

GREEN BUSINESS'S

G A Z E T T E

ISSUE 4 2020



AIRBUS

STEPS UP INITIATIVES FOR DEVELOPMENT OF A NEW
ZERO-EMISSION CONCEPT AIRCRAFT

ZWL\$150

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Harnessing Water
From Fog

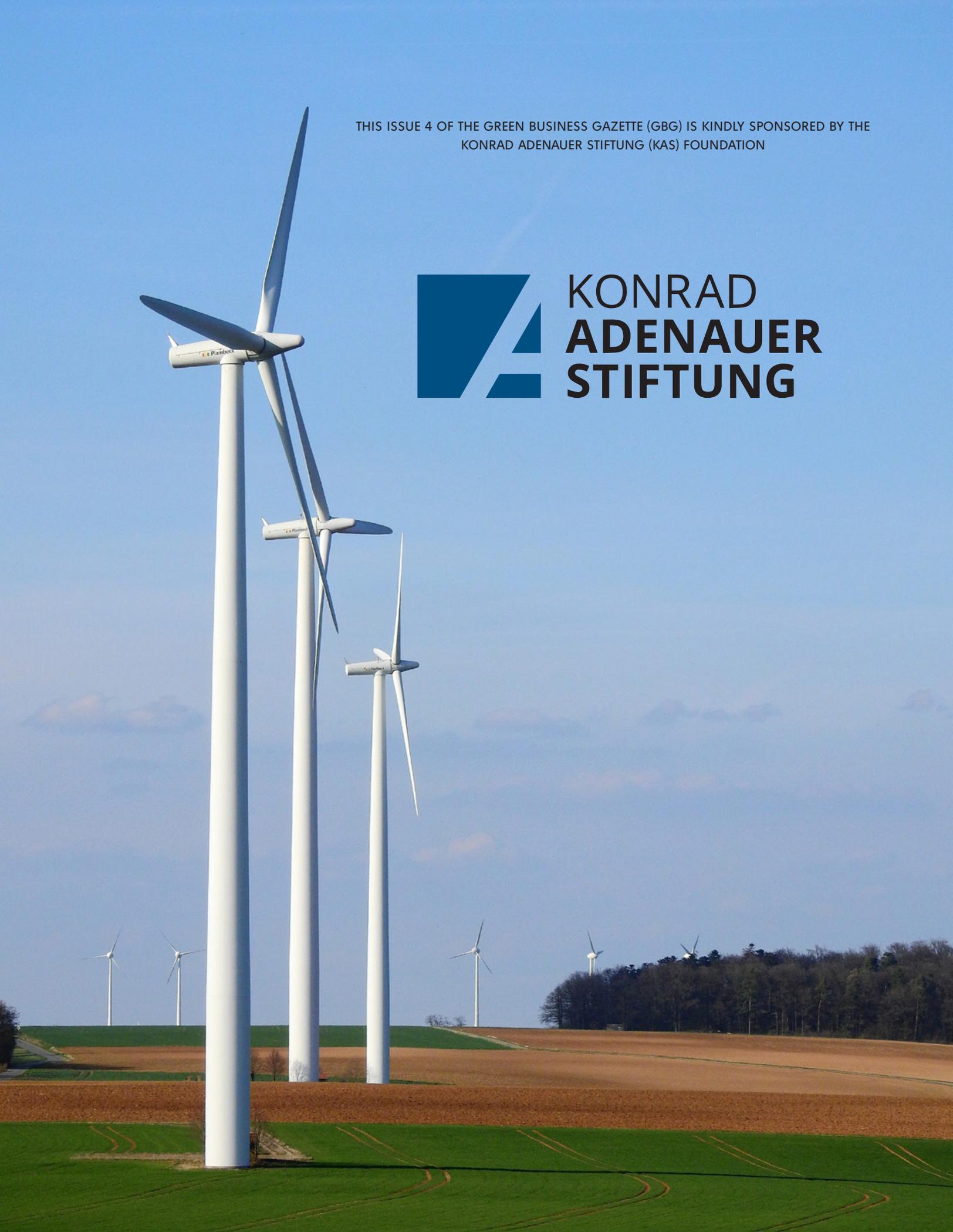
AIRBUS Developing
Zero-Emission Aircraft

Timber Logging
Threatening Biodiversity

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GREEN BUSINESS'S

G A Z E T T E

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A special welcome to all our readers to the 4th Issue of the leading Environmental Magazine in Zimbabwe, Green Business Gazette. This Issue brings us to the end of the year and we would like to thank our esteemed readers across the world for their continued unwavering support in 2020. Since the inaugural issue released in June 2020, the Green Business Gazette has been experiencing an increase in readership in every Issue. I will also like to extend my gratitude to Konrad Adenauer Stiftung for sponsoring the production of Issue 4. Their support is going a long way towards raising environmental awareness in Zimbabwe and across the world.

We have come to the end of 2020 which was a very difficult year due to the COVID-19 Pandemic which resulted in the loss of many lives globally, world economic recessions and saw most countries going into total lockdowns for several months. The world has had to adapt to the new normal to prevent the spread of the novel virus. However, hopes are high as possible vaccines begin to emerge and hopefully life will go back to normal sooner than expected.

In this Issue of the Green Business Gazette, we look at the just recently ended United States of America

election which saw the coming in of Joe Biden as the new president after a resounding victory against Donald Trump. This election was very critical to Climate Change Action as it determined whether or not America remained as a signatory to the Paris Agreement. The new president has raised hopes towards addressing one of the greatest challenges of our times, climate change.

Access to clean water is said to become one of the leading challenges in future. We look at how fog is being harnessed to supplement rainfall in order to improve access to clean water for drinking and agriculture. We also focus on the dire waste management situation in Harare, which needs urgent action. We also see electronic waste building up and worsening the existing waste management challenges in Zimbabwe and other developing countries. We take a closer look at the toxicology of electronic waste and how it affects the health of children who are exposed to it. Urban fires have become a concerning issue in most cities and towns. We also look at what is causing urban infernos and provide possible solutions as to how these can be prevented.

This issue highlights some of the initiatives which the Government of Zimbabwe is doing in energy management through energy efficiency and capacity building. We also look



at the adoption renewable energy in Africa particularly Biogas and solar energy. As the world continues to reduce emissions from the transport sector, we look at how electric vehicles are being scaled and the creation of zero-emission Airbus aircraft.

The nexus between climate change and spread of invasive species is still very debatable and in this issue we take a closer look at the relationship between the two. Biodiversity conservation is very important in sustainable development because it ensures resource protection for future generations to come. We explore how commercial timber harvesting is leading to the loss of biological diversity in natural forest biomes. We also look at the impacts of chemical use on our environment and how we can mitigate them. Other issues included in this issue are greening of events and the loss of Green Belts as a result of urbanization.

On behalf of the editorial team, I would like to wish all our readers a Merry Christmas and a Prosperous 2021.

Tawanda Collins Muzamwese
EDITOR IN CHIEF



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Joe Biden Wins USA elections

Raises Hopes Of Climate Action As USA Set To Re-Join The Paris Agreement

Joe Biden has won the United States of America election after attaining and surpassing the minimum 270 Electoral College delegates required to head to the White House. Pitted against the incumbent, Donald J. Trump; Joe Biden put up a spirited performance which earned him the ticket in a hotly contested plebiscite.

In the context of environmental sustainability and climate change discussions, the outcome of the election has far reaching impacts on the ability of the world to fight climate change. It is well known that the United States of America is the second highest emitter of Greenhouse Gas Emissions in the world (5.41 billion tonnes of carbon dioxide) rivalled only by China (ranked first in greenhouse gas emissions) which emits 10.06 billion tonnes of carbon dioxide. Given its global contribution to emissions, it is essential for the United States to step up efforts in climate mitigation and reduction of greenhouse gas emissions.

Speaking to prospective voters in various states and caucuses, Biden pledged to return the United States to the Paris Agreement on the first day he assumes office. In a tweet delivered on 5 November 2020, Biden implored, "Today, Trump Administration officially left the Paris Climate Agreement. And in Exactly 77 days, a Biden Administration will join it"

The Paris Agreement is a climate pact which brings together about 175 Conference of Parties to fight climate change. One of its major highlights includes the formulation of Nationally Determined Contributions (NDC) which set emission reduction targets at national level.

On 20 January 2021 at midday; on the steps of the Capital Building



in Washington DC, Biden will be inaugurated, carrying the hopes of many environmental enthusiasts and those who are concerned about the changes in our climate. Whether or not he will live to the billing and deliver a New Green Deal, remains to be seen.

Biden's promise to scale up the adoption of renewable energy technologies in the United States of America is seen as a key step in halting irreversible warming of the planet. His predecessor had supported fossil fuels in his administration and therefore the change in the leadership helm could signal a policy shift towards cleaner energy sources.

Climate denialism had been one of the key features of the election opponent Donald Trump. The incumbent had believed that climate change was and

is a hoax. The chilling win by Biden, could facilitate shift towards science based-views of climate change and accelerated actions by the USA in dealing with climate change.

Joe Biden plans to spend 2 trillion United States Dollars on clean energy sources and work to recover years of climate action demonization. As countries head towards the COP-26 Conference at the end of 2021, it is very clear that the United States of America may play a leading role in accelerated action towards climate mitigation and adaptation.

The Green Climate Fund (GCF), which is the world's biggest funding source of climate finance looks set to be replenished and the US may end up paying its contributions to the Green Climate Fund.

Climate Finance: A Critical Enabler For Climate Change Aspirations

The impacts of Climate change need no introduction anymore, since they have been laid bare for all to see in our daily lives. Climate change has become a threat multiplier; it amplifies the existing threats and is increasing problems for the economy, environment and society. In Zimbabwe, erratic rainfall has led to successive droughts which are one of the major impacts related to climate change amongst other impacts such as extreme weather events. Cyclone Idai (2019) has been recorded as one of the latest climate induced disasters to hit the country and the region with major impacts in Zimbabwe, Mozambique and Malawi. Recent events have almost defined what climate change is and what to expect in the future with absolute certainty.

Central to the climate change discussion is a complex issue to the discourse on climate finance. Climate finance has been such a critical issue to the United Nations Framework Convention on Climate Change (UNFCCC) to the extent that they are no agreed definitions yet on climate finance. The term climate finance has been emotionally loaded at the international convention as the globe tries to qualify the finance in reference to development assistance. Efforts from developing countries have been to ensure that climate finance is a top up to the traditional development finance rather than a replacement. Developing countries however have no control on the current development finance as they are not bound by any global agreements, hence cannot ascertain if climate finance is truly a new finance or a reinvention of the traditional finance.



FROM THE
EDITOR'S
DESK

Despite all the controversy of the climate flows, there is a general consensus on what the finance should target. Climate finance comprises of financial support for mitigation and adaptation activities, including capacity building, research and development as well as issues related to decarbonisation and climate resilient development. The two generally used definitions of climate finance are from the UNFCCC standing committee on Finance that has defined climate finance as financial transactions "that aims at reducing emissions and enhancing sinks of greenhouse gases. Climate finance facilitates reduction of vulnerability and increasing the resilience of human and ecological systems to negative climate change impacts". The IPCC Fifth

Assessment Report (2014) concluded that there is no agreed definition but that the term is applied to financial resources devoted to addressing climate change globally and to the financial flows to developing countries to assist them in addressing climate change.

Zimbabwe as a signatory to the Paris Agreement (PA) is entitled to receive climate finance, which is mainly categorised as Mitigation finance and Adaptation finance. Whilst climate finance is divided into these two categories, it is part of a broader discourse on sustainable finance that deals on the provision of finance to investments taking into account environmental, social and governance considerations.

Catching the fog

COUNTRIES BEGIN TO HARNESS WATER FROM FOG AND LOW LYING CLOUDS DUE TO CLIMATE CHANGE

by Tawanda Collins Muzamwese



Imagine making a cup of coffee using water harnessed from the fog! Dire situations are befalling countries of the world due to the advent of climate change. Water scarcity has already driven some countries into conflict, sexual exploitation, crop losses and low food security. Globally 1 in 10 people lack access to water. This number is set to increase in years to come.

Due to necessity, new innovative ways of doing things are emerging. Fog

catching has emerged as a technology of harnessing water from areas of high altitude.

Fog nets woven from polypropylene and other synthetic materials can be used for fog catching. Careful erection in a symmetrical shape, coupled with a mechanism to collect at the bottom is proving to sequester high yields of water.

High altitude is associated with fog and

low lying clouds. As this cold air passes through the fog catching site, it passes through a film of synthetic material thereby condensing the water vapour. Micro-droplets of water condensing during fog catching can support irrigation and drinking water.

Over a long period of time, droplets can yield significant amounts of water which can be deployed to users of water. Erratic droughts and low precipitation will surely drive many communities

to implement fog catching if the right weather conditions permit. Pessimists believe that this technology is taking things to the extreme. In other cultures it is also viewed as a preposterous, obnoxious and overzealous attempt to conquer nature.

Climate change is here permanently to stay. Being able to adapt to climate change is of paramount importance to the sustainable development of the world. Fog catching is one of the latest ways of harnessing water resources in drought prone areas.

In areas where fog catching is being done, an average of 500 litres of water per fog net can be harnessed every day. There is a need to ensure that fog catching is scaled-up in different parts of the world including in countries which lack adequate water resources.

The key conditions for ensuring that fog catching works well for sustainability, is the need to erect fog nets in areas where fog is prevalent enough to sustain adequate daily yields of water. Without this climatic condition, there is risk of creating a "white elephant" through fog catchers which are not viable.

African countries such as Morocco are scaling up fog catching at a viable scale which supplies communities. In the age of climate change and uncertain weather conditions, supplementing rainfall with fog catching is necessary in the quest for sustainable development. Improving water supply will require novel solutions and change in the way of doing business.

Fog harvesting is indeed a novel way of providing freshwater. In order for it to work, fog catching nylon, polythene or polypropylene is placed between 2 perpendicular poles. The system should be perpendicular to the direction of the wind in order to yield the highest level of water.



Inspection and maintenance of fog nets is necessary in order to ensure that there is longevity of the systems. The key advantage of fog catching is the fact that it is effortless and requires no energy input, construction is not complicated and does not require skilled personnel.

This technology produces clean water which is not contaminated. In areas with fog catching capabilities, ranges of collection are between 5.3 litres per square metre to 13 litres per square metre

per day. According to United Nations Environment, fog catchers can last up to 10 years when effectively erected.

The challenge of fog catching is that it is very difficult to predict the patterns and behaviour of weather. The construction of fog catching infrastructure can result in the damage of flora and fauna. Transportation of material to potential sites is also a barrier due to steep slopes and lack of accessibility. Despite these obstacles, fog catching will dominate water availability solutions in the years to come.



AIRBUS

Steps Up Initiatives For Development Of A New Zero-Emission Concept Aircraft

by Wallace Mawire



Airbus has revealed three concepts for the world's first zero-emission commercial aircraft which could enter service by 2035. It is reported that the concepts each represent a different approach to achieving zero-emission flight, exploring various technology pathways and aerodynamic configurations in order to support the company's ambition of leading the way in the decarbonisation of the entire aviation industry.

The company further added that all of the concepts rely on hydrogen as a primary power source, an option which Airbus believes holds exceptional promise as a clean aviation fuel and is likely to be a solution for aerospace and many other industries to meet their climate-neutral targets.

"This is a historic moment for the commercial aviation sector as a whole and we intend to play a leading role in the most important transition this industry has ever seen. The concepts we unveil today offer the world a glimpse of our ambition to drive a bold vision for the future of zero-emission flight," said Guillaume Faury, Airbus CEO. "I strongly believe that the use of hydrogen both in synthetic fuels and as a primary power source for commercial aircraft has the potential to significantly reduce aviation's climate impact."

It is added that the three concepts, all codenamed "ZEROe" for a first climate

neutral zero-emission commercial aircraft include:

- **A turbofan design** (120-200 passengers) with a range of 2,000+ nautical miles, capable of operating trans-continently and powered by a modified gas-turbine engine running on hydrogen, rather than jet fuel, through combustion. The liquid hydrogen will be stored and distributed via tanks located behind the rear pressure bulkhead.

- **A turboprop design** (up to 100 passengers) using a turboprop engine instead of a turbofan and also powered by hydrogen combustion in modified gas-turbine engines, which would be capable of traveling more than 1,000 nautical miles, making it a perfect option for short-haul trips.

- **A "blended-wing body"** design (up to

200 passengers) concept in which the wings merge with the main body of the aircraft with a range similar to that of the turbofan concept. The exceptionally wide fuselage opens up multiple options for hydrogen storage and distribution, and for cabin layout.

"These concepts will help us explore and mature the design and layout of the world's first climate-neutral, zero-emission commercial aircraft, which we aim to put into service by 2035," said Guillaume Faury. "The transition to hydrogen, as the primary power source for these concept planes, will require decisive action from the entire aviation ecosystem. Together with the support from government and industrial partners we can rise up to this challenge to scale-up renewable energy and hydrogen for the





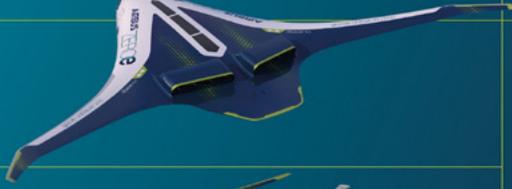
sustainable future of the aviation industry." It is added that in order to tackle these challenges, airports will require significant hydrogen transport and refuelling infrastructure to meet the needs of day-to-day operations.

It is further added that support from governments will be key to meet these ambitious objectives with increased funding for research and technology, digitalization, and mechanisms that encourage the use of sustainable fuels and the renewal of aircraft fleets to allow airlines to retire older and less environmentally friendly aircraft earlier.



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Introducing Airbus ZEROe

| | | |
|---|---|---|
| <p>Turboprop</p>  | <p><100 Passengers</p> <p>Hydrogen Hybrid Turboprop Engines (x 2)</p> | <p>1,000+nm Range</p> <p>Liquid Hydrogen Storage & Distribution System</p> |
| <p>Blended-Wing Body</p>  | <p><200 Passengers</p> <p>Hydrogen Hybrid Turbofan Engines (x 2)</p> | <p>2,000+nm Range</p> <p>Liquid Hydrogen Storage & Distribution System</p> |
| <p>Turbofan</p>  | <p><200 Passengers</p> <p>Hydrogen Hybrid Turbofan Engines (x 2)</p> | <p>2,000+nm Range</p> <p>Liquid Hydrogen Storage & Distribution System</p> |

AIRBUS

Electric Mobility Facts

What the World Is Doing To Scale Up

By Freedom Muranda

Globally, passenger cars are projected to double by 2050. Most developing countries have no vehicle emissions standards and incentives in place to promote zero emission vehicles. The COVID-19 pandemic has contributed to a significant drop in oil prices and consequently, lower gasoline prices. Consumer purchasing power has been reduced during this period. The pandemic has prompted some new incentives and changes for emission regulations for several governments. Many governments have increased consumer incentives for electric vehicle purchases. According to McKinsey and Company the purchase price subsidy for electric vehicles in China currently ranges from approximately USD 2,350 to USD 3,365 per car whereas in Germany purchase price subsidies for new electric vehicles are amounting to more than USD 10,000 per vehicle. In April 2020 China committed more than USD 1.4 Billion to subsidise the construction of charging stations.

Electric mobility will reduce the consumption of non- renewable energy and greenhouse gas emission from individual cars. However, electric mobility will also increase electric consumption. The transition to electric mobility requires infrastructure and technology which involves installation of public charging stations and private charging stations at homes and work places. Air pollution and the carbon footprint in the transport sector can be reduced by transitioning to electric mobility. Approximately a quarter of all the carbon dioxide emissions in the atmosphere are related to transport. Scientists predict that these energy related emissions are growing faster than all the other sectors and are set to reach one third by 2050. Advances in oil extraction technology may extend the life of oil supplies from

fossil fuels while technology for the internal combustion engine will increase in efficiency and reduced emissions. These improvements will only extend the transition to long term sustainability through electric mobility. Net zero carbon energy carriers that are non – fossil and can be produced and are the only real solution to promote long term sustainability. Electricity, hydrogen or syngas are some of the options currently available.

The International Energy Agency (IEA) reported that electric car deployment has grown rapidly over the past ten years. The global stock of electric passenger cars passed 5 million in 2018 which is a 63% increase from the previous year. The IEA further states that around 45% of electric cars on the road in 2018 were in China, a total of 2.3

million compared to 39% in 2017. Europe accounted for 24% of the global fleet, and in comparison to the United States which had 22%. Electrically propelled passenger cars including hybrids are still fairly in the minority. Electric mobility will bring along risks and opportunities to the electric system. Electric vehicles will need to be charged and this will create a demand for new generation capacity, transmission capacity and energy. However, this new capacity can then be minimised by shifting charging times to off peak hours. Electric vehicles can also be modified to supply electricity back to the grid from battery storage. The International Energy Agency (IEA) estimated the number of charging points worldwide to have been approximately 5.2 million at the end of 2018, up 44% from the year before. Most of this increase was in private charging



points, accounting for more than 90% of the 1.6 million installations in 2019. In an effort to speed up the mobilisation of electric vehicles a campaign called the EV30@30 has been launched to reach a 30% sales share of electric vehicles by 2030 amongst the participating countries. EV30@30 aims to help realise the multiple benefits offered by electric mobility. These benefits are innovation, energy security, economic and industrial development and reduction of local air pollution. The campaign sets a target for electric vehicles sales that will keep track of climate goals for 2050. These goals will be combined with the decarbonisation of the power sector whilst improving lives of people in member countries. EV30@30 campaign aims to gather commitments from governments in agreement with their priorities and plans. The campaign calls for the participation of additional governments in EVI activities.

Governments can pledge to implement supportive policies such as tax incentives and promote charging infrastructure. Businesses can work on increasing electric vehicle usage in company and supplier fleets. Charging station provider companies



can contribute to infrastructure development. Associations can contribute to expanded research and analysis to promote accelerated learning among stakeholder groups. Public and private sectors can agree to share information on successful strategies for raising consumer awareness of the benefits of electric vehicles. Organisations can provide in-kind support through the Clean Energy Solutions Centre's Ask-An-Expert Service, providing expertise in the policy, regulatory, and technical challenges involved in electric vehicles and electric vehicle infrastructure deployment.

The EV30@30 campaign seeks the engagement of local authorities, the mobilisation of the private sector, and the involvement of civil society; and welcomes the support of philanthropy to develop its implementing actions. Consumer awareness campaigns, electric vehicle friendly policy mechanisms, vehicle charging networks, electric vehicle procurement and funding of relevant research and analysis are some of the commitments that can be adopted. Cities can build connections, support electric vehicle adoption projects and share case studies.

Commercial Timber Logging Threatens **BIODIVERSITY**

By Diana Tapedzanyika

Natural forests have been an integral part of humanity since time immemorial because of the numerous ecosystem services they offer for the existence of humankind. Its major interest is the providing of raw material in the manufacturing industry.

Timber harvesting has always been practiced on a small scale mostly for domestic purposes. However, over the years, the coming in of industrialization and globalization has resulted in the increase in trade. The globalized trade has increased markets which resulted in the demand for timber products especially round wood.

The round wood has become the major drive for deforestation of natural forests through logging and land clearing for the expansion of plantation forests in order to meet demand for timber. The demand in round wood is estimated to reach six million cubic by 2050. This means that more forest areas will be lost to timber harvesting and clearing for the expansion of industrial plantations.

Timber harvesting in general has negative impacts on the environment and biodiversity. However, commercial timber harvesting causes more impacts because it is done on a large scale and involves a lot of activities. The impact and extent on biodiversity loss varies significantly depending on the geographic variability, type of harvesting system (clear cut or selective cutting) being applied in that area and the technology being used.

Commercial harvesting involves the felling and extraction of timber using heavy equipment such as skidders, teleloggers, and tractors. It also involves the clearing of land for the creation of roads for accessibility and landings where logs are kept before transportation. Other indirect impacts of timber harvesting include noise from equipment such as chainsaws and saw mills, oil spillages and fuel leaks from machinery. All these disturb the ecosystem functions.

Natural forests harbour the greatest



species diversity with most species being found in Tropical Rainforests or Amazon Forests. These forests are ecologically sensitive biomes with very high endemism and fragile in nature. Brazil and Indonesia are home to the Tropical Rain forests are amongst the leading countries in the production of forest products.

One of the leading causes of biodiversity loss in the Amazon forests is commercial timber harvesting which results in the cutting down of trees which are important habitats for animals and birds. Timber harvesting causes habitat destruction. Habitats play a crucial role in the survival of species as they provide food, shelter and security. Without habitats, species become vulnerable and susceptible to all forms of danger. Clearing of trees also leads to habitat fragmentation which can eventually lead to extinction of species.

In Zimbabwe, 90% of plantation forestry is found in the Eastern Highlands. Natural forests in Nyanga, Chimanimani, Vumba and other areas were cleared for monoculture stands of trees such as Pinus and Eucalyptus species. Firstly the clearing of land affected the diversity of both flora and fauna which included endemic species. A reduction in biodiversity has been noted. Studies carried out in the Eastern Highlands showed that diversity of bird species is higher in natural forests as compared to plantations.

Commercial harvesting also occurs in the Kalahari sand forests or Zambezi Teak forests, Matebeleland North and Midlands Provinces of Zimbabwe are home to Teak, Mukwa and Mahogany. These tree species grow on the fragile Kalahari sand soils and timber harvesting has been the greatest threat which has significantly disturbed this ecosystem and resulted in the loss of biodiversity.

The long term effects of timber harvesting on the ecosystem is that it compromises the resilience of forests which affects their long term ability to provide ecosystem services.



Microclimatic conditions are maintained by forests and natural forests influence temperature, light and humidity of an area. The microclimate enables the creation of microhabitats for climate sensitive species. The destruction through logging of these forests leads to loss of these species. Secondary impacts of commercial timber harvesting which indirectly leads to biodiversity loss include invasive species for example the spread of black wattle in the Eastern Highlands of Zimbabwe, increases risks of fire and climate change as a result of reduced carbon sinks.

Global population will continue to increase and so will the demand for timber. This means that plantation forestry remains an economically viable

industry which will continue to threaten biodiversity. Good conservation and biodiversity standards now need to be ensured in timber harvesting operations so as to mitigate the loss of biodiversity by implementing reduced impact logging aimed to strike a balance between economic and environmental sustainability.

Interesting facts

- 300 000 ha of indigenous hardwood of forests are lost annually in Zimbabwe
- Tree cover the size of a football pitch is lost every 6 seconds in the Tropical Rainforests
- The Amazon rainforest might dry out if 25% of tree cover is lost



HARARE'S WASTE MANAGEMENT SITUATION DETERIORATES AS LOCAL AUTHORITIES BATTLE TO MANAGE WASTE

By Bright Chituu



Solid waste normally termed as "garbage" or "trash" has always been an inevitable by-product of human activity. It is a special kind of public resource which is not fixed to any physical space (e.g. streets, sidewalks or parks) but is a moveable, material resource which urban dwellers tend to replenish, rather than deplete.

Increasing population, rapid urbanization and the improving living standards of people have significantly exacerbated the amount of solid waste generated in urban areas across Zimbabwe. The generation rate is budding faster than nature's ability to absorb the waste resulting in the amassing of solid waste at illegal dumpsites.

Recent estimates revealed that solid waste generated worldwide surpasses 2 billion tons per year, which is a potential threat to the environment. At a national level, Zimbabwe generates an average of 2.5 million tons of solid waste (residential and industrial combined) per year whilst Harare City has a generation rate of 0.56kg/capita/day. Solid waste is a precursor of a number of societal as well as ecological problems, ranging from clogged drainage and sewers, waterborne diseases like typhoid, cholera and diarrhoea, increased upper respiratory diseases from open burning of the garbage, to the release of greenhouse gases, especially methane into the atmosphere which leads to global warming. Solid waste management in Zimbabwe, like any other country in the world, has always been a responsibility

of local authorities but the picture is changing with the recognition that they, on their own are not capable of effectively and efficiently managing waste.

Littering and garbage disposal by vendors has been a grim for the once called Sunshine City. Street vendors sell goods and provide services at affordable prices to the public in the Central Business District of Harare. They sell fresh fruits and vegetables, food, garments and crafts, flower garlands, locks and keys, electronics, building materials, auto parts and more. In carrying out their activities, street vendors create masses of waste which need to be managed daily.

It is widely acknowledged that although producers of goods and materials have a role to play in reducing waste, the general public, in the way that we consume and utilize products, have a key role in delivering sustainable waste management.

Solid waste collection and transportation done by means of the municipality trucks is easier said than done, difficult and expensive. The City Council is riddled with operational inefficiencies of municipal Solid Waste services and management. Furthermore, the municipality is lacking fuel and enough vehicles to collect and transport solid waste from grocery stores, illegal vendors, residential areas, hospitals and clinics, food industries, manufacturing sites, processing industries, motor industry as well as the construction industry at regular intervals.

From residential areas, the City Fathers come to collect waste once a week, one bag or bin per household. As a result of these inadequacies, to avoid pilling of waste, households and enterprises, have now resorted to secretly dumping their waste at undesignated areas usually by roadsides, open spaces, rivers and bridges creating nuisance in these areas. These areas turn out to be breeding places for vermin and other vectors of communicable diseases such as diarrhoea, dysentery and typhoid. Uncollected waste usually ends up in open drainage canals and on the banks or surface water streams. During the rainy season, waste dumped blocks the drains, which results in flooding and stagnant water, with consequent risk of mosquito breeding.

Collection and disposal systems have proved to be inefficient and are not environmentally-friendly, respectively. Most of the solid waste deposited in open dumps and these dumpsites require proper equipment for their effective operation. Good examples are Pomona and Golden Quarry Dumpsites sites in Harare which have turn out to be toxic and exceeded their carrying capacity of containