



The Renewable Energy Data and Information Service (REDIS)

Morten Blarke

Technical Advisor, Department of Energy



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

The Danish South African Programme on Renewable Energy

Started in 2013 with three components:

1. Technical assistance to the Department of Energy
2. Further development of the wind atlas for South Africa
3. Technical assistance to ESKOM



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

DANIDA



EMBASSY OF DENMARK

DANIDA

INTERNATIONAL
DEVELOPMENT COOPERATION

Why REDIS? - Data is a public good

- ***Economic benefits***
 - Encourage entrepreneurship
 - Innovation: Improved or new private products and services
 - Release economic value
- ***Political-administrative benefits***
 - Transparency and democratic control
 - Participation and self-empowerment
 - Improved efficiency/effectiveness of government services
 - Impact measurement of policies
- ***Scientific benefits***
 - New knowledge from combined data sources and patterns in large data volumes



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

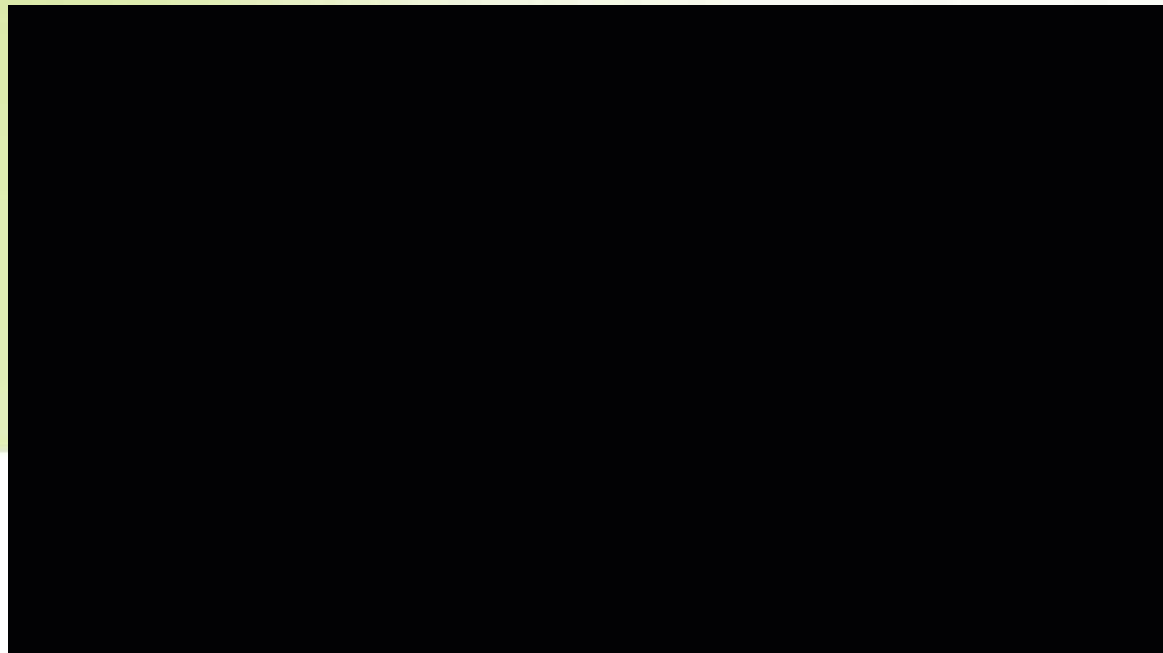
Interactive data service rather than static data reporting

- Online, interactive data-driven information service
- <http://redis.energy.gov.za>
- REDIS platform will be used to compile and publish an annual report on renewable energy data and information



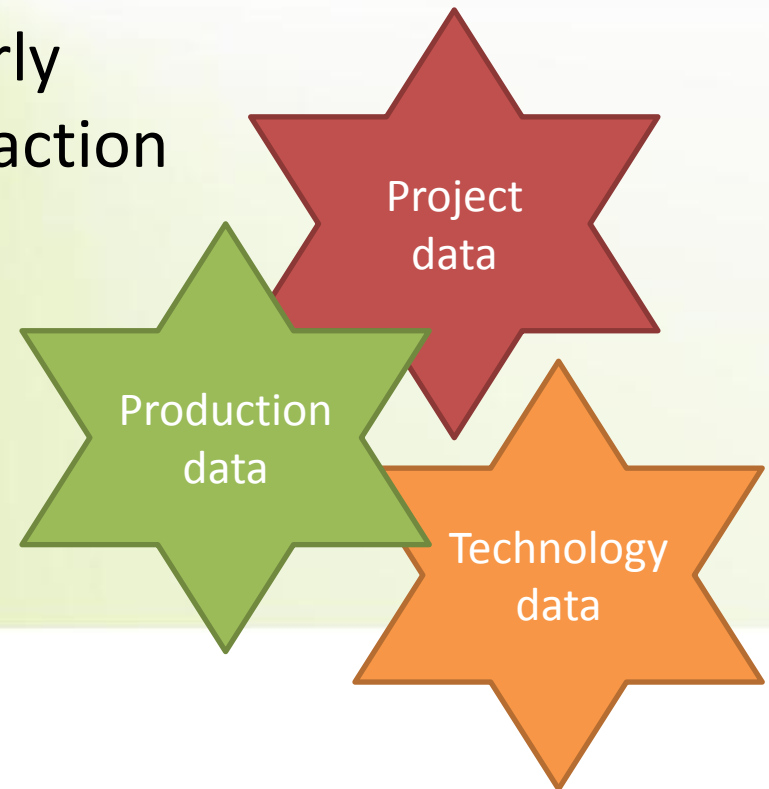
energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA



REDIS principles

- Data-driven (no plans, just data)
- In-house development team (continuous development)
- Accelerated learning = early release, stakeholder interaction



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

Priority data

1

- Grid connected wind power (on-shore wind)
- Grid connected solar power (PV, CSP)
- IPP/ESKOM generators (incl. Small scale IPPs)

2

- Grid connected industrial co-generators
- Small Scale non-IPP/non-Eskom generators

3

- Solar Water Heaters
- Off-Grid PV

4

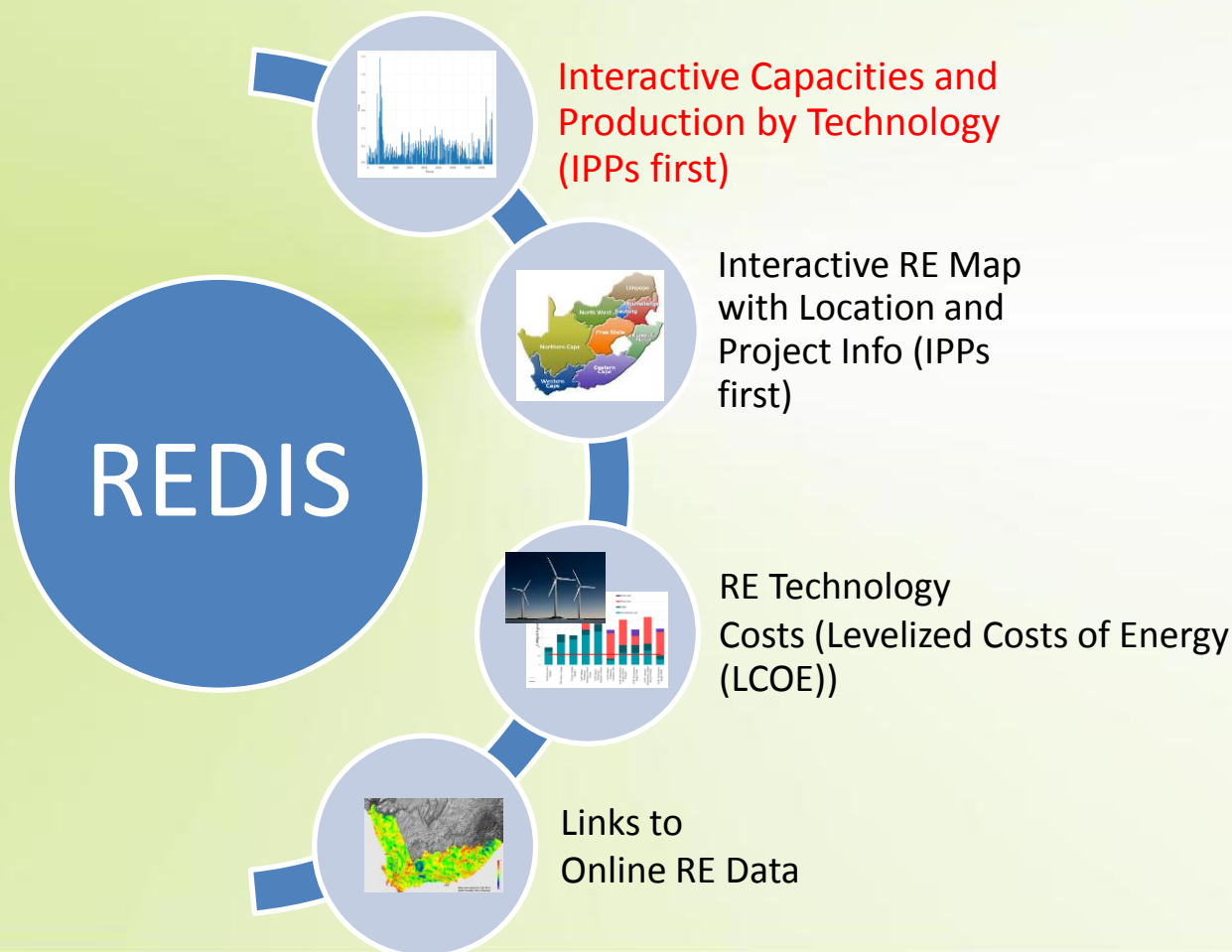
- Small Scale Off-Grid
- Domestic/Farm Biogas, Traditional biomass
- Biofuels



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

What initially to expect



energy

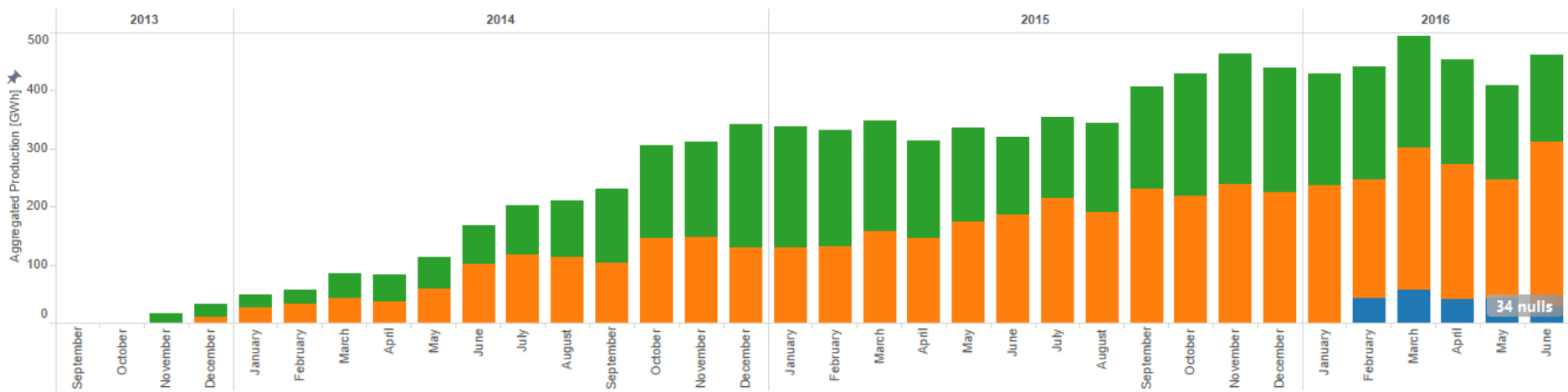
Department:
Energy
REPUBLIC OF SOUTH AFRICA

Electricity Production From Renewables

< Electricity production is dominated by wind and PV
 Active total capacity totals almost 1900 MWp as of mid-2016
 References and notes >

