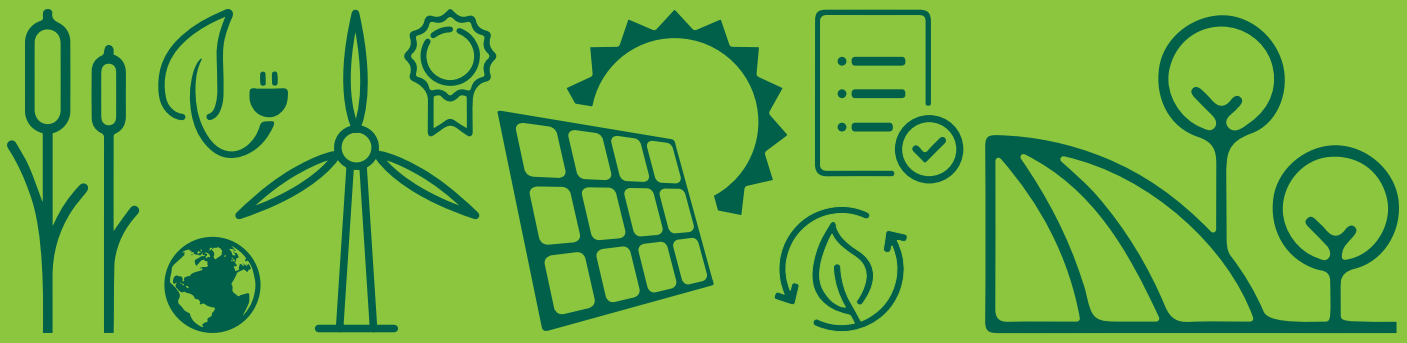
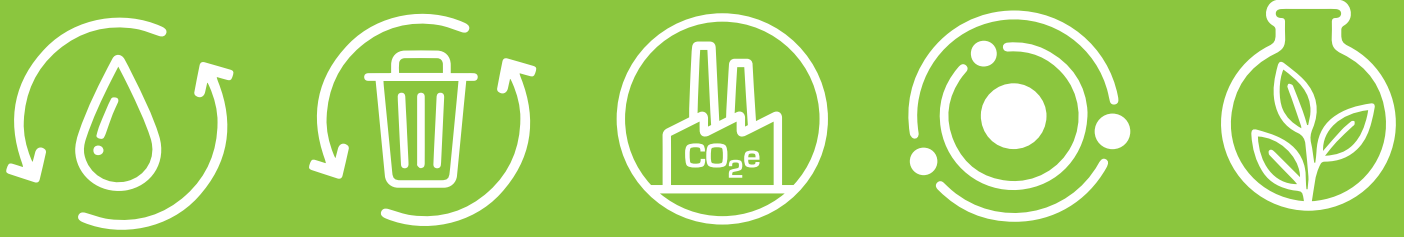
December 2019



GOING GREEN

The objective of Going Green is to drive environmental solutions towards a sustainable future.

We encourage all employees to identify ways we can minimise AECI's environmental impact through our key focus areas:



WATER | WASTE | CARBON DIOXIDE EMISSIONS | ENERGY | GREEN CHEMISTRY

OUR STRATEGY

Our goal is Zero Harm. We aspire to operate sustainably, without harm to people, the environment and the communities in which we operate. Roll-out of the new Going Green campaign aligned with this, focused in the areas outlined in the pages that follow, will be accelerated in 2020. The aim is to minimise environmental impact and drive a beyond compliance mind-set within our own operations and across the value chain. This will boost AECI's visibility as a Company of Choice.

GOING GREEN IS ONE OF OUR BIGGER VALUES.

The new campaign is summarised as follows:

Role

Drive environmental solutions towards a sustainable future

Scope

- *Reduce our current environmental footprint*
- *Use natural resources responsibly*
- *Explore innovative solutions to environmental challenges*

Purpose

- *To drive innovative environmental solutions in current operations and the Business of Tomorrow*
- *To create awareness of Going Green among internal and external stakeholders*
- *To drive a culture of good environmental practice and a beyond compliance mind-set in the workplace*
- *To improve market competitiveness through Green Chemistry and best available technology in our products and services*
- *To reduce AECI's environmental impact through measurement and target setting*
- *To improve the visibility of our Going Green programme among external stakeholders*

KEY FOCUS AREAS: YOU CAN MAKE A DIFFERENCE

ENERGY

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The Energy key focus area strives to reduce energy usage while realising the cost saving opportunities created.

The objective is also to create wider awareness regarding all sources of energy being used and the impact of those sources, key among which is load shedding.

USE THE ENERGY PROGRESSION ARROW

IDENTIFY
AREAS WHERE ENERGY IS WASTED AND SAVE. (SWITCH IT "OFF" CAMPAIGN)

OPTIMISE
PROCESSES TO BE MORE ENERGY EFFICIENT

IMPLEMENT
PROCESS CHANGES E.G. VSDS, RENEWABLE ENERGY, ALTERNATIVE FUEL

RENEWABLE
ENERGY USAGE (WIND/WATER/ SOLAR). OFF THE "GRID" ENERGY USAGE

TO IDENTIFY KEY OPPORTUNITIES

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

HELPFUL TIPS

AECI good chemistry

HOW TO SAVE ENERGY

SWITCH IT OFF

Is ALL electrical equipment that you're not using or needing at the moment switched off?

SWITCH TO A GREENER OPTION

Are you using the most fuel efficient source of energy?

USE RENEWABLE ENERGY

Are we ready to invest in renewable energy?

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

WATER

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The Water key focus area is aimed at facilitating integrated action regarding the conservation and utilisation of water in operations and the value chain.

It seeks to establish an awareness of the physical limits of water use on future development and minimise the impact of water use on the environment.

USE THE WATER PROGRESSION ARROW

MONITOR WATER USAGE; IDENTIFY AREAS OF WATER WASTAGE

FIX AREAS OF WATER WASTAGE

OPTIMISE RE-USE OF WATER WITHIN INDIVIDUAL OPERATIONS AND BETWEEN AECI COMPANIES

EXPLORE WATER TREATMENT OPPORTUNITIES TO FURTHER IMPROVE RE-USE

EXTEND RE-USE AND RECYCLING OPPORTUNITIES TO SUPPLY CHAIN AND COMMUNITIES

TO IDENTIFY KEY OPPORTUNITIES

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

HELPFUL TIPS

AECI good chemistry

HOW TO SAVE WATER

CONDUCT A WATER AUDIT

An audit establishes baseline water usage data and reveals areas in the operation with high water consumption.

REMOVE WATER FROM CLEANING PROCESSES

When a dry alternative is possible — evaluating each step in an industry's cleaning procedures may reveal simple opportunities to reduce water consumption by utilising practices that require little to no water.

RE-USE NON-POTABLE WATER

Water left over from one sector of an operation can be re-used for another purpose.

RETROFIT EXISTING EQUIPMENT AND FIXTURES

Setting appliance parameters to meet the minimum water requirement for usage; installing automatic shut-off nozzles to hoses; switching to high-pressure, low-volume hose nozzles; and installing water efficient sink faucets, shower heads and toilets are several ways to retrofit existing equipment to save water.

