Independent Power Producer procurement – Improving integration with municipal distributors

A partnership between:

Department of Energy

National Treasury

Development Bank of Southern Africa

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IPP Office

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Role of private sector in procurement of energy

• Our present **generation constraints** are severe and debilitating
• IPPs in partnership with Eskom provide a **sustainable and complementary solution** to our electricity generation requirements
• The introduction of private sector electricity generation (complementary to Eskom) offers **multiple benefits**: 
  – **Diversifying** both the supply and nature of energy production,
  – **Introducing** of **new skills and in new investment** into the industry, and
  – **Benchmarking** of performance and pricing.
Context for the IPPPP (Independent Power Producer Procurement Programme)

• A significant share of South Africa’s electricity generation is already produced by Independent Power Producers (IPPs)
• Required a framework for the procurement of electricity - IPPs to sell power (to Eskom)
• We have a world-class IPP procurement programme, the results of which have saved South Africa money and reduced load-shedding
• IPP procurement is being driven by the “IPP Office”
Role and mandate of the IPP 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.
Procured RE generation capacity

REIPPPP capacity procured

Capacity (GW)

17.8 GW by 2030 (IRP, NDP)

7 GW procured by 2019 to be operational by 2020 (NDP)

6.9 GW determined

6.3 GW procured (BW 1, 2, 3, 3.5 & 4)

1.9 GW commissioned (operational¹)

Note 1. As at June 2015
IPP competitive tendering
(Bid Windows)

• IPP procurement has been designed with a **rolling bid-window programme** format which:
  – attracts **continued market interest**
  – induces increased **competitive pressure** amongst bidders to offer reduced pricing
  – allows for **improvements and lessons** learnt with each bid window to be incorporated in the refinement of procurement documentation in the following bid-windows
  – uses **standard contracts that avoid negotiations and enables consistency**
IPP competitive tendering (Bid Windows) cont...
Design of the programme **aligns with the National Development Plan** to set in motion a virtuous cycle of development growth by recognising the inter-dependency between the desired Vision 2030 outcomes and the socio-economic commitments made by the IPPs in relation to:

– **job creation and skills development**
– economic interest participation by **previously disadvantaged persons and local communities**
– **localised** spend and procurement
– as well as the general **improvement of the lives of people**, for example through access to health and education
IPP competitive tendering (Procurement of electricity)

• The IPP programme **procures electricity, not a power station:**
  – IPP determines the **plant location and design** (the IPP sits with the associated risks)
  – IPP determines how the plant is **designed, constructed and operated**
  – IPP manages the **risk of delays and cost overruns** (impacts their profitability)
  – IPP gets **paid for electricity generated** (drives efficiency and delivery)
  – The **tariff paid to the IPP is firm and fixed** for the duration of the Power Purchase Agreement (PPA). The consumer is protected from price increases
To date there have been **5 Bid Windows (BW)** of the REIPPPP...

<table>
<thead>
<tr>
<th>Bid Window</th>
<th>Submission Date</th>
<th>Preferred Bidders</th>
<th>Contracted Capacity</th>
<th>PPAs Signed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BW 1</strong></td>
<td>4 November 2011</td>
<td>28</td>
<td>1 425 MW</td>
<td>5 November 2012</td>
</tr>
<tr>
<td><strong>BW 2</strong></td>
<td>5 March 2012</td>
<td>19</td>
<td>1 040 MW</td>
<td>9 May 2013</td>
</tr>
<tr>
<td><strong>BW 3</strong></td>
<td>19 August 2013</td>
<td>17</td>
<td>1 457 MW</td>
<td>11 December 2014 (except 2 projects to be signed by mid 2015)</td>
</tr>
<tr>
<td><strong>BW 3.5</strong></td>
<td>31 March 2014</td>
<td>2</td>
<td>200 MW</td>
<td>Expected mid 2015</td>
</tr>
<tr>
<td><strong>BW 4</strong></td>
<td>18 August 2014</td>
<td>26</td>
<td>2 205 MW</td>
<td>7 June 2015</td>
</tr>
</tbody>
</table>

...contribute**ng 6 327 MW** in total
REIPPPP Programme successes (up to June 2015)

WITH ONLY THE FIRST 37 IPPs CONNECTED TO THE GRID BY JUNE 2015, THE REIPPPP IS ALREADY CHANGING THE SOUTH AFRICAN ENERGY LANDSCAPE FOR THE BETTER

- **4.4m Tons CO₂ savings**

- **4.3 Terrawatthours**
  Power generated to date using renewable energy procured by the REIPPPP

- **4.0 Rand billion**
  More in financial benefit for the country than its cost

- **1.3 million**
  Homes equivalent powered by electricity generated from RE

- **19 033 job years**
  Employment opportunities for South African citizens during construction and operation

Note 1. Calculated financial benefit (As a result of fuel savings when displacing coal and diesel powered alternatives and the economic benefit of avoiding unserved energy during severe shortfalls – what would have resulted in power cuts if RE was not available) minus tariff payments made to IPPs (not reflecting any socio economic or secondary industry benefits); Assessment concluded by Council of Scientific and Industrial Research (CSIR), published August 2015. Note 2. Annual consumption per household based on Eskom data for residential sector. Note 3. Equivalent of a full time employment opportunity for one person for one year.
The REIPPPP has attracted significant investment in BW 1, 2, 3, 3.5 & 4

<table>
<thead>
<tr>
<th>Planned</th>
<th>Actuals²</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Total project cost ¹)</td>
<td>(Achieved during construction phase)</td>
</tr>
<tr>
<td><strong>Total project costs</strong></td>
<td><strong>45</strong> Rand billion</td>
</tr>
<tr>
<td>- 193 Rand billion</td>
<td></td>
</tr>
<tr>
<td><strong>Local content</strong></td>
<td><strong>Local content to date</strong></td>
</tr>
<tr>
<td>- of which locally procured 65 Rand billion</td>
<td>- 22 Rand billion</td>
</tr>
</tbody>
</table>

Note 1. IPP data reflects cumulative values over the construction phase and projected operational life (production phase) of the projects (i.e. 20 years). Note 2. Actuals reported for period up to June 2015
Pleasing renewables price path

**Note 1.** Contracted (at which power is sold to Eskom) price (in 2015 terms) per IPP was weighted with consideration of the technologies and their relative, projected annual energy contribution (P50). BW3 estimated rate incorporates the peak tariff (270% of base rate) applicable to CSP.

**Note 2.** MAC Consulting report (extract presented by Eskom), EIUG analysis on a levelised cost scenario of Eskom’s New Build programme, NERSA media statements (2012). Latest industry estimates are about R1.05/kWh (SAWEA), i.e. R1.23/kWh in April 2015 terms.

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**REIPPPP estimated price trends**

Energy weighted average (R/kWh)

- BW 1: 2.37
- BW 2: 1.56
- BW 3: 1.26
- BW 4: 0.77
- Medupi: 1.14
- Kusile: 0.86
- MedupiE: 0.63

**Note:** REIPPPP prices expressed in April 2015 terms
Non-Renewable IPPs

- In May 2011, the DoE gazetted the New Generation Regulations under the Electricity Regulation Act (ERA). This includes:
  - 2 500 MW designated from coal-fired plants
  - 800 MW of cogeneration increased to 1800MW
  - 3 126 MW of Gas-fired power plants
- The IPP base-load Coal Programme was released in Dec 2014. It follows the successful bid window approach implemented in the Renewable Programme
- Co-generation Programme released in June 2015
- Gas Programme is due to be released shortly
The REIPPPP inherently targets large utility scale renewable energy projects that are generally located in rural areas supplied directly by Eskom. Exceptions include the landfill gas projects.

The Cogeneration “cogen” Programme is anticipated to see increasing numbers of projects within municipal distributors.

There is a need for increased communication and integration with Municipal Distributors.

The remainder of this presentation is focused on the Cogen Programme and some of its salient design features.

Further engagement is required with the Municipal Distributors....
Contracting arrangements examples

- Eskom (Buyer)
- Water Authority/Municipality
- Project Company
  - Water Supply Agreement
  - O&M Agreement
  - EPC Agreement
  - EPC contractor
  - O&M contractor
- Implementation Agreement
- RSA Government
- Lenders
- Financing
- Lease/Land Purchase
- Land owner
What is “CoGen”?

• “CoGen” is the **generation of electricity** from a generation facility that is **integrally linked to a host industrial process** and is classified under the following technologies:
  – Type 1: *Waste to Energy*
  – Type 2: *Combined Heat and power*
  – Type 3: *Industrial biomass*
Type 1: Waste to Energy

- Characterized by an energy resource that consists of waste heat or gases from an industrial process
- Energy resources may be either high temperature exhaust gases that feed a heat recovery steam generator, or gases that may be used as a fuel as they contain a combustible component.
Type 2: Combined Heat and Power

- Simultaneously **produce heat/steam for the underlying host industrial process (Host) and electricity for Host consumption**, with any excess electricity available for export into the grid.
Type 3: Industrial Biomass

- Utilise **renewable fuel such as by-products from the pulp and paper industry or the sugar industry** and can use agricultural or forestry residue of the primary inputs to the industrial process.
CoGen Bid Window 1
Procurement of “quick energy”

- BW1 focused on the **procurement of additional energy** from existing generators
- Designed to procure additional energy **in excess of an existing “base-line”** from existing “brown-field” cogen installations
- Maximum **12 Month duration from bid award to Commercial Operation**
- **Minimalist approach** for bid development and submission
- **Tariff Cap** applied to each Technology Type
- Energy must be **supplied into the Host Facility**
Electrical Connection

Utility SS

Host Distribution Network

System Meter

“PPA” Facility Meter (Main and Check)

Transformer

Point of Connection (Grid Code Compliant)

Delivery Point (PPA meter point)

Facility Generator 1

Facility Generator 2

Facility Generator X

towards sustainable energy
Energy baseline

Aggregate of Year -5 is Baseline Annual Energy Output

Energy Output profile of Year -5 is adopted as the Baseline Monthly Energy Output
Grid Connection

- Grid upgrades are **scoped by the Network Service Provider** via the typical grid connection application and quotation processes.
- The IPP **development timeframes** and scheduled commercial operation date would **need to consider grid timeframes**.
- Any **grid upgrades may be a key constraint** of the Cogen Programme delivery, and requires careful consideration.
- Even **if there is no export of power** into the utility grid (all Cogen power is consumed by the Host Plant), it is plausible that **grid upgrades may still be required** given that the generation may impact network fault levels, power quality and protection.
- Prospective IPPs have been informed of this potential dependency, and have been encouraged to **engage accordingly with their Network Service Provider**.
Codes and Agreements

• CoGen facility must be **compliant with the RSA Grid Code and the Utility Interconnection Standards**

• The agreements that will need to be entered into include:
  
  – **Supply, Connection and Use of System Agreements** between the Host Facility and the Municipal Distributor
  
  – **Reconciliation Agreement** between the **Host Facility and Municipal Distributor**
  
  – **Reconciliation Agreement** between the **Municipal Distributor and Eskom**
Reconciliation of accounts

Eskom Municipal billing Adjusted by Cogen production

Host Facility billing adjusted by Cogen production

Reconciliation Agreement sets out the terms and conditions on which the energy purchased by Eskom is to be added back onto the Host Facility’s electricity account.

Physical Power Flows
Way forward

- IPPs are already playing an important role in the South African generation mix
- Dispersed generation, embedded in Distributor Networks, will increase
- Such generation presents Distributors with challenges and opportunities
  - Introduces new potential revenue streams (Generation and Wires Charges)
  - Supports efficiency and sustainability
- Municipal Distributors will need to play an increasingly important role
- Need to improve communication and integration with Municipal Distributors
Thank you for your attention
Pleasing renewables price path

The REIPPPP is delivering energy at increasingly cost competitive rates

<table>
<thead>
<tr>
<th></th>
<th>BW1</th>
<th>BW2</th>
<th>BW3</th>
<th>BW3.5</th>
<th>BW4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onshore Wind</strong></td>
<td>1.42</td>
<td>1.12</td>
<td>0.82</td>
<td>0.71</td>
<td></td>
</tr>
<tr>
<td><strong>Solar PV</strong></td>
<td>3.44</td>
<td>2.05</td>
<td>1.10</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td><strong>Solar CSP</strong></td>
<td>3.35</td>
<td>3.13</td>
<td>1.82</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td><strong>Landfill Gas</strong></td>
<td></td>
<td></td>
<td>1.04</td>
<td>1.52</td>
<td></td>
</tr>
<tr>
<td><strong>Biomass</strong></td>
<td></td>
<td></td>
<td>1.55</td>
<td>1.17</td>
<td></td>
</tr>
<tr>
<td><strong>Small Hydro</strong></td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Key REIPPP Energy Triangle\(^1\) facts
(for period 11/2013 – 06/2015)

4 294 GWh
\(^{REIPPP}\) Actual energy contributed to National Grid
of which
1 991 GWh
Wind (46%)
2 219 GWh
Solar PV (52%)
62 GWh
CSP (1.5%)
22 GWh
Small Hydro (0.5%)

15% of the Renewable Energy production is available during system peak time (as defined by the Megaflex tariff)

R 9.2 billion
\(^{REIPPP}\) Total payment to all IPPs
of which
R 2.4 billion
In this reporting quarter

4.4 Mton CO\(_2\) equivalent RE emissions reduction achieved relative to Eskom generated power (grid EF of 1.015 tCO\(_2\)/MWh\(^3\))

Contributing to socio-economic and enterprise development

<table>
<thead>
<tr>
<th>Planned</th>
<th>Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic development</td>
<td>19 Rand billion</td>
</tr>
<tr>
<td>Enterprise development</td>
<td>6 Rand billion</td>
</tr>
</tbody>
</table>

Note 1. 20 years operational life. Note 2 Actuals will grow exponentially as more projects reach COD; Actuals reported for period up to June 2015

Actuals:
- R 76 million (contributed by 37 of 62 operational IPPs that have come online over the last few months)
- R 31 million (contributed by 37 of 62 operational IPPs that have come online over the last few months)