Technology

(All) ▼



Technology	2013	2014	2015	2016	Grand Total
Photovoltaic Power	37.7	1,101.8	2,184.4	1,072.6	4,396.5
Onshore Wind Power	9.8	1,056.9	2,241.6	1,407.4	4,715.6
Concentrated Solar Power				210.6	210.6
Small Hydro Power					
Grand Total	47.4	2,158.7	4,426.0	2,690.6	9,322.7

Photovoltaic Power Onshore Wind Po.. Concentrated Sol.. Small Hydro Power

Why high-resolution production data? (by hour, by technology, by province)

- Planning and researching options for large-scale integration of RE (what works where, and how does it affect the system as a whole)
- Low-risk local investments (better feasibility studies)



Source: Eskom, July 2016. Data includes all IPPs in operation.

Hourly Electricity Production [L... Full-Load Hours [h] Load Factor [%] Hourly Electricity Production...



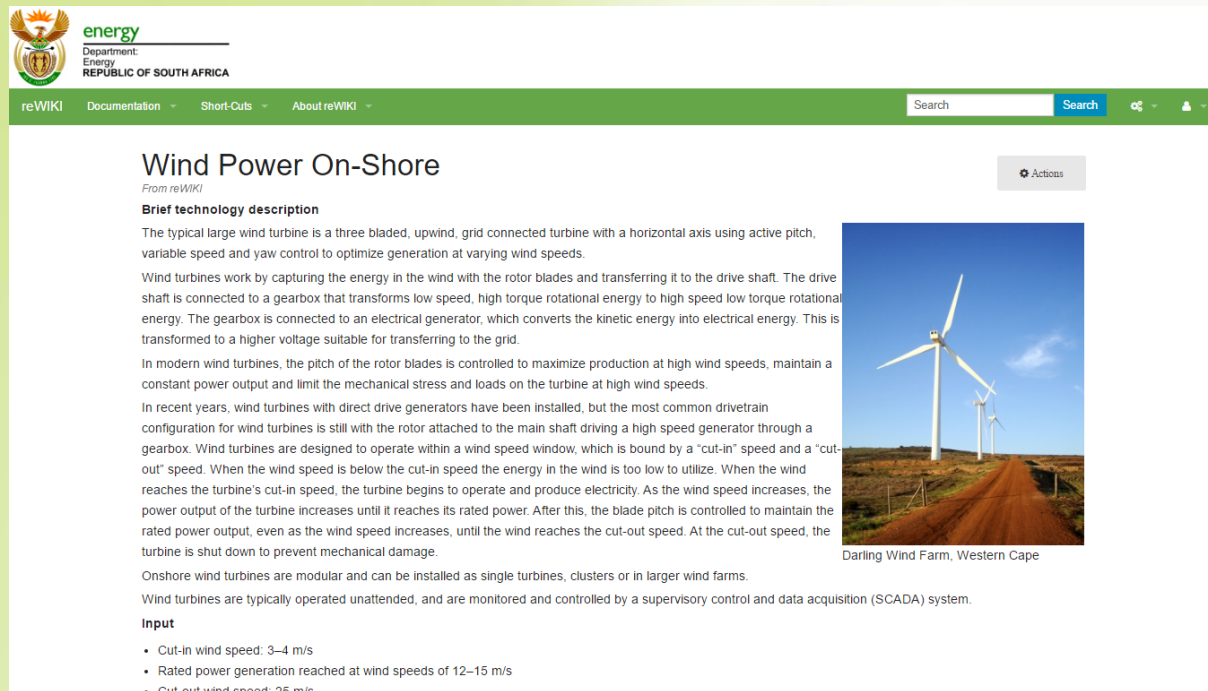

energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

The Renewable Energy Wiki (reWIKI)

<http://rewiki.energy.gov.za> (Intranet Only!)

An collaborative platform for developing and managing knowledge about RE.



energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

reWIKI Documentation Short-Cuts About reWIKI

Search Search

Wind Power On-Shore

From reWIKI

Brief technology description

The typical large wind turbine is a three bladed, upwind, grid connected turbine with a horizontal axis using active pitch, variable speed and yaw control to optimize generation at varying wind speeds.

