CREATING A SUSTAINABLE FUTURE

PuRK ENERGY

OVERVIEW

PuRK ENERGY

PuRK Energy is a future thinking energy company, focused on developing green and clean energy projects on the African continent and making a difference to all. The company provides innovative and flexible project and build solutions, customised to suit local dynamics and client needs.

Our core focus is on the energy and power sectors and we pride ourselves in adding demonstrable value to our investee companies.

The business is focused on the energy and power sector project solutions. PuRK Energy is targeting renewable energy projects, with a focus on waste to energy projects (including cogeneration and combined heat to power and biomass).

Led by a highly skilled and experienced professional team, which has extensive local and global relationship networks we identify, evaluate, structure and complete renewable energy projects as well as offering solutions for the energy and power sectors.

PuRK ENERGY FOCUSES ON ENERGY AND POWER SECTOR SOLUTIONS

PURK ENERGY HAS A MISSION TO PLAY AN ACTIVE ROLE IN PROMOTING RENEWABLE ENERGY IN AFRICA. WE RECOGNISE THE ENORMITY OF THIS AMBITION BUT OUR VISION IS TO POSITIVELY CONTRIBUTE TO CREATE A MORE SUSTAINABLE WORLD FOR FUTURE GENERATIONS.

We at PuRK Energy are passionate and driven to contribute towards creating a sustainable world, independent of power and energy from fossil fuels. Our contribution is made through investments in profitable power and energy projects that advocate and commercialise clean energy and technologies in an ethical and socially responsible way benefitting communities and our environment.

We strive to achieve success by partnering to deliver innovative and sustainable green solutions within the power and energy sector and actively invest in select projects to deliver sustainable returns

PuRK Energy's core values of Professionalism, Ubuntu, Integrity and Transparency ensure that we fulfill our mandate.

Going green isn't just about being responsible and protecting our environment - it contributes positively to delivering sustainable profits and creating jobs.

FOCUSING ON RENEWABLE PROJECTS

THE BUSINESS IS FOCUSED ON THE ENERGY AND POWER SECTOR PROJECT SOLUTIONS WITH SPECIAL FOCUS ON RENEWABLE ENERGY AND WASTE TO ENERGY PROJECTS (INCLUDING COGENERATION AND COMBINED HEAT TO POWER AND BIOMASS).

Key focus areas include:

- Biomass is fuel that is developed from organic materials, providing a renewable and sustainable source of energy to produce electricity.
- Cogeneration is also referred to as combined heat and power (CHP). CHP plants recover otherwise wasted thermal energy for heating or producing electricity.
- Waste-to-energy or energy-from-waste is the process of generating energy in the form of electricity and/or heat from the treatment of waste (e.g. solid municipal waste, etc).

PARTNERS

Purk Energy's partners include:

Power Matla Renewables (Pty) Ltd is a locally owned black empowered company with investments in the renewable energy market providing good shareholder value and solid returns. Headed by Kgathola Ngoasheng and a small team that understands the South African business landscape as regards the renewable energy opportunities available.

Epiworx Projects (Pty) Ltd established in 2009 as an investment company, wholly owned and managed by women; 99.5% BWO. Their mission is a value add partner, facilitating the empowerment of women through active and meaningful participation in business at all levels, including Board.

Empower a Thousand Holdings is an investment company established in 2006 to house trading companies which will undertake investment opportunities in various industries and projects. It is a 100% black owned company wherein the shareholding is 82.4% African women, 18% African men and 14.9% through a trust, with total women ownership in the company at 74.6%.

Khajona Investments was established by Sikander "Sikkie" Kajee following 30 years of varied finance and corporate governance experience. The business is 100% Black owned and has been independently rated as a level 3 contributor in terms of the B-BBEE codes

Tactus Advisory Services (Pty) Ltd ("Tactus") was established as an independent financial services advisory company with a focus on emerging markets.

As a niche corporate finance, mergers and acquisitions advisory company Tactus proves independent and high-quality advisory services to the mid-market. Tactus is a specialist mid market adviser, advising on transaction sizes between R50million to R3billion. These include taking equity in renewable projects they advise on.

