Environmental Impact

The underlying philosophy of Illovo's environmental management approach is to continually investigate means to reduce the environmental impact of the group's operations. This is achieved through both the efficient use of natural resources and committing the group to continuous improvement.

Illovo complies with country-specific environmental legislation and regulations and adheres to international best practice standards, as well as internal operational environmental policies. Environmental management at the operations is carried out in line with the NOSA Integrated Five-Star System, which incorporates environmental management. When considering new business ventures and expansions, due diligence and environmental impact assessments are undertaken to ensure that potential negative environmental impacts are identified and mitigation or management plans implemented.

TECHNOLOGY, RESEARCH AND DEVELOPMENT

In order to optimise the return from existing installed capacity, the group has well-established in-house resources which provide technical expertise in agricultural production and sugar and downstream product manufacture to all operations. A centralised core of expertise exists to ensure technical standards are optimised and maintained for both existing equipment and new agricultural and factory installations, and to keep abreast with technical innovations. This in-house function is also involved in investigating opportunities to expand the group's operations, and in the planning and implementation of approved projects.

Collaboration with regard to the application of new technology and energy and process performance optimisation between the group's technical team and AB Sugar is ongoing. This collaboration is expected to benefit the group in the longer-term.

Benchmarking to improve productivity and reduce unit costs is a major area of attention at all operations, resources having been allocated to enhance operational performance and benchmarking across the group. Illovo is also participating in operational performance benchmarking and best operating practices within the AB Sugar group.

The group benefits on an ongoing basis from research and development undertaken by the South African Sugar Milling Research Institute and the South African Sugarcane Research Institute. These organisations are funded by the member sugar industries which are represented on the respective boards of the institutes.

Illovo also has a dedicated team which pursues opportunities for the development and commercialisation of downstream products and new applications. In addition to its own resources, there is ongoing collaboration with both local and international research organisations, and contract work is outsourced when appropriate.

OPERATIONAL ASPECTS

Agriculture

In respect of its agricultural operations, the group adopts farming practices based on field conservation guidelines as advocated by the South African Sugarcane Research Institute, so as to ensure agricultural production on a sustainable basis with minimum impact on the environment. This includes the implementation of land use plans when developing new and re-establishing existing cane fields; the optimal placement of field and access roads; the most suitable method of field establishment so as to conserve soil and water; the protection of existing environmental features such as rivers, wetlands, catchment areas; and the removal of alien vegetation.

In addition, sugar cane, upon harvesting, immediately recommences another growing cycle from its existing roots. This process called ratooning recurs until the

The unique process of utilising bagasse and biomass as an energy source also results in the group having minimal reliance on fossil fuels, such as coal, for its energy requirements. Coal usage within the group comprises only approximately 4% of total energy usage.

cane yield of the plant reduces below a predetermined level, whereafter replanting is undertaken. This generally takes place every seven to ten years. The environmental benefit of this ratooning and replanting process is the significant reduction in the frequency of soil disturbance and the exposure to soil erosion.

Agricultural operations in South Africa are rain-fed, thereby minimising the impact on subterranean water supplies, whilst in the group's other countries of operation, water for irrigation is supplied from secure water resources such as major rivers, lakes and dams.

The conventional practice of cane burning immediately prior to harvesting is conducted in terms of industry guidelines. The adoption of "green cane harvesting" practices, without burning, takes place where feasible. This has the benefit of the leaves and the tops of the cane plant being left behind in the harvesting process, providing for moisture retention and nutrients for the soil, and offering potential as a renewable energy source as a feedstock for the sugar factory boilers. The use of the cane leaves and tops as biomass feedstock for the boilers, as a supplement for bagasse, has been successfully integrated into the sugar factory operations in Swaziland and Malawi.

Sugar manufacture

The process used for manufacturing sugar from sugar cane provides a unique sustainable advantage with minimal environmental impact. The fibrous residue remaining after the extraction of sucrose from sugar cane, bagasse, may be used as a bio-renewable energy source in sugar factory boilers to generate electricity. This electricity is capable of not only meeting the power requirements of the sugar factory, but may also be used for operating the irrigation systems used for cane growing, and for supplying administrative and domestic users and national grids.