Wind turbines work by capturing the energy in the wind with the rotor blades and transferring it to the drive shaft. The drive shaft is connected to a gearbox that transforms low speed, high torque rotational energy to high speed low torque rotational energy. The gearbox is connected to an electrical generator, which converts the kinetic energy into electrical energy. This is transformed to a higher voltage suitable for transferring to the grid.

In modern wind turbines, the pitch of the rotor blades is controlled to maximize production at high wind speeds, maintain a constant power output and limit the mechanical stress and loads on the turbine at high wind speeds.


In recent years, wind turbines with direct drive generators have been installed, but the most common drivetrain configuration for wind turbines is still with the rotor attached to the main shaft driving a high speed generator through a gearbox. Wind turbines are designed to operate within a wind speed window, which is bound by a "cut-in" speed and a "cut-out" speed. When the wind speed is below the cut-in speed the energy in the wind is too low to utilize. When the wind reaches the turbine's cut-in speed, the turbine begins to operate and produce electricity. As the wind speed increases, the power output of the turbine increases until it reaches its rated power. After this, the blade pitch is controlled to maintain the rated power output, even as the wind speed increases, until the wind reaches the cut-out speed. At the cut-out speed, the turbine is shut down to prevent mechanical damage.

Onshore wind turbines are modular and can be installed as single turbines, clusters or in larger wind farms.

Wind turbines are typically operated unattended, and are monitored and controlled by a supervisory control and data acquisition (SCADA) system.

Input

- Cut-in wind speed: 3–4 m/s
- Rated power generation reached at wind speeds of 12–15 m/s
- Cut-out wind speed: 25 m/s



