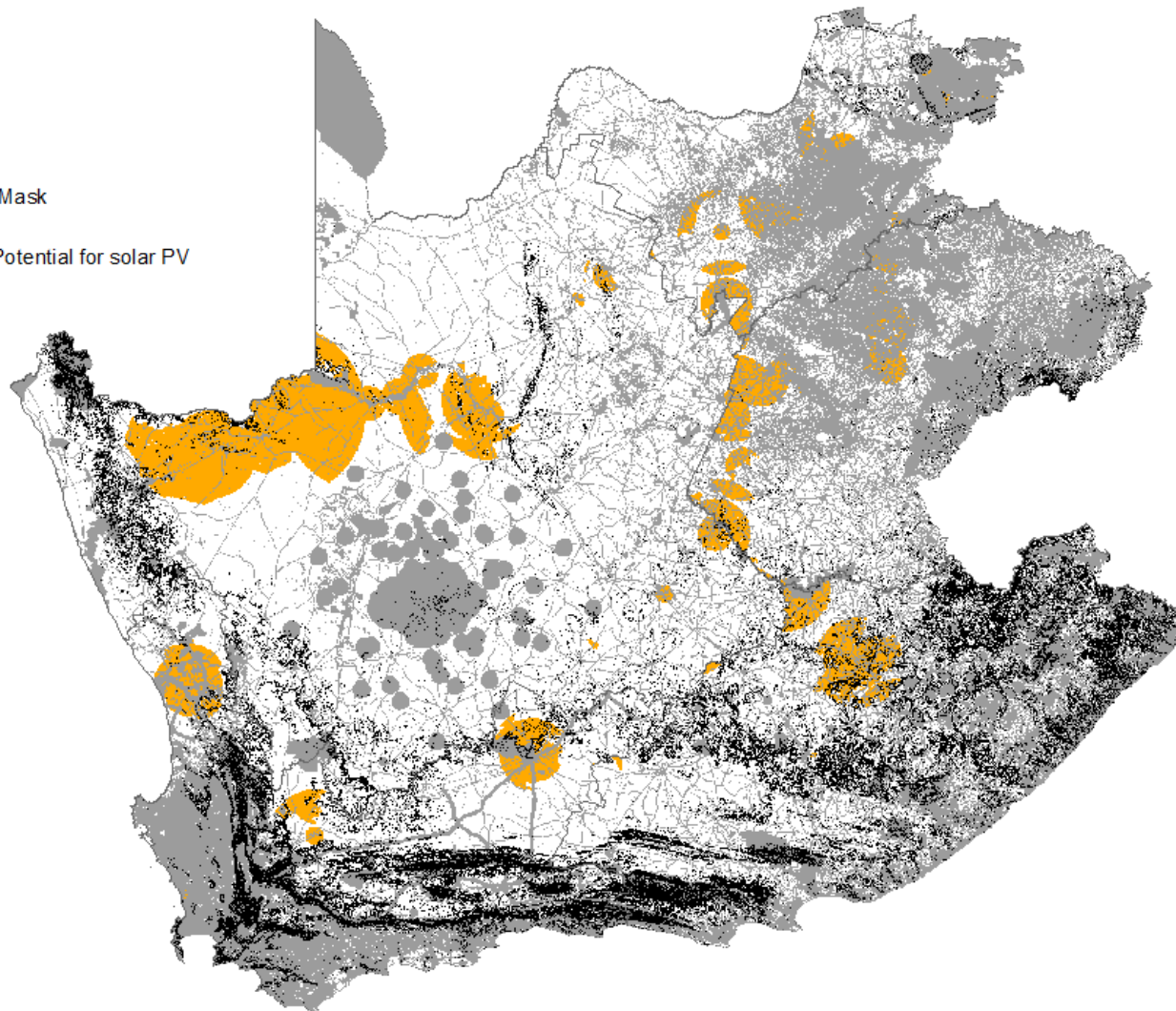
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# High Development Potential with Exclusion Mask

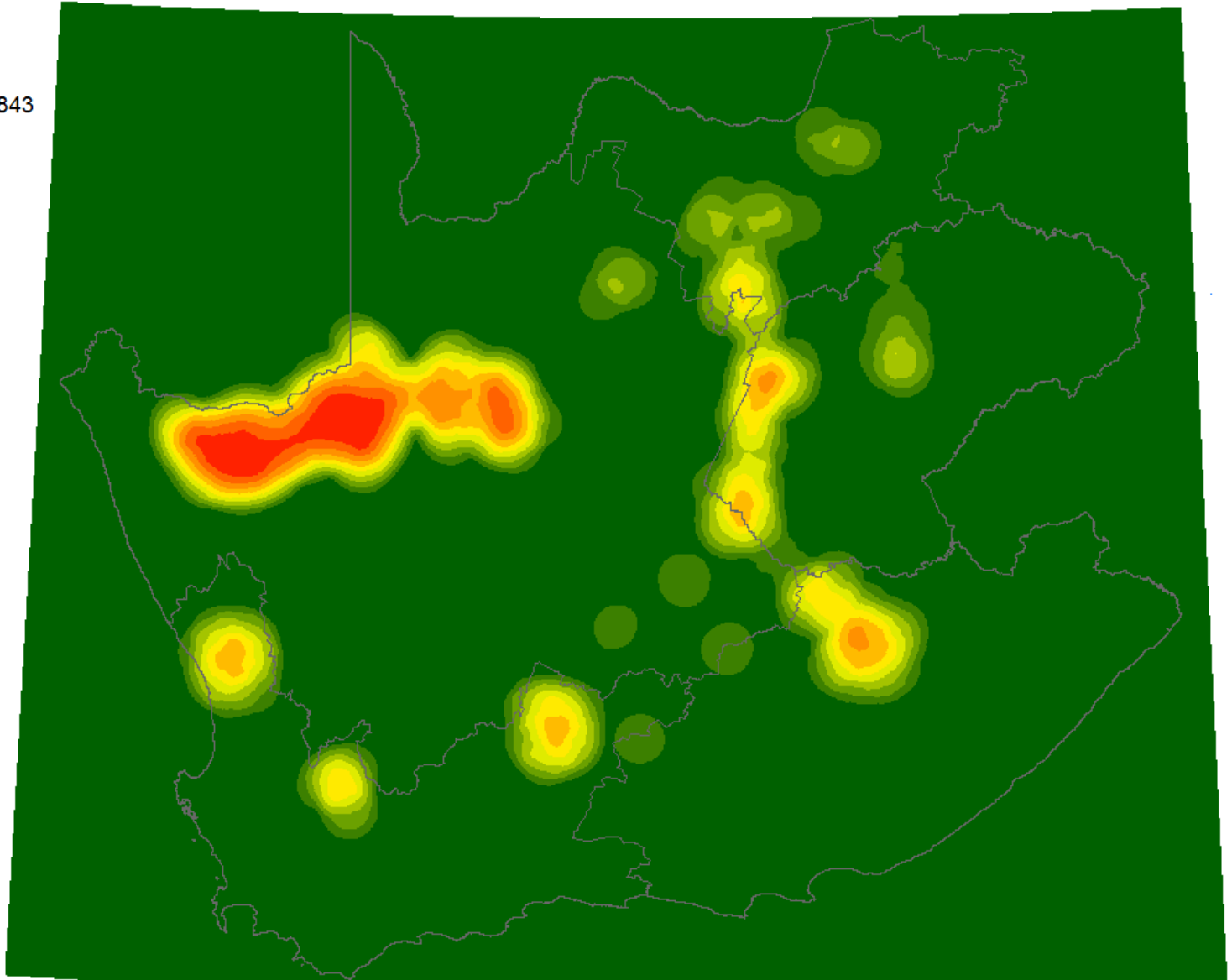
## Legend

-  Slope >10 Degrees
-  Solar PV Exclusion Mask
-  High Development Potential for solar PV

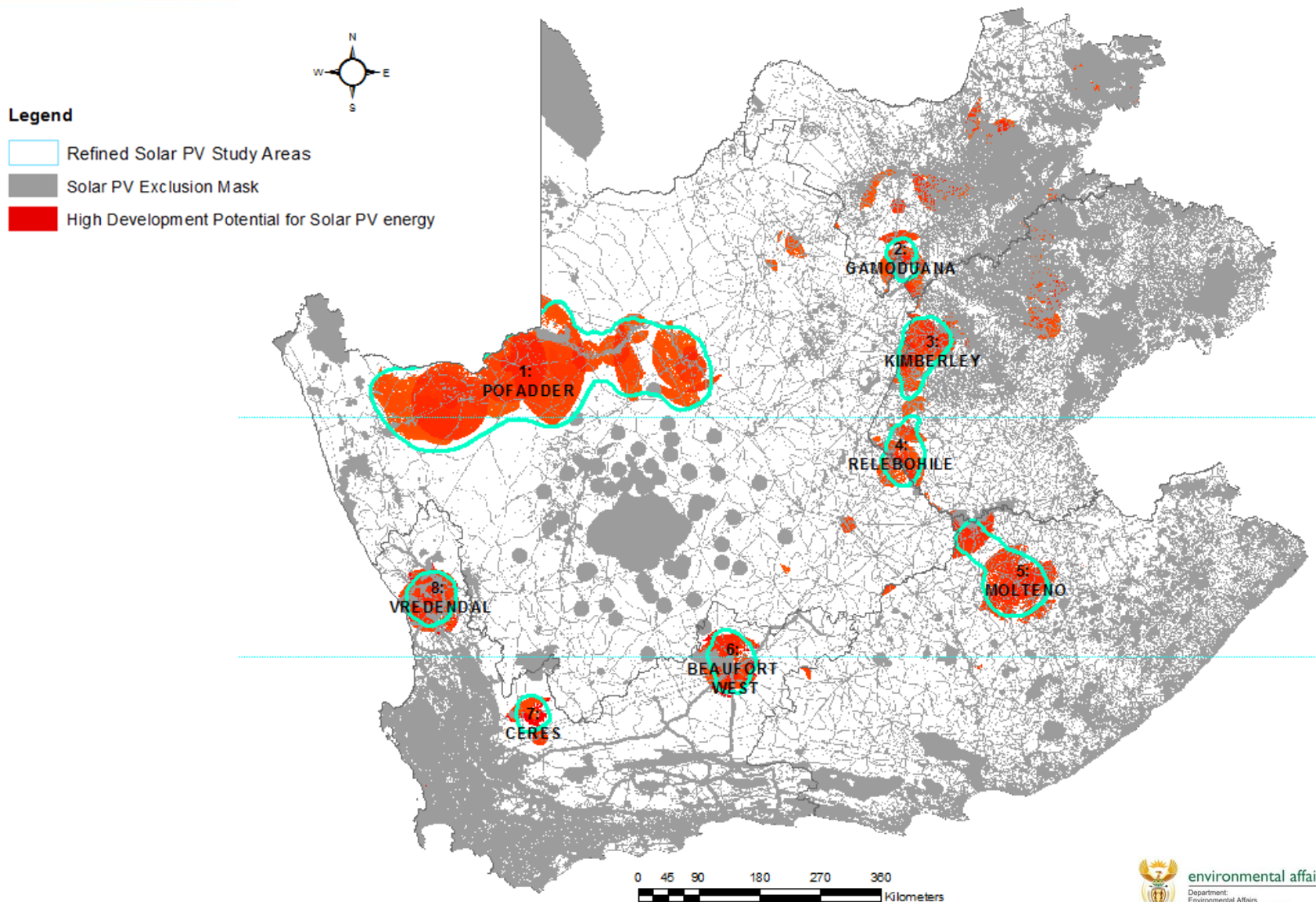


# 30km Radius Cluster Analysis

Value  
High : 13.8843  
Low : 0



# Study Areas (8) Boundary Refinement – 30 km radius point density



Produced: 22/07/2013







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# Solar PV Study Area 1: Pofadder (1: Development Potential)

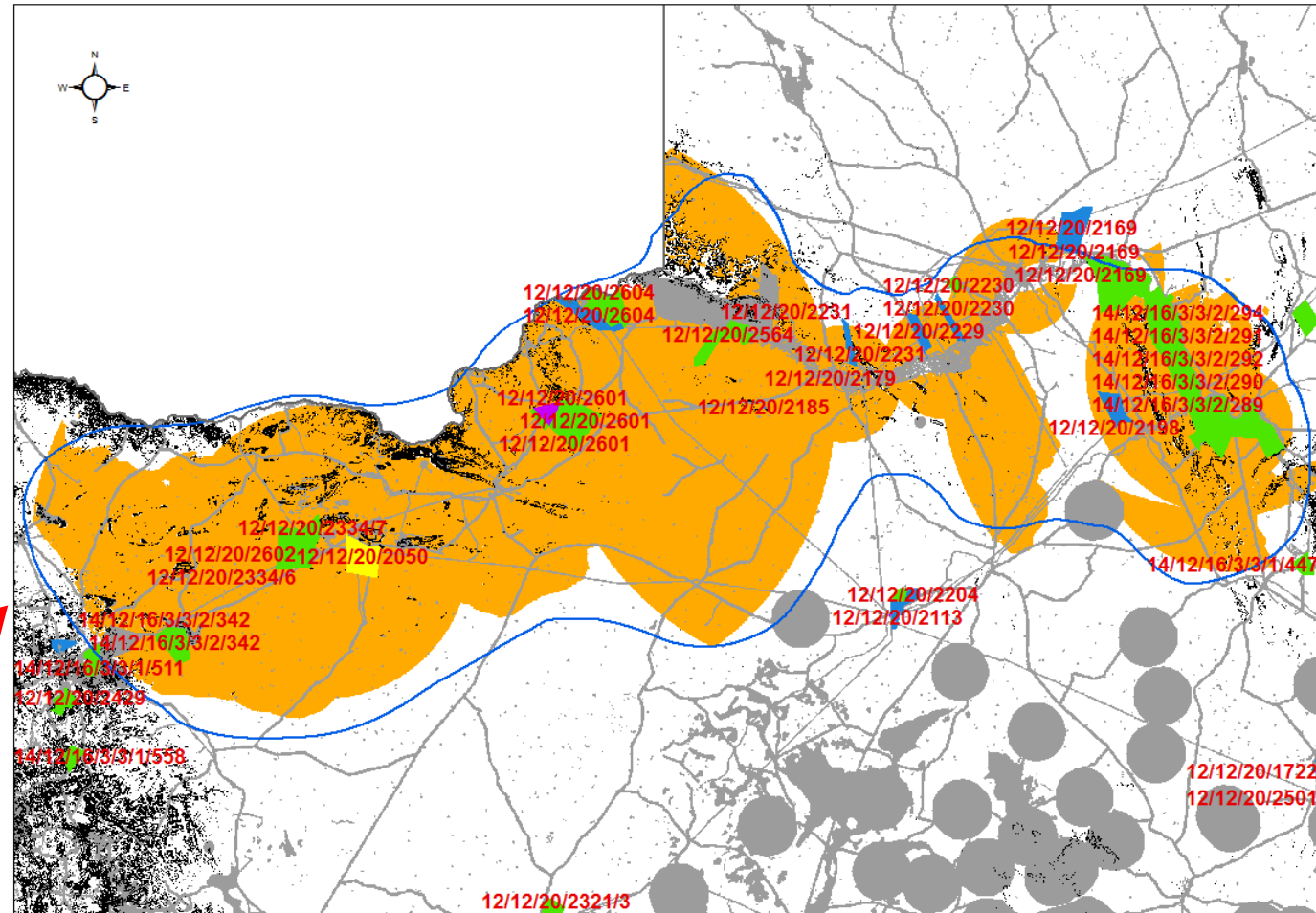
## Legend

-  Study Areas
-  Slope >10 Degrees
-  Solar PV Exclusion Mask
-  High Development Potential for solar PV

## Solar EIA Applications

### Applications Status

-  Approved
-  Preferred Bidder Round 1
-  Preferred Bidder Round 2
-  In progress
-  Withdrawn/Lapsed



## Existing application (up to Dec 2012) inside study area:

- 1 Preferred Bidder R1
- 2 Withdrawn/Lapsed
- 27 Approved
- 33 In progress

# Solar PV Study Area 1: Pofadder (2: Resource, cadastral & existing applications)

Area: 44175 km<sup>2</sup>

Afri GIS Land Portions (within 300 m of Boundary): 3824

Mean solar resource: 2253kWh.m-2

## Legend

Global Horizontal Irradiation (GHI)

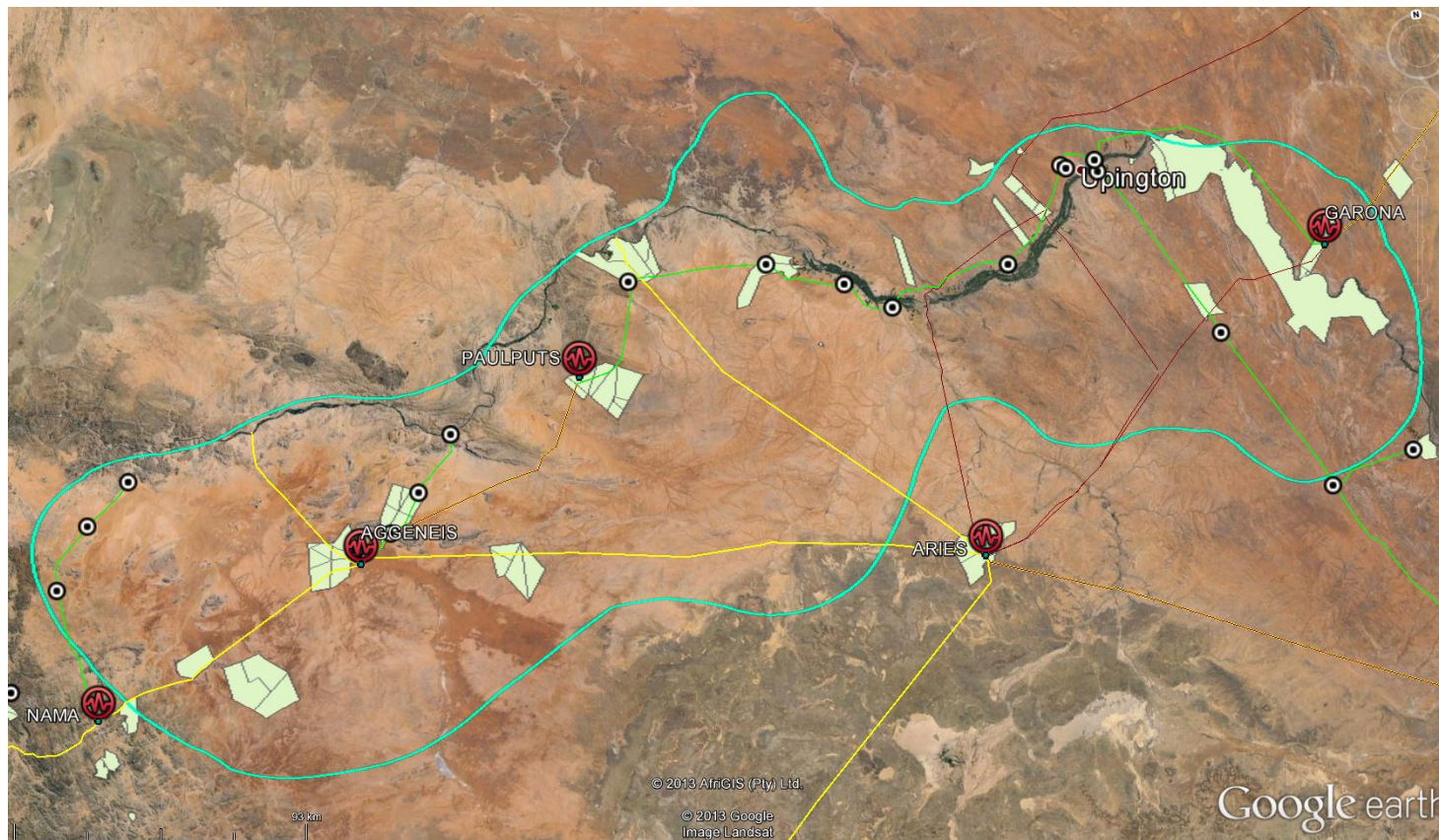
GHI value [kWh/m<sup>2</sup>]

High : 2310

Low : 1593



# Solar PV Study Area 1: Pofadder (3: Eskom network)



## Tx Substations inside study area (GCCArev1):

1. Paulputs (1x125 MW transformers, 33 MW busbar, 120 MW committed)
2. Garona (1x125 MW transformers, 44 MW busbar, 109 MW committed)
3. Aggeneis 1 (2x315 MW transformers, 121 MW busbar, 0 MW committed)
4. Aggeneis 2 (2x80 MW transformers, 98 MW busbar, 0 MW committed)