Bagasse is used as a boiler fuel at all Illovo's sugar factories, and under normal operating conditions, the factories are self-sufficient in terms of electrical requirements, save that the downstream plant at Sezela relies on power from the national grid. Whilst the factories outside South Africa also supply power for cane irrigation, supplementary electricity supplies are required from external sources, particularly during the factory offcrop maintenance periods. Fortunately, these periods coincide with the rainy seasons, when there is a limited need for irrigation. The recent completion of Ubombo's major factory expansion and co-generation project in Swaziland has enabled this operation to also export power into Swaziland national grid.

The unique process of utilising bagasse and biomass as an energy source also results in the group having minimal reliance on fossil fuels, such as coal, for its energy requirements. Coal usage within the Illovo group comprises only approximately 4% of total energy usage.

During the year under review, the group's sources of energy comprised:

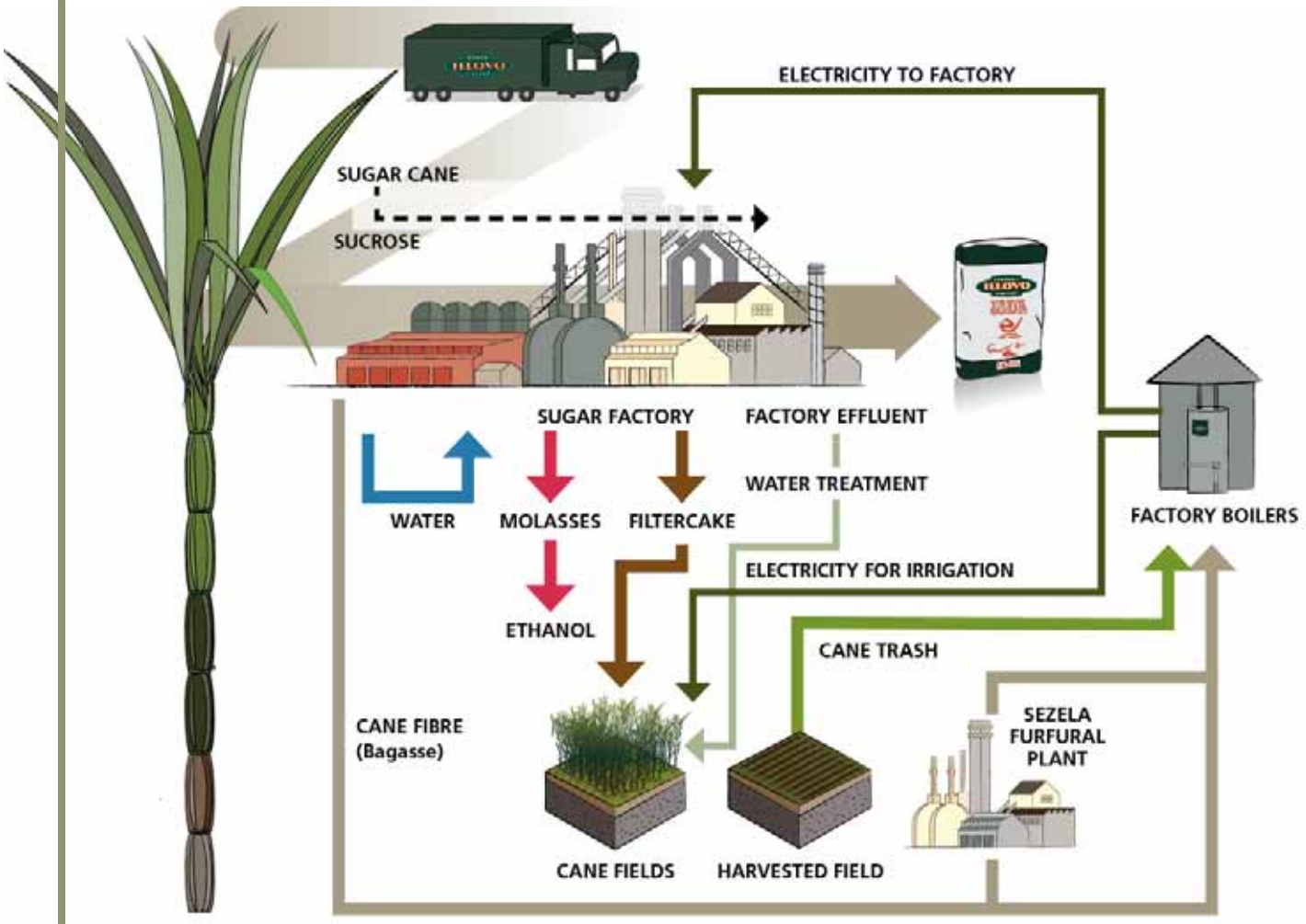
Type	**2011 GWh**	**%**	2010 GWh	%
Bagasse	**8 855**	**88**	9 370	88
Coal	**435**	**4**	520	5
Electricity	**430**	**4**	360	3
Imported steam	**168**	**2**	160	2
Gas/oil/diesel	**152**	**1**	120	1
Biomass	**68**	**1**	108	1
Other sources	**1**	**–**	32	–
Total	**10 109**		10 670	

