Safety first

SAFETY is at the heart of everything we do
VEOLIA DESIGNS AND DEPLOYS CIRCULAR ECONOMY SOLUTIONS FOR WATER, WASTE AND ENERGY MANAGEMENT TO IMPROVE EFFICIENCY FOR CITIES, INDUSTRY AND CITIZENS.

€24,390 million revenue

163,226 employees on 5 continents

A Trusted Partner

Veolia works with top industrial companies:

- BASF
- Borealis
- bp
- Total
- Solvay
- Rio Tinto
- Iberdrola
- Nestlé
- Heineken
- Danone
- Mars
- ExxonMobil
A COMPLETE MASTERY OF THE WATER/WASTE/ENERGY CYCLE TO SERVE OUR CUSTOMERS BETTER

4,052 drinking water production plants managed
2,928 wastewater treatment plants managed
Almost 61 million people connected to wastewater systems
100 million people supplied with water

2,086 industrial facilities managed
44 million MWh produced
551 heating and cooling networks operated
2,4 million multi-family housing units managed

40 million people received collection services
45 million metric tons on waste treated
591 treatments plants operated
764,477 business customers
Veolia is the trusted partner of leading Miners across the world.
VEOLIA:
20-Year Experiences in Africa
Our experience in Africa

>1 billion €
REVENUE (Africa activity only, except Egypt)

Permanent presence in 18 Countries

6,536 EMPLOYEES (Africa)

2015 Data
Veolia Ghana Limited

- 100% subsidiary of Veolia Africa, founded in July 2014 and registered in Ghana under the Companies Code of 1963, Act 179.
- **Primary activities:** Provision, Operation and maintenance of Water and Water Waste Facilities, Solid and Liquid Waste Treatment and Energy Services, Development of Water and Waste Water Facilities; solid and liquid waste Treatment Facilities and Energy Services.

- **Missions & objectives:**
  - To provide high quality products and services to its customers at competitive prices
  - To ensure the highest level of customer satisfaction
  - To increase return to owners and investors
  - To improve and maintain a local team through training and development programs
Veolia accreditation in Ghana (1/2)

- Visit to Veolia facilities in South Africa in March 2017

REPORT
ON THE TRIP TO SOUTH AFRICA:
VISITS TO VEOLIA FACILITIES

Recommendation

The team concludes that Veolia has amply demonstrated their capability and capacity to treat any form of water in any part of this country including brine without any contradiction. We therefore strongly recommend that the Environmental Protection Agency and the Ghana Chamber of Mines allow Veolia to compete favorably with other service providers based on track record, applicable technology, cost of manufacture of plant, operation, maintenance and transfer of technology.

3.0 Conclusions

1. The team is of the view that Veolia has the expertise, technical know-how, the appropriate technology, well developed structure, industrial and chemical support base to manage and treat any form of water anywhere in the world. They are extensively involved in water, waste water and brine treatment.

3. They have a policy to train and transfer technology to locals to own the technology and run treatment plants on their own even in patented facilities (Actiflo and Multiflo). AGA Obusi’s Actiflo Treatment plant is run by Ghanaians.
Veolia accreditation in Ghana (2/2)

- Veolia accreditation letter by EPA in April 2017

In order to assess Veolia’s capability to provide mine waste water treatment and brine management services, representatives of the EPA, Ministry of Environment, Science, Technology and Innovation, and the Ghana Chamber of Mines visited some of Veolia’s operational projects in South Africa. Veolia Ghana Limited has been assessed and evaluated by the EPA, Ministry of Environment, Science, Technology and Innovation, and the Ghana Chamber of Mines, and found to be capable for mine wastewater treatment and brine management in Ghana. The observations and conclusions of the evaluation team, with regard to Veolia’s capabilities, are documented in a report.

The current list of companies that have been accredited by the EPA for mine wastewater treatment and brine management in Ghana are: MIWATEK, P2W (Pollution to Water) Company Limited; Proxa Ghana Limited, QEC; and Veolia Ghana Limited;
The Industrial Utility Dilemma

Utilities are key to the performance of your core business

State of the art utilities enables you to:

- Improve competitiveness
- Maximize core business production
- Ensure compliance with regulations (emissions, effluents, waste)
- Manage environmental and social impact
- *Improve capital optimization*

And yet Utilities are not your core business

Many Industrial Companies:

- Prefer not to invest scarce capex in Utility assets
- *Do not have the expertise to design, construct and operate*
- Utility assets for optimal performance and total cost of ownership
- Do not want to invest their best people in Utilities
Veolia Is Uniquely Positioned For Your Utility Outsourcing

Utilities are key to the performance of your core business

CREDIBILITY
A Global Company with an unrivalled business network
A Water Energy Waste Company with the ability to self source across the entire water-energy-waste business
A Proven Industrial Company transforming non-core services for global industrial leaders

COMMITMENT
Complete solution provider
Providing Guaranteed Outcomes
Agility of our business models

DIFFERENTIATION (reason to believe)
• Operator Engineer DNA to optimize Total Cost of Ownership
• Asset Management aligned with the needs of your core business
• Continuous Performance Improvement to unlock value
• Financial Engineering aligned with the financing needs of your business
• Social Impact of your business on local communities
A few case examples
In 2001, Veolia Water Solutions & Technologies South Africa designed, constructed and financed the country’s first re-use plant.

Located in Durban, the largest city on the East Coast of South Africa

Public Private Partnership (PPP) - 20 year concession

Treat 50 to 77 mega litres per day of municipal wastewater to a near potable standard for direct reuse in industrial processes.

Commissioned in May, 2001

Total cost: ZAR 74 million (US$ 8.8 million)
Veolia Water Technologies designs, constructs and provides a service offering for a versatile, reliable and robust mobile water treatment plant.

- 200 m$^3$/day producing drinking war quality effluent from polluted river water sources.
- Raw water feed pump
- Clarifier
- Ceramic Membrane Ultra-filtration Unit
- Diesel generator
- Dosing Equipment
- 4x4 Diesel Truck
CUSTOMER CHALLENGE

Find a reliable and experienced service provider to acquire and manage large-scale power, heat, cold and compressed air facilities to focus on core business;

Ensure the acquirer can also guarantee top-quality service for these critical utilities, supporting the safety and production of 5 underground Coal Mines.

VEOLIA SOLUTION

⇒ Assets transfer and operations outsourcing not only bring cash-in and enable upgrade investments which would otherwise not have been possible. It also paves the way for efficiencies by setting our clear operations targets.

✓ Smooth transfer of employees and assets for a 20-years delegation of operations. Annual capacities:
  - Heat production: 270 GWh
  - Compressed Air: 1.4 billion Nm³
  - Power distribution: 730 GWh
  - Nitrogen: 25 billion m³

✓ Performance guarantees by contract with black out commitments. Improved reliability of supply with technical upgrades: new cold production facility and nitrogen supply;

✓ Transparent pricing, and energy savings guarantee equivalent to 50,000 tons of CO₂eq. reduction per year.

Assets financing and guaranteed pricing for long term visibility on cost.
Zero Liquid Waste: A Solution for Mine Water Treatment
CUSTOMER CHALLENGE

Provide a cost-efficient, integrated solution for 3 remote coal mines with contaminated water from 6 sources to meet the newly issued regulation on chloride discharge.

VEOLIA SOLUTION

⇒ Provide a turnkey Zero Liquid Waste strategy, allowing the client to meet the new discharge standard and to improve Site’s water-source independence by further reusing water for operations

✓ Design, Build and Operations of a centralized plant for the 6 effluents under a 10-years contract: Veolia takes complete responsibility for water management;

✓ Combination of softening, filtration, reverse osmosis and evapo-crystallization technologies, with a total capacity of 18,900 m³/day and 85% chlorides removal;

✓ Achieve a zero liquid waste system: based on site’s needs, clean water is reused for boiler feed or safely discharged, while solid non-hazardous waste is landfilled on site.

Meet local environmental requirements to maintain smooth operations: avoidance of 9,300 tons of chloride discharge per year.
The Pearl Gas-to-Liquid (GTL) complex operated by QSGTL in Ras Laffan, Qatar, is the largest plant of its kind in the world. Each day it produces 140,000 boe of clean burning fuels per day like gasoline, diesel and kerosene from natural gas. In addition the plant produces 120,000 boe natural gas and ethane. Water is a significant by-product of the conversion of natural gas into fuels. Shell and its partner, Qatar Petroleum, were looking to operate a model facility that would have zero liquid discharge as part of a closed-loop system.

