



Independent Power Producer Office

# Stakeholder Consultation Workshop: Preparation of the Second Edition of the State of Renewable Energy in South Africa Report Market Overview and Current Levels of Renewable Energy Deployment Maduna Ngobeni 25 November 2016

a partnership between



energy

Department:  
Energy  
REPUBLIC OF SOUTH AFRICA



national treasury

Department:  
National Treasury  
REPUBLIC OF SOUTH AFRICA



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# Outline

- **Energy policy context for the IPPPP**
- **IPP Office – mandate and role**
- **Market overview and renewable energy deployment**
- **Selected REIPPPP achievements**
- **Gains made by REIPPPP so far**
- **Potential losses to the country if the rest of the procured REIPPPP projects are not signed**
- **Potential total losses to the country (including losses from current procured projects not announced and not signed)**



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## Energy Policy Context of the IPPPP



# Regulatory Framework

- Energy Regulator Act
- Integrated Energy Plan (IEP)
- Integrated Resources Plan (IRP) 2010
  - Update in progress
- Ministerial Determinations
- Nersa concurrence
- Competitive Bidding
- Nersa licensing
- Nersa letter to Eskom confirming that they can sign the PPA with cost recovery.
- National Treasury 66/70 concurrence
- Department of Public Enterprise Section 54 approval
- Government Support Framework Agreement
- Implementation Agreement



# Energy Policy Context of the IPPPP

## Global context and commitments 1

### Global trends

Political Economic  
Social Environmental  
Technical Legal

### Global Commitments

COP 21 (UN Convention on Climate Change)  
Regional Integration  
Bilateral & Multi-lateral

## National strategies, plans, policy and processes 2

### National Development Plan (NDP)

Identifies long-term plans to meet SA's economic, social and environmental needs. Energy infrastructure is a critical component. The **NDP proposes diversity and alternative energy** resources and energy supply options, both in terms of power generation and the supply of liquid fuels.

### National Infrastructure Plan

17 Catalytic Strategic Infrastructure Plans (SIPs) for social and economic infrastructure across all 9 provinces

### National Legislation

Electricity Regulation Act (ERA) and Electricity Regulations on New Generation Capacity

### Integrated Energy Planning Processes

Long-term (2050) Integrated Energy Plan being developed - informed by key sectoral Masterplans and Road Maps (Gas, Liquid Fuels, Coal, Hydro, Renewables, etc.

### Integrated Resource Plan (IRP)

The IRP 2010 developed the preferred energy mix with which to meet the electricity needs over a 20 year planning horizon to 2030, and informs Ministerial Determinations on energy capacity. The IRP is currently being updated.

## IPPP Programme mandate 3

### Ministerial Determinations

14 725 MW for renewable IPPs  
15 390 MW for non-renewable IPPs

### DoE Strategic Plan

IPP Office planning informed by Department of Energy (DoE) 5-year plans



# IRP 2010 and Ministerial Determinations

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New build options

|       | Coal  | Import hydro | Gas – CCGT | Peak – OCGT | Wind  | CSP   | Solar PV |
|-------|-------|--------------|------------|-------------|-------|-------|----------|
|       | MW    | MW           | MW         | MW          | MW    | MW    | MW       |
| 2010  | 0     | 0            | 0          | 0           | 0     | 0     | 0        |
| 2011  | 0     | 0            | 0          | 0           | 0     | 0     | 0        |
| 2012  | 0     | 0            | 0          | 0           | 0     | 0     | 300      |
| 2013  | 0     | 0            | 0          | 0           | 0     | 0     | 300      |
| 2014  | 500   | 0            | 0          | 0           | 400   | 0     | 300      |
| 2015  | 500   | 0            | 0          | 0           | 400   | 0     | 300      |
| 2016  | 0     | 0            | 0          | 0           | 400   | 100   | 300      |
| 2017  | 0     | 0            | 0          | 0           | 400   | 100   | 300      |
| 2018  | 0     | 0            | 0          | 0           | 400   | 100   | 300      |
| 2019  | 250   | 0            | 237        | 0           | 400   | 100   | 300      |
| 2020  | 250   | 0            | 237        | 0           | 400   | 100   | 300      |
| 2021  | 250   | 0            | 237        | 0           | 400   | 100   | 300      |
| 2022  | 250   | 1 143        | 0          | 805         | 400   | 100   | 300      |
| 2023  | 250   | 1 183        | 0          | 805         | 400   | 100   | 300      |
| 2024  | 250   | 283          | 0          | 0           | 800   | 100   | 300      |
| 2025  | 250   | 0            | 0          | 805         | 1 600 | 100   | 1 000    |
| 2026  | 1 000 | 0            | 0          | 0           | 400   | 0     | 500      |
| 2027  | 250   | 0            | 0          | 0           | 1 600 | 0     | 500      |
| 2028  | 1 000 | 0            | 474        | 690         | 0     | 0     | 500      |
| 2029  | 250   | 0            | 237        | 805         | 0     | 0     | 1 000    |
| 2030  | 1 000 | 0            | 948        | 0           | 0     | 0     | 1 000    |
| Total | 6 250 | 2 609        | 2 370      | 3 910       | 8 400 | 1 000 | 8 400    |

- RE First Determination: 3 725 MW Aug 2011
- RE Second Determination: 3 200 MW Dec 2012
- RE Third Determination: 6 300 MW Apr 2015
- Solar Parks Determination: 1 500 MW May 2016

- Coal Domestic Determination: 2 500 MW Dec 2012
- Coal from Cross Border: 3 750 MW Apr 2016
- Imported Hydro Determination: 2 609 MW Dec 2012
- Gas Determination: 3 126 MW Aug 2015



# Summary of IRP Targets and Ministerial Determinations

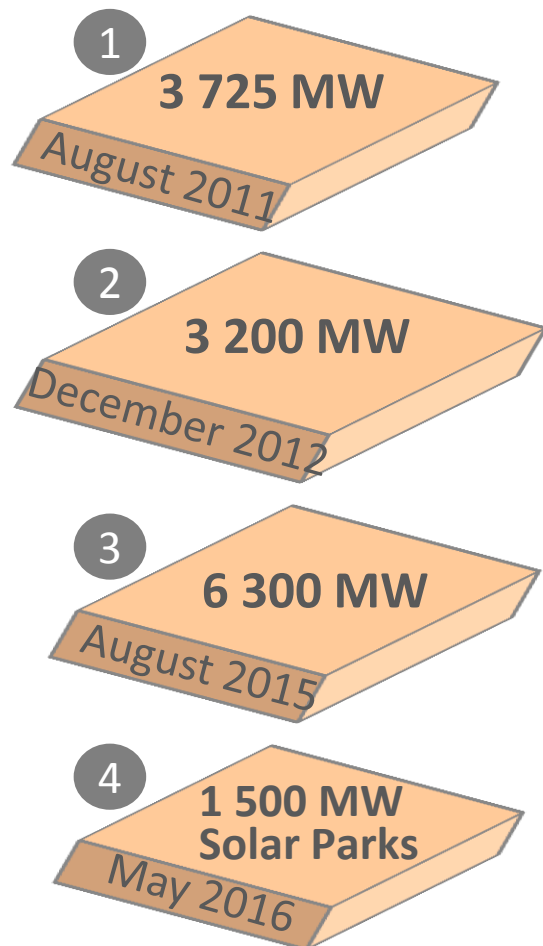
| Technology   | IRP targets by 2030 | IPP Determinations to be implemented by IPP Office |
|--|---------------------|--|
| <b>Renewable</b>   |                     |  |
| Wind   | 8 400               | 6 360  |
| CSP  | 1 000               | 1 200  |
| PV (including Solar Parks)   | 8 400               | 6 225  |
| Landfill, Hydro, Biomass   | 125                 | 940  |
| <b>Total RE</b>  | <b>17 925</b>       | <b>14 725</b>                                      |
| <b>Non renewable and cross border</b>                                |                     |  |
| Coal   | 6 250               | 2 500  |
| Cross-border Coal (part of total Coal target)                        |                     | 3 750  |
| Gas (Combine Cycle Gas Turbine CCGT and Open Cycle Gas Turbine OCGT) | 6280                | 3 726  |
| Cross-border Hydro   | 2 609               | 2 609  |
| Cogen  | * 1 500             | 1 800  |
| Nuclear  | 9 600               |  |
| Peaker Plants  | 1 020               | 1 005  |
| <b>Total Non-RE</b>  | <b>27 259</b>       | <b>15 390</b>                                      |
| <b>Total capacity</b>  | <b>45 184</b>       | <b>30 115</b>                                      |

\* Co-generation (Co-gen / Own-gen supply side options identified in Table 1 of Annexure E of IRP for reducing the medium-term supply demand shortfall – conservative view)



# REIPPP and Ministerial Determinations

## 14 725 MW Renewable Energy through 4 determinations



**PROCURED 6 376 MW to date through the rolling bid-window programme**

**6** Bid rounds **completed** Large REIPPP Bid Windows 1, 2, 3, 3.5, 4 Smalls BW1)

**102** Projects **signed** from Large REIPPP Bid Windows 1, 2, 3 and 3.5 (1 project)

**51** **Operational** IPPs - 2 738 MW reached Commercial Operation by 30 Sept 2016

**SIGNED 4 006 MW to date**

**64** Projects signed from Large REIPPP Bid Windows 1, 2, 3 and 3.5 (1 project)

**PROCURED, ANNOUNCED BUT NOT YET SIGNED 2 370 MW**

**38** Projects contracted from Large REIPPP Bid Windows 3 (1 project) and 3.5 (1 project) 4 (26 projects) and Smalls (10 projects)

**PROCURED, NOT YET ANNOUNCED 1 825 MW**

**19** Expedited Bid Window projects, with option to double-up to 28 projects totalling 3 550 MW

**PLANNED**

- Release Requests for Proposals for Large REIPPP Bid Window 5, Smalls Bid Window 3, and Solar Parks Programme



# Role of the IPPPP in the national planning context

## NDP

The National Development Plan (NDP) identifies the need for South Africa to invest in a strong network of economic infrastructure.

Energy infrastructure is a critical component.

The NDP requires the development of **10 000 MWs additional electricity capacity** to be established by 2025 against the 2013 baseline of 44 000 MWs.

## IRP

The Integrated Resource Plan (IRP) 2010 developed the **preferred energy mix** with which to meet the electricity needs over a 20 year planning horizon to 2030.

## Determinations

The DoE gazetted the **New Generation Regulations** under the Electricity Regulation Act (ERA) and made the following determinations to date:

- 14 725 MW RE
- 6 250 from coal-fired plants
- 1 800 MW of cogeneration under the MTRM plan
- 3 726 MW of Gas-fired power plants
- 2 609 MW of imported hydro

## IPPPP

The Independent Power Producer Procurement Programme (IPPPP) is a key vehicle for **securing electricity capacity** from the private Sector for **renewable and non-renewable energy sources** as determined by the Minister of Energy.



# Role and mandate of the IPPPP Office

- Primary mandate is to secure electrical energy from the private sector for renewable and non-renewable energy sources.
  - Established (Nov 2010) by the South African Department of Energy (DoE), National Treasury (NT) and the Development Bank of Southern Africa (DBSA)
- Designed to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

## Non Renewable Energy Procurement

- Coal (base load)
- Cogeneration
- Gas

## Renewable Energy Procurement

- REIPPP Programme (onshore wind, solar PV, CSP, small hydro, biomass, biogas, landfill gas)
- Small REIPPs
- Hydro
- Cogeneration (from agricultural waste / byproducts)

## Advisory services

- Gas Policy Framework
- Energy Solutions for the future
- Grid Development and Grid Code Enhancement
- Solar Water Heaters Repair and Replace
- Regulatory and legislative aspects impacting on the IPPPP

## Regional co-operation



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# Market Overview and Renewable Energy Deployment

# Major renewable energy milestones are being realised globally...



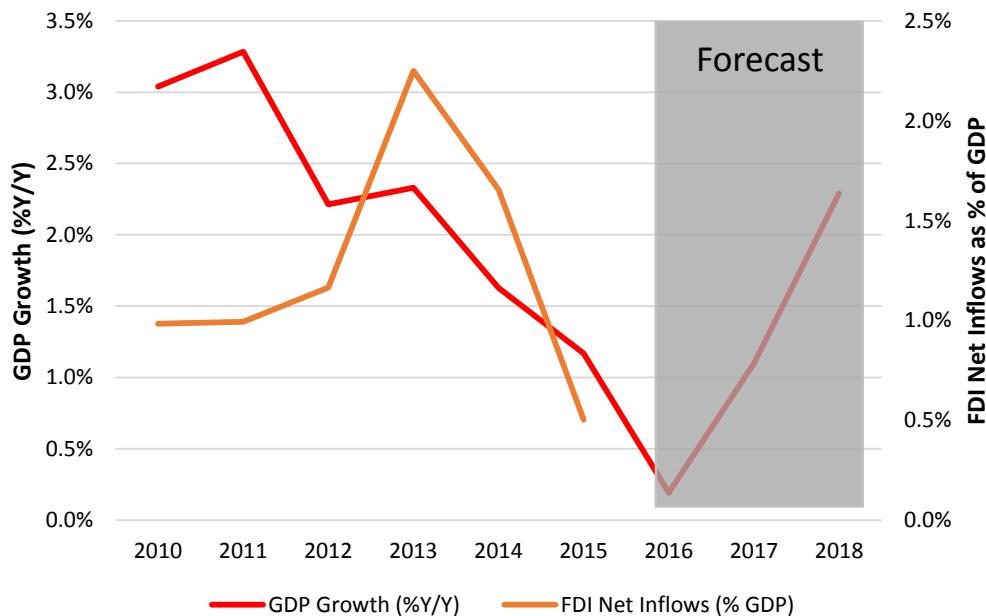


# ...and South Africa is following suit



# Macroeconomic Context

- Weak macroeconomic environment with year-on-year growth in Gross Domestic Product (GDP) expected around 0.2% in 2016 before improving.
- Similarly, net Foreign Direct Investment (FDI) Inflows as a share of GDP on the decline and equivalent to 0.5% of GDP in 2015.



Source: IHS Global Insight and World Bank Databank



# The REIPPPP as vehicle for RE procurement

**As at end September 2016...**

**6** bid rounds (bid windows 1, 2, 3, 3.5, 4 and 1S2<sup>1</sup>) **completed**

**102** **selected** as preferred bidders identified with...

**2 738** MW already **operational** from 51 IPPs

**460** bids received and **evaluated** (26.7 GW total capacity)

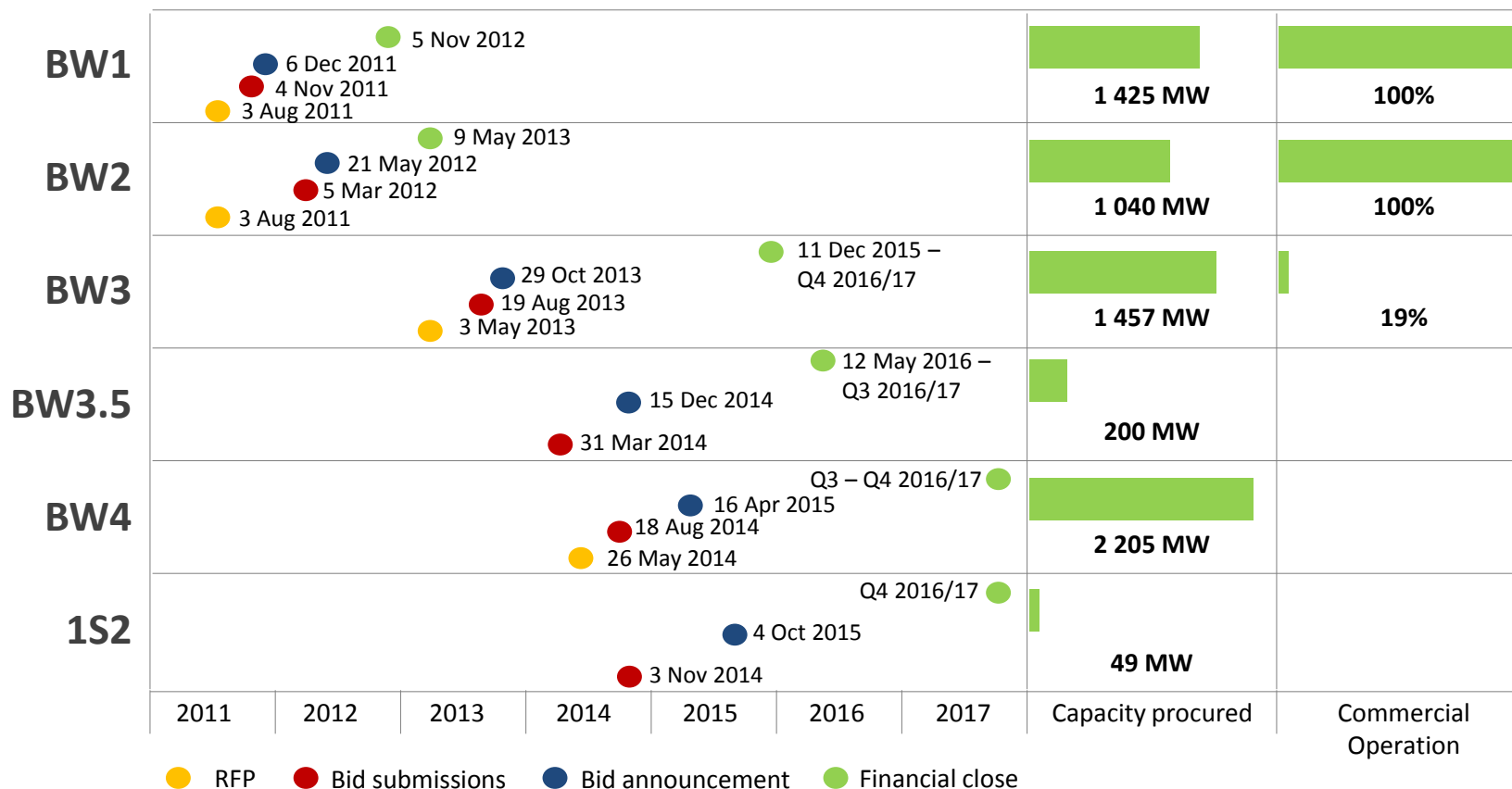
**6 376** MW electricity capacity **procured**