In total, the group used 10.109 GWh of energy for production during the year under review. It is significant that 89% of the group's energy requirements is produced from renewable energy sources.

In South Africa, Illovo is presently monitoring its compliance with the recently promulgated Air Quality Act and, where necessary, the phased implementation of any new requirements will be undertaken.

(continued on page 88)

Cane sugar sustainability model



Sugar cane

- Sugar cane is a large grass variety which grows well in tropical and sub-tropical climates across the globe
- Harvesting takes place in the southern hemisphere between April and December when the cane is 12 to 24 months old
- Once harvested, the cane commences a new growing cycle from its existing roots; this re-growth is called a "ratoon". Replanting takes place only every 7 to 10 years, minimising soil disturbance and exposure to wind and water erosion
- Rainfed cane in South Africa, with industry yields of around 65 tons of cane per hectare, minimises the impact on subterranean water supplies, whilst in other countries of operation, where yields are approximately 100 tons of cane per hectare, water for irrigation is sourced from secure water resources such as large rivers, lakes and dams

Maximum usage

The sugar cane manufacturing cycle makes maximum usage of all its input materials with very few waste products.

- Sugar cane contains between 13% to 15% sucrose which is used in sugar factories to produce granulated brown and refined sugar
- Cane fibre or bagasse, the fibrous residue following the extraction process, is used as a bio-renewable fuel source by the factory boilers to produce steam for processing requirements and to generate electricity to power the factory and other operations:
  - at the Sezela downstream plant in South Africa, plant material in the bagasse is extracted to produce low-volume/high-value downstream products. Once processed, the bagasse is routed to the boilers for electricity operations;
  - at Illovo's operations in Swaziland and Malawi, cane trash is blended with bagasse to increase the volume of fuel feedstock for the boilers, thereby providing for increased electricity generation; and
  - Illovo's objective is to be self-sufficient in its own electricity requirements and, where feasible, to export surplus power into the national grids of the countries in which it operates. In 2010/11, 89% of the group's power requirements were produced by the group's own installed electricity generating capacity from renewable resources;
- Water contained in sugar cane amounts to between 68% and 72% of total content. During the extraction process, this water is released and recycled for use within the factory, reducing reliance on external water resources;
- A by-product of the manufacturing process is molasses which is used by Illovo to produce potable and denatured alcohols for use in the cane-based liquor, pharmaceutical, cosmetic and printing industries; and
- Organic and non-organic impurities captured in the form of 'filtercake' during the manufacturing process are returned to the fields for use as a fertiliser.

Downstream products

Downstream product manufacture is a core activity of Illovo, fulfilling the group's Strategic Intent to optimise the return on every stick of cane by adding value to its core commodity products: fibre, sugar and molasses. The group, out of its downstream production plants in South Africa, is a material player in most of the world markets in which it participates, and exports furfural, furfuryl alcohol, diacetyl, 2.3-pentanedione, natural methanol, ethanol and lactulose to 81 countries. The group has also developed and is commercialising a range of agricultural products derived from furfural. Crop Guard® and MultiGuard Protect® are nematicides. Protect® is a nematicide and fungicide whilst BioMass Sugar® is classified as an organic fertiliser, phytofortifier or soil improver dependent upon the country-specific regulations where it is sold.

