

A photograph of an industrial power plant facility with several tall smokestacks emitting plumes of white smoke. The scene is set against a clear sky with some trees in the foreground. The image is framed by a blue border with a purple accent on the right side.

CO-GENERATION IN SADC

TPC LIMITED
TANZANIA

STRATEGIES

HISTORICAL BACKGROUND

- ❑ TPC Limited was established in the early 1930's by a company which was registered in Denmark in the name A/S Tanganyika Planting Company Limited
- ❑ In 1936 sugar was first produced at TPC
- ❑ On the 1st January 1980, the Government bought back the company from the Danish owners
- ❑ Between 1936 and 2000 the record production was reached in 1975 with **50,978 t of sugar**

PRIVATISATION

□ In March 2000 Sukari Investment Company Ltd purchased 75% shares of TPC Limited, and became the majority shareholder of the company

□ Sukari Investment Company Ltd registered in Mauritius is owned by a Mauritian and a French company, namely, Deep River Beau Champ Ltd and Sucriere de la Reunion respectively

INVESTORS

□ Both companies, Deep River Beau Champ Ltd and Sucriere de la Reunion are involved in co-generation in Mauritius and reunion Island respectively:

- DRBC:

- Sugar factory 260TCH
- Power plant 24MW

- SR:

- Sugar factory 360TCH
- Power plant 2 X 30MW = 60MW
- Planning to install an additional unit of 60MW

PRODUCTION

Since privatization in 2000, sugar production has increased steadily as shown below:

Pre - Privatisation			Post - Privatisation			
1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	Target 03/04

Cane Crushed (t)	323,761	428,251	344,808	447,759	451,887	552,302	604,631
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Sugar Production (t)	27,896	39,780	34,892	42,018	49,650	54,848	62,277
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LAND AREA

- ❑ TPC has a total of 16,000 ha of land (including KAHE), out of which about 6,100 ha is under cane cultivation.
- ❑ A large area in the South of TPC is not arable because of high salts level in the soil. But not all arable land is cultivated at the moment
- ❑ 1,200 ha are replanted annually.

ELECTRICITY SUPPLY TO EMPLOYEES

☐ Number of employees :

- Permanent 2,667
- Temporary 591
- Seasonal 636

☐ 2,578 employees, with their families, are residing on TPC premises

☐ All residential compounds have electricity but not at individual house level

PRESENT FACTORY CAPACITY (2004)

- ❑ Crushing rate = 130 TCH
- ❑ Tonnage of cane = 604,000 t
- ❑ Sugar production = 62,000 t
- ❑ Start of crop = 1st July
- ❑ End of crop = 15th March
- ❑ Number of crushing days = 256
- ❑ Field Potential cane production = 775,000 t
(excluding outgrowers and improvement of irrigation system)

STEAM GENERATION DATA

- ❑ Installed Boilers Capacity (steam t / hr)
 - 4 X 9 tonnes = 36 tonnes (1 standby)
 - 1 X 20 tonnes = 20 tonnes
 - 1 X 40 tonnes = 40 tonnes
 - Total = 96 tonnes

- ❑ Type of Boilers
 - Hearth Shoe Furnace cells (very Low efficiency)

- ❑ Steam Pressure = 12 Bar

- ❑ Steam Temperature = 290 ° C

- ❑ Factory Steam Consumption = 69 to 72 t / hr

POWER GENERATION DATA

□ Power Generation

- 1 X 3 MW Back Pressure Turbo Alternator
- 1 X 2.5 MW Back Pressure standby Turbo Alternator

□ Power Consumption

- | | |
|-----------------------------------|---------------|
| • Factory: | 1,8 MW |
| • Hospital/Garage/Offices/Houses: | 0,7 MW |
| • Houses (Tanesco) | 0,2 MW |
| • Irrigation (Tanesco): | 3,4 MW |
| • Total: | 6,1 MW |

POWER GENERATION DATA (cont)

☐ Electricity produced during crop season: 11.2 GWh

☐ Electricity Imported from grid:

- Factory & Estate Utilities: 8.7 GWh
- Irrigation Network: 10.0 GWh
- Total: 18.7 GWh

CAPACITY INCREASE AND CO-GENERATION SCENARIO 1

- ☐ Crushing Rate = 200 TCH
- ☐ Cane Production = 775,000 tonnes
- ☐ Sugar Production = 85,500 tonnes