**R194 billion** investment attracted for energy infrastructure in bid windows 1 – 1S2

Note 1. bid window 1S2 | Small scale projects, first completed procurement window comprised of a two stage bidding process

# Progress of the current procured RE portfolio

## Procurement milestones and bid window status as at 30 September 2015

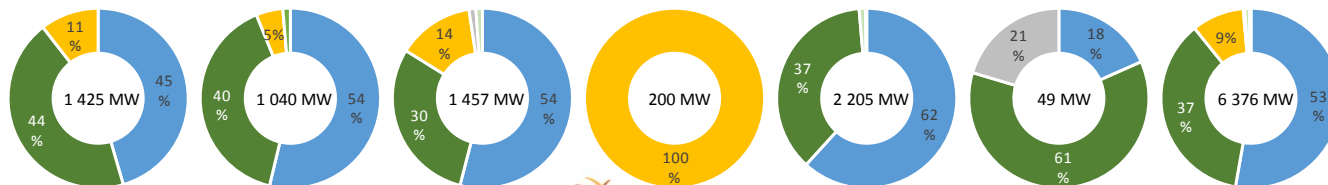




# RE capacity development is taking big strides

- 6 different renewable energy technologies with wind energy contributing more than half of total capacity, followed by solar PV

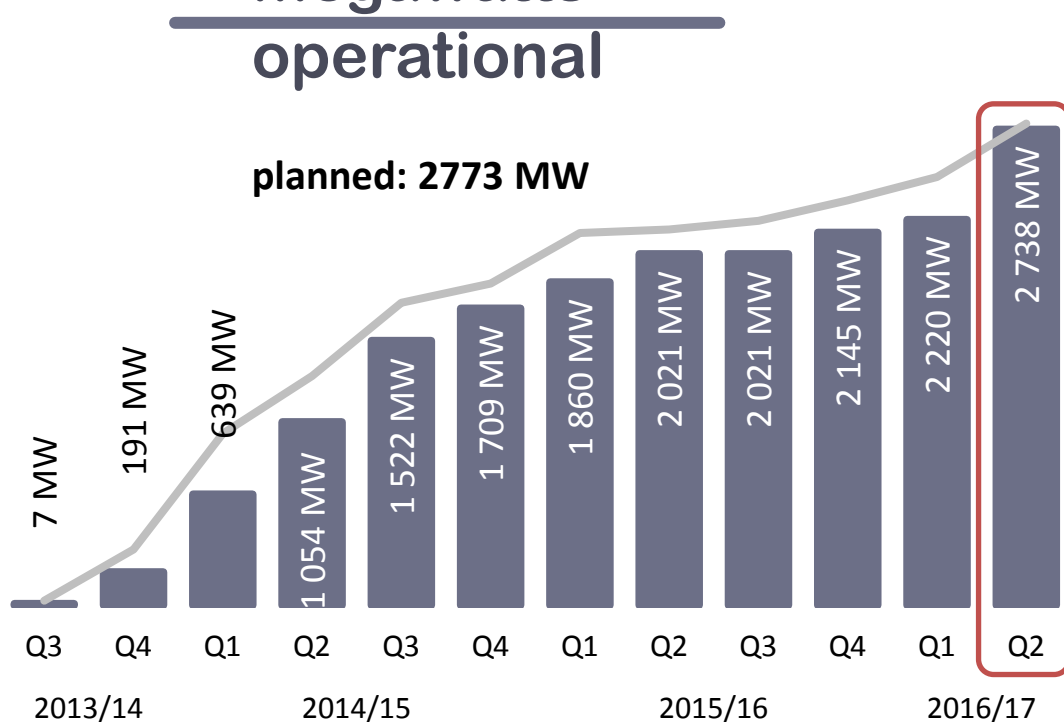
|                      | BW1            |                    | BW2            |                    | BW3            |                    | BW3.5          |                    | BW 4           |                    | Smalls         |                    | ALL            |                    |
|----------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|
|                      | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects | Capacity<br>MW | No. of<br>Projects |
| Wind                 | 648            | 8                  | 559            | 7                  | 787            | 7                  |                |                    | 1 362          | 12                 | 9              | 2                  | 3 365          | 36                 |
| Solar PV             | 627            | 18                 | 417            | 9                  | 435            | 6                  |                |                    | 813            | 12                 | 30             | 6                  | 2 322          | 51                 |
| Solar CSP            | 150            | 2                  | 50             | 1                  | 200            | 2                  | 200            | 2                  |                |                    |                |                    | 600            | 7                  |
| Landfill Gas         |                |                    |                |                    | 18             | 1                  |                |                    |                |                    |                |                    | 18             | 1                  |
| Biomass              |                |                    |                |                    | 17             | 1                  |                |                    | 25             | 1                  | 10             | 2                  | 52             | 4                  |
| Small Hydro          |                |                    | 14             | 2                  |                |                    |                |                    | 5              | 1                  |                |                    | 19             | 3                  |
| Contracted           | 1 425          | 28                 | 1 040          | 19                 | 1 457          | 17                 | 200            | 2                  | 2 205          | 26                 | 49             | 10                 | 6 376          | 102                |
| Commercial Operation | 1 415          | 28                 | 1 033          | 19                 | 289            | 4                  | 0              | 0                  | 0              | 0                  | 0              | 0                  | 2 738          | 51                 |



# The REIPPPP is bringing electricity online quickly and on time

**megawatts  
operational**

**planned: 2773 MW**



**98%**

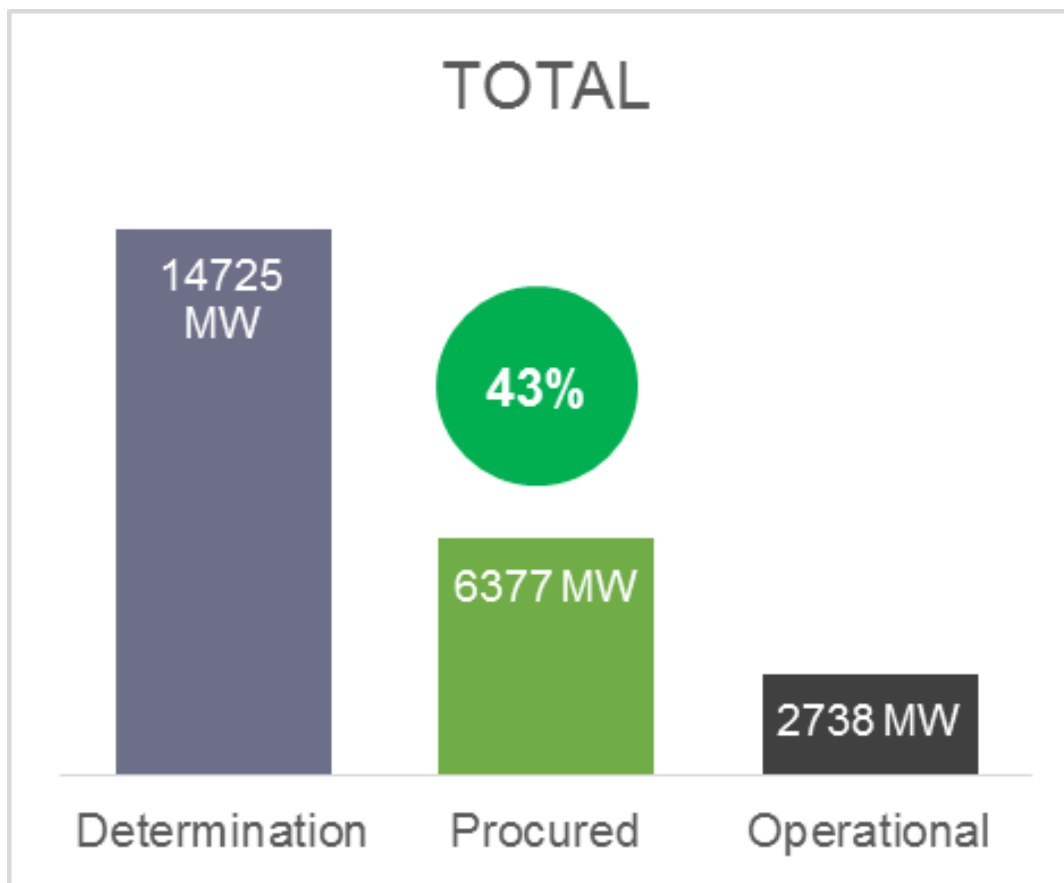
of IPPs have reached commercial operation as scheduled<sup>1</sup>

