SACC will use funding from the IDC to develop an 8 MW co-generation facility, which will serve as both a cost saving initiative and a security of supply measure, the latter being a pre-requisite to maintaining production levels thus boosting the company's organic growth plans.

As a clean development mechanism (CDM) initiative, SACC is to fund the R105-million capital cost requirement for this project over a financing period of 10 years.

The principal objectives of the project are:

- Energy security: securing electrical energy for SACC's required growth programme.
- Meeting Eskom's PCP requirements.
- Development of a "green project" contributing carbon emission reductions.
- Development of an economically feasible project for SACC and the Andina Group realising energy cost savings.

Electricity demand

Electricity costs account for the bulk of the company's production costs and without the program SACC would have seen a huge surge in production costs. SACC currently accounts for 50% of the electricity demand of the Newcastle region (Fig. 1), and expansion is restricted by limitations on maximum demand that the company can make on the grid.

Flare gas

Carbon monoxide gas is produced by the process of manufacturing calcium carbide, and is currently flared at the site (Fig. 2).

Calcium carbide production

Calcium carbide is made by heating calcium carbonate (limestone) to produce lime and subsequently reducing this with carbon.

In the first stage of the process limestone, mined in the northern cape, is heated to produce lime:

\[ \text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2 \]

Furnace

The furnace is a closed construction of German Uhde design with a nameplate capacity of 50 MW. It is equipped with a hollow electrode system and incorporates in-house modifications and improvements as well as a Mintek designed resistance controller. A wet gas scrubbing system is used and extensive use is made of PLCs and SCADA in the plant.

\[ \text{CaO} + 3\text{C} \rightarrow \text{CaC}_2 + \text{CO} \]
The furnace is of the sealed type and the CO is piped away and flared into the atmosphere. Furnace is a three electrode 55 MVA arc furnace with a capacity of 100 tons of CaC₂ per year. The furnace is currently running at about 75% capacity, producing 75 tons per year because of restrictions on the power that can be drawn from the grid. The CO currently flared will be used to produce an additional 8 MW of power which will enable the furnace to run at its maximum capacity without increasing the load on the Eskom grid.

Future projects
SACC intends capturing the CO₂ produced in the first stage of the process and producing food and beverage grade gas. The high purity of the input materials makes it possible to achieve this with minimum further treatment, and thus the cost of the project will be minimal. SACC already has an off-taker for the product who currently uses commercially produced CO₂. The project will offset the use of fossil fuels used in the commercial process.

Project progress
Project development options (SACC; January 2010)
Project viability study (SACC-GreenEng; March 2010)
Project development funding approved (SACC; May 2010)
Commenced enviro auth basic assessment Process (SRK, 1 June 2010)
Environmental authorisation ROD (DEA, 16 February 2011)
Project concept & feasibility study report (GreenEng, March 2011)
CDM PDD validation report (TÜV NORD, 18 March 2011)
CDM PDD finalisation (CDM Africa, June 2011)
Design underway – electrics, gas monitoring & testing, furnace pressure relief system, 2nd scrubber, powerhouse, control systems
Est. project commencement date - August 2011
Est. project commissioning date - October 2012

Contact Juan Sabio, SACC, Tel 034 370-1121, juans@sacarbide.com

The furnace is a three electrode 55 MVA arc furnace with a capacity of 100 tons of CaC₂ per year. The furnace is currently running at about 75% capacity, producing 75 tons per year because of restrictions on the power that can be drawn from the grid. The CO currently flared will be used to produce an additional 8 MW of power which will enable the furnace to run at its maximum capacity without increasing the load on the Eskom grid.

Table 1 shows the projected growth for the SACC plant.

Table 1: Projected growth for SA calcium carbide.

<table>
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<tr>
<th>Year</th>
<th>mtCaC₂/yr</th>
<th>mtCaC₂/yr (projected)</th>
<th>Gas flow (Nm3/hr)</th>
<th>Furnace Av (MVA)</th>
<th>Hours</th>
<th>Capacity (min)</th>
<th>Engines</th>
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Table 2: Project financials.