World-class waste-to-energy solutions
Our philosophy

As Africa’s premier resource for green technology, we set the standard when it comes to providing energy, health and corporate philanthropy solutions designed to enhance and improve the lives of all Africans, today and in the future.

“Inasmuch as we have been tasked with the guardianship of Somerset, we realise that, as Somersetians, we are the conduits of good business and wealth, and have a social responsibility to all we come in contact with.”

– Henri Thompson Executive Chairman
The Somerset Group offers its clients leading technology and expertise when it comes to the design and implementation of effective waste-to-energy solutions. The conversion of waste to energy not only yields a valuable end-product but also delivers a dynamic and sustainable bottom-line revenue stream for businesses across most industrial sectors.

The quality products, coupled with the most efficient solutions, have seen several Somerset clients reach a break-even financial status within only ten months.
Waste coal to electricity or gas

tyre pyrolysis to fuel oil, electricity or gas

Abattoir waste to energy

Biomass to electricity or water

Onsite waste to electricity, heat or steam

Plastics and plastifuel to diesel

Used oil refined to diesel, oil
Waste coal, tailings and other forms of coal or carbon can be converted into electricity and heat, as well as potable drinking water.

This process is especially useful to mines as it not only plays a positive role in their overall environmental rehabilitation strategy by reducing the waste they produce, but it also eliminates the need to transport drinking water to the site. In addition, they can use the process to generate electricity or create thermal energy, thus cutting down on their energy costs.

When using Somerset technology, slag doesn’t form as the tailings have a high sand content and the energy requirements can be optimised to supply peak and low consumption curves.
Tyre pyrolysis to fuel oil, electricity or gas

Waste tyre pyrolysis involves the thermal degradation of tyres to produce a gas (or liquid) that can be used for fuel. The whole or shredded tyres are heated in a reactor vessel that consists of an oxygen-free atmosphere and a heat source. In the reactor, the rubber is softened until the rubber polymers break down into smaller molecules.

These smaller molecules eventually vaporise and exit from the reactor where they can be burned directly to produce power or condensed into an oily type liquid, generally used as a fuel. Some molecules are too small to condense. They remain as a gas which can be burned as fuel. When performed well a tyre pyrolysis process is a very clean operation and has nearly no emissions or waste making it environmentally friendly, not only in its process, but in the fact that it provides an opportunity to reduce the huge stockpiles of used vehicle tyres that clutter our environment.
Tyre pyrolysis to fuel oil, electricity or gas
Abattoir waste to energy

Blood, hair, skin, hooves, ears and any kind of abattoir waste matter can be converted into electricity, heat and water.

Abattoirs have a large number of energy-intensive processes. Apart from high electricity costs, the disposal of the animal by-products is expensive too. By using this effective process, 85% of waste accumulated during the slaughter process is converted into 2700MWh thermal and 3200MWh electrical energy in a biogas combined heat and power (CHP) plant.

The thermal energy is then integrated into the production process via a stratified heat buffer. The energy generated by the biogas CHP-plant can cover a significant share of the energy requirement of the abattoir corresponding to 50% of heat and 60% of electric demand, respectively.

This means a significant reduction in power and disposal costs for the company.
Somerset offers a container-based technology solution that utilises organic matter such as wood chips, agricultural residue, peat, corncobs and the like, to produce electricity and potable drinking water.

Approximately 1.5 billion people worldwide live without electricity today, and biomass-to-green energy is cited as a practical, sustainable solution for developing countries.

The tried and tested technology offered by Somerset is suitable for rural areas where communities don’t have access to safe, drinking water and electricity.
Onsite waste to electricity, heat or steam

Industry manufacturing food types, plastics and all goods that produce carbon-based waste products (in fact everything excluding glass, metals and stones/cement) can be converted into energy.

Somerset’s plants are modular in design and range from 100KW to 1MW.
Using a process called catalytic distillation, Somerset’s plastics-to-diesel technology can convert 10 tonnes of waste plastic into 6,000 and 9,000 litres of low sulphur diesel, per day.
Plastics and plastifuel to diesel
Plastics and plastifuel to diesel

Plastifuel is a plastics-to-fuel depolymeriser where specific plastics such as polypropylene (PP), HD-PE and LDPE are heated in an oxygen-free environment and then condensed to produce 10 to 20 litres of diesel-type fuel per day.

Polyolefins consist only of carbon and hydrogen, and are the largest group of thermoplastics found to be the most suitable for producing diesel.
Used oil refined to diesel or oil

Our distillation plant can convert all used oil and even tyre pyrolysis oil into < 260ppm diesel.