## Tx Substations near study area (GCCArev1):

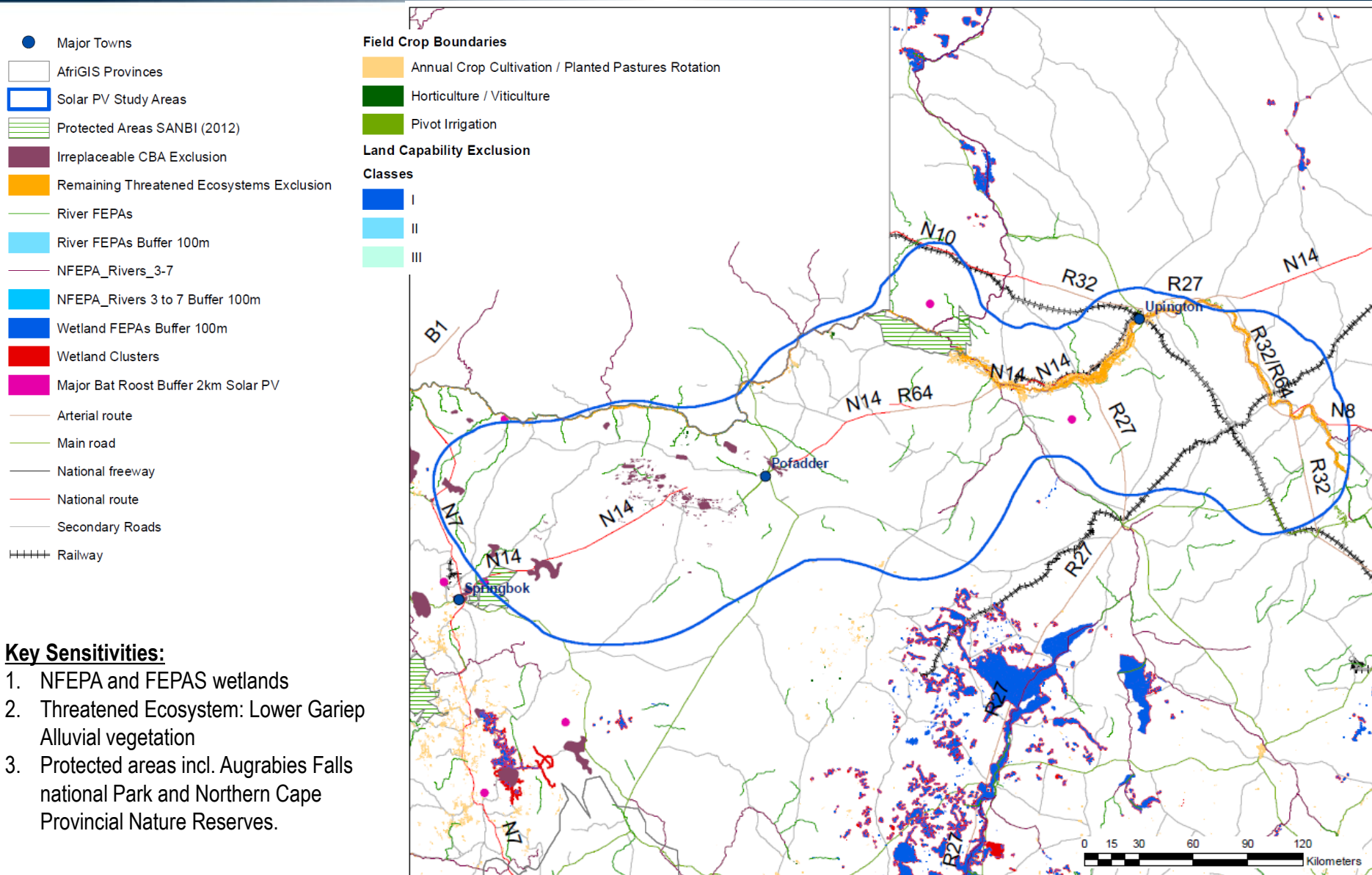
1. Aries 30 km south (1x10 MW transformers, 116 MW busbar, 10 MW committed)
2. Nama 30 km south (2x80 MW transformers, 37 MW busbar, 0 MW committed)

**Generator Tx Zones:** CAPE ZONE (+2.9%) + KAROO ZONE (+0.5%)

**Eskom Area Limit:** Namaqualand [Stability Limit: 1235 MW]



# Solar PV Study Area 1: Pofadder (4: Key environmental sensitivities)












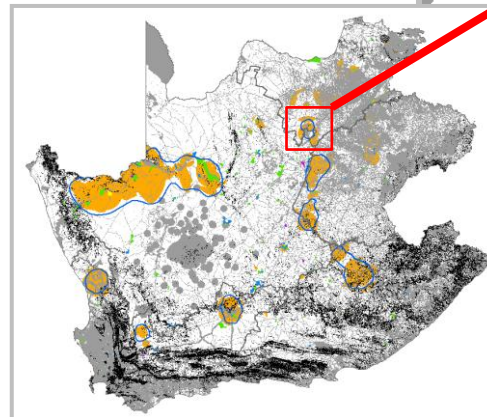
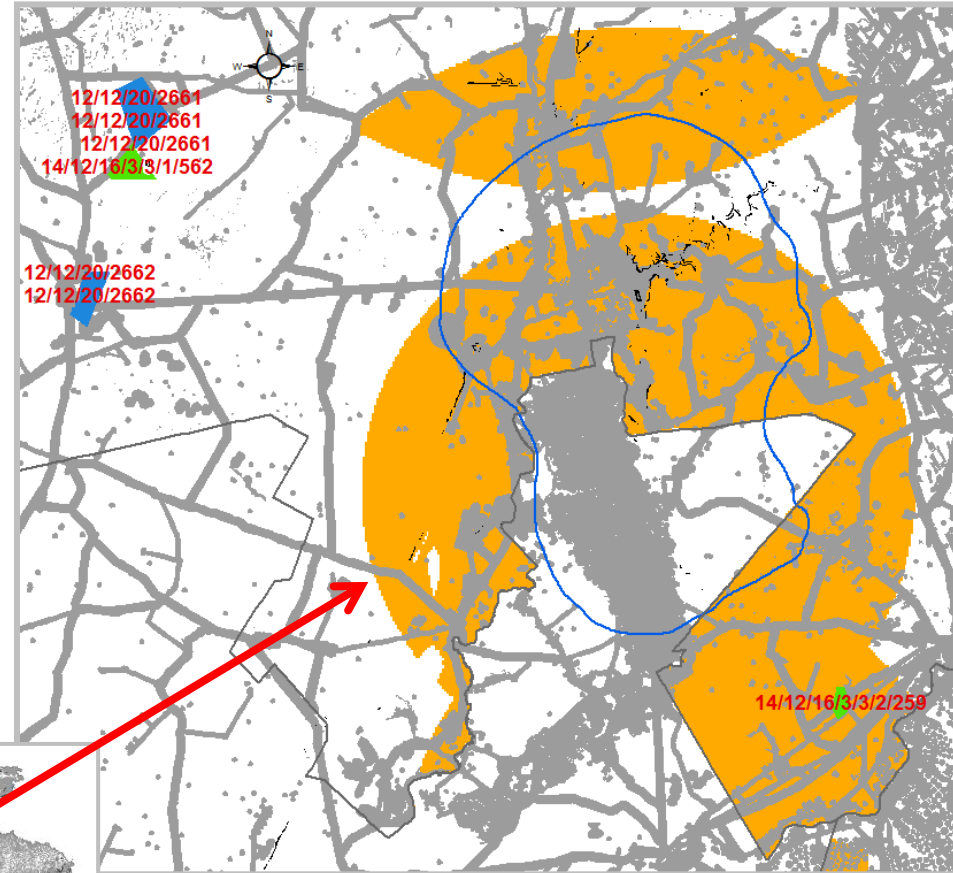
# Solar PV Study Area 2: Gamoduana (1: Development Potential)

**Area:** 1594 km<sup>2</sup>  
**Afri GIS Land Portions**  
**(within 300 m of**  
**Boundary):** 111  
**Mean solar resource:** 2135  
kWh.m-2

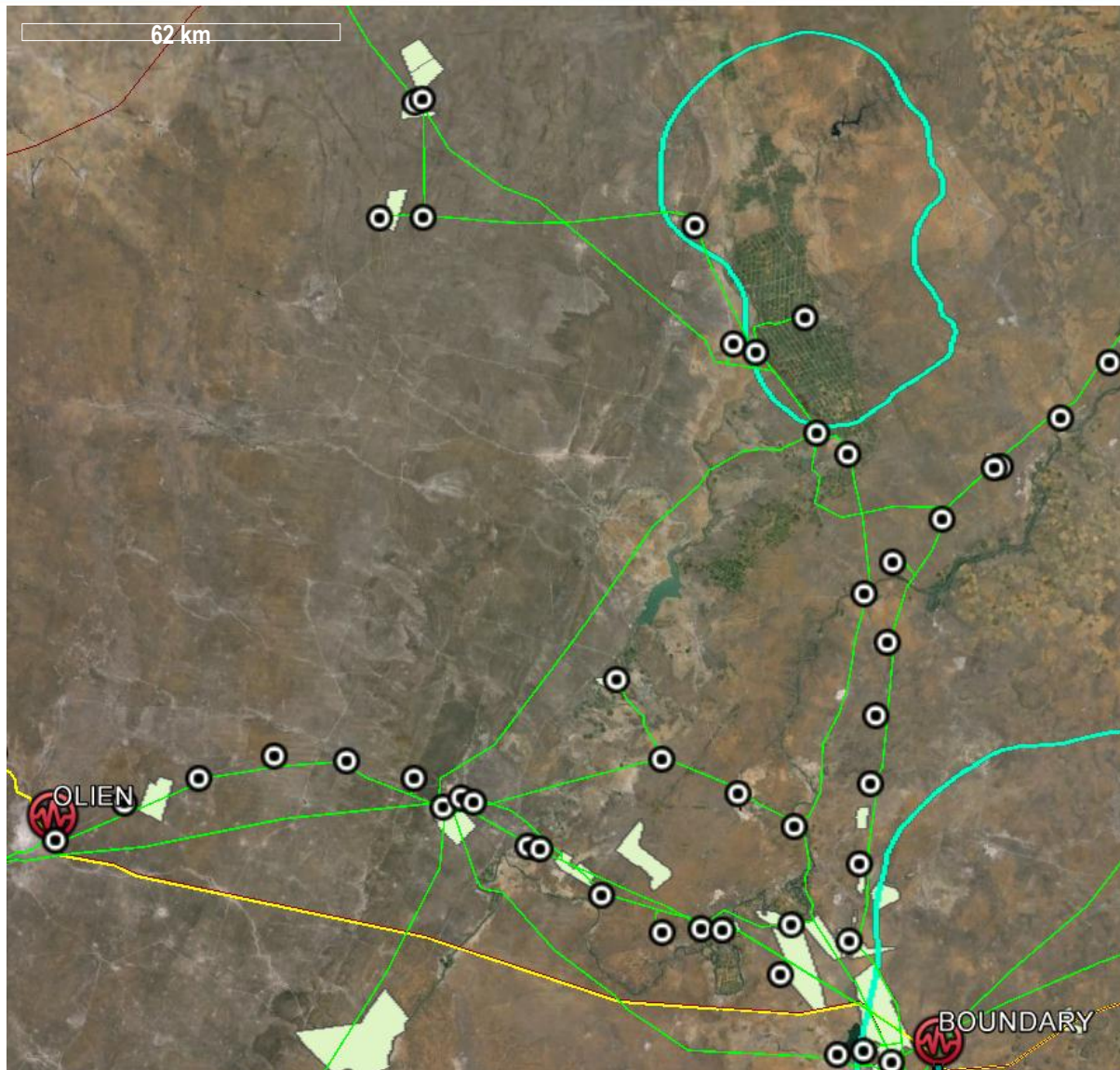
No existing application (up to  
Dec 2012) inside study area.