REPLACE

OLD EQUIPMENT WITH WATER-SAVING ALTERNATIVES

CLOSE

TAPS PROPERLY

USE

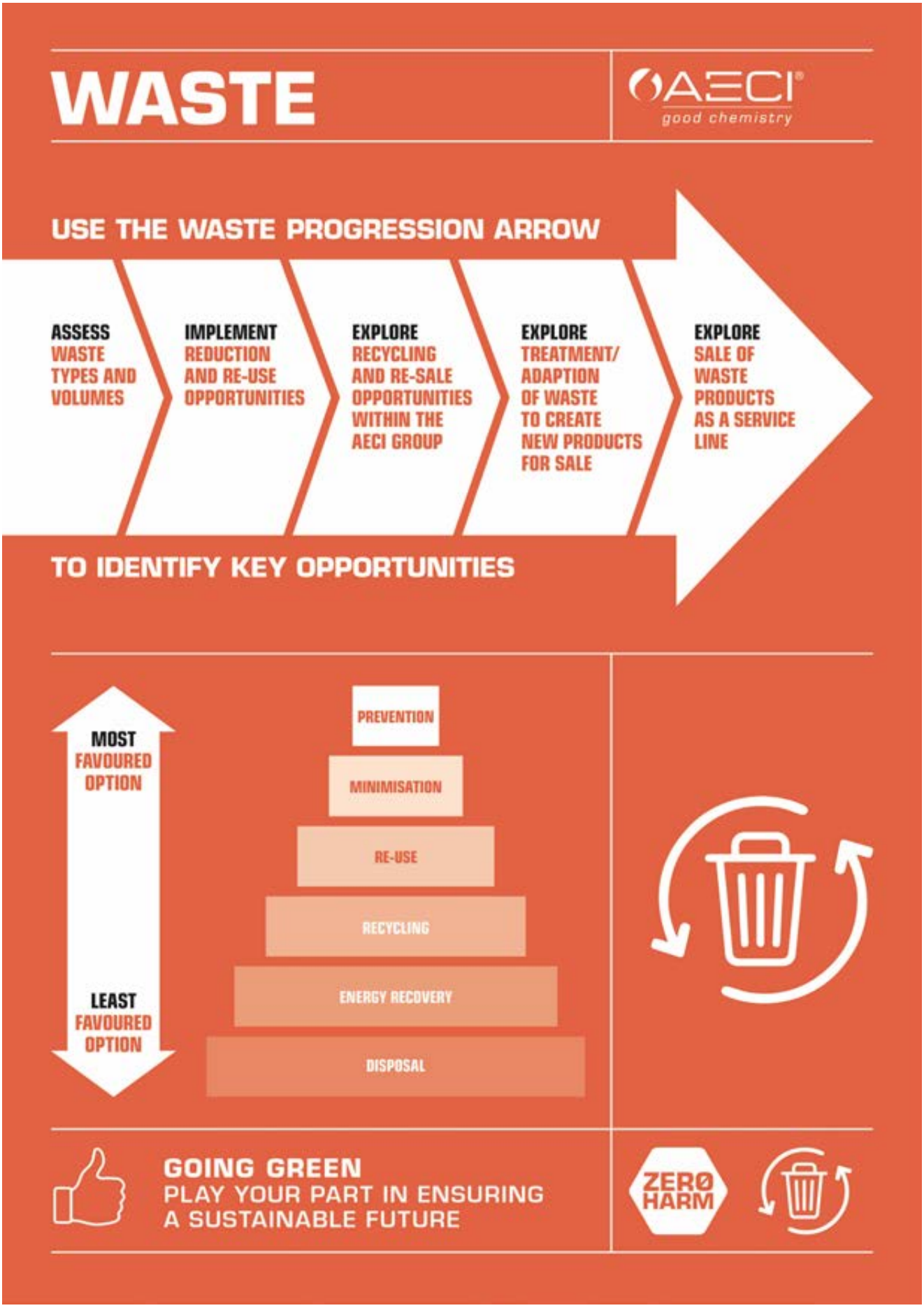
MORE RECYCLED WATER

DETECT

AND REPAIR ALL LEAKS

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM


WASTE
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USE THE WASTE PROGRESSION ARROW
ASSESS WASTE TYPES AND VOLUMES
IMPLEMENT REDUCTION AND RE-USE OPPORTUNITIES
EXPLORE RECYCLING AND RE-SALE OPPORTUNITIES WITHIN THE AECI GROUP
EXPLORE TREATMENT/ ADAPTION OF WASTE TO CREATE NEW PRODUCTS FOR SALE
EXPLORE SALE OF WASTE PRODUCTS AS A SERVICE LINE
TO IDENTIFY KEY OPPORTUNITIES
MOST FAVOURED OPTION
LEAST FAVOURED OPTION
PREVENTION
MINIMISATION
RE-USE
RECYCLING
ENERGY RECOVERY
DISPOSAL
GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE
ZERO HARM

HELPFUL TIPS

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KNOW YOUR WASTE

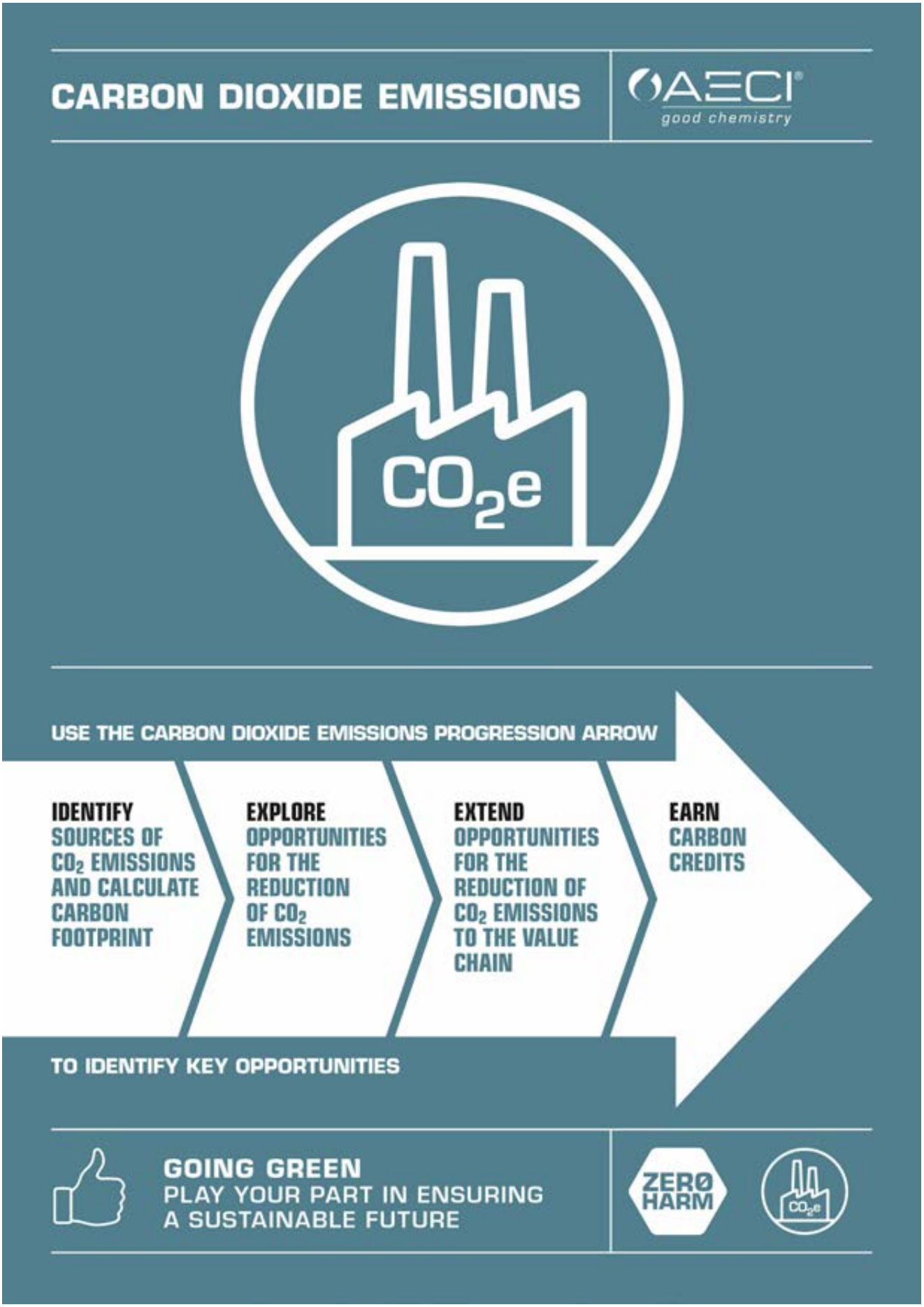
DO YOU KNOW
where your waste is generated?