To markets - diesel or oil
Compressed Air Energy System (CAES)

Compressor train

Air

$P_c$ = Compressor power in

Expander/generator train

Exhaust

$P_g$ = Generator power out

Fuel (e.g. natural gas, distillate)

Aquifer, salt cavern or hard mine

$P_c = \text{Compressor power in}$

$P_g = \text{Generator power out}$

$\text{Air storage}$

$hs = \text{hours of storage (at } P_c)$
Compressed air battery energy storage

With Somerset’s range of waste-to-energy solutions, we can offer stored electricity with our new compressed air storage systems from 40KWh upwards. The power is constantly available and isothermal expansion delivers up to 90% round trip efficiencies. The system’s lifespan exceeds 20 years.
Compressed air battery energy storage

Medium and large energy users require a cost-effective, stable power and water supply. The Somerset Air Battery allows you to:

- Store energy during low tariff rate periods and utilise it during high tariff rate periods (load levelling).
- Store energy during low peak demand times and utilise the stored energy during high peak demand times (peak shaving).
- Store energy that has been produced by renewable solutions.
- Utilise the clean water produced.
- Remove unwanted particles from the air, and thus emit clean air.
Municipal Solid Waste to Refuse Derived Fuel

Solid/specified Recovered Fuel

Waste to energy

Waste in this instance defines any combustible, non-hazardous material resulting from the output of household and industrial processes. This represents a wide range of feedstocks, from construction waste to biosolids from sewage.

Somerset’s new small-scale waste-to-energy solutions have seen the company develop waste processing facilities that can cost-effectively produce Solid Recovered Fuel (SRF) and Refuse Derived Fuel (RDF) that is suitable for energy conversion.

Somerset will custom-build a system including conveyors, cranes, balers, wrappers and shredders to your specifications. This method of waste processing, which is widely used in Europe, is often the first phase of a waste energy plant and is the future of waste management in South Africa.
Green waste to energy facility schematic

Municipal Solid Waste (MSW)

Manual material recovery facility

1. Waste shredder
2. Waste baler
3. Wrapper
4. RDF storage
5. RDF Pyroliser
6. Electricity via gas generator

Glass
Metals
Organics
Plastic

Phase 1 Phase 2
Municipal Solid Waste to Refuse Derived Fuel
Solid/specified Recovered Fuel waste to energy

1. Municipal waste
2. Infeed conveyor
3. Sorting convertor
4. Shredder
5. Baler
6. Wrapper
7. Wrapped bale stockpile
8. Exporting RDF/RF
9. Green electricity
POWA-THERM power generation
Organic Rankine Cycle (ORC)

Somerset POWA-THERM Organic Rankine Cycle units can be manufactured and configured for different power output requirements from 15kW to a maximum of 1000kW.

Somerset’s energy developments yield extensive benefits for small, medium and larger type units required in remote areas and in off-grid conditions.

The organic Rankine cycle is mostly used when the high temperatures required to produce steam are not available. The ordinary Rankine cycle uses thermal power to convert water to steam, however, instead of using water, which has a relatively high boiling point, the organic Rankine cycle makes use of an organic fluid that has a much lower boiling point than water, so it vaporises faster. It also has a low freezing point so it will never become solid throughout the cycle.

The ORC system is green power technology at its best and is fuel free with near zero emissions. Inside the fence, installations can occur for existing sites and no water consumption occurs within the closed-loop operation. In addition, no waste is created and fossil-fuel based energy is displaced.
POWA-THERM power generation
Organic Rankine Cycle (ORC)

Heat Input

1 Low-pressure liquid
2 High-pressure liquid
3 Heated pressurised vapour
4 Low-pressure vapour

Green Machine

Evaporator
Expander
Pump
Condensor
Generator

Electrical output
Heat output
Somerset has the ability to integrate renewable energy resources such as oil, gas, biomass, solar, compressed energy storage, wind and coal, into a seamless individual system that provides energy, hot water and steam. Our solutions can be tailor-made to suit every client’s individual needs, from start to final commissioning and productive operation.

We engineer full turnkey green energy system solutions that are expertly project-managed to deliver reliable renewable waste to energy systems. All Somerset systems adhere to statutory, environmental and regulatory safety requirements.
Green waste to energy facility schematic

- Oil
- Biomass
- Natural gas
- Solar
- Coal
- Future energy sources

Electricity

Distribution infrastructure

Industrial

Residential

Centralised heating and cooling system

Thermal storage
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