Darling Wind Farm, Western Cape

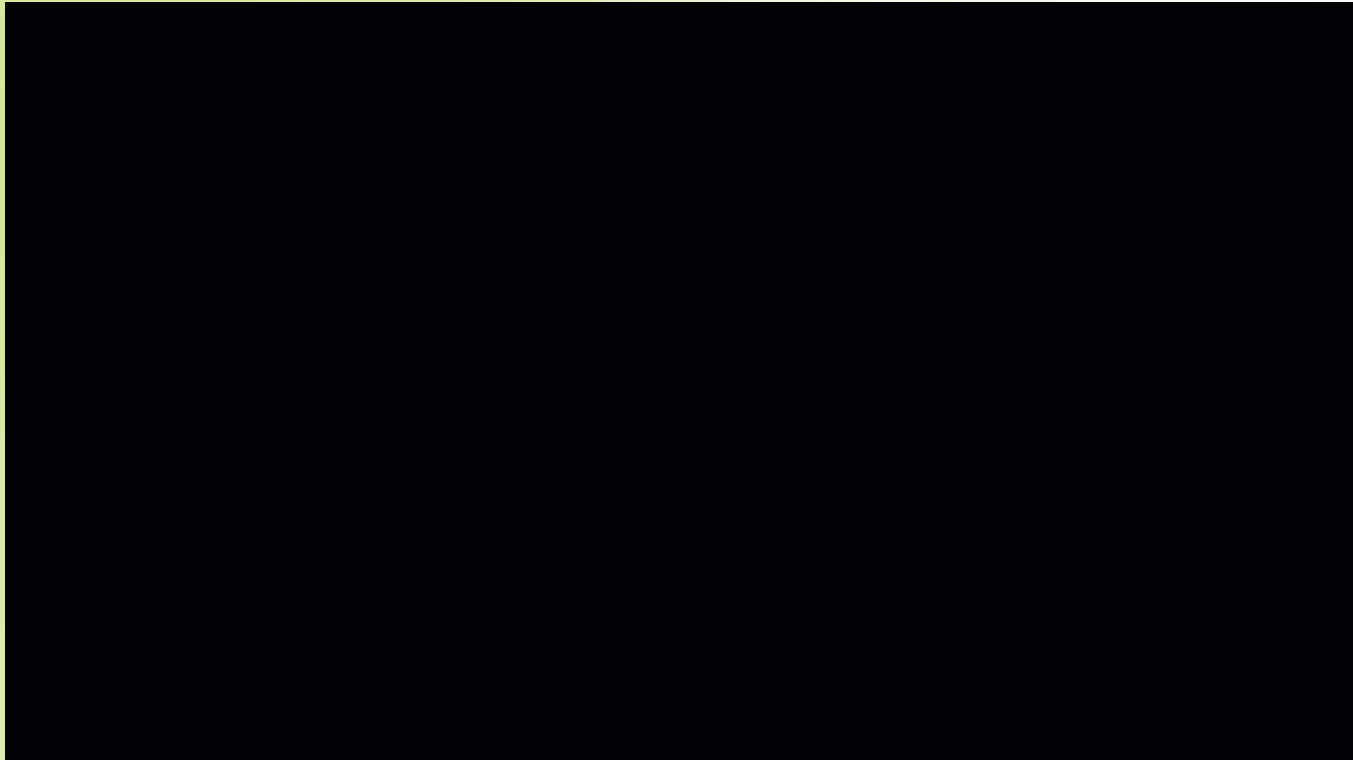


energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

The Renewable Energy Data and Information Service (REDIS)

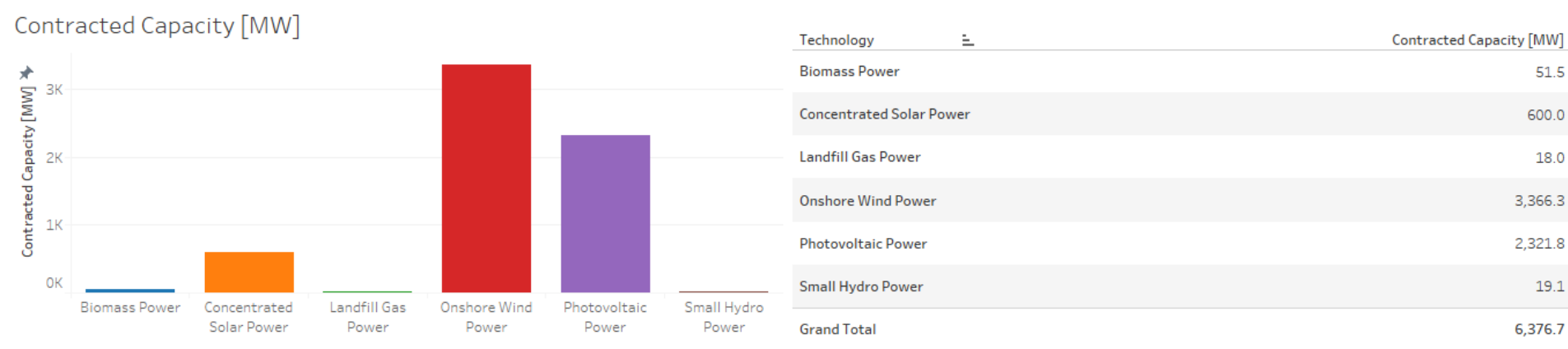
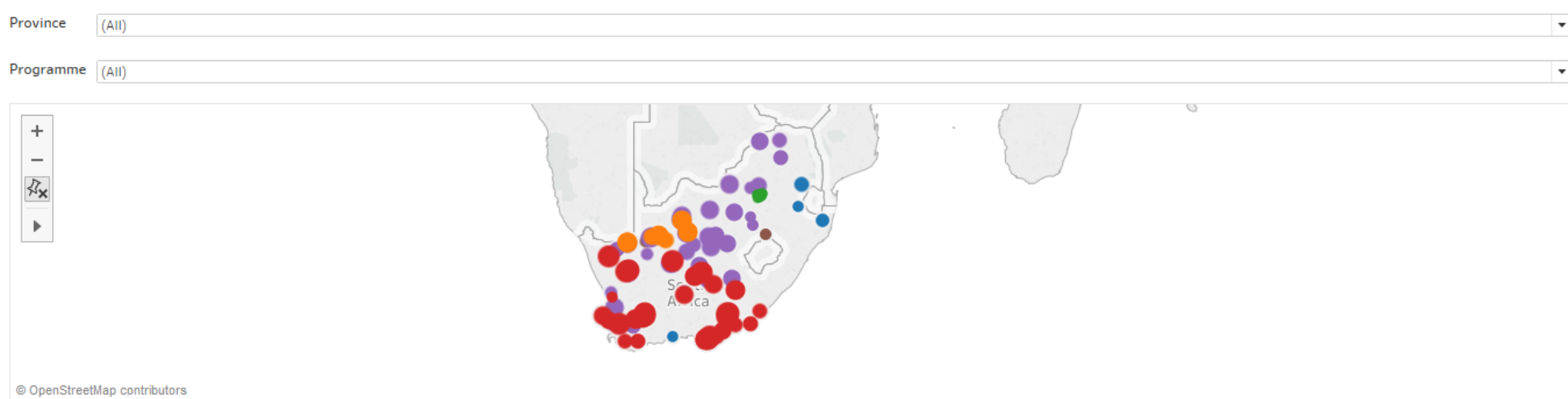
<http://redis.energy.gov.za>