## Legend

-  Study Areas
  -  Slope >10 Degrees
  -  Solar PV Exclusion Mask
  -  High Development Potential for solar PV
- Solar EIA Applications
- Applications Status
-  Approved
  -  Preferred Bidder Round 1
  -  Preferred Bidder Round 2
  -  In progress
  -  Withdrawn/Lapsed



# Solar PV Study Area 2: Gamoduana (3: Eskom network)



**Eskom Area Limit:** Kimberley [Stability Limit: 2580 MW]

**Generator Tx Zones:** KAROO ZONE (+0.5%)

**Tx Substations near study area (GCCArev1):**

1. Boundary 88 km south (2x250 MW transformers, 140 MW busbar, 96 MW committed)
2. Olien 120 km west (2x150 MW transformers, 143 MW busbar, 139 MW committed)












# Solar PV Study Area 3: Kimberley (1: Development Potential)

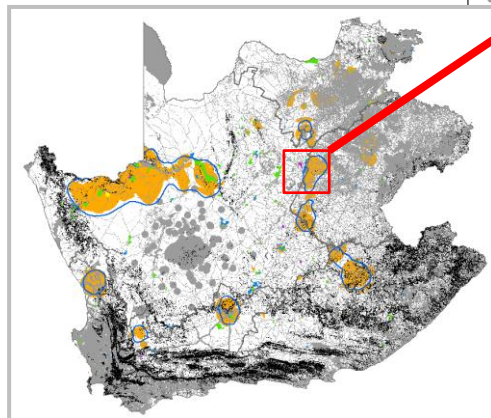
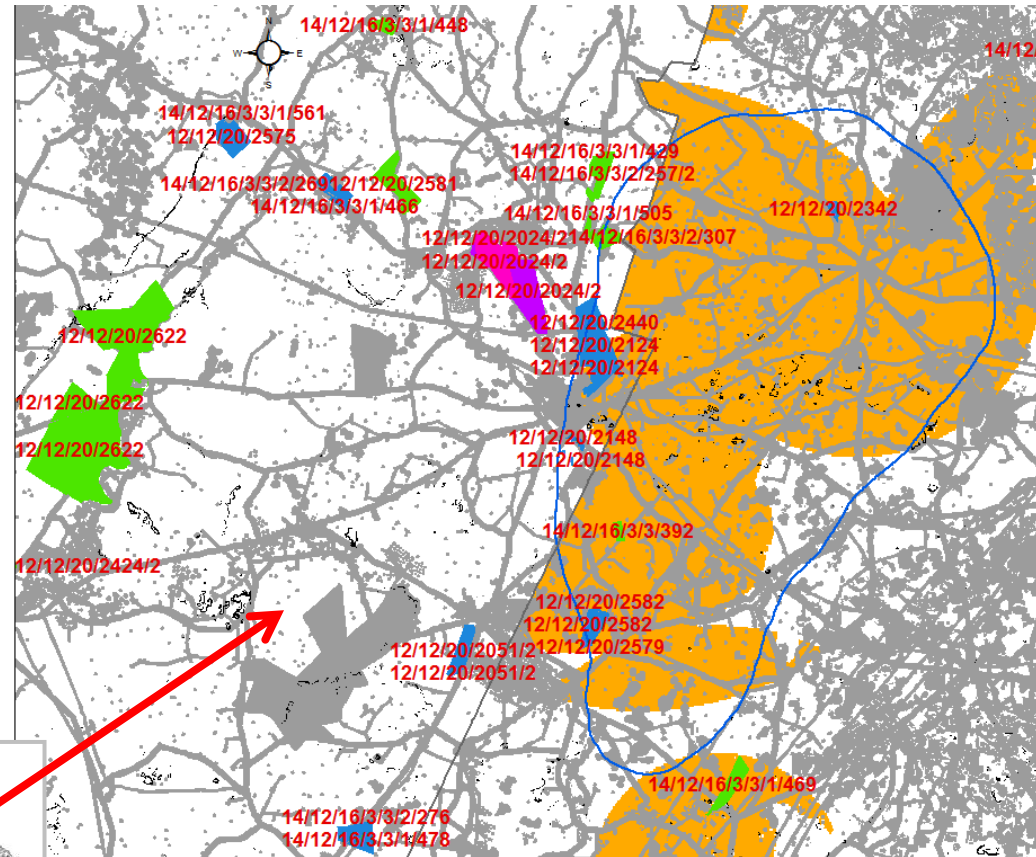
Area: 4681 km<sup>2</sup>  
Afri GIS Land Portions (within 300 m of Boundary): 1043  
Mean solar resource: 2121 kWh.m-2

## Existing application (up to Dec 2012) inside study area:

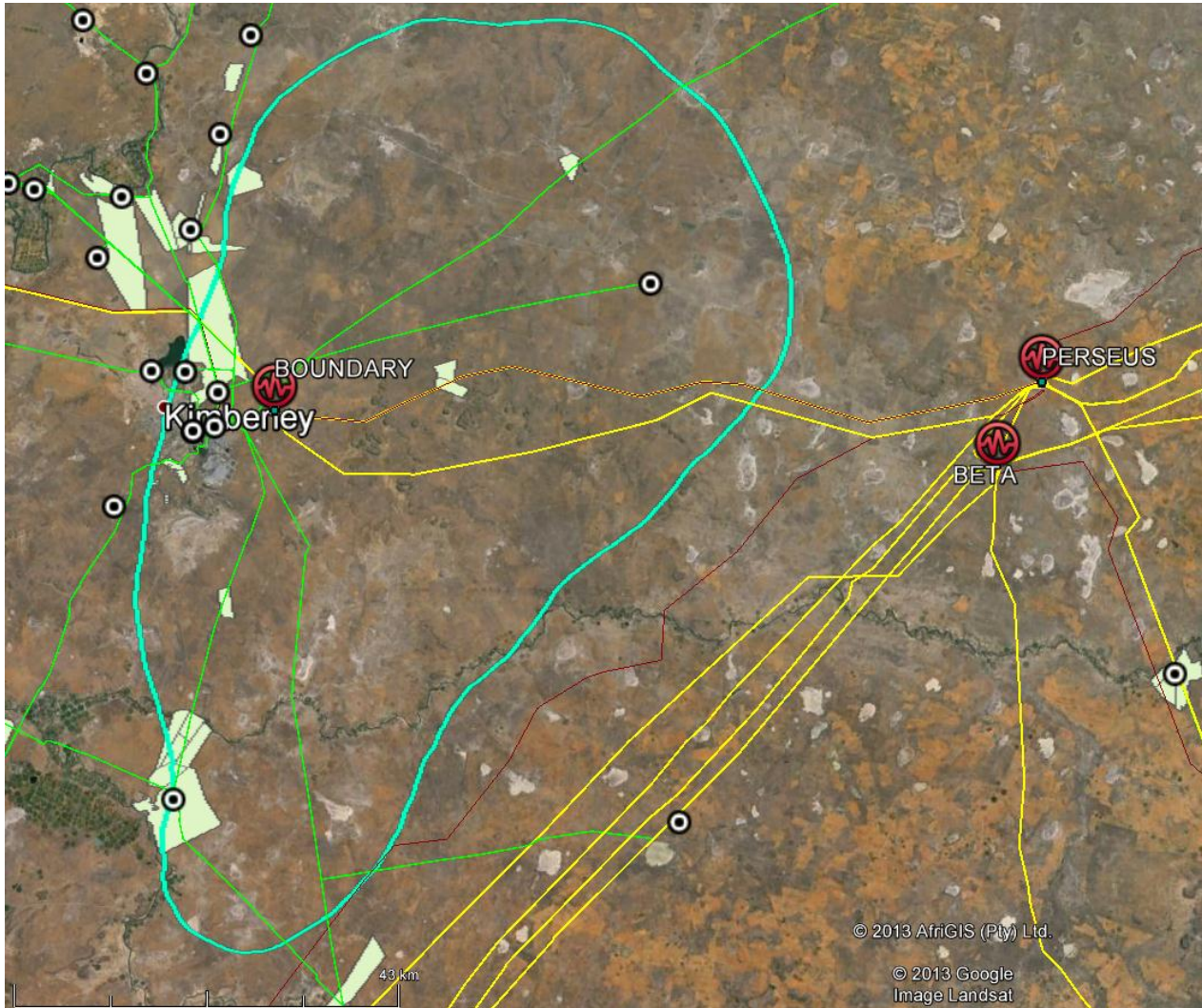
- 21 In progress
- 1 Preferred Bidder R2
- 6 Approved

### Legend

	Study Areas
	Slope >10 Degrees
	Solar PV Exclusion Mask
	High Development Potential for solar PV
<b>Solar EIA Applications</b>	
<b>Applications Status</b>	
	Approved
	Preferred Bidder Round 1
	Preferred Bidder Round 2
	In progress
	Withdrawn/Lapsed



# Solar PV Study Area 3: Kimberley (3: Eskom network)



**Eskom Area Limit:** Kimberley [Stability Limit: 2580 MW]  
Bloemfontein [Stability Limit: 4745 MW]

**Generator Tx Zones:** KAROO ZONE (+0.5%)

**Tx Substations inside study area (GCCArev1):**

1. Boundary (2x250 MW transformers, 140 MW busbar, 96 MW committed)

**Tx Substations near study area (GCCArev1):**

1. Perseus 35 km east (2x400 1x180 MW transformers, 633 MW busbar, 0 MW committed)












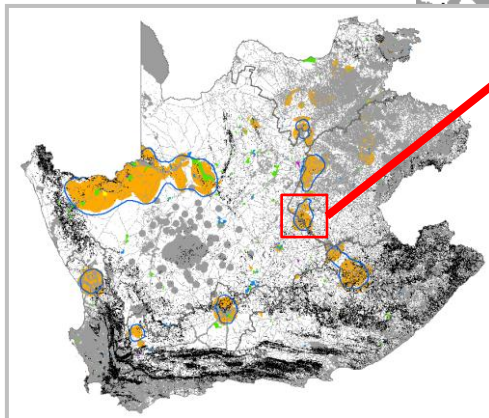
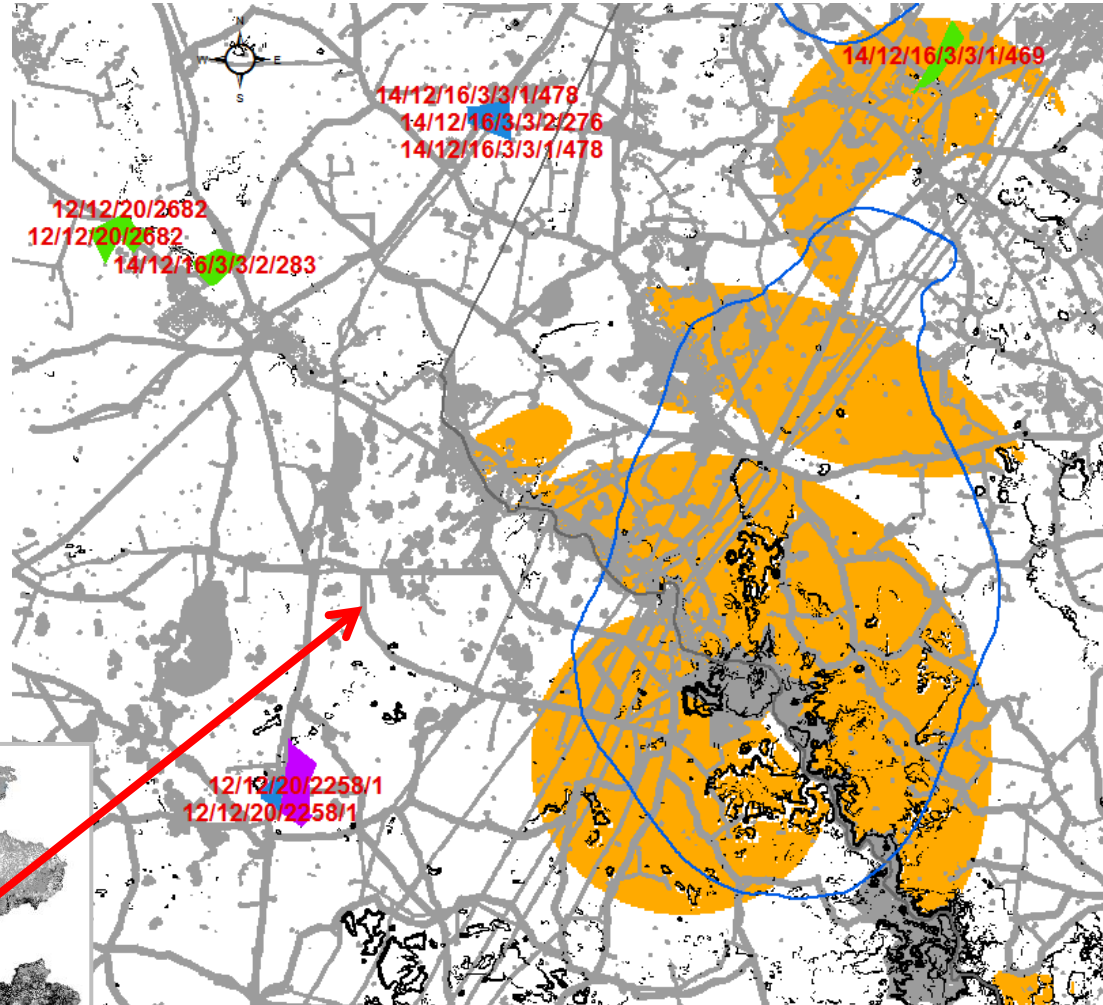
# Solar PV Study Area 4: Relebohile (1: Development Potential)

**Area:** 3402 km<sup>2</sup>  
**Afri GIS Land Portions (within 300 m of Boundary):** 551  
**Mean solar resource:** 2130 kWh.m<sup>-2</sup>

No existing application (up to Dec 2012) inside study area.

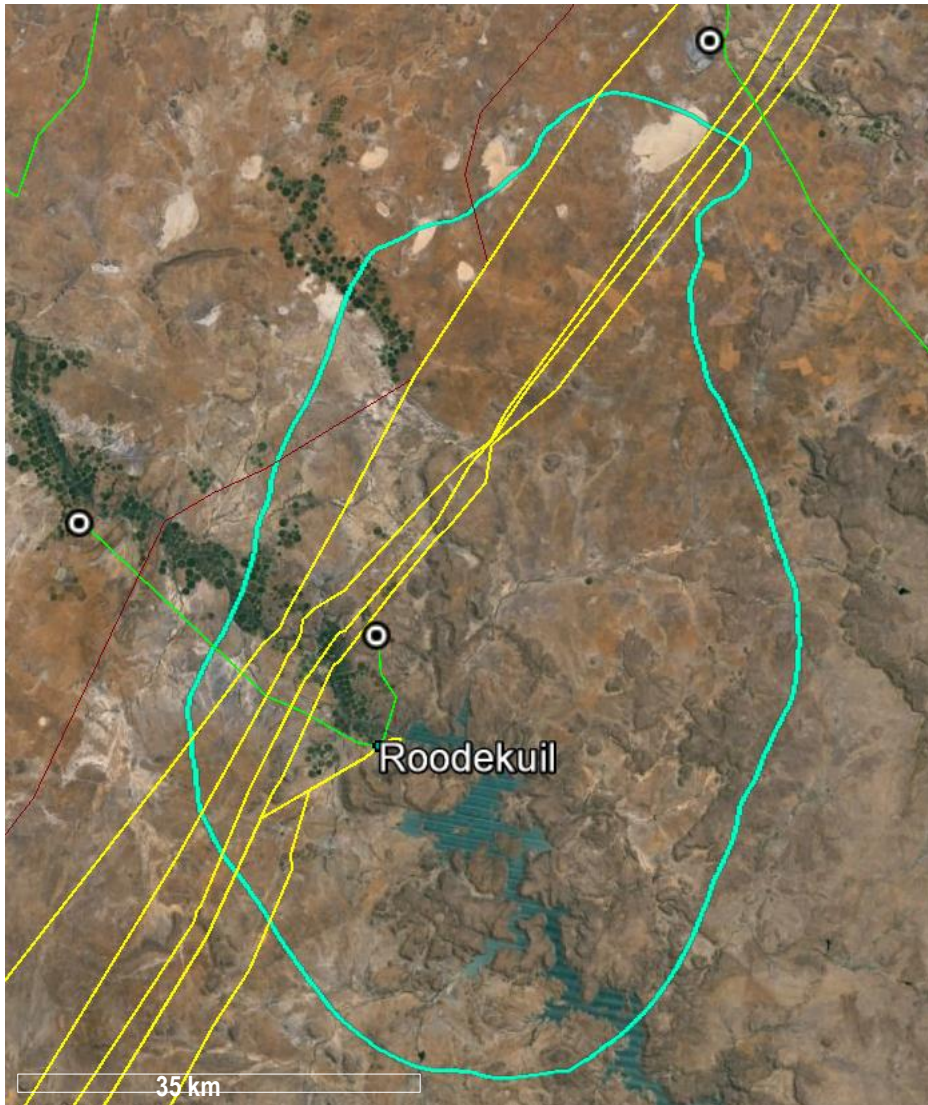
## Legend

-  Study Areas
  -  Slope >10 Degrees
  -  Solar PV Exclusion Mask
  -  High Development Potential for solar PV
- Solar EIA Applications
- Applications Status
-  Approved
  -  Preferred Bidder Round 1
  -  Preferred Bidder Round 2
  -  In progress
  -  Withdrawn/Lapsed





# Solar PV Study Area 4: Relebohile (3: Eskom network)



**Eskom Area Limit:** Karoo [Stability Limit: 2398 MW]

**Generator Tx Zones:** KAROO ZONE (+0.5%)

**Tx Substations inside study area (GCCArev1):**

1. Roodekuil (1x125 MW transformers, 43 MW busbar, 0 MW committed)

# Solar PV Study Area 5: Molteno (1: Development Potential)










No existing application (up to Dec 2012) inside study area.

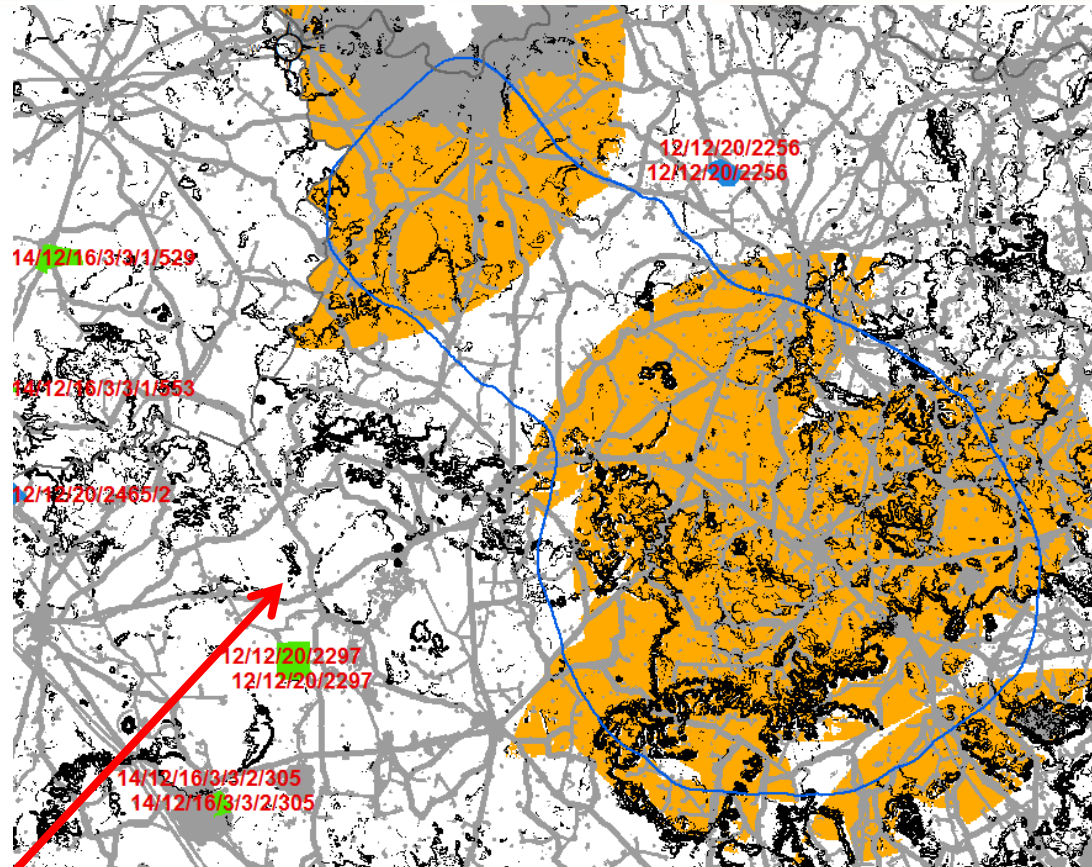
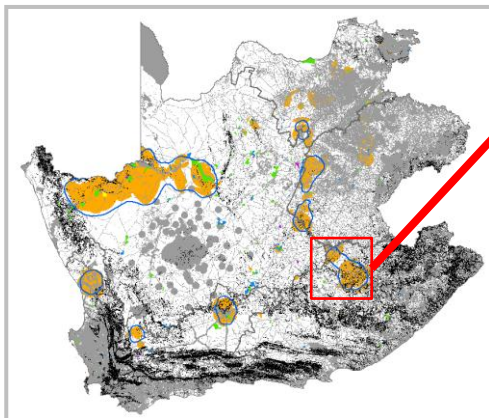
**Area:** 7348 km<sup>2</sup>