Sezela downstream

PRODUCT PRODUCED	USES
Furfural	Mainly for the production of furfuryl alcohol and in lube oil refineries as an extractive solvent in the purification of base oils. It is also used for specialist applications such as the manufacture of grinding wheels, friction pellets for brake pads, crucible manufacture, and to a small extent as a flavour ingredient.
Furfuryl Alcohol	Used to produce a resin used in the foundry industry as a polymeric binder for foundry sands. It is also used for wood treatment, to produce acid resistant coatings and certain pharmaceuticals, and as a flavour ingredient.
Crop Guard® MultiGuard Protect® Protect®	Used as an agricultural contact nematicide, at plant and within the growing season. *(Developed and marketed by Illovo's "Agriguard" business as an agricultural chemical under the trade names Crop Guard® in South Africa and MultiGuard Protect® in the USA.)* Used prior to plant, as a nematicide and fungicide
BioMass Sugar®	Used as phytofortifiers/soil improvers or as a liquid organic fertiliser
Diacetyl	Used as an ingredient in butter flavourings.
2.3-pentanedione	Used as an ingredient in butter flavourings and as an intermediate in the manufacture of pyrazines.
Natural Methanol	Used in the manufacture of natural flavour ingredients.

Merebank

PRODUCT PRODUCED	USES
Ethanol Potable Extra Neutral Alcohol (ENA) – 96.4%*	A very high quality potable alcohol used by liquor industries for the production of branded alcoholic drinks (e.g. canes, vodkas, gins, rums, liqueurs and aperitifs).
Anhydrous Alcohol – 99.9%	Used in the pharmaceutical industry to produce pharmaceutical intermediaries and products (e.g. in cough mixtures, alcohol is used to dissolve ingredients not able to be dissolved by water). Also used in surgical spirits, medical disinfectants, and in the production of solvents for use in the printing ink and flexible packaging industries.
Rectified Extra Neutral Alcohol (REN) – 96.4%	Also has pharmaceutical applications but used mainly in the personal care industry to produce cosmetics, hair care products, toiletries, fragrances and perfumes. In the food industry, it is used to produce flavours and spirit vinegar which is used in various pickling processes and in the production of condiments (e.g. tomato sauce, chutney, mayonnaise and salad dressings).
Industrial Alcohol – 95%	Used in the production of methylated spirits, solvents and thinners.
Lactulose **	Mild, natural laxative.

* *Potable Extra Neutral Alcohol is also produced at the Glendale Distillery on the KwaZulu-Natal north coast*

** *Lactulose, a mild, natural laxative, is produced at Merebank utilising Illovo's significant fermentation technology expertise*

Water released in the extraction process is recycled for use within the factory operations, thereby minimising the dependence of the factories on external water sources

Water comprises approximately 70% of the content of sugar cane. This water is released in the extraction process and recycled for use within the factory operations, thereby minimising the dependence of the factories on external water resources. The water which leaves the factory, representing less than 10% of the original volume, is tested in terms of its quality to ensure that it falls within the group's waste-water quality parameters, which are themselves adopted from national regulatory standards.

During the year under review, 9 447 tons (2010: 72 500 tons) of non-hazardous waste and 413 tons (2010: 537 tons) of hazardous waste were generated from the group's operations. Non-hazardous waste generally is released into registered landfill facilities, whilst hazardous waste that cannot be recycled is designated for collection by registered waste removal companies for safe disposal.

Downstream

As the major by-product of the sugar manufacturing process, molasses is used in several value-added downstream applications. In South Africa generally, the majority of molasses is used as a constituent of animal feeds and by the fermentation industry for the manufacture of ethanol. Illovo utilises a significant portion of its molasses output in the production of ethanol at its Merebank plant in Durban and its Glendale distillery on the KwaZulu-Natal north coast.

At the Sezela complex on the KwaZulu-Natal south coast, various compounds in the bagasse are extracted to produce value-added downstream products, comprising furfural and its derivatives. The residual bagasse from this process is then routed back to the sugar factory boilers for steam and electricity generation.

The final waste water stream from the downstream plant takes the form of dilute acetic acid. A process for treating this waste water stream has been developed and currently treats around 25% of this final stream. The balance is currently discharged under permit from the Department of Water Affairs through an off-shore pipeline.

RENEWABLE ENERGY

Illovo proactively monitors and manages energy consumption throughout the group's operations. During the year under review, around 89% of the energy consumed within the operations was supplied from renewable resources.

Co-generation

Dry, fibrous bagasse, remaining after the extraction of juice from the crushed stalks of sugar cane, provides Illovo with a substantial renewable energy opportunity. Co-generation utilising bagasse substantially reduces the group's reliance on electricity from the national grids as well as greenhouse gas emissions. In addition to the use of bagasse, the operations in Swaziland and Malawi augment co-generation capacity by utilising green cane biomass as a boiler feedstock. During 2010/11, the two operations supplemented boiler fuel-feedstock by approximately 33 000 tons of biomass. The group is currently assessing opportunities to increase the co-generation capabilities of all its operations to further decrease the group's externally-sourced electricity requirements and consequently Illovo's cost base.