BOARD OF DIRECTORS

ROSHNI LAWRENCE

An experienced business leader, from a professional engineering background, with over 15 years solid experience and a proven track record in delivering sustainable results, primarily in heavy industries (cement, glass and mining). Extensive experience within African continent.

Roshni has the distinct advantage and specialist technical and commercial experience in developing sustainable and economically feasible energy strategies, focused on Waste to Energy, Cogeneration and Biomass projects.

KURREN NAICKER

Kurren has 13 years of professional experience, the past 10 of which was spent in corporate finance.

His last position was Associate Director at PwC Corporate Finance where he advised on transactions totaling more than R30 billion in BEE, valuations, acquisitions, divestures, finance raising, mergers, cross-border transactions and restructuring.

SOLLY MOLOKO

Solly is the non-executive chairman of Power Matla (Pty) Ltd, a locally owned black empowered company with investments in various portfolios within the energy and ICT markets. Solly has extensive knowledge of the various disciplines of strategic marketing and human resources.

He has been involved in various industries which include mining, energy and transport and has sat on various Boards, namely Billiton Group, Ariviakom, Eskom Finance Company, South Dunes Coal Terminal, Golang, Eskom Enterprises, Eskom Pension Fund, MEETI and African Tramways.

KGATHOLA NGOASHENG

The co-founder and Chief Executive of Power Matla (Pty) Ltd and a director of numerous companies including Powertech Transformers (Pty) Ltd, Altech UEC and Dorper Wind Farm.

He has more than twenty five years' experience at operational, managerial and executive positions in materials management, supply chain management, strategic sourcing, procurement, ERP system implementation, e-procurement and logistics.

MAGGIE DIGABANE

A qualified Chemical Engineer, with more than 15 years experience in manufacturing and operations.

She is also a director of Dorper Wind farm, Vintage Energy and Kitso Thebe Consulting, Maggie has extensive knowledge in operations management, key stakeholder relationships, continuous improvement, and human capital management.

SIKKIE KAJEE

An experienced executive and business leader, from a professional financial background. Sikkie has also served at leading Audit and Advisory companies in SA (BDO Spencer Steward, E&Y, KPMG, Gobodo Inc.).

He serves on a number of Boards both Governmental and private and also consults through the Institute of Directors providing both director development and in performing board appraisals.

WASTE TO ENERGY: HOW IT WORKS

Waste-to-energy uses everyday rubbish and waste materials as a fuel for generating power, just as power plants use coal, oil, or natural gas. The burning fuel heats water into steam that drives a turbine which creates electricity. This process has the capacity to reduce a community's landfill volume by up to 90 percent, and through this step prevents one ton of carbon dioxide release for every ton of waste burned.

WHAT IS WASTE?

Waste as a combustion material reduces landfill volumes by more than 90 percent. Waste to Energy prevents one ton of CO_2 release for every ton of waste burned and removes methane that would have escaped into the atmosphere due to landfill disposal.

Best practices rely on the "three Rs": Reuse, Reduce, Recycle. Recycling plastics, glass, paper, metals, and wood from the waste stream minimses the carbon and pollutants created in the burn process. Materials such as kitchen and commercial refuse as well as bio waste are ideal for combustion.

MONITOR AND CONTROL

The air stream rising to the stack is monitored to ensure compliance with air quality standards. The entire process can be controlled to optimise efficiency in the combustion, heat and steam generation, electrical energy, and environmental control processes.

MATERIAL PROCESS

Waste material is received in an enclosed receiving area, where it is processed and prepared for combustion. Negative airflow carries dust and odours into the combustion chamber from the receiving area, along with the waste to eliminate its spread outside the facility.

EFFICIENT COMBUSTION

Mixed waste enters the combustion chamber on a timed moving container, where it is rotated continuously to keep it exposed and burning (similar to turning over coals on a braai or barbeque). A measured injection of oxygen and fumes drawn from the receiving area ensures a more complete burn.

FLY ASH CAPTURE

Although fly ash is captured throughout the process, the finest airborne particulates are separated in the filter baghouse, where an induction fan extracts air through fabric bags toward the stack or chimney. This process removes 96 percent of any remaining particulates. The bags vibrate at intervals to loosen particulates plastered on the inner and outer surfaces. Captured fly ash is often returned to landfills.

ACID GAS TREATMENT

The acidic combustion gasses are neutralised with an injection of lime or sodium hydroxide. This chemical reaction produces gypsum and the process removes 94 percent of the hydrochloric acid.

BOTTOM ASH RECYCLING

The unburned remains of combustion—"bottom ash"—are passed by magnets and eddy current separators to eliminated both ferrous (steel and iron) and other metals—such as copper, brass, nickel, and aluminum—for recycling. The remaining ash can be used as aggregate for roadbeds and rail embankments. Ash is generated at a ratio of about 10 percent of the waste's original volume and 30 percent of the waste's original weight.

STEAM POWER GENERATION

Highly efficient superheated steam powers the steam turbine generator. The cooling steam is recycled back into water through the condensor or diverted as a heat source for buildings or desalinisation plants. Cooled stream is reheated in the economiser and superheater completing the steam cycle.

MERCURY AND HEAVY METAL CAPTURE

Activated carbon (charcoal treated with oxygen to increase its porosity) is injected into the hot gases to absorb and take out heavy metals, such as mercury and cadmium.

NOX TREATMENT DIOXINS/FURANS TREATMENT

Nitrogen oxide in the rising burn gases is neutralised by the injection of ammonia or urea. Dioxins and furans are destroyed by exposing flue gases to a sustained temperature of 1,562°F/850°C for two seconds. This process removes more than 99 percent of dioxins and furans.

ELECTRIC POWER AND HEAT

A 1,000 ton-per-day WTE plant produces enough electricity for 15,000 households. Each ton of waste can power a household for a month. If combined with a cogeneration plant design, WTE plants can, while producing electricity, also supply heat for nearby businesses, desalination plants and other purposes.

CONTRIBUTING TO A SUSTAINABLE FUTURE

Fossil fuels contribute heavily to climate change, which has a devastating impact on Earth's ecosystems. The environmental benefits of renewable energy are clear - renewable energy is safe, sustainable and profitable. This offers a win-win situation for all involved from communities to the investors to governments.

Africa is blessed with an abundance of renewable resources and offers the most obvious and compelling answer, boasting a wealth of opportunities across solar, wind, hydro and geothermal resources and technologies.

It is the unfortunate reality that even though Africa is endowed with inexhaustible raw energy potential, millions people still do not have access to electricity, and this power deficit continues to hamper growth and development.

Access to electricity is important for improving everything from education and agricultural productivity to employment. Africa therefore needs to unlock its energy potential – both conventional and renewable. Renewable energy can play a positive role in Africa's development.

RENEWABLE ENERGIES

SOLAR ENERGY

THE AFRICAN CONTINENT HAS WELL OVER 10 TW OF SOLAR POTENTIAL, 350 GW OF HYDROELECTRIC POTENTIAL, 110 GW OF WIND POTENTIAL AND AN ADDITIONAL 15 GW OF GEOTHERMAL POTENTIAL.

Africa is often referred to as the "Sun continent" or the continent where the Sun's influence is the greatest. According to the "World Sunshine Map", Africa receives many more hours of bright sunshine during the course of the year than any other continent. Many African countries receive on average a very large number of days per year with bright sunlight, especially the dry areas. Most of the sunniest places in the world are on the African continent, due to the general low cloud cover in the sky. This gives solar power the potential to bring energy to virtually any location in Africa

WIND ENERGY

Wind is one of the most abundant sources of energy on earth and is the fastest-growing form of renewable energy on the planet. Over 3% of the current world's energy is being generated by wind sources in various parts of the world.

Generally, annual average wind speeds greater than 4 meters per second (m/s) (9 mph) are required for small wind turbines. For utility-scale wind power plants, a minimum average wind speed of 6 m/s (13 mph) would be needed. It is then not a surprise to find that the best wind in Africa is located in the coastal regions of the continent.

