Public Participation | IRP

Nelspruit, Mpumalanga 27 January 2017

YORK TIMBERS

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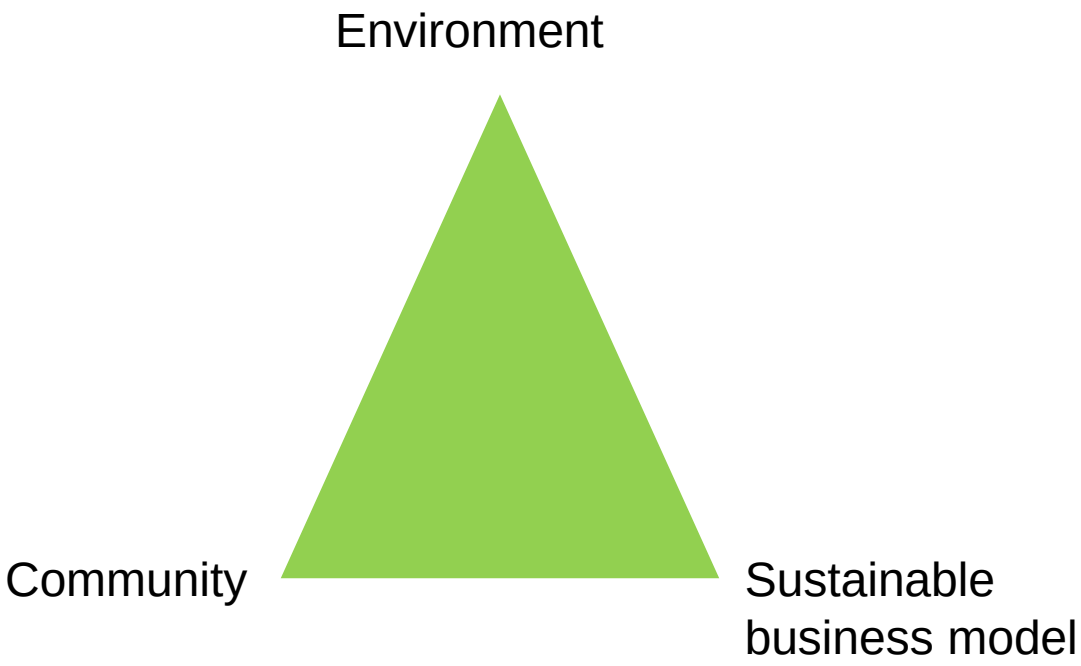
- Applies three-pillar model regarding raw material



- **Environment**
  - Legislation and requirements different for different sectors
  - Forestry requirements a lot stricter than for mining sector
  - Biomass power plants can alleviate some of the challenges in an efficient manner

- **Community**
  - Owns 94000 ha. (55000 ha. planted)
  - Intense crop harvesting being conducted on land
  - Land houses 7500 people
  - Employs 5300 people

- **Community**
  - Biomass offers sustainable, integrated and viable model between York and communities

- **Sustainable business model**
  - Owner/operator of five processing plants, including the largest sawmill and plywood plants in South Africa
  - Typical sawmill recoveries of 48%, meaning only 48% of tree is used for existing products
  - Biomass to add fair value to traditionally under-valued 52% of timber not used in processing thereby creating a truly sustainable business model

BIOMASS POTENTIAL IN SOUTH AFRICA

	Unit	Value
Afforested areas in South Africa	Hectare	1 250 000
Softwood afforested areas	Hectare	628 000
Softwood sawn timber harvesting	m3/annum	4 155 000
Softwood production	m3/annum	1 994 000*
Available biomass for power generation	m3/annum	2 368 000**
Average biomass for power generation	Ton/MWh	1.754
Potential biomass power generation	MWh/annum	1 436 207
Capacity (92%)	MW	179
Capacity (46%)	MW	359
Total potential capacity (46%)	MW	~ 1 000
Resource availability	Unit less	Immediately

*Based on 48% recovery
**Based on 52% and Forest Residue
Source: DAFF – Report on Commercial Timber Resources and Primary Roundwood Processing in SA 2012/13, April 2015

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BIOMASS AS INTERMEDIATE POWER GENERATOR

	IRP Biomass	York Biomass	CCGT
Load Factor (%)	70	46 – 92	36
Cost Boundary	Delivered Fuel	Delivered Fuel	Gas terminals
LCOE (ZAR/MWh)	1835.90 (70%)	1508.81 (92%) 1795.70 (46%)	1183.22 (36%)
Lead time (years)	3.5 – 4	3	3*
Fuel costs (ZAR/GJ)	29.3	29.3	51.8
Overnight costs (ZAR/kW)	68 062	43 893	18 030**
Heat Rate (kJ/kWh)	14 243	12 386	8 900
Water usage (l/MWh)	227	67	19.3
Carbon dioxide emission (kg/kWh)	1 243	0	42
Full capacity available	Yes	Yes	No

*Excludes LNG terminal infrastructure
**With CCS

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CONCLUSIONS AND RECOMMENDATIONS

- Biomass (forest residue) not awarded any capacity up to 2050
- CCGT awarded 21 960 MW (36%) up to 2050
- IRP falsely assumes carbon dioxide emissions from biomass power generation – biomass is carbon neutral (Roth and Ambs, 2004)
- CCGT requires additional infrastructure whilst biomass available immediately
- Biomass can work either as intermediate or baseload power generator

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CONCLUSIONS AND RECOMMENDATIONS

- Biomass has easy grid access (plant can be constructed next to distribution/transmission lines) – York's proposed 25 MW site is 27m from distribution line
- National Veld and Forest Fire Act (Act no. 101 of 1998) requires firebreaks to be burnt – building biomass power plants will alleviate this need (negative externality cost)
- Biomass proven technology worldwide with thousands of plants in operation
- Biomass has added benefits – communities may be heated through cogeneration
- Biomass plants (including biogas) result in by-products which can lead to new markets

- There is enough quantifiable evidence for biomass to be included into Base Case and associated scenarios

THANK YOU

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