REIPPs have consistently delivered capacity according to schedule since the end of 2013, delivering critical generation capacity quickly and generally on time.

Note 1. prices expressed in 2016 terms, using April CPI to inflate; Note 2. Contracted price (at which power is sold to Eskom) per IPP was weighted with consideration of the technologies and their relative, projected annual energy contribution (P50) (in April 2016 terms). BW 3 estimated rate incorporates the peak tariff (270% of base rate) applicable to CSP. BW 3.5 is not included as it is technology specific.

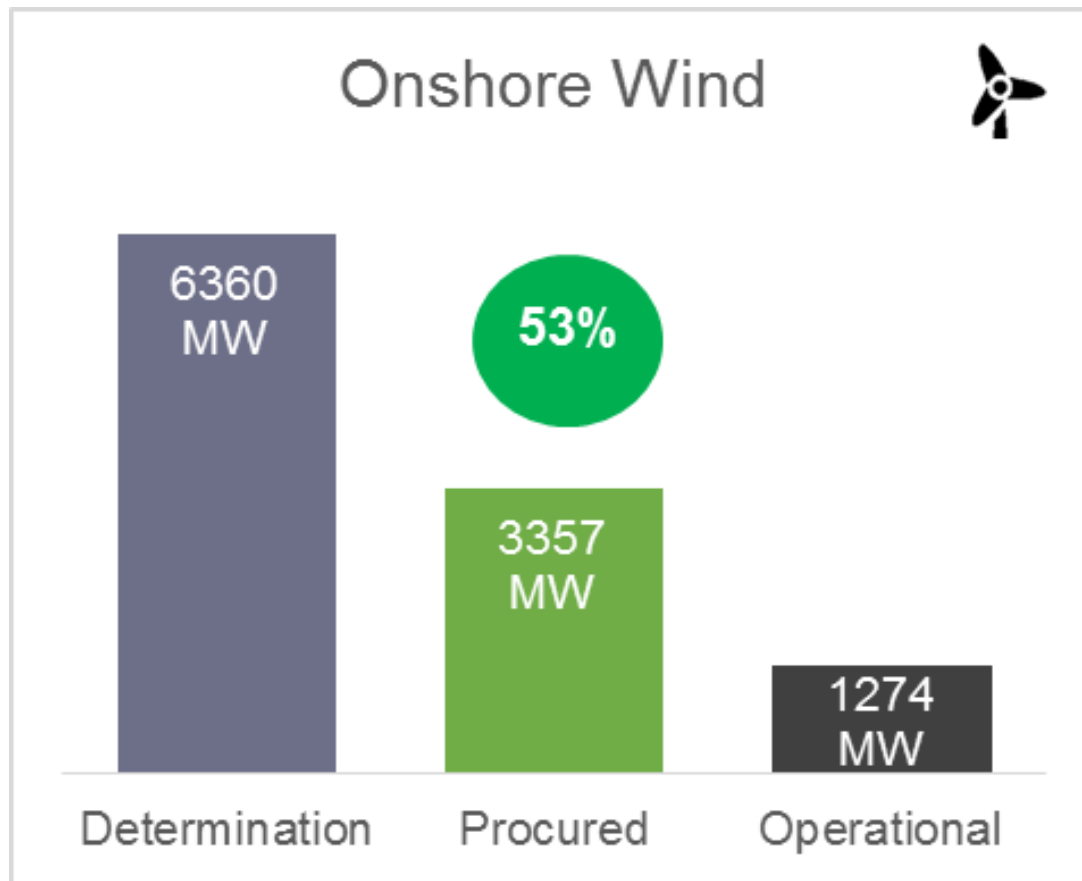
# REIPPPP Progress against determinations

## REIPPPP BW1 – 1S2



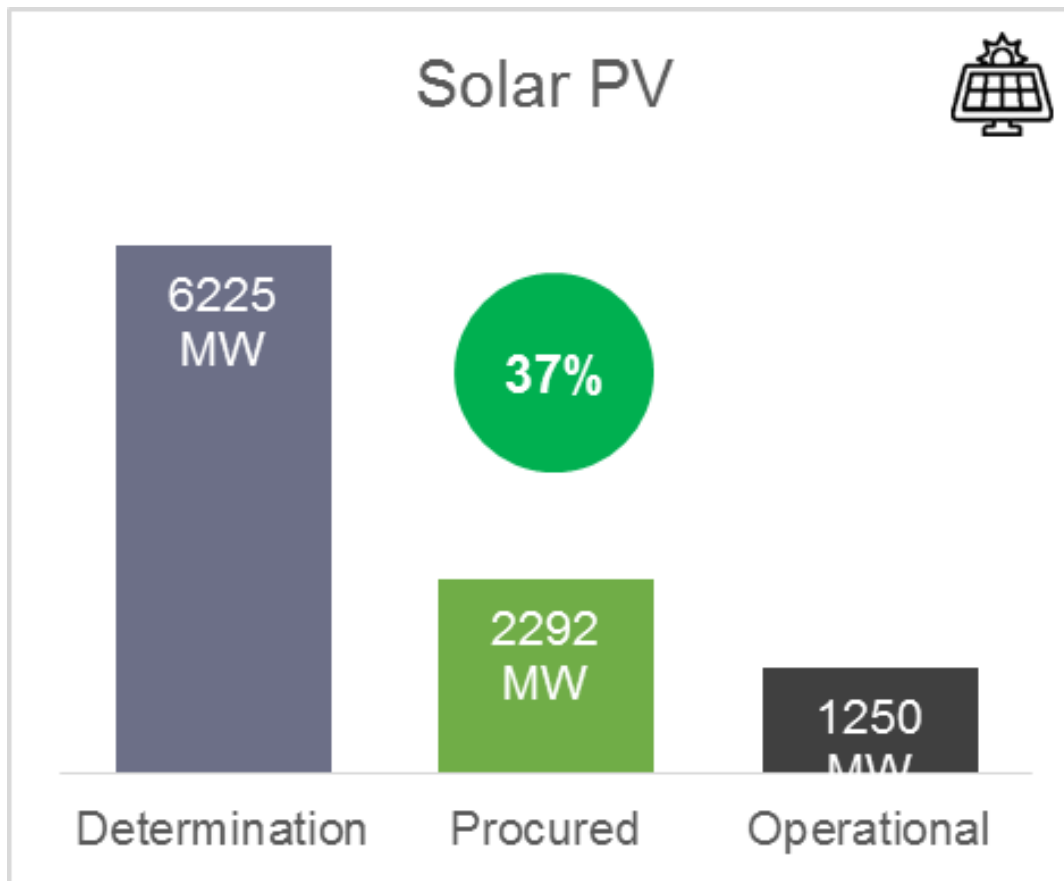
# REIPPPP Progress against determinations