ADVANTAGES OF USING WIND ENERGY?

Wind is a clean energy source – Converting wind energy into electricity releases no harmful by-products into the environment as compared to conventional fossil fuels which is used to generate electricity in most parts of the world.

Wind energy projects create jobs for both skilled and unskilled workers.

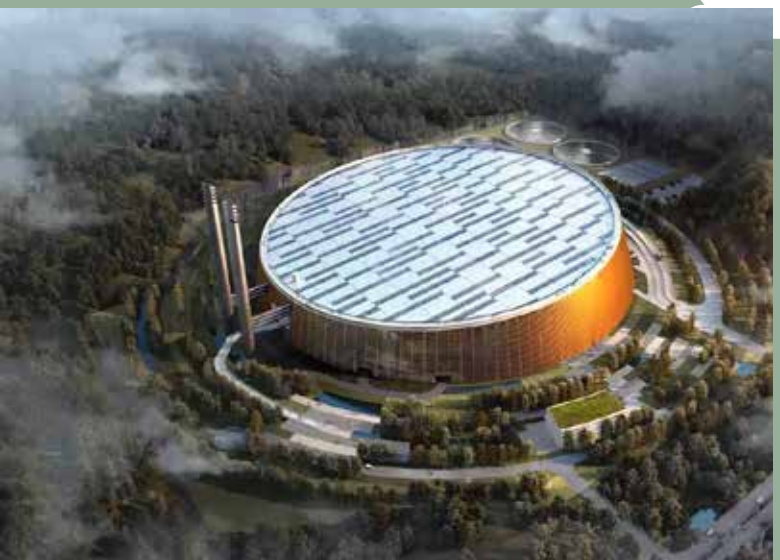
Wind energy brings electricity to rural communities – Most wind farm projects are set up in rural communities, as the land and environmental conditions are ideal for renewable energy initiatives. Wind farms bring clean, affordable and sustainable energy to these communities, as well as to other areas that don't have access to electricity.

BIOMASS

Biomass is fuel that is developed from organic materials, providing a renewable and sustainable source of energy to produce electricity. Biomass power is carbon neutral generated from waste that would otherwise be dumped in landfills or openly burnt. Some examples of biomass fuels are wood chips, certain crops, manure, forest debris and some types of waste residues.

GEOTHERMAL ENERGY

Geothermal energy refers to the production of energy using the internal heat of the Earth's crust. The production process involves the drilling of wells into the Earth's crust and heat and/or hot water is extracted and used directly to heat buildings and homes, or is used to produce electricity in a geothermal power plant.



COGENERATION

Cogeneration is also referred to as combined heat and power (CHP). CHP plants recover otherwise wasted thermal energy for heating or producing electricity.

WASTE TO ENERGY (WtE)

Waste-to-energy or energy-from-waste is the process of generating energy in the form of electricity; and/or gas from the treatment of waste (e.g. solid municipal waste, etc). Most WtE processes produce electricity and/or gas directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol or synthetic fuels.

OVERVIEW

PuRK ENERGY & WATER

PuRK Energy & Water is a future thinking energy & water company, focused on developing clean water projects on the African continent and making a difference to every life. Water and energy are critical elements for the development of society, whilst also strengthening human dignity. The advancement of technology and the connectedness across the world allows for innovation and accessible solutions

Water is the most vital natural resource on the planet, needed for human survival and a critical input into our food, manufacturing, and energy systems. It is predicted that the demand for water globally will increase by 55 percent between 2000 and 2050. The demand will be driven by agriculture to feed the growing population. But, we continue to place increasing pressure on freshwater resources through a rapidly growing population, ever rapidly changing climate, increasing pollution and general water wastage.

We at PuRK Energy & Water see an opportunity to play a positive role in helping to alleviate some of these challenges by creating and implementing effective solutions to make clean, safe and affordable drinking water available to everyone.

PuRK Energy & Water partners with companies for the design, construction, commissioning, operating and maintenance of water treatment plants, sanitation plants, effluent plants, etc.