**Afri GIS Land Portions (within 300 m of Boundary):** 1928

**Mean solar resource:** 2039 kWh.m<sup>-2</sup>

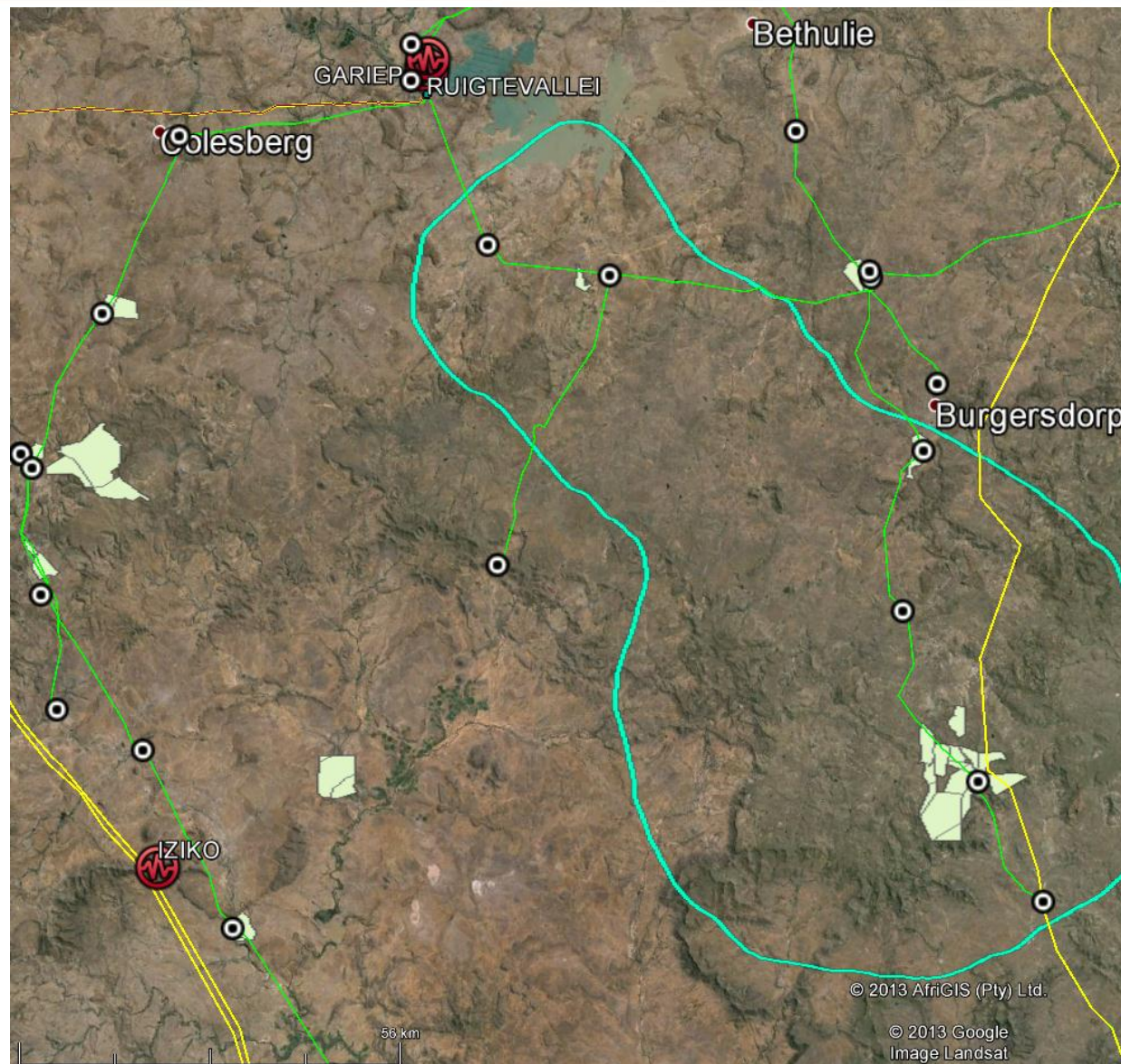
## Legend

-  Study Areas
  -  Slope >10 Degrees
  -  Solar PV Exclusion Mask
  -  High Development Potential for solar PV
- Solar EIA Applications**
- Applications Status**
-  Approved
  -  Preferred Bidder Round 1
  -  Preferred Bidder Round 2
  -  In progress
  -  Withdrawn/Lapsed





# Solar PV Study Area 5: Molteno (3: Eskom network)



**Eskom Area Limit:** Karoo [Stability Limit: 2398 MW]

**Generator Tx Zones:** CAPE ZONE (+2.9%) + KAROO ZONE (+0.5%)

**Tx Substations near study area (GCCArev1):**

1. Ruigtevallei 17 km north (1x125 MW transformers, 123 MW busbar, 0 MW committed)



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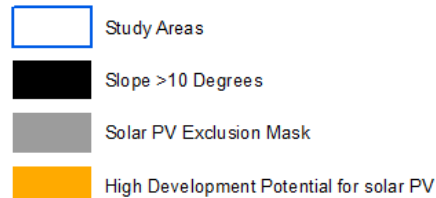
# Solar PV Study Area 6: Beaufort West (1: Development Potential)

Area: 3471 km<sup>2</sup>  
Afri GIS Land Portions  
(within 300 m of  
Boundary): 433  
Mean solar resource:  
2067 kWh.m<sup>-2</sup>

Existing application (up  
to Dec 2012)  
inside study area:

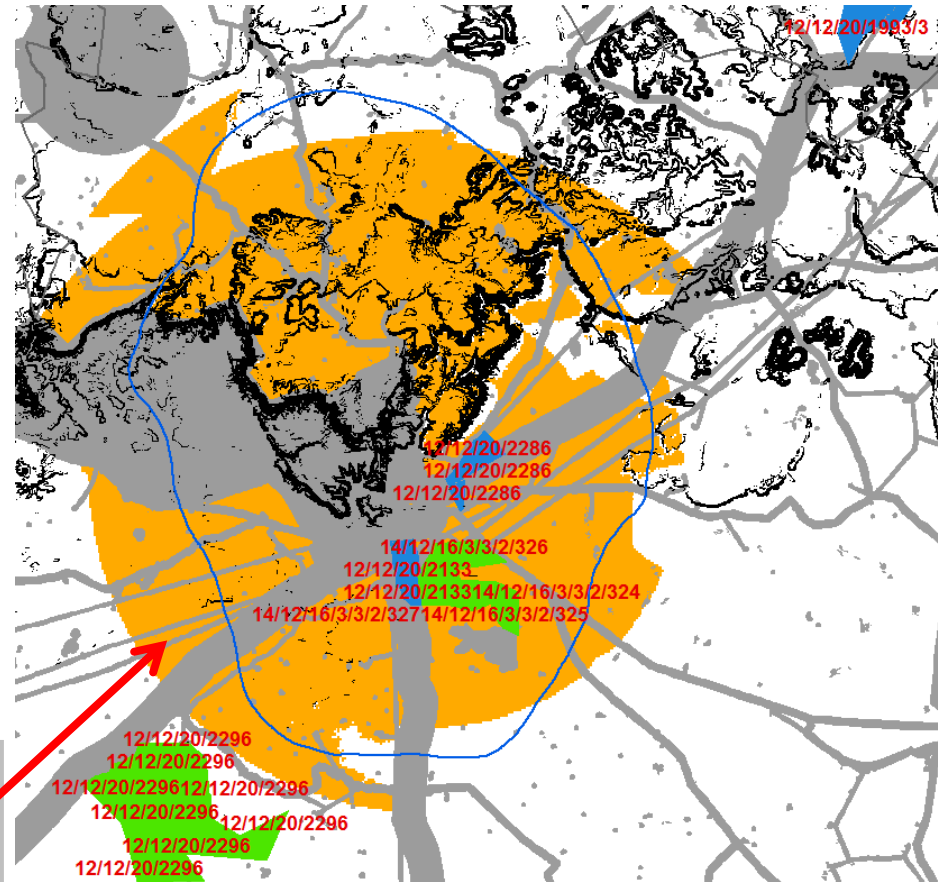
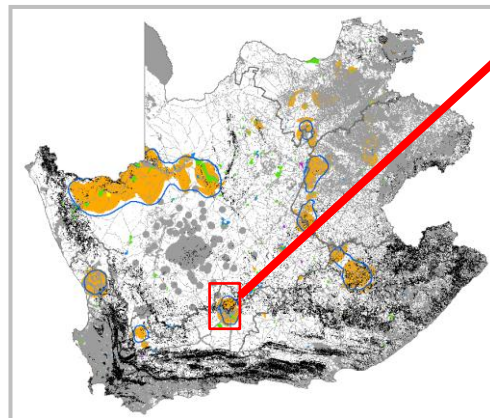
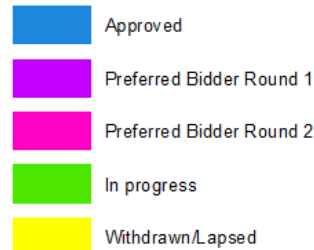
- 13 approved applications
- 4 EIA process in progress