Veolia has developed a unique process for recycling water generated during the gas-to-liquid transition so it can be fully reused on site. Veolia was selected to design and build an effluent treatment facility. Treatment uses a flotation and a biological process, followed by ultra-filtration and double pass reverse osmosis (RO). Brine from the RO is treated by evaporation/crystallization to recover appr. 500 m³/h from the brine and close the water balance. Residual (solid) by-product streams consisting of salt and sludge are further minimized by means of dewatering. The plant is designed to treat 45,000 m³ of water a day which is then reused in the plant’s production process.

• Strict regulatory compliance
• Smaller water footprint
• Greater community acceptance
CUSTOMER CHALLENGE

Build lasting and meaningful relationships with local communities, in particular indigenous people who own the land, so as to bridge the local skills gap and improve Mining industry acceptance.

VEOLIA SOLUTION

⇒ Continuous long term effort to anchor our business into the local communities where we and our Customers operate.

✓ Establishment of a Joint Venture with a local indigenous company to deliver our waste and cleaning services in Western Australia: develop local skills and employment opportunities

✓ Annual review of the Reconciliation Action Plan aimed at acknowledging the importance of indigenous people’s role for the company and taking pro-active, concrete steps in empowering them.

Making a lasting and positive community impact, beneficial to both our business and the one of our Customers.
UK: Wheal Janes, Acid Mine Drainage Management after Closure

CUSTOMER CHALLENGE

Ensure the control of a closed flooded mine acidic overflow to avoid spillage into the environment and risk of large financial penalties.

VEOLIA SOLUTION

- 10-year operations and maintenance contract for acid mine drainage overflow treatment;
- Integrated wastewater treatment solution and technology improvement allowed treatment cost optimization
  - 25% reduction of energy cost for WW treatment
  - 10% reduction of energy cost for pumping
- Comprehensive monitoring and reporting systems to follow up on water quality and operations performance
AUSTRALIA: Woodlawn Bio-energy project, giving a second life to your Closed Mine Site

CUSTOMER CHALLENGE

Previous copper, lead and zinc open cut mine put to Closure becomes a potential environmental liability for the Customer.

VEOLIA SOLUTION

- Acquisition of the closed mine site and conversion into a Veolia bio-energy facility
- Design and integration of municipal solid waste landfilling, compost facilities and bio-energy generation
  - 200,000 tons of waste/year
  - Production of power for over 2,500 households
- Upcycling opportunities: remaining nutrients and recovered heat are further re-used for on-site agricultural purposes (aquaculture and animal breeding).

Second life of the mine site is beneficial to both environment and the communities.
Cogeneration case examples

**Hungary**  
*City of Pecs*

- Electricity and heat production for the heating network
- Output (biomass): 150 MWth and 50 MWe [total output 573 MW]
- Tonnage: over 400,000 tons per year
- Type of biomass:
  - Forestry waste
  - By-products of sawmills
  - Energy crops (miscanthus), Very Short Rotation Coppices (poplar)

**United Kingdom**  
*Agrifood industry*

- Electricity and heat production
- World leader in the production of alcoholic beverages (spirits)
- Output: 50 MWth and 8 MWth
- Energy recovery:
  - Of distillation waste (by combustion)
  - Of the biogas produced at the site (by methanisation)
- Biomass tonnage 220,000 tons/year
- Type of biomass: 100% of process by-products (whisky pulp)
FINLAND : Neste, Industrial Utility Assets

Challenge

- Neste’s Porvoo refinery has the largest industrial utilities plant in the Nordic region and is one of the top 3 most profitable refineries in Europe
- Neste were obliged to comply with new European Union emission limits (IED) and improvement of plant energy efficiency

Solutions

- Establishment of a special purpose vehicle (SPV) with multiple stakeholders
- Design, Build and Operate of a new energy facility producing 2,5TWh steam (100-5b), ~300GWh electricity including demineralized and boiler feed water
- Project financing for capital investment
- Mutulisation of assets with third parties

Asset mutualisation and innovative project structuring enabled the SPV to consolidate the investment resulting in a reduction in WACC from 10% to 4%* which delivered annual financing cost saving in excess of 250 million Euro

Deconsolidation also unlocked 400 million Euro of Capital enabling the stakeholders to effectively lighten their balance sheet

Asset mutualisation maximised plant utilisation

100% availability guarantee avoids costly disruptions to customers’ production

Innovative product recovery technology used refinery residuals as a fuel maximising value of residuals and saving 58 million Euro per year in fuel purchases

Operator influenced design ensured efficiency of operations delivering saving in excess of 20% against initial design specifications
Unlocking Value from Industrial Water, Waste and Energy Assets
Questions?