## Wind



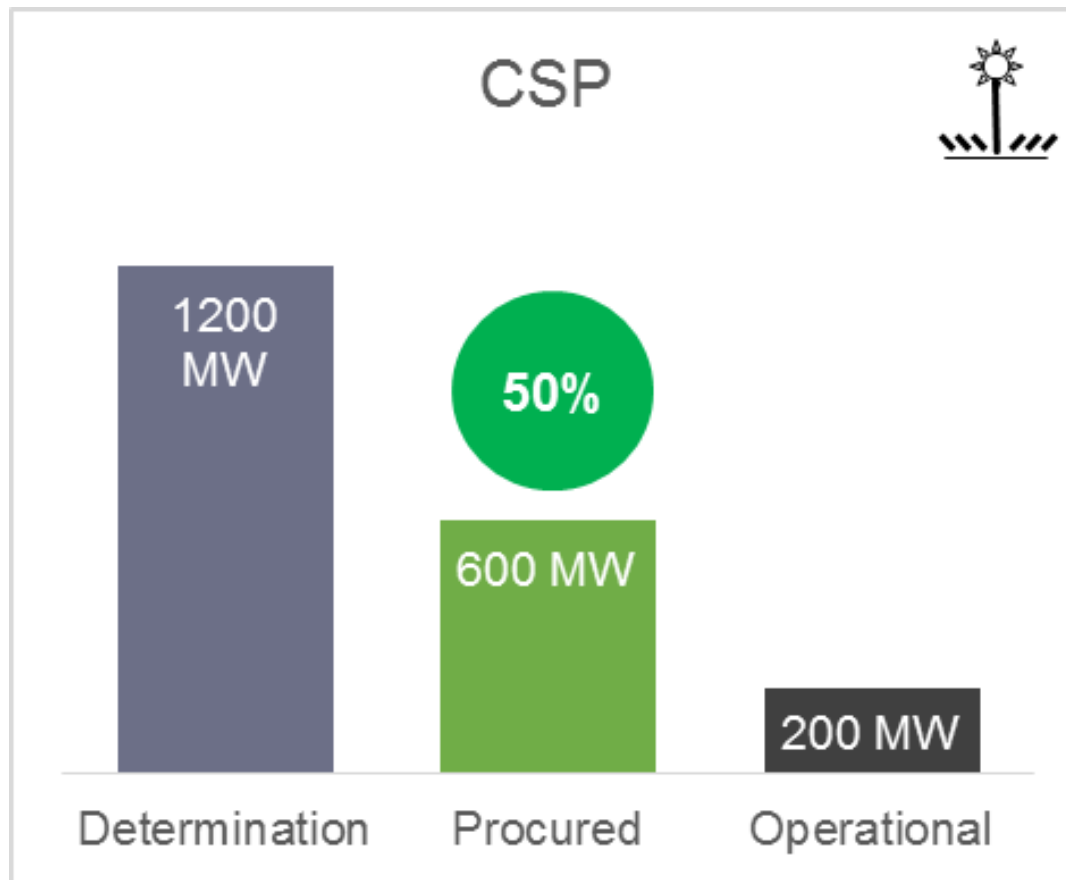
# REIPPPP Progress against determinations