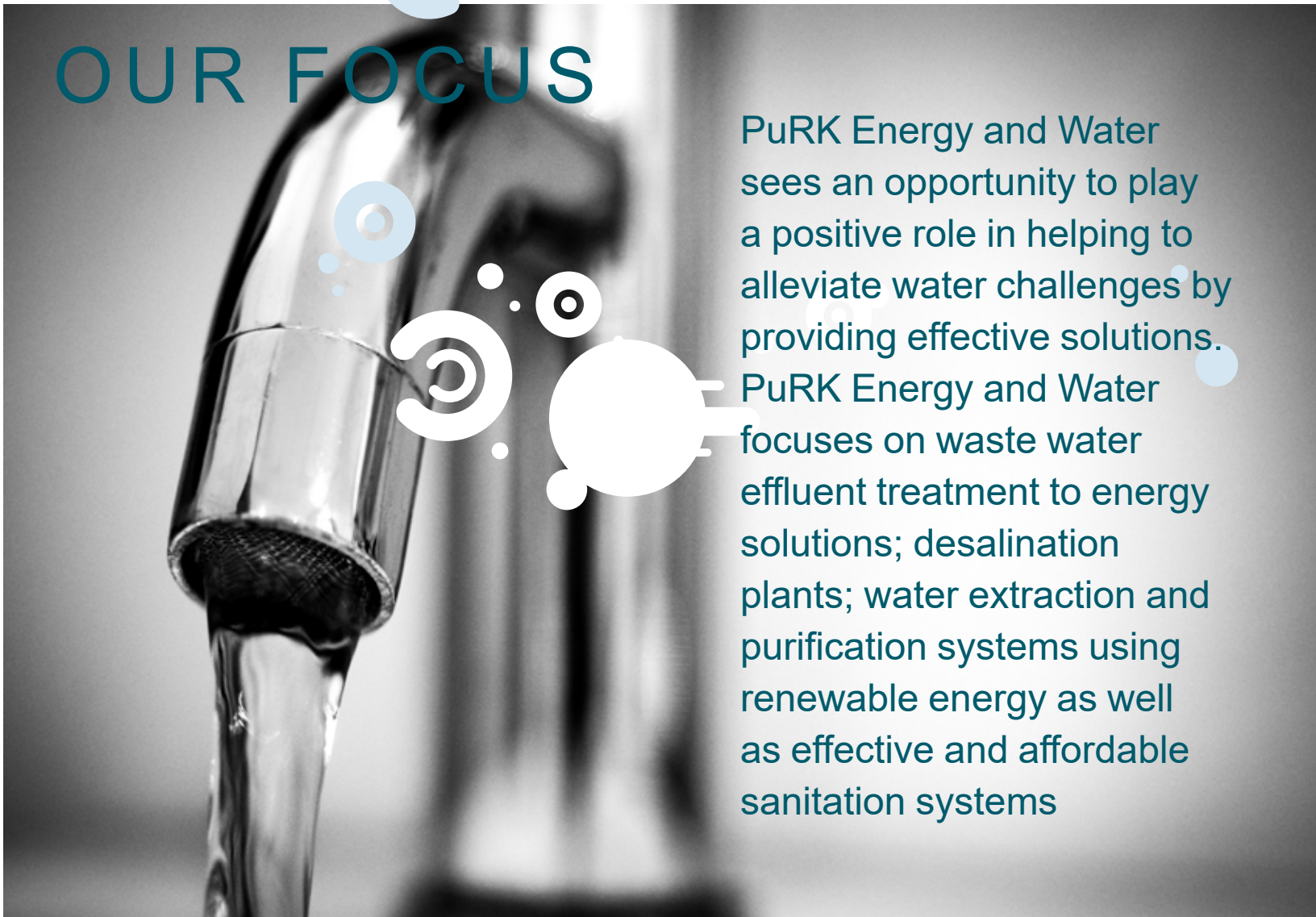
WATER SHORTAGES

Water shortage is a global risk and South Africa and other African countries are no different. The problem is so severe and the United Nations Sustainable Development Goal 6 is focused on water and associated challenges, with several sub-goals related to different water challenges.