In addition to the environmental and cost benefits, co-generation provides a potential source of additional revenue through the export of energy into the national grid. During the year under review, the operation in Swaziland exported 16.5 GWh to the Swaziland national grid, whilst following the commissioning of the new co-generation plant, it is planned to export 55 GWh to the grid over a 48-week period in the current year.

Bioethanol

An additional renewable energy opportunity provided by sugar processing is the fermentation of molasses to produce bioethanol. Illovo is currently considering entering the bioethanol market at a number of its operations. The group's move into the market will depend on commercial viability and on the implementation of facilitatory mechanisms within the various countries of operation. In preparation for such a move, the following steps were undertaken during the year under review:

- the operation in Zambia initiated a feasibility study for the development of biofuel on the estate; and

- progress on the capital investment in Mali continues, where a greenfield cane sugar project would annually produce 200 000 tons of sugar and 15 000 kilolitres of fuel-blend ethanol, while producing sufficient energy for the agricultural and factory operations, with additional capacity to export power into the national grid.

The production of bioethanol will provide Illovo with the opportunity to further decrease its fossil fuel usage and greenhouse gas emissions, as well as provide an additional revenue stream.

NON-RENEWABLE ENERGY

The largest consumers of coal within the group are the operations in South Africa. During the year under review, approximately 45 000 tons of coal was consumed by these operations, representing around 75% of the group's coal usage. A broad-scale Performance Optimisation Plan (POP) has been employed to improve energy efficiencies at an operational level within the South African factories, with the aim of reducing the consumption of purchased electricity and coal.

Specific initiatives within the POP undertaken at Illovo's South African operations during the year under review included:

- the operation of only one of two boilers at the Glendale distillery during the summer season in an attempt to reduce coal consumption;
- the manufacture and use of polyfuel, a heavy hydrocarbon derived from a blend of methanol, ethanol, diacetyl, water, furfural, furyl methyle ketone, 5-methyl furfural and acetic acid, as a supplementary fuel in Sezela's boilers;
- energy mass balance assessments of the Sezela and Noodsberg mills in order to maximise factory modification and monitor energy reduction equipment performance; and
- the installation of a thermal compressor at Noodsberg; initial mass balance calculations reflecting savings of around six tons of high pressure steam per hour, equating to a coal saving of 0.82 tons per hour.

AGRICULTURE AND BIODIVERSITY

The management of the natural areas surrounding and within the group's operations is extremely important due to the high conservation status of such areas at a number of Illovo's operations. Illovo is cognisant of the group's potential impacts on these areas and supports a number of initiatives to preserve ecosystem integrity. Nature conservation areas supported by the group, either financially, managerially or through the donation of land, include:

- Mhlongsinga Nature Reserve at Ubombo in Swaziland: Illovo manages the 1 000 hectare game reserve which forms part of a greater 10 000 hectare conservancy combining national, private and community-owned reserves;
- Nyala Park at Nchalo Estate in Malawi: Situated on the border of Nchalo Estate, the Illovo-owned private game reserve, Nyala Park, is 300 km² in extent and is rated as being one of the best managed protected areas in Malawi;
- Mwanachingwala Conservation Area at Nakambala in Zambia: This conservation area is situated on the border of the Nakambala Estate, within the Kafue Flats. Illovo donated land towards the establishment of the area to ensure the protection of the RAMSAR-listed Kafue Flats; and
- Magombera Forest at Kilombero in Tanzania: Magombera Forest is an area of low-lying tropical forest with significant biodiversity value on the southern boundary of the Kilombero Estate. Illovo withdrew expansion plans originally intended for the area in light of the forest's biodiversity value and is attempting to negotiate with the Tanzanian authorities to lease the Magombera Forest land for conservation management.

Additionally, the group supports the Malawian Government Reforestation Initiative aimed at rehabilitating the Shire Valley through the cultivation of indigenous trees and woodlots. The cultivation of Eucalypt woodlots is promoted in an effort to reduce the harvesting of indigenous trees for firewood and charcoal production, a serious threat to Malawi's natural environment. Approximately 6 000 trees are planted annually by Illovo. Indigenous tree seedlings were also donated by the company to individuals and conservation organisations for planting.