## Solar PV

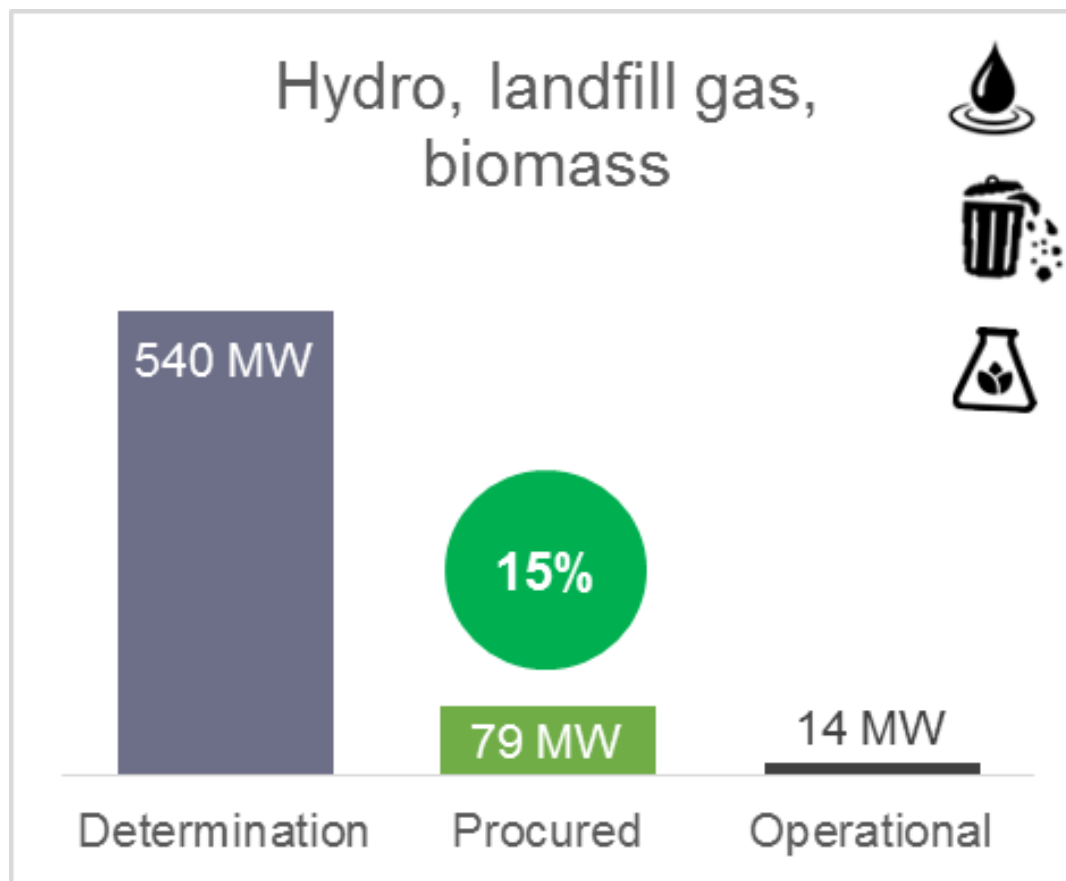


# REIPPPP Progress against determinations

## CSP

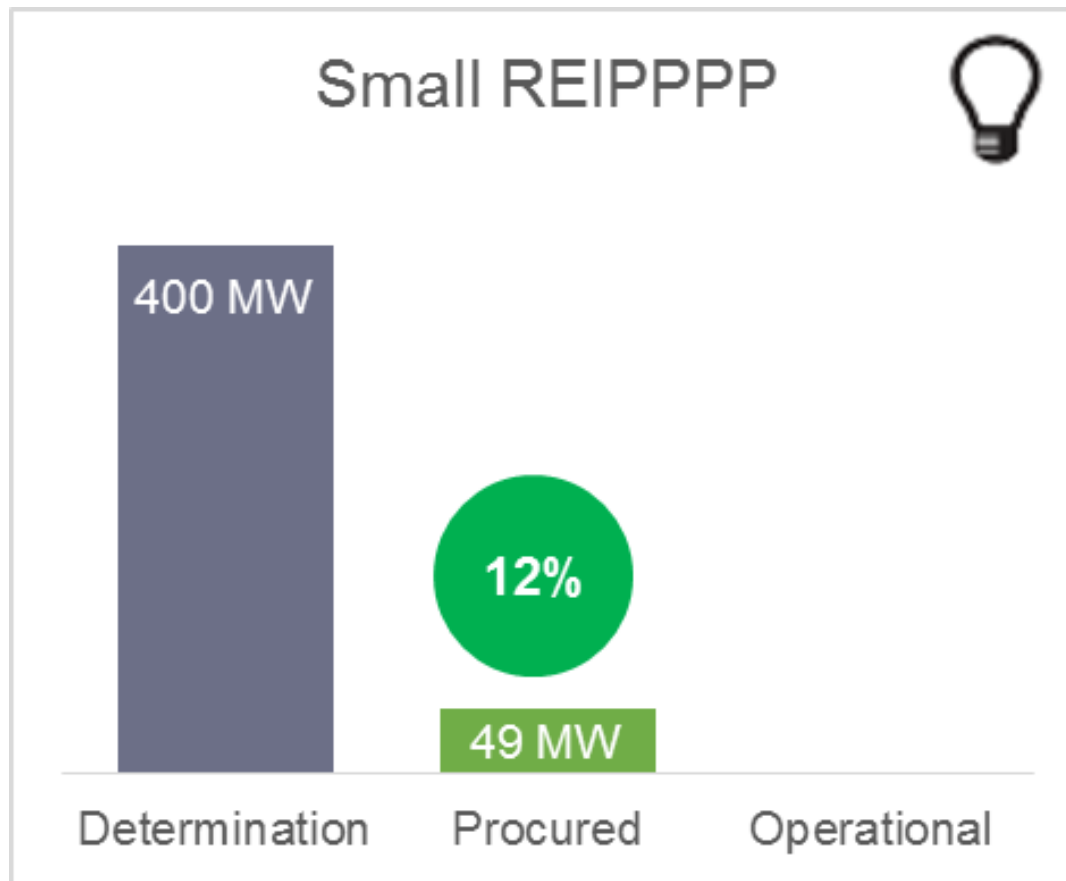


# REIPPPP Progress against determinations Hydro, Landfill gas, Biomass



# REIPPPP Progress against determinations

## Small REIPPPP

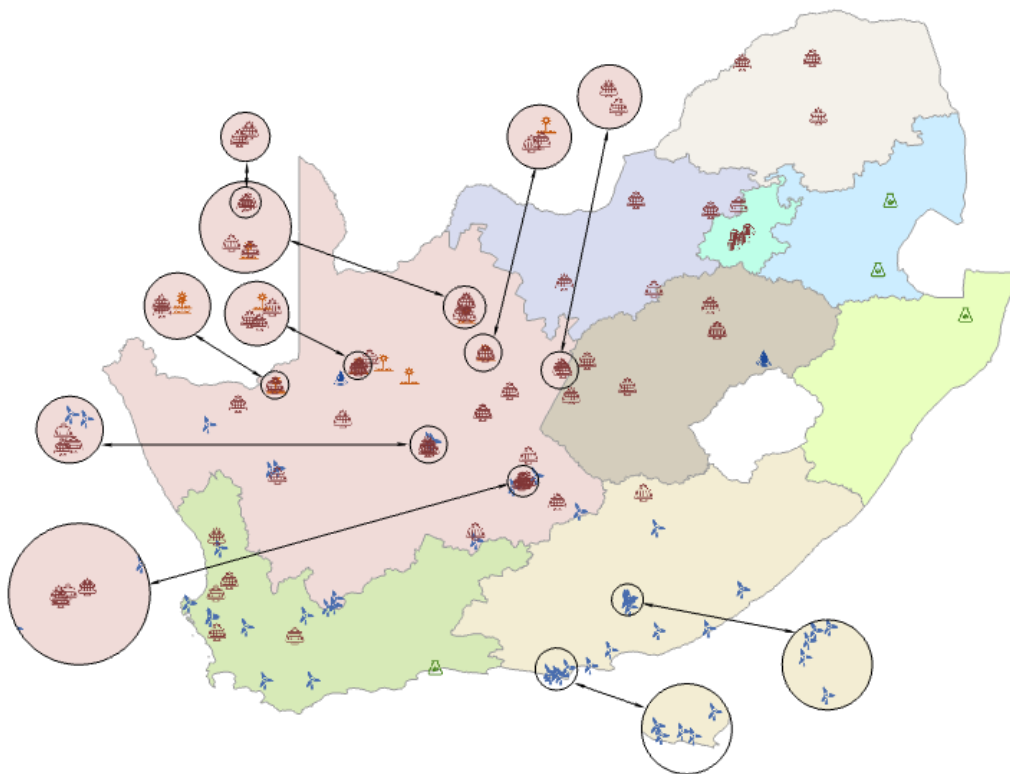






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# South Africa's growing RE footprint

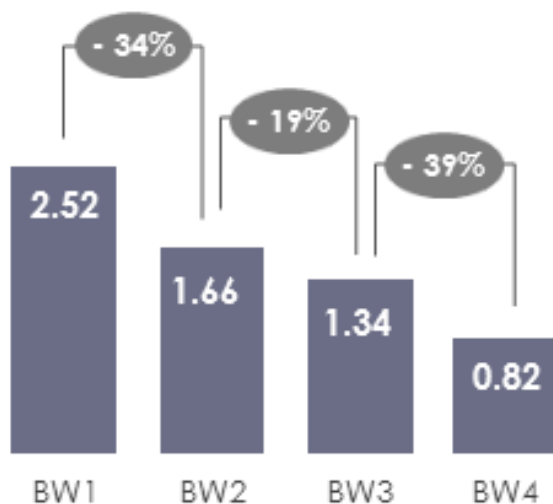


| IPP Project status                   | OW | PV | CSP | SH | LG | BM |
|--------------------------------------|----|----|-----|----|----|----|
| No financial close yet               |    |    |     |    |    |    |
| Under construction                   |    |    |     |    |    |    |
| Operational                          |    |    |     |    |    |    |
| Came online last quarter             |    |    |     |    |    |    |
| Expected to come online next quarter |    |    |     |    |    |    |
| Completed – no Grid connection       |    |    |     |    |    |    |

1 December 2016

# The REIPPPP is procuring energy at increasingly cost competitive rates

## portfolio price trend (R/kWh)



Prices stated in April 2016 terms. Energy weighted average (R/kWh) considering average technology RFP submission price (published) per BW and projected, annual energy contribution per technology type.

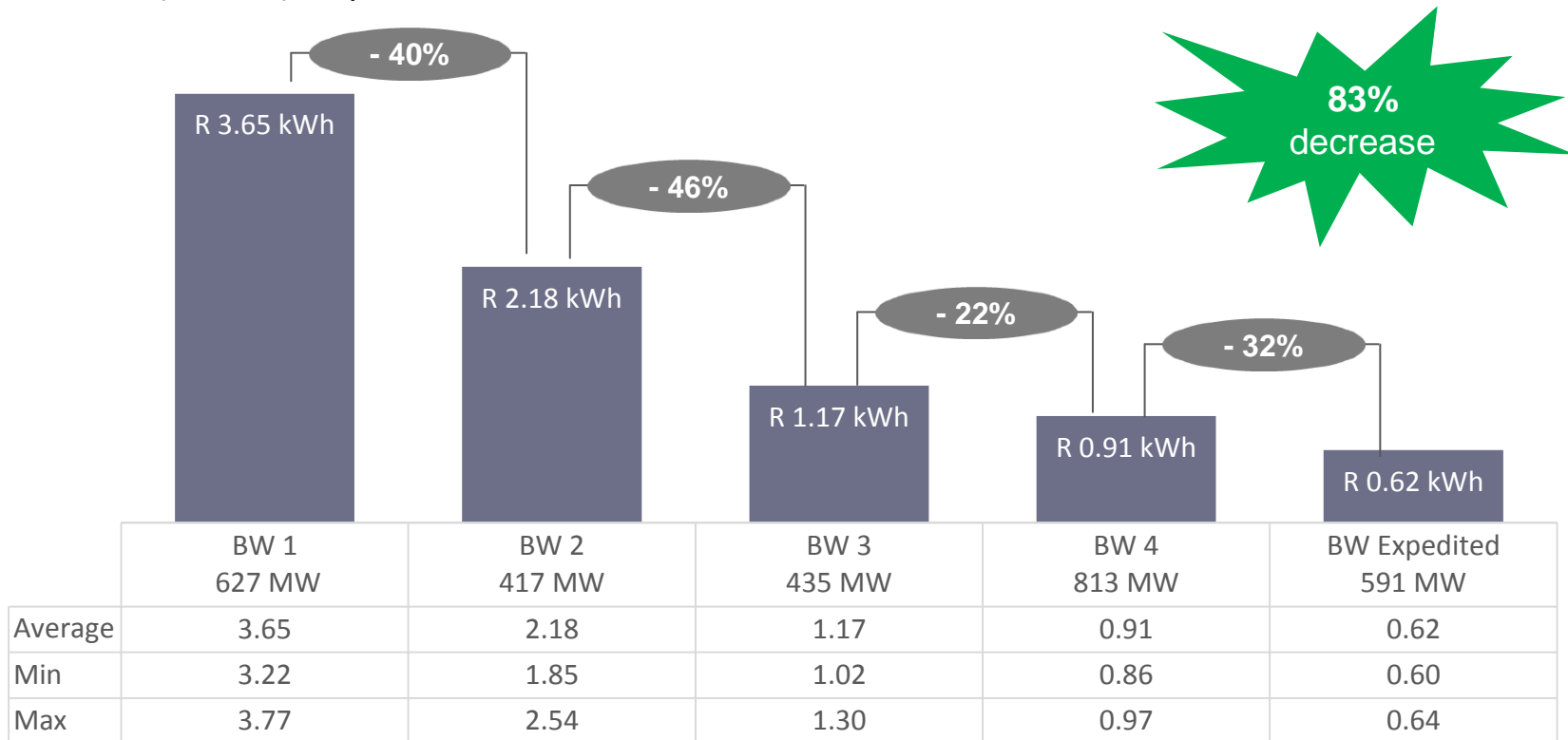
Contracted price (at which power is sold to Eskom) per IPP was weighted with consideration of the technologies and their relative, projected annual energy contribution (P50) (in April 2016 terms). BW3 estimated rate incorporates the peak tariff (270% of base rate) applicable to CSP. BW3.5 is not included as it is technology specific



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# Solar PV Price Trend

Price trend (R/kWh) - April 2016 terms - Solar Photovoltaic



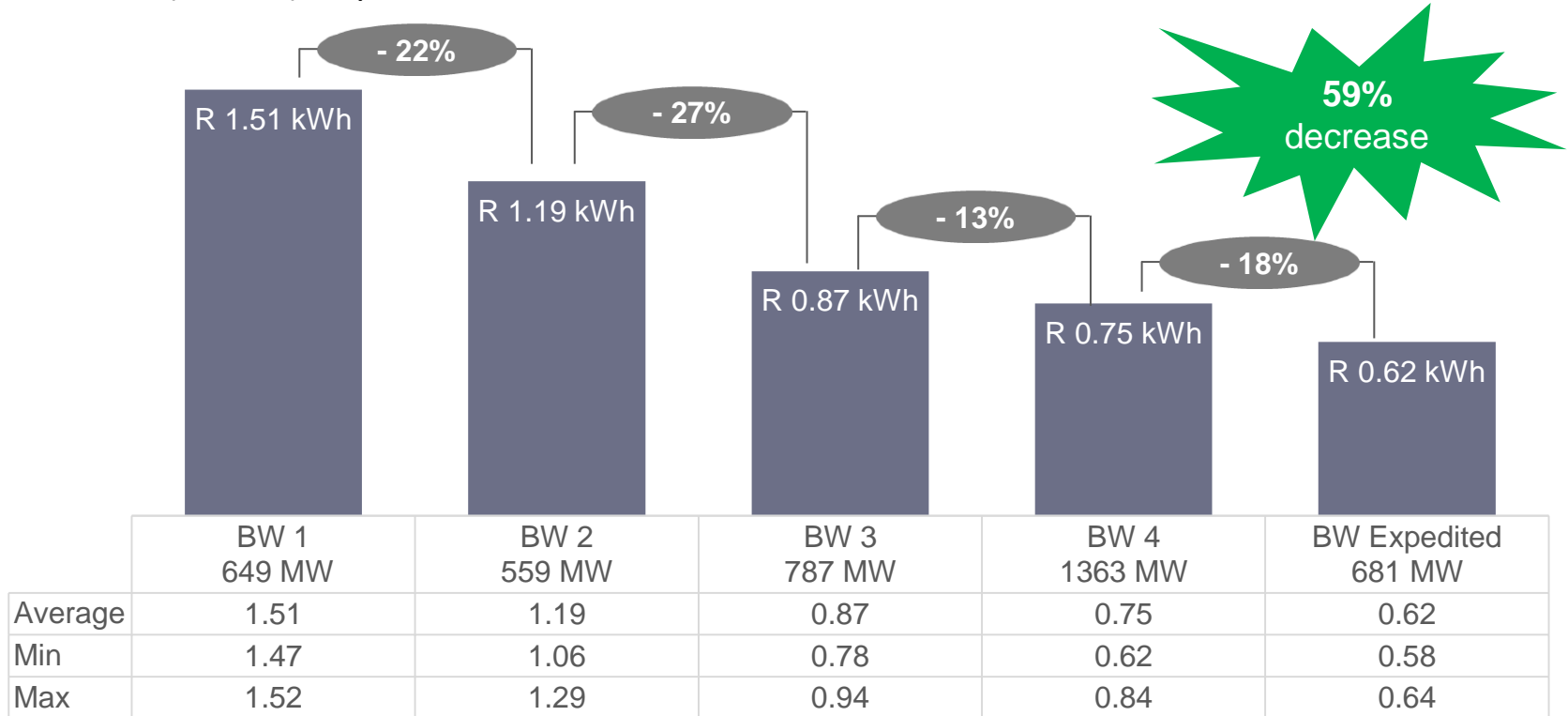
Note: All tariffs are contracted to increase by CPI or less per annum over the PPA term. 6 BW 2 and 1 BW 3 projects are partially indexed resulting in a reduced tariff in real terms over the PPA term. Further tariff reductions are possible through refinancing i.e. sharing of the refinancing gain with consumers.



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# Onshore Wind Price Trend

Price trend (R/kWh) - April 2016 terms - Onshore Wind



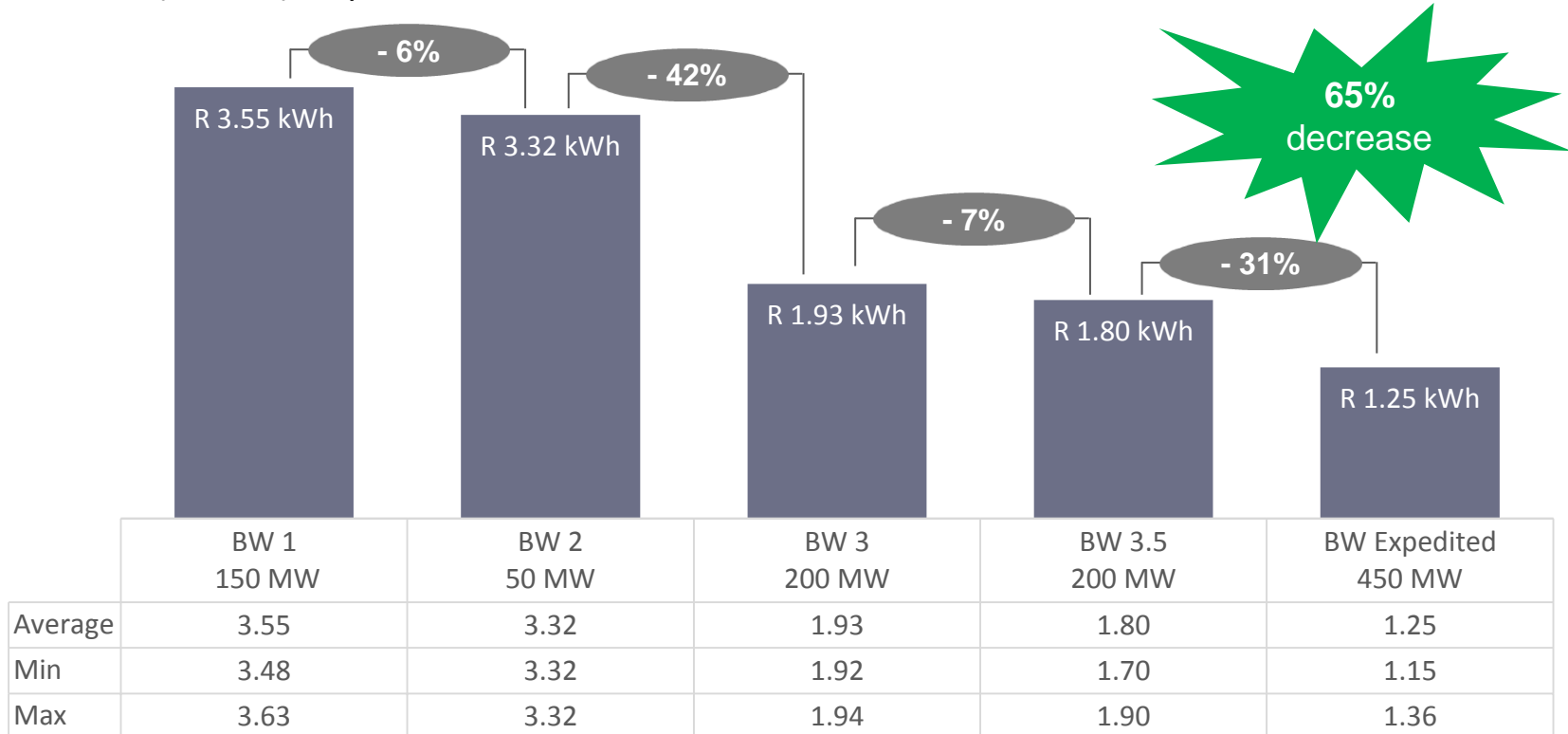
Note: All tariffs are contracted to increase by CPI or less per annum over the PPA term. 4 BW 2 and 1 BW 3 projects are partially indexed resulting in a reduced tariff in real terms over the PPA term. Further tariff reductions are possible through refinancing i.e. sharing of the refinancing gain with consumers.



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# CSP Price Trend

Price trend (R/kWh) - April 2016 terms - Concentrated Solar Power



Note: All tariffs are contracted to increase by CPI or less per annum over the PPA term. Further tariff reductions are possible through refinancing i.e. sharing of the refinancing gain with consumers. It should also note that BW1 and BW2 cannot be compared with the BW3 and later bid windows due to a structural change.