## Legend

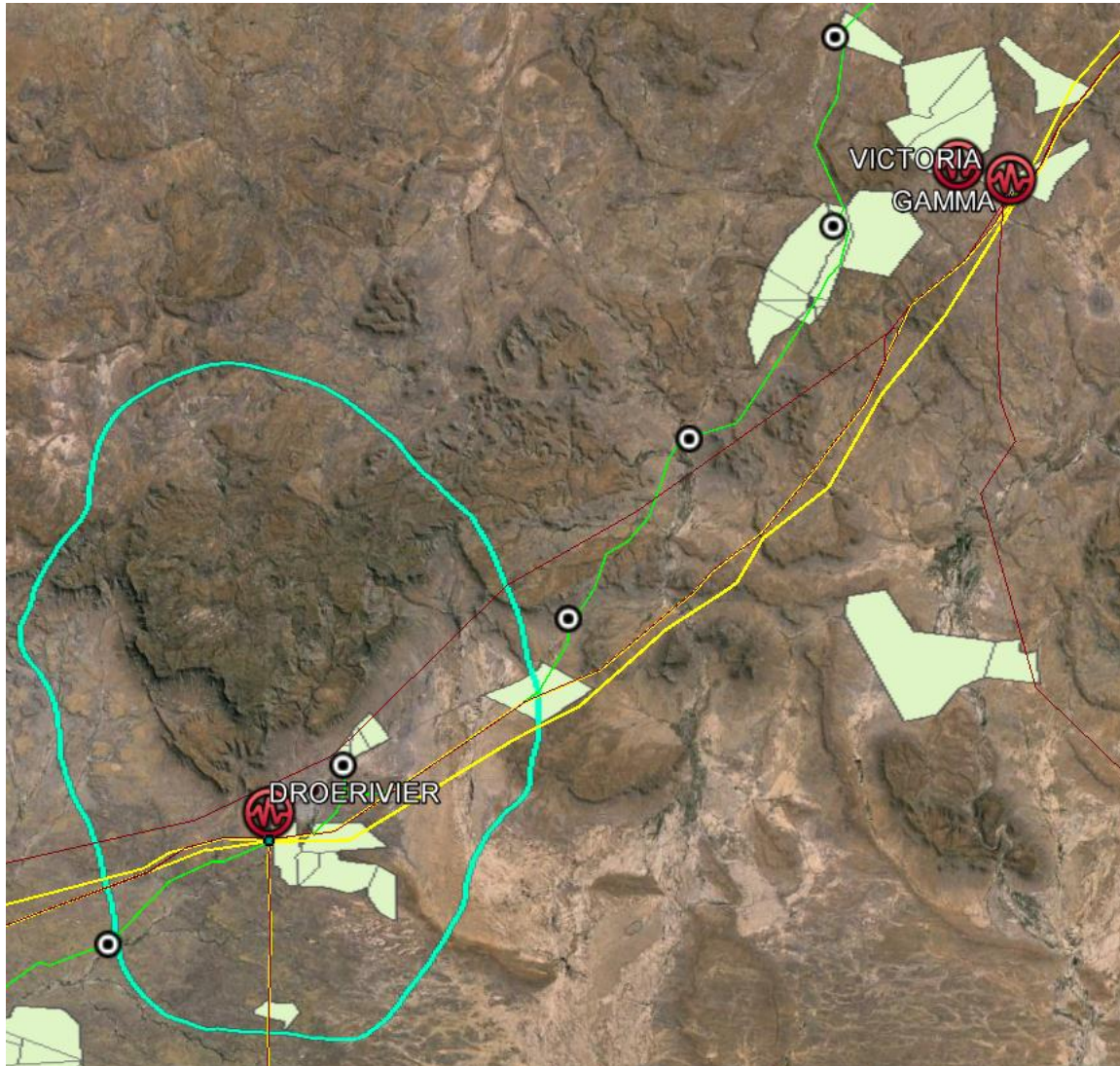


## Solar EIA Applications

### Applications Status



# Solar PV Study Area 6: Beaufort West (3: Eskom network)



**Eskom Area Limit:** Southern Cape [Stability Limit: 3318 MW]

**Generator Tx Zones:** CAPE ZONE (+2.9%) Western Part

**Tx Substations inside study area (GCCArev1):**

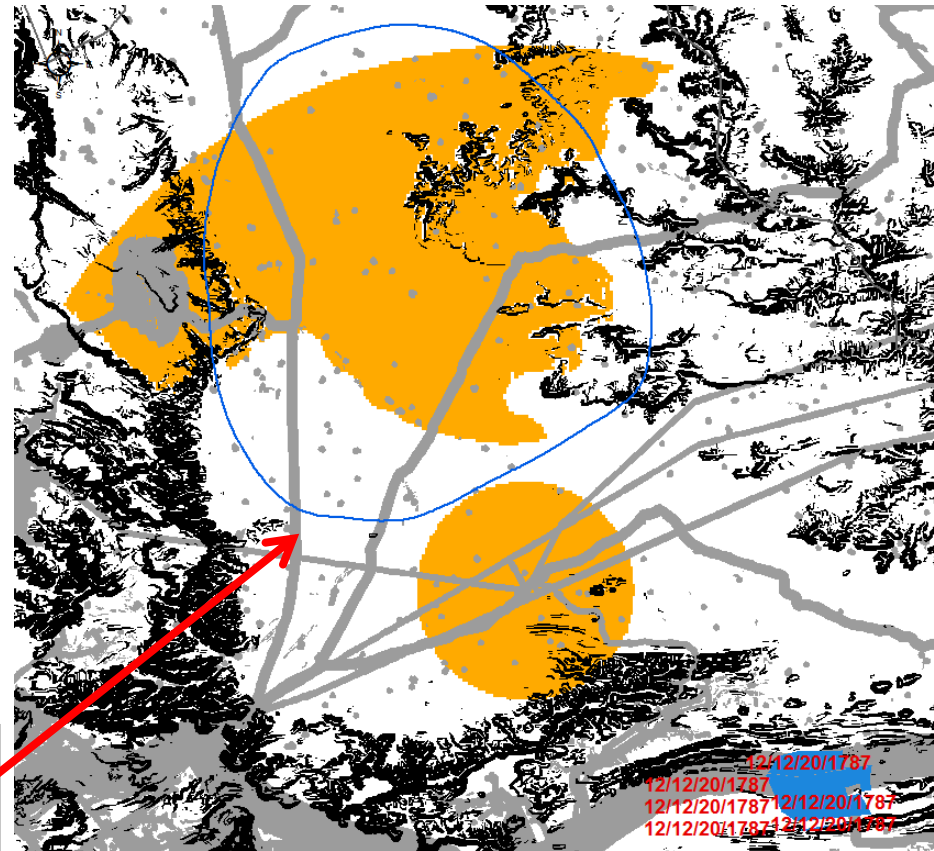
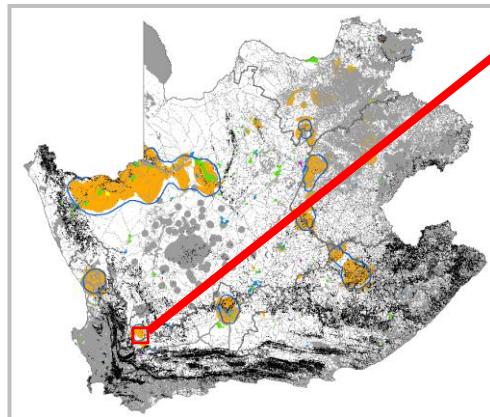
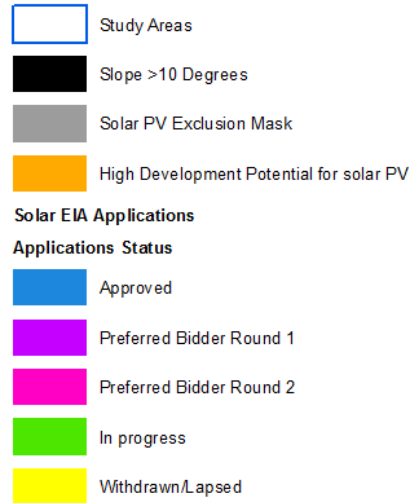
1. Droerivier (2x120 MW transformers, 953 MW busbar, 0 MW committed)

# Solar PV Study Area 7: Ceres (1: Development Potential)

Area: 1457 km<sup>2</sup>  
Afri GIS Land Portions  
(within 300 m of  
Boundary): 108  
Mean solar resource:  
2128 kWh.m<sup>-2</sup>

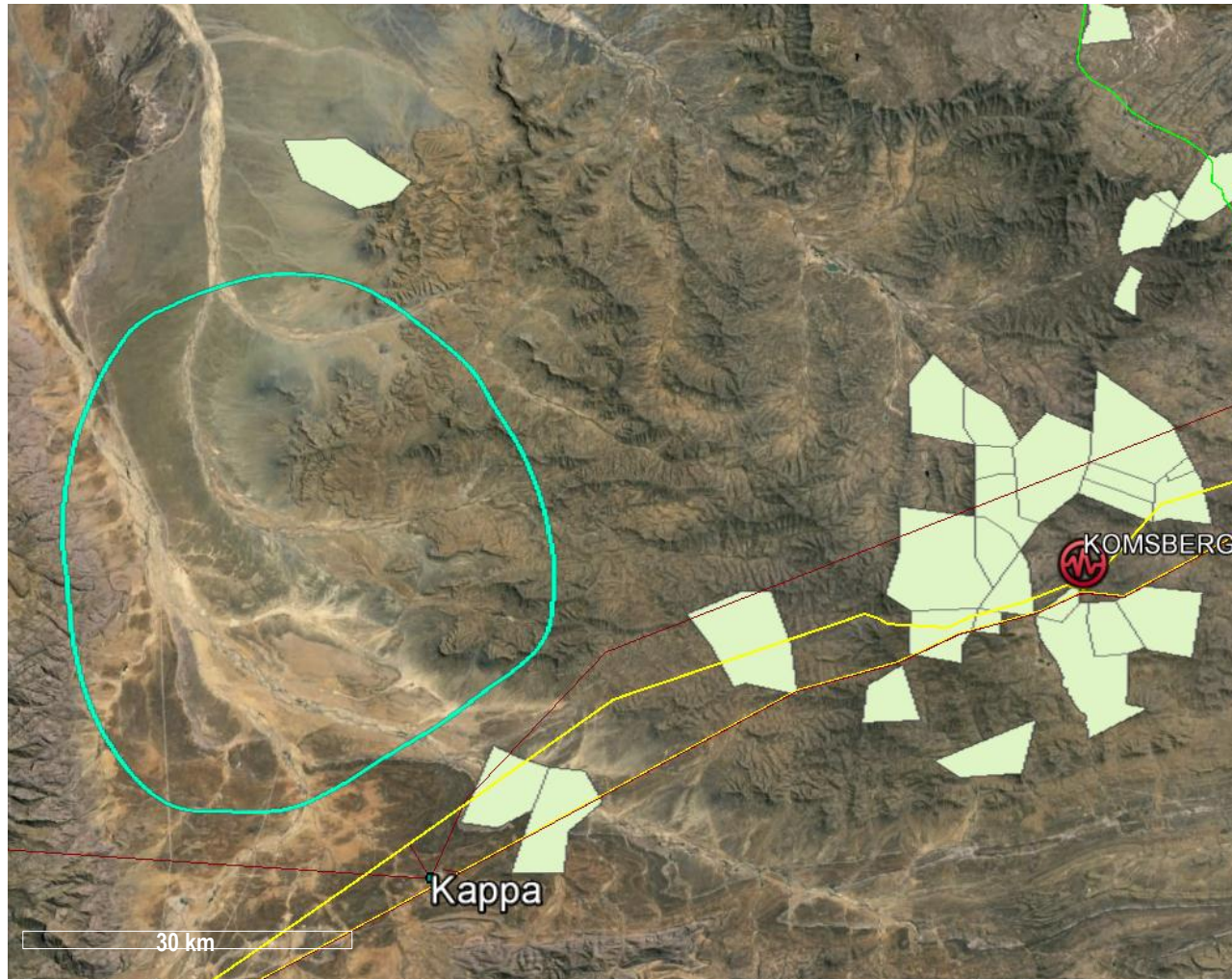
No existing application  
(up to Dec 2012) inside  
study area.

## Legend





# Solar PV Study Area 7: Ceres (3: Eskom network)



**Eskom Area Limit:** Southern Cape  
[Stability Limit: 3318 MW]

**Generator Tx Zones:** CAPE ZONE  
(+2.9%) Western Part

**Tx Substations inside study area  
(GCCArev1):**

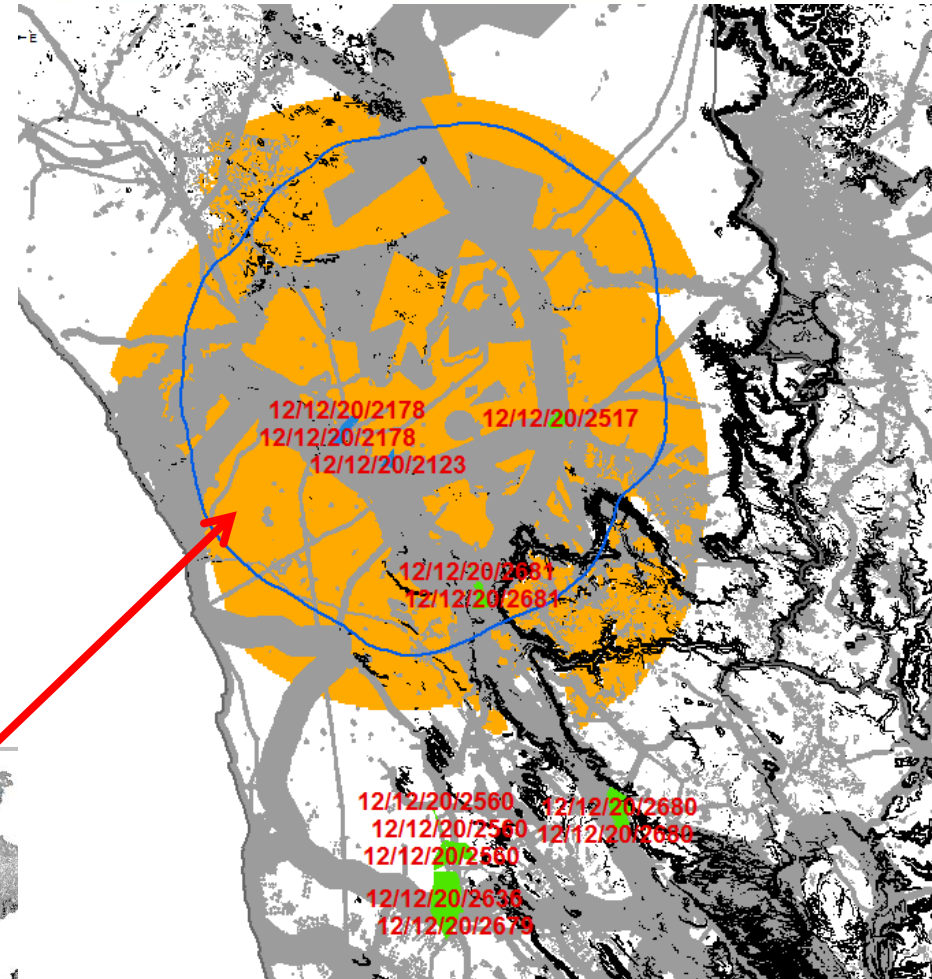
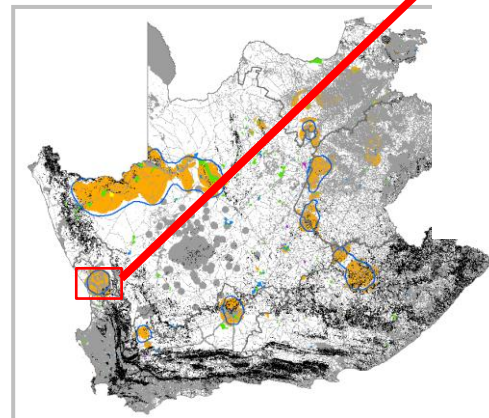
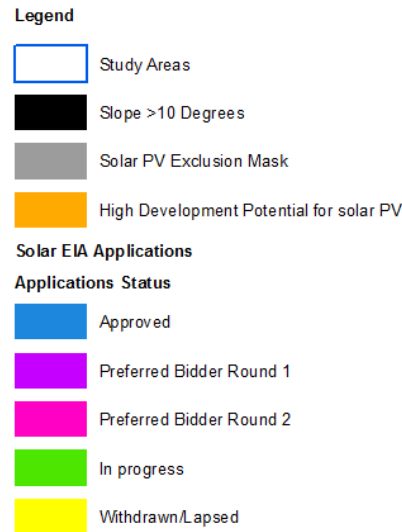
1. Kappa 12 km south (1x2000 MW transformers, 926 MW busbar, 0 MW committed)

# Solar PV Study Area 8: Vredendal (1: Development Potential)

**Area: 3314 km<sup>2</sup>**  
**Afri GIS Land Portions**  
**(within 300 m of Boundary):**  
**1160**  
**Mean solar resource: 2073**  
**kWh.m-2**

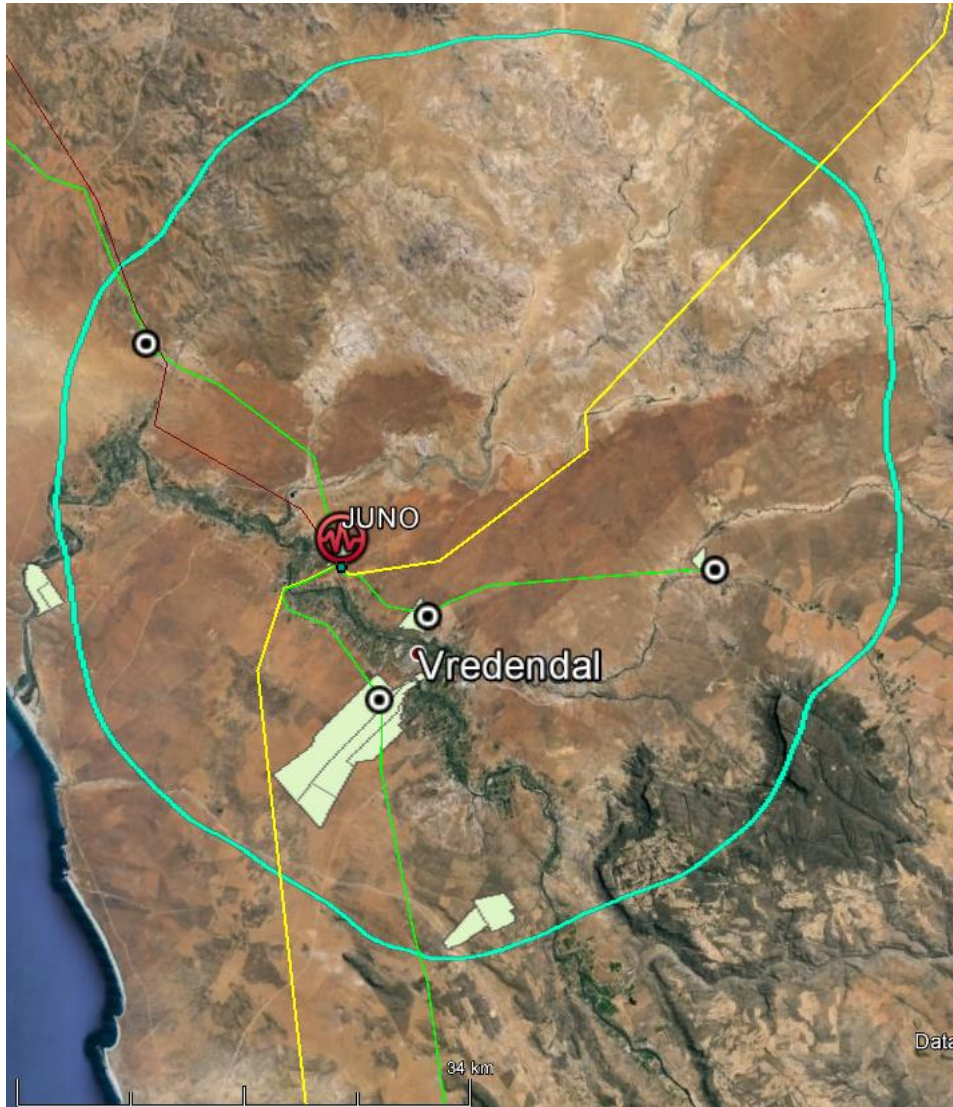
Existing application (up to Dec 2012) inside study area:

- 6 approved applications
- 1 preferred bidder Round 2
- 8 EIA process in progress





# Solar PV Study Area 8: Vredendal (3: Eskom network)



**Eskom Area Limit:** West Coast [Stability Limit: 2616 MW]

**Generator Tx Zones:** CAPE ZONE (+2.9%) Western Part

**Tx Substations inside study area (GCCArev1):**

1. Juno (2x120 MW transformers, 441 MW busbar, 109 MW committed)



# Solar PV Study Areas Summary

	Site name	Area (km2)	Land Portions (indicative)	Mean Solar Resource (kWh.m-2)	Nearest transmission substation
<b>NORTHERN CAPE PROVINCE</b>					
1	POFADDER	44175	3824	2253	<ul style="list-style-type: none"> <li>Paulputs / inside study area</li> <li>Garona / inside study area</li> <li>Aggeneis 1 / inside study area</li> <li>Aggeneis 2 / inside study area</li> </ul>
<b>FREE STATE AND NORTH WEST PROVINCES</b>					
2	GAMODUANA	1594	111	2135	<ul style="list-style-type: none"> <li>Boundary / 88 km south</li> <li>Olien / 120 km west</li> </ul>
3	KIMBERLEY	4681	1043	2121	<ul style="list-style-type: none"> <li>Perseus / 35 km east</li> </ul>
4	RELEBOHILE	3402	551	2130	<ul style="list-style-type: none"> <li>Roodekuil / inside study area</li> </ul>
<b>EASTERN CAPE PROVINCE</b>					
5	MOLTENO	7348	1928	2039	<ul style="list-style-type: none"> <li>Ruigtevallei / 17 km north</li> </ul>
<b>WESTERN CAPE PROVINCE</b>					
6	BEAUFORT WEST	3471	433	2067	<ul style="list-style-type: none"> <li>Droerivier / inside study area</li> </ul>
7	CERES	1457	108	2128	<ul style="list-style-type: none"> <li>Kappa / 12 km S</li> </ul>
8	VREDENDAL	3314	1160	2073	<ul style="list-style-type: none"> <li>Juno/ inside study area</li> </ul>
	<b>TOTAL</b>	69442	9158		