Water utility providers and municipalities are faced with many challenges including aging infrastructure, booming populations and demand that is fast outstripping supply. More effective water network management is essential in addressing these and other potential future issues.

Our focus is on:

Waste water effluent treatment to energy solutions
Desalination plants
Water extraction and purification systems using renewable energy
Effective and affordable sanitation systems



OUR FOCUS

PuRK Energy and Water sees an opportunity to play a positive role in helping to alleviate water challenges by providing effective solutions. PuRK Energy and Water focuses on waste water effluent treatment to energy solutions; desalination plants; water extraction and purification systems using renewable energy as well as effective and affordable sanitation systems

OUR FOCUS

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WASTE WATER TREATMENT PLANTS

Waste Water Treatment Plants convert polluted water back into pure and non polluted water. These plants reduce the amount or the concentration of the pollutants in the water and to convert it back for either human consumption, industrial use and for irrigation purposes.

Processes used to convert the water are either filtration, process like settling or chemical processes such as coagulation and disinfection.

WATER PURIFICATION PLANTS

Water purification plants use containerised potable water treatment package plants sometimes just called modular systems, these water purification package plants have very few moving parts and a small carbon footprint, taking up minimal space which results in a dependable water purification method and recycling of water.

This method benefits both municipal and industrial clients who realise that recycling and purification of used water is of utmost importance.

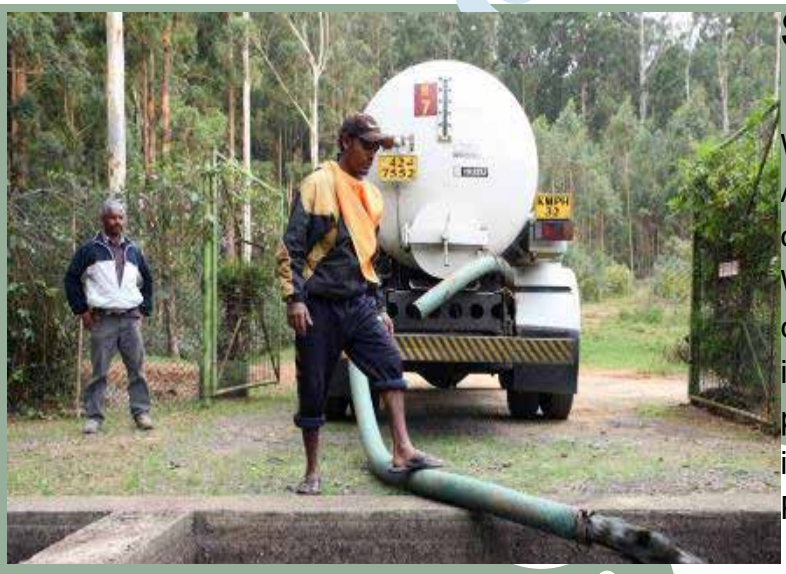
DESALINATION PLANTS

Desalination is a process that removes mineral components and salts from saline water.

Saltwater is desalinated to produce water suitable for human consumption or irrigation. One by-product of desalination is salt. Desalination is mainly focused on the optimal provision of fresh water for human use.

Currently, approximately 1% of the world's population is dependent on desalinated water to meet daily needs, but the UN expects that 14% of the world's population will encounter water scarcity by 2025.

Desalination is particularly relevant in water scarce or dry countries such as Africa and the desalinated water is usually healthier than water from rivers and ground water.

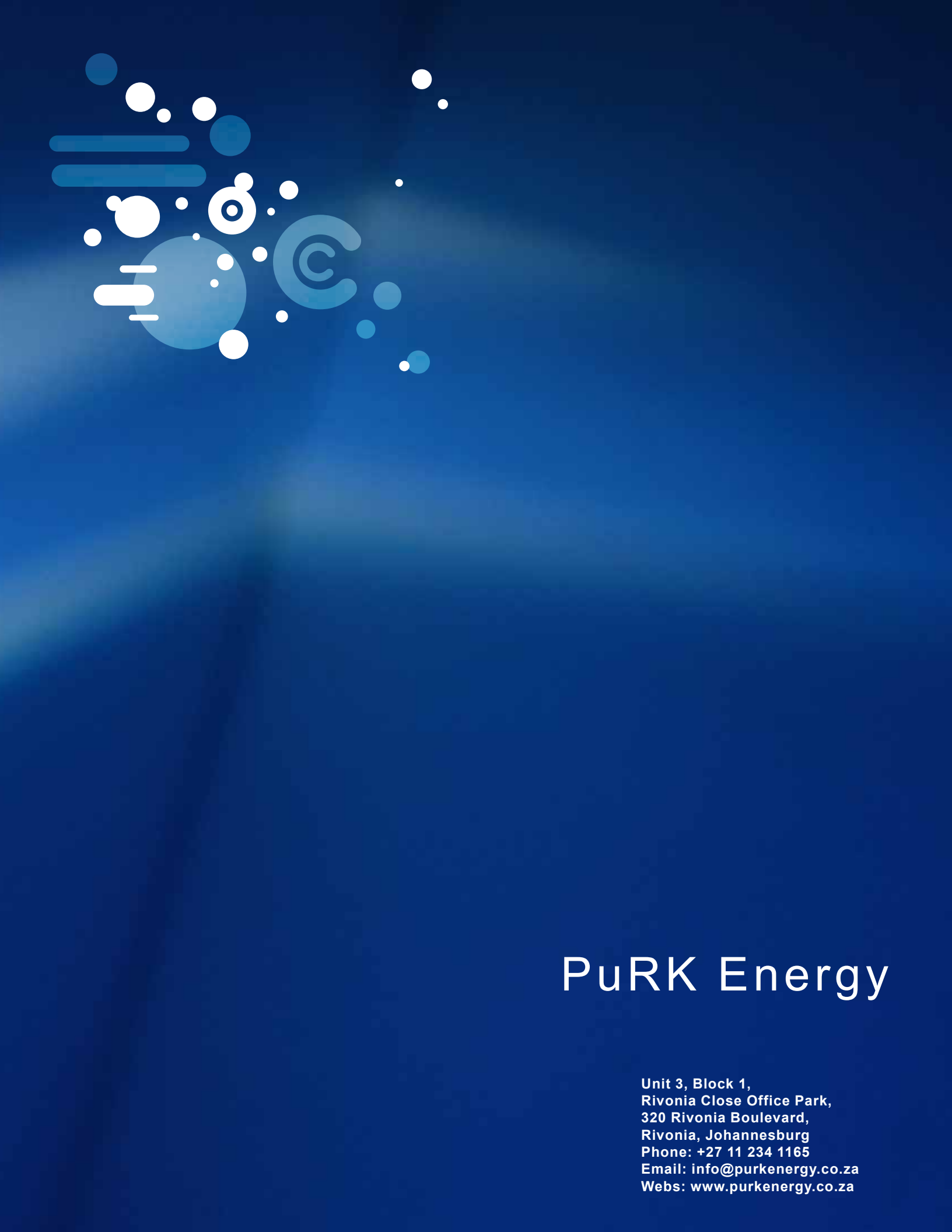


SANITATION SYSTEMS

Water services (i.e. water supply and sanitation) in South Africa are controlled by the Water Services Act (Act 108 of 1997) and the National Water Act (Act 36 of 1998). The Water Services Act deals with water services provision to consumers, while the National Water Act deals with water in its natural state. As in the case of water supply, the provision of sanitation to a community should take place in terms of the relevant Water Services Development Plan, which is required in terms of the Water Services Act.

Water services (i.e. water supply and sanitation) in South Africa are controlled by the Water Services Act (Act Water, sanitation and waste management are important driving forces for community health within South and Southern Africa. A clean environment, open defecation free areas, personal hygiene practices among individual members of a community, proper solid and liquid waste management, and availability of adequate safe drinking water determine the health of individuals as well as the community.

PuRK Energy & Water's focus is ensuring the provision of effective and affordable sanitation systems for all people within Africa.



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