Steam Generation

- Boiler Capacity : 90 tonnes MCR at 45 Bar and 430 °C

Power Generation

- Capacity:- 1 X 14 MW Back Pressure Turbo alternator

- Factory = 7.4 MW
- Irrigation = 4.6 MW
- Estate Utilities = 0.9 MW
- Total = 12.9 MW**

CAPACITY INCREASE AND CO-GENERATION SCENARIO 1 (cont)

Investment

- **Magnitude of Investment = USD 28.5 M**

Comments

- This scenario caters only for TPC electricity own use
- The Internal Rate of Return is very marginal (Less than 20 %)
- Return of investment highly sensitive to cost of capital
- Tsh loan would be a precious advantage

CAPACITY INCREASE AND CO-GENERATION SCENARIO 2

- ☐ Crushing Rate = 200 TCH
- ☐ Cane Production = 775,000 tonnes
- ☐ Sugar Production = 85,500 tonnes

Steam Generation

- Boiler Capacity : 140 tonnes MCR at 45 Bar and 430°C

Power Generation

- Capacity:- 1 X 22 MW Back Pressure and Condensing Turbo Alternator
- Factory = 7.4 MW
- Irrigation = 4.6 MW
- Estate Utilities = 0.9 MW
- **Export To National Grid = 7.6 MW**
- Total = 20.5 MW

CAPACITY INCREASE AND CO-GENERATION SCENARIO 2 (cont)

Investment

- **Magnitude of Investment = USD 35.5 M**

Comments

- Return on investment highly sensitive to price and conditions attached to sale of kWh, which are not known
- Long term agreement "cast in concrete" with TANESCO necessary
- Return on investment highly sensitive to cost of capital
- Tsh loan would be a precious advantage

CAPACITY INCREASE AND CO-GENERATION
SCENARIO 3

- ☐Crushing Rate = 200 TCH
- ☐Cane Production = 775,000 tonnes
- ☐Sugar Production = 85,500 tonnes

Steam Generation

- Boiler Capacity : 140 tonnes MCR at 80 Bar and 520 °C

Power Generation

- Capacity:- 1 X 30 MW Back Pressure and Condensing Turbo Alternator
- Factory = 7.4 MW
- Irrigation = 4.6 MW
- Estate Utilities = 0.9 MW
- Export To National Grid = 15.4 MW**
- Total = 28.3 MW

CAPACITY INCREASE AND CO-GENERATION SCENARIO 3 (cont)

Investment

- **Magnitude of Investment not determined**

Comments

- Return on investment highly sensitive to price and conditions attached to sale of kWh, which are not known
- Long term agreement "cast in concrete" with TANESCO necessary
- Return of investment highly sensitive to cost of capital
- Tsh loans would be a precious advantage
- Need for a strategic partner

CONCLUSION - Summary of the 3 Scenarios

	Scenario 1	Scenario 2	Scenario 3
Crushing Rate(TCH)	200	200	200
Cane Production (T)	775,000	775,000	775,000
Sugar Production (T)	85,500	85,500	85,500

Steam & Power Generation			
Boiler - Capacity	90 t MCR	140 t MCR	140 t MCR
Pressure	45 Bar	45 Bar	80 Bar
Temperature	430 oC	430 oC	520 oC

Turbo Alternator	Back Pressure	Back Pressure & Condensing	Back Pressure & Condensing
Capacity	14 MW	22 MW	30 MW

Factory	7.4 MW	7.4 MW	7.4 MW
Irrigation	4.6 MW	4.6 MW	4.6 MW
Estate Utilities	0.9 MW	0.9 MW	0.9 MW
Export to grid	Nil	7.6 MW	15.4 MW
Total	12.9 MW	20.5 MW	28.3 MW

Investment	US \$ 28.5 M	US \$ 35.5 M	Not Available
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CONCLUSION

Co-generation development at TPC LTD is linked to:-

- ❑ Increase in factory capacity crushing rate from 130 to 200 TCH
- ❑ Firm and constant demand from TANESCO in kWh during crop season. "Cast in concrete" agreement
- ❑ Clear long term policy from the Government and full support for clean energy production through financing facilities / incentives
- ❑ Financial support for a feasibility study would be a precious advantage
- ❑ Secure investment climate in the country

CONCLUSION

Advantages derived:

- Increase in sugar production up to 85,000 tonnes
- Improved electricity supply to the region / country
- Clean energy
- Improving the standard of living of 2,600 families by providing free electricity
- Attract further investment in the region