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

Electricity Producer's Location and Contracted Capacities



Source: The IPP Office, July 2016. Data includes all contracted capacities under the listed programmes 2013-2016.

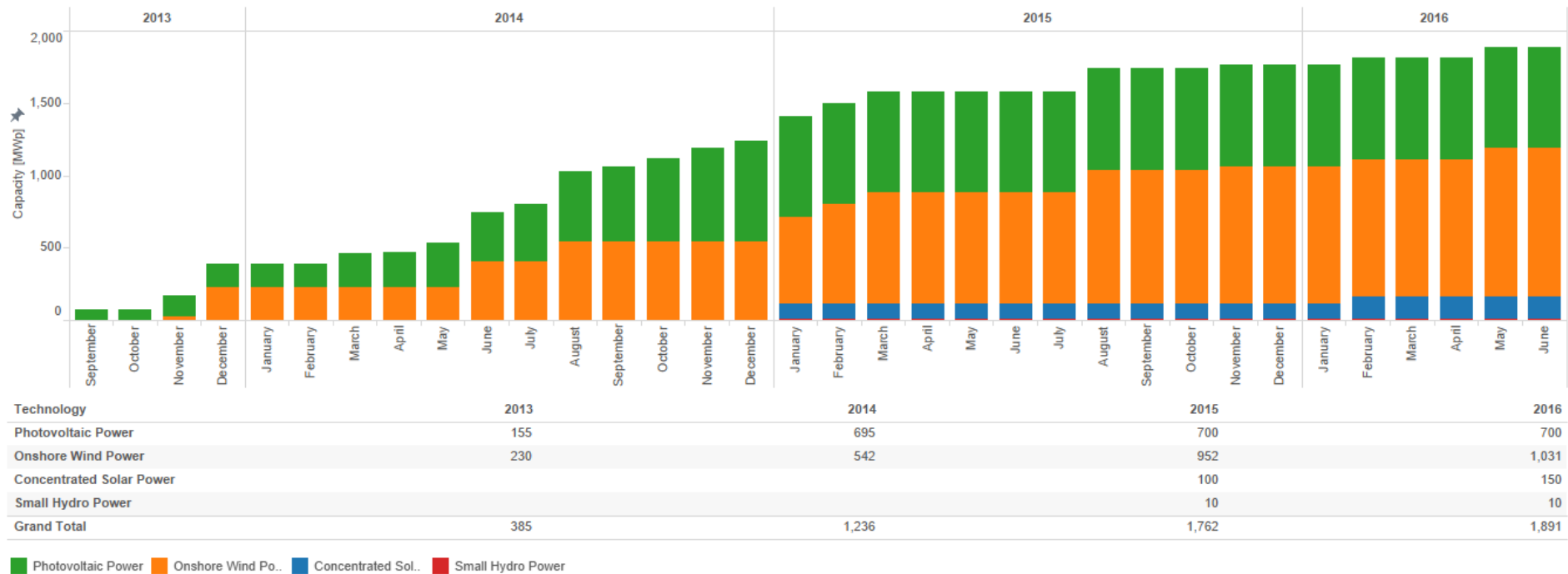
Internal REDIS reference: REDIS-project-map-v3, last edited and published by DellMorten.

Operating Electricity Generating Capacity From Renewables

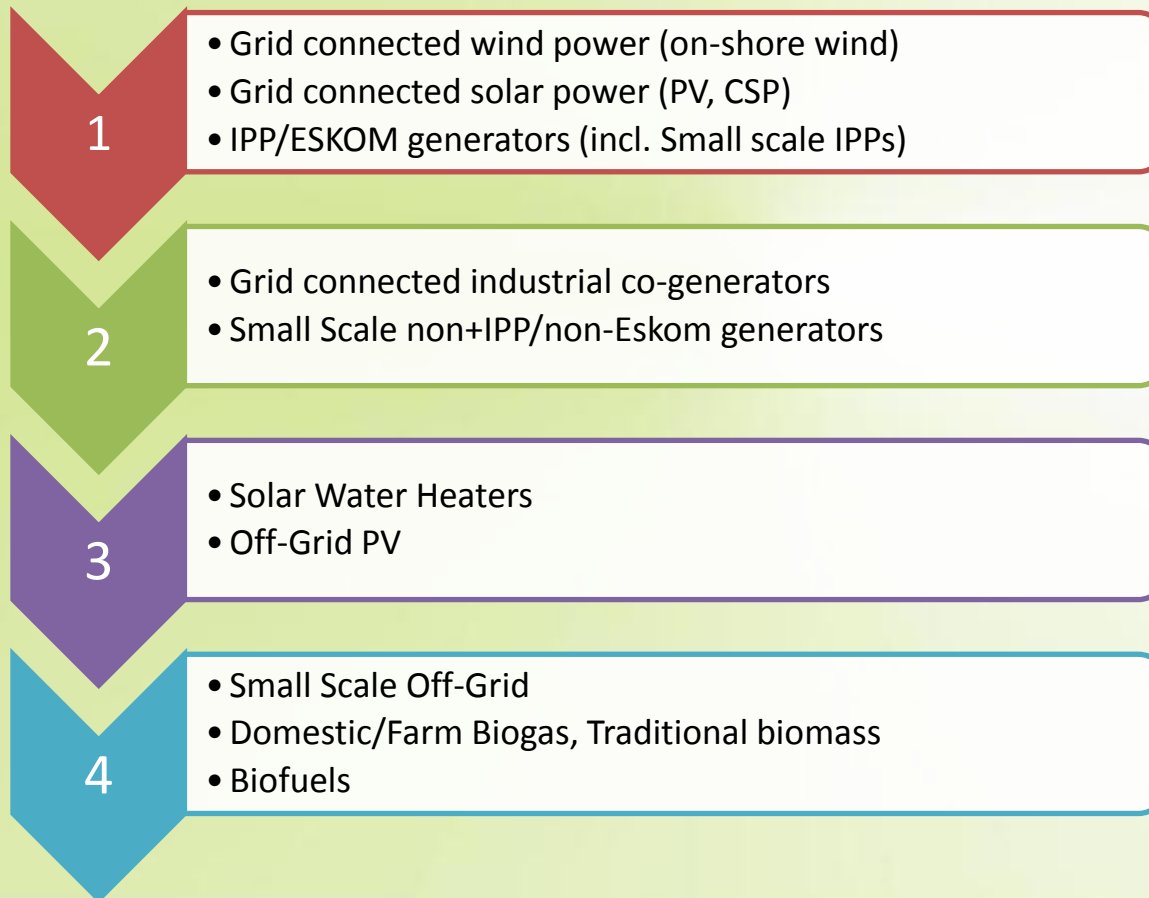
[Electricity production is dominated by wind and PV](#)
[Active total capacity totals almost 1900 MWp as of mid-2016](#)
[References and notes](#)

Technology

(All)



Priority RE data and data sources



Data Source

Eskom,
IPP

Eskom,
Nersa

DoE (INEP)
+PQRS

Nersa,
statsSA, DoE



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA