Perspective of an IPP (Independent Power Producer) in the North West Province

Pravin Semnarayan
Content

• Momentous Energy Developer Overview

• RustMo1 Solar Farm in Rustenburg

• IRP 2030

• Public and Private Sector Programmes

• Opportunities in the Energy Sector
SA DoE Renewable Energy Framework

- Department of Energy: Implementation Agreement (IA)


- IA and PPA underwritten by National Treasury for the 20 Year Period

- Round 1, 2, 3 and 4 successful.

- The Programme enjoys investor confidence and has received international acclaim.

- Top 10 internationally in terms of Renewable Energy implementation.
Table 1 – IRP2010 Policy Adjusted Plan with Ministerial Determinations

| Year | Coal (PF, FBC, imports, own build) | Gas - CCGT | Peak - OCGT | Wind | CSP | Solar PV | Coal | Other | DoE Peaker | Wind | Other Renew | Co-genera
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Total: 6,250, 9,600, 2,609, 2,370, 3,910, 4,800, 10,800, 800, 325, 800

Notes: 1. OCGT is seen as natural gas in the determination
2. Includes Sere (100MW)
RustMo1 Solar Farm

• RustMo1 Solar Farm situated 22km east of the city of Rustenburg

• First renewable energy project to achieve scheduled commercial operations as part of the SA Department of Energy Renewable Energy Programme

RustMo1 Solar Farm

Minister of Energy Dipuo Peters and SA government officials open the plant
Overview of Momentous Energy

- Momentous Energy is a South African company, with a long-term commitment to supplying Southern Africa with affordable, renewable electricity.

- We specialise in developing, financing, building and operating renewable energy plants in Southern Africa.

- We undertake the development of large-scale solar installations for grid-connected and off-grid projects (which includes large-scale solar PV rooftop applications).

- Momentous Energy has an innovative approach to developing renewable energy projects and it is our goal to create clean and renewable energy for the region, together with creating employment and providing skills development.

- By working with our technology partners, provincial government and local communities, we are confident that together we can build a brighter, more sustainable future in harmony with the environment.
Momentous Energy - Focus

• Our focus is to provide a complete turnkey solution for the development, build and operation of renewable energy plants. This encompasses the full project life cycle for renewable energy projects, including:
  • Development
  • Investment
  • Construction
  • Operation
• This includes both **Grid Connected** and **Off-Grid Solutions**.
• Coupled to this, we provide sustainable job creation, skills training and socio-economic development for the local communities in which we operate.
Grid Connected Solutions

Our grid-connected systems are typically connected to a large national grid (typically the public electricity grid) and feeds power into the primary grid system. The Momentous grid connected systems vary in size and is modular. This solution offers a form of decentralized electricity generation and carbon reduction. The feeding of electricity into the grid requires the transformation of DC into AC by a special, grid-controlled solar inverter and working closely with the Grid Network Operator, usually under a license as an Independent Power Producer.

Momentous Energy’s RustMo1 Solar Farm – Fully Operational
Off Grid Solutions

Momentous provides energy supply solutions that are not connected to the national grid and which delivers a power supply for most typically, mines or rural infrastructure that is too far away from the national grid network. This includes providing electricity to mines in remote areas, powering buildings in rural areas; producing environmentally friendly power for lights, refrigerators and communication devices. We work with local businesses to establish and operate the renewable energy plants that generate a continuous energy supply and thus strengthen the local economy.

Our rooftop solar system lets you become an energy producer for your own consumption or supply to the grid. The Momentous rooftop solar PV systems are the ideal choice for organizations with captive and clean power generation for internal use, which also offsets the high cost of diesel power. Solar PV solutions enable enterprises to become green and sustainable in a very short time span.
RustMo1 Solar Farm - Rustenburg

Momentous developed the RustMo1 Solar Farm, which is the first renewable energy plant in the history of South Africa to provide power to Eskom as part of the renewable energy Independent Power Producer Programme. The plant achieved commercial operations on the 15 November 2013. RustMo1 is a 7MWp photovoltaic plant located about 22km east of the city of Rustenburg. Momentous was involved from the early stages of development of this greenfield project, to obtaining financial close, managing the construction to currently managing the operations of the plant.
**Timeline**

**Development Process**
- Momentous Energy Started October 2010
- Integrated Resource Plan 2010
  - Published in May 2011 by the DoE outlines the proposed power generation mix for the period 2010 to 2030 (renewable energy = 42% of all new-build generation)
  - 20 Year generation plan. 17800 MW by 2030
- On 2 July 2011, the Minister of Energy issued the determination for the IPP Procurement Programme in accordance with Section 34 (1) of the Electricity Regulation Act 2006 No 4 of 2006
- The National Energy Regulator of South Africa (NERSA) concurred with the Ministerial Determination on 7 July 2011. The concurrence was for the procurement of 37 25 MW of renewable energy: 1850 of Onshore Wind, 1450 MW of solar photovoltaic, 200 MW of concentrated solar power (CSP), 75 MW of small hydro (<= 10 MW), 25 MW of landfill gas and 12.5 MW of biomass.
- Eskom Single Buyer Office
- Grid Access Unit

**Preferred Bidder**
- Department of Energy preferred bidder announced on 7 December 2011.
- 28 Bidders Selected out of 53.

**Financial Close Process**
- NERSA
- Generation and Distribution Licence issued on 26 April 2012.
- Financial Close date - 5 November 2012

**Construction Process**
- Early Operations Date – 9 November 2013
- Commercial Operations Date – 15 November 2013

**Operations Process**
- As from 15 November 2013
## Rustmo1 Solar Farm Construction Programme

<table>
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<tr>
<th>Date</th>
<th>Plant Progress</th>
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<td>9 November 2012</td>
<td><strong>Financial Close</strong></td>
</tr>
<tr>
<td>2 Feb 2013</td>
<td><strong>Construction Commenced</strong></td>
</tr>
<tr>
<td>March 2013</td>
<td>Site clearance/ access roads/laydown area completed</td>
</tr>
<tr>
<td>April 2013</td>
<td>Fence completed, installing the module structures, foundations</td>
</tr>
<tr>
<td>May 2013</td>
<td>Installation of the modules, cable laying</td>
</tr>
<tr>
<td>June 2013</td>
<td>All modules installed, all civil works completed</td>
</tr>
<tr>
<td>July 2013</td>
<td>All cables terminated and tested</td>
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<tr>
<td>August 2013</td>
<td>Substation works/grid connection</td>
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<tr>
<td>15 September 2013</td>
<td><strong>Mechanical Completion</strong></td>
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<tr>
<td>9 November 2013</td>
<td><strong>Early Operations</strong></td>
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<tr>
<td>15 Nov 2013</td>
<td><strong>Scheduled Operations</strong></td>
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## Environmental Consents and Permits

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<td>Environmental Authorisation</td>
<td>EA was granted to the Project Company for various listed activities.</td>
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<td>Water Use License</td>
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<td>Rezoning and alterations of land use control rules or consent use</td>
<td>The site has been successfully rezoned</td>
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<tr>
<td>Civil Aviation Authority Consent.</td>
<td>Consent obtained</td>
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<tr>
<td>Building Plan Approval</td>
<td>Site development and building plans approved</td>
</tr>
<tr>
<td>Mining Rights: Application to use the surface land in terms of this Act</td>
<td>Proof of lodging of application is available.</td>
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<tr>
<td>Servitudes</td>
<td>All required servitudes registered</td>
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<tr>
<td>NERSA</td>
<td>NERSA license to operate a power generation plant and distribution.</td>
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Irradiation and Energy Yield Assessments

- An evaluation of the insolation and yield at the site was carried out by: Juwi (Germany), and Solar Praxis (Germany) and also by Arup, the Lenders Technical Advisor. It is to be noted that the weather data used by both is a combination of Meteonorm, NASA and other satellite derived data; the average specific yield is 2086 KWh/m² (see table below).
- For the site investigation as well as the initial yield estimate, climatic data has been taken from various sources. The following table summarizes the global irradiation data for Rustenburg on a monthly basis.
- Projected Annual Generation: 12,592 MWh / Year 1

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<th>PVSYST [kWh/m²]</th>
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Structure of the Project

Equity
- Momentous Foundation Community Trust
- Momentous Solar Farm
- Momentous Technologies
- Evolution One

Debt
- Industrial Development Corporation of SA
- Nedbank

Project Company
RustMo1 Solar Farm (Pty) Ltd

Contractors
- Engineering, Procurement and Construction
- Operations and Maintenance
• Legal compliance of the project has been maintained by strict adherence to the numerous legislative requirements, various miscellaneous applications, various consents, the proper negotiation of contracts and agreements, through procedural and protocol compliance in all matters, by following the strict injunctions of the RFP, and through constant advice from the legal advisors. All documents submitted to the tender has been checked for legal compliance
• All agreements, contracts, and other binding documents have been processed by the legal advisory team (and verified by the banks’ legal advisor)
• The contracts and agreements to be signed for grid connection and operation are standard agreements prepared by the Department of Energy; these may not be marked up by the project company. These agreements are:
  • Power Purchase Agreement
  • Direct Agreement
  • Implementation Agreement
  • Use of Distribution System Agreement
• Other principal agreements to be concluded are:
  • Shareholders Agreement
  • Debt Finance Agreement
  • IDC BEE Preference Share Finance Agreement
  • IDC BBBEE Preference Share Finance Agreement
  • Project Company Memorandum of Incorporation
  • Engineering Procurement Construction Contract
  • Operations and maintenance Contract
• The DoE contracts are standard contracts for all Independent Power Producers in the current procurement programme
Technology

- RustMo1 is a free standing plant that will connect to Eskom’s Spruitfontein substation located about 130m from the eastern boundary of the land.

- The plant consists of 29808 polycrystalline modules mounted onto structures driven into the ground; the module arrays are connected to DC combiner boxes and then to the inverters, distributed evenly and as optimally close as possible to the modules, for inversion from DC to AC power.

- The power from the inverters is stepped up to 22KV at distributed transformers and then to 88KV before being evacuated into the substation.

- The metering of the power output occur at the high voltage end of the 22/88KV transformation and before Eskom’s uptake point circuit breaker.

- Various protection, metering, monitoring and security and other requisite balance of Plant equipment and structures orm part of the plant.

- The technology installed must work for a minimum of 20 years without outages. International certification.
OPERATIONS AND MAINTENANCE

- Momentous actively involved in the day-to-day operations and management of RustMo1. An O&M agreement concluded with Juwi.

- The O&M Contract covers the monitoring of the SCADA data to ensure that the output is at optimum at all times and will include the regular comparison of actual output to planned output. The O&M Contract covers maintenance of the 11KV/22KV Transformation Centre – inverters and transformers, including the management of essential spares.

- Momentous takes responsibility for site management, security, panel cleaning, grass cutting and Balance of Plant maintenance.
Economic Development

• Local content
  • Local electrical contractors
  • Transformers
  • Components

• The Momentous Foundation Community Trust
  • The Momentous Foundation Community Trust has been set up to own 17% of the Project Company, RustMo1 Solar Farm (Pty) Ltd. The beneficiaries of the Trust will be local communities within a 50km radius of the project site. The Trust has been set up to comply with the essentials BBBEE Codes of Good Practice:
    • The initial beneficiary trustees were elected by the community people of the Villages of Lapologang and Tsakane.

• Job Creation
  • Up to 80% of the employees for the project will come from local areas – that is areas within 50km of the project site. Most of the low skilled jobs will be taken up by the local villagers. The towns of Rustenburg and Brits, both of which are within 50km of the Project Site, also supply the semi-skilled and skilled labour force for the project. Jobs are in the areas of Panel cleaning, maintenance of the vegetative ground cover and 24hour security patrolling of the site. The semi-skilled and skilled jobs will consist of Site Management and Balance of Plant Maintenance, Accounts, and HR/Training Administration.
Socio-Economic Development Programme

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Opportunities

- IRP 2030
- Projects
- Development
- Engineering, Procurement and Construction
- Services
- Operations and Maintenance
For Advise or Support

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