DO YOU KNOW
how much waste you generate?

DO YOU KNOW
where it goes?

GOING GREEN
PLAY YOUR PART IN ENSURING
A SUSTAINABLE FUTURE

ZERO HARM


CARBON DIOXIDE EMISSIONS
AECI
good chemistry
CO_2e
USE THE CARBON DIOXIDE EMISSIONS PROGRESSION ARROW
IDENTIFY
SOURCES OF CO_2 EMISSIONS AND CALCULATE CARBON FOOTPRINT
EXPLORE
OPPORTUNITIES FOR THE REDUCTION OF CO_2 EMISSIONS
EXTEND
OPPORTUNITIES FOR THE REDUCTION OF CO_2 EMISSIONS TO THE VALUE CHAIN
EARN
CARBON CREDITS
TO IDENTIFY KEY OPPORTUNITIES
GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE
ZERO HARM
CO_2e

HELPFUL TIPS

AECI good chemistry

REDUCE YOUR CARBON FOOTPRINT

TELECOMMUTE AND TELECONFERENCE

Do you need to fly to a business meeting in another capital city to talk to your colleagues? Or can you think inventively and make best use of the benefits of the internet to do some of this remotely? Teleconferences mean less wasted aeroplane trips, which create a huge CO_2 burden. It can't always be done, but even a few less trips, here and there, add up to make a big difference.

RECYCLE, RE-USE AND AVOID USELESS PURCHASES

Try to get appliances and tools fixed rather than replaced. The carbon footprint of fixing things is far smaller than making them from scratch.

MAKE YOUR WORKSPACE AND HOUSEHOLD ENERGY EFFICIENT

Behaviour change lies at the heart of most individual actions for reducing our individual carbon footprint. By being sensible about your energy use, and making sure your building is well insulated, you can make a huge dent in your CO_2 emissions and it will save you money since you no longer spend on wasted energy.

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

GREEN CHEMISTRY

AECI good chemistry

The key focus for driving greener chemistry is to enable environmental solutions that will allow for a sustainable future.

Green chemistry will explore innovative solutions to drive change by reducing the use of natural resources in the chemical manufacturing process while maintaining excellent product output. AECI's businesses should also strive towards reducing their environmental footprints.

USE THE GREEN CHEMISTRY PROGRESSION ARROW

ACCESS
CURRENT PROJECTS AND NEW OPPORTUNITIES

REFORMULATE
PRODUCTS BY EXPLORING ALTERNATIVE GREEN RAW MATERIALS

NEW
DEVELOP GREEN PRODUCTS AND TAKE THEM TO MARKET

TO IDENTIFY KEY OPPORTUNITIES

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

HELPFUL TIPS

AECI good chemistry

KNOW YOUR GREEN CHEMISTRY

STEP ONE

ASSESS CURRENT PRODUCTS AND NEW OPPORTUNITIES

› Identify the "team"
› Schedule an annual review date and quarterly update meetings
› Workshop your current/new opportunities
› Track progress quarterly

STEP TWO

REFORMULATE A PRODUCT BY EXPLORING ALTERNATIVE GREEN RAW MATERIALS

› Identify raw materials used in all your current product lines
› Research alternatives by considering "greener" options for inputs AND/OR process
› Discuss the alternative options at your annual review

STEP THREE

DEVELOP GREEN PRODUCTS AND TAKE THEM TO MARKET

› Test and trial your identified alternative
› Notify relevant stakeholders of your improvement
› Introduce into the market

GOING GREEN
PLAY YOUR PART IN ENSURING A SUSTAINABLE FUTURE

ZERO HARM

GREEN AWARDS FOR AECI

The Department of Environment, Forestry and Fisheries hosted a three-pronged conference, known as the Waste Khoro, under the theme "Good Green Deeds" in September. The emphasis was on the creation of a platform for engagement on waste-related matters, particularly in terms of land remediation and asbestos management among industry leaders, NGOs and government entities.

The SHE team from AECI attended and presented papers related to remediation work completed across the Group. Furthermore, AECI sponsored and provided a 60-seater delegate lounge, with screens showcasing work in the Group, as well bottled water (courtesy of ImproChem). At the gala dinner, AECI received an award for its remediation activities and contribution to sustainable development.

CAIA

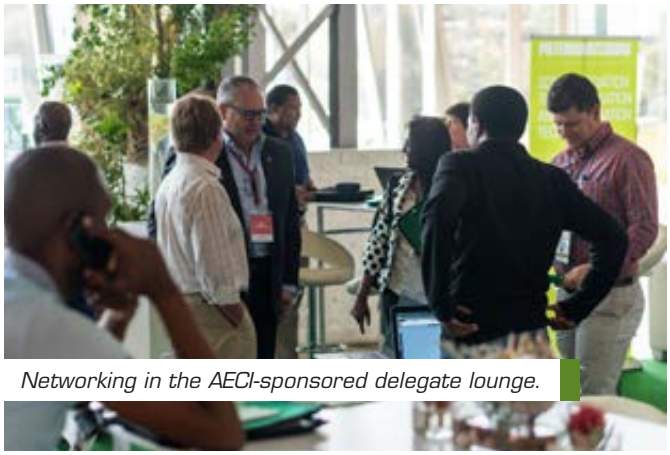
ChemSystems' Umbogintwini site won the Chemical and Allied Industries' Association (CAIA) Responsible Care® Award at the Responsible Care® Award ceremony in Johannesburg in November.

The Award recognises the achievement of companies that go above and beyond Responsible Care® compliance in terms of safety, health and the environment.

CAIA's Responsible Care® Award.

Neil Franklin (AECI Group SHE Manager) (left) and Letladi Maisela (AECI Group Land Remediation Manager).

AECI's SHE team at the Waste Khoro.



Networking in the AECI-sponsored delegate lounge.

EXPLOSIVES WASTE REDUCED

In terms of South Africa's National Explosives Act, any waste that enters an explosives area is considered explosive and may only be disposed of by burning. In the past, it meant all process and non-process waste at AEL Intelligent Blasting in Modderfontein was transported to the burning ground for open air destruction. This resulted in heavy smoke that contained dust, nitrous oxide and nitrogen dioxide.

Subsequent to the successful implementation of a Going Green project, AEL has managed to:

- *Recover R60 000 from packaging recycling (excluding packaging for reuse)*
- *Recycle over 55 tonnes of packaging*
- *Recycle all non-explosives plastic waste (eg. 23 000kg of tubing)*
- *Reduce explosive waste being burned by 40%*
- *Reduce dust, heavy smoke and nitric oxide and nitrogen dioxide emissions*
- *Reduce paraffin use (at the burning ground)*

To support the project, AEL acquired different coloured bins, cages and skips to facilitate waste separation. The Cordex, Extrusion and Pentolite plants also introduced a new task of decanting packaging material, solely for waste separation and avoiding contamination. Additional personnel were allocated accordingly.

PVC bags are sent for recycling twice a month.

Test tubing is being recycled successfully.

Packaging boxes await collection by recycling waste service providers.

Tubing waste is shredded or piled for reuse at the Extrusion plant.

VARIABLE SPEED DRIVE TECHNOLOGY ENABLES ENERGY SAVINGS

In a previous issue of Our World magazine, which included a feature on Innovation in the Group, the Variable Speed Drive technology installed on the cooling tower system at AEL's Nitric Acid plant was featured. Implementation of this BIGGER Idea led to lower energy use on the fans at night and in winter because less air is now required to cool the plant.

110 kilowatts of power savings over 8 560 operational hours were realised, which is 941 600 kilowatt hours per year. The energy saved equates to R856 000 and a payback period of 1,3 years for the project, which cost R1,1 million.

The long-term advantages include:

- *Reduced energy consumption, and therefore a cleaner environment owing to lower air emissions*
- *Reduced stress on the fans means fewer fan and gearbox failures, leading to better plant availability and higher production levels*
- *Reduced stress log during start-ups. Motors were started directly online before the project was implemented*

Variable Speed Drive technology yields environmental and financial benefits.

Reed bed.

Effluent dosing pond.

USING NATURE AS A FILTER IN ZAMBIA

A reed bed and dosing pond are reducing the low pH and high nitrate levels in plant effluent exiting AEL Zambia's operations. After passing through the reed bed, the effluent is transferred to the dosing pond, where it's tested. Lime is added manually to increase alkalinity prior to discharge beyond the site's boundries.

A reed bed is a non-invasive filtration method for the natural reduction or removal of nitrates in effluent and/or waste water. Melissa Naidoo, AEL Environmental Manager, explained: "The root system absorbs the nitrates and creates microorganisms that utilise the nitrates to promote a healthy ecosystem."

Results to date have been very pleasing. Nitrate levels have reduced by 75% - from 200ppm to less than 50ppm.

The reed bed will be replaced every three years or when its efficiency declines.

ARBOUR WEEK SEES SENMIN LAUNCH ITS GOING GREEN CAMPAIGN

200 Senmin employees and service providers planted indigenous trees on site in Sasolburg in September.

The SHE team also used the opportunity to shine a light on health, safety and quality generally, particularly in terms of AECI's risk-based SHE management approach. To support the message, they screened a documentary on the Chernobyl nuclear disaster.

The Chernobyl incident occurred in April 1986 and is considered the worst disaster of its kind in history. It was caused by reactor design flaws and a breach of protocol during a simulated power outage safety test.

After the documentary, everyone shared what they thought went wrong. The SHE team guided the discussion, bringing it back to typical challenges in the workplace. The importance of accountability featured strongly.

Senmin employees and service providers celebrate Arbour Week.

Newly planted trees in Sasolburg.

A COLLABORATIVE EFFORT

In the spirit of collaboration, Senmin is working with ChemSystems to treat liquid effluent at source and reuse it for plant and process activity at its Sasolburg site instead of transferring it to Sasol for treatment. The feasibility of using a bio-agent is being investigated and a pilot project is being planned.

CHEMSYSTEMS GOING GREEN

New product development

The business has developed an eco-degreaser made from environmentally friendly ingredients. Grease removal of 99% is achieved.

This demonstrates how the commitment to Green Chemistry is helping ChemSystems grow market share, especially among brands and businesses that champion sustainability in their marketing.

Recycling

The Paper and Leather plant started recycling vessel wash water in January. This is the water used to clean a container before it's used to manufacture a new product. In the past, wash water was handled as effluent. Now it's treated with biocide and reused as diluent. The volume of effluent has been reduced and 13 000ℓ of water have been saved to date.

In a further initiative, a recycling station has been put in place. Here employees at Chem Park, Chloorkop, can deposit recyclable waste from home if a facility isn't available where they live. Batteries, globes and packaging (cans, glass and plastic) can be brought, making it possible for everyone to reduce their environmental footprint and save landfill space.

Recycling asphalt from old roads.

PAVING THE ROAD TO A GREENER FUTURE

Much Asphalt is no stranger to recycling.

Reclaimed asphalt comes from old roads that are being reconstructed and day-to-day manufacturing waste. It is crushed and screened before being used again to produce fresh material. New asphalt containing up to 40% reclaimed product has been manufactured.

A reduced need for "fresh" raw materials means less aggregate mined from quarries and lower input of virgin bitumen derived from crude oil.

Since 2012, Much Asphalt has used 106 865 tonnes of reclaimed asphalt, equivalent to more than 101 500 tonnes of aggregate that wasn't mined and 5 343 tonnes of bitumen that didn't have to be refined.

Asphalt recycling in the industry has been so successful that the South African Road Federation has made it part of its tender requirements. For many contracts, the inclusion of recycled product is compulsory for the construction of new roads.

Interesting facts

- *Asphalt is among the most recycled materials in the world*
- *Aggregate and bitumen can be used and reused many times (the industry talks about a "perpetual pavement", which is a very green concept!)*
- *Much Asphalt owns and operates four mobile reclaimed asphalt processing units*