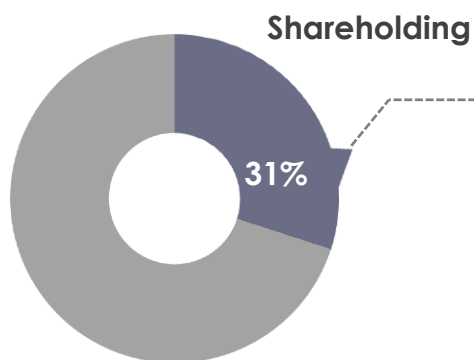
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## Selected REIPPPP Achievements

1 December 2016



# The programme is effectively contributing to broader development objectives in SA



Shareholding by Black South Africans across the complete supply chain (for the projects in BW 1, 2, 3 and 3.5 that reached financial close)



With 11% held by **local communities**

**51%** **local content** achieved in construction

**local content** reported as percentage of Total Project Value achieved during construction



**127 %**  
of planned employment achieved during construction (BW 1, 2, 3 and 3.5)

Even though BW 3 and 3.5 have only recently started construction, 27% more direct employment opportunities for South African citizens reported (26 207 actual vs 20 688 planned job years) during construction than originally projected by developers



+ **125% more** people from local communities employed by IPPs during construction than was contractually required



# Whilst securing equity for South Africans, the REIPPPP has also attracted significant FDI into the country

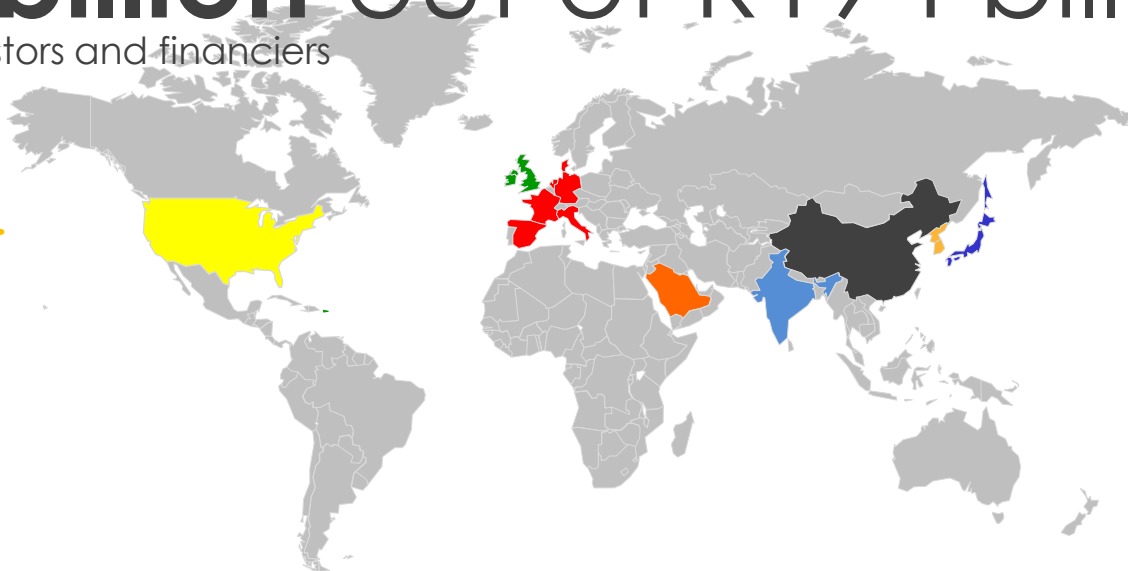
For bid windows 1 – 4 and small projects<sup>1</sup>

## R53.4 billion out of R194 billion

from foreign investors and financiers  
across the globe

i.e.:

**27.5%**



**Note 1.** Small projects bid window analysis included.





# Potential Macroeconomic Benefits from Renewable Energy Deployment

The impact if the global share of renewables in the energy mix is doubled<sup>1</sup> by 2030



**Global GDP**  
**0.6% increase<sup>2</sup>**  
of GDP by 2030



**Global Jobs**  
**24.4 million jobs**  
in RE by 2030



**Global Welfare<sup>3</sup>**  
**2.7% increase<sup>2</sup>**  
in welfare by 2030



**Investment in renewable energy is an investment  
in socio-economic development**



**SA GDP**  
**1.2% increase<sup>2, 6</sup>**  
of GDP by 2030



**SA Jobs<sup>4</sup>**  
**106 100 new jobs<sup>5</sup>**  
in RE by 2030



**SA Welfare<sup>3</sup>**  
**3.6% increase<sup>2, 6</sup>**  
in welfare by 2030

Accelerating the deployment of renewable energy will fuel economic growth, create new employment opportunities, enhance human welfare, and contribute to a climate safe future

**Image and data (unless stated otherwise) sourced from IRENA Measuring the Economics 2016 report.** **Note 1.** All impacts based on IRENA's REmap case (unless stated otherwise): The global share of renewables in the energy mix is increased to 36%. **Note 2.** The percentage increase impacts refers to the percentage change from the Reference Case. **Note 3.** The combined indicator for welfare considers a number of factors including: economic impacts based on consumption and investment; social impacts based on expenditure on health and education; and environmental impacts, measured as greenhouse gas emissions and materials consumption. **Note 4.** Greenpeace, South African Energy Sector Jobs to 2030. The figure is based on Energy [R]evolution scenario i.e. By 2030, renewable energy supplies 36% of South Africa's electricity. **Note 5.** In the [R]evolution scenario 72 400 new renewable energy jobs are created by 2030, and an additional 33 700 jobs could be created by 2030 by pursuing policies to boost South African renewable manufacturing capability. **Note 6.** Numbers derived from graphs provided in IRENA Measuring the Economics 2016 report.



## Gains made by REIPPPP so far (Commitments from signed projects)



## Gains made by REIPPPP so far

# 64 active projects

out of 102 projects procured  
by REIPPPP to date (in BW1 – 4 and smalls)

# 4 006 MW

out of 6 376 MW procured by REIPPPP  
to date (in BW1 – 4 and smalls)

The investments, from active projects in BW1 to BW3.5, will contribute to South Africa as follows:

ENERGY  
(P50)

# 11 784



gigawatt hours / a

### Investment

The REIPPPP has **attracted R135.6 billion in investment since inception** (from projects that have signed contracts in BW1 – 3.5). Of this, R35 billion (25.8%) is from foreign financiers and investors across the globe.

### Jobs

In only three years, the REIPPPP has **created 26 790 jobs** for SA citizens, of which 24 838 were in construction and 1 952 in operations.

The 64 active projects (that have signed contracts and commenced construction) have committed to create 57 627 jobs for SA citizens, but since IPPs have consistently been overachieving on job creation targets, it is expected that employment opportunities will grow beyond original expectations.

The programme is contributing to **youth (47% of jobs for youth) and women employment (10% of jobs for women of which 33% women in top management in construction and 32% in top management in operations)**



# Gains made by REIPPPP so far

## Localisation

- A total of R32.1 billion local content spend has been achieved in the REIPPPP.
- It is expected that the active projects will spend more than R42.5 billion on local content during construction.

## BBBEE

- The REIPPPP is creating opportunities for black industrialists. A total of R65.5 billion have been procured from BBBEE firms for the projects that have signed.

## Socio-Economic Development (SED)

- By June 2016, R216 million has been spent on socio-economic development by the 44 IPPs that have come into operation since November 2013.
- A total of R9.2 billion have been committed by the 64 active projects (projects that have signed contracts and have commenced construction) for Social Economic Development (SED), over the 20 years life-cycle of the IPPs.

## Enterprise Development (ED)

- By June 2016, the first 44 operational IPPs have spent R66.1 million on enterprise development.
- A total of R2.6 billion have been committed by active IPPs over the project 20 years life-cycle.

## Community Development

- The total commitment over the life-cycle of the active projects is R23.1 billion.



# Gains made by REIPPPP so far

## THE REIPPPP IS PROVIDING BENEFITS TO SEVEN OF NINE PROVINCES

**Commitments for bid windows 1, 2, 3, and 3.5 (by IPPs that have signed contracts)**

| Province      | Number of Projects | Contracted Capacity (MW) |
|---------------|--------------------|--------------------------|
| Northern Cape | 33                 | 2 127                    |
| Eastern Cape  | 13                 | 1 080                    |
| Western Cape  | 9                  | 453                      |
| Free State    | 4                  | 203                      |
| Limpopo       | 3                  | 118                      |
| Mpumalanga    | 0                  | 0                        |
| KwaZulu-Natal | 0                  | 0                        |
| Gauteng       | 1                  | 18                       |
| Northwest     | 1                  | 7                        |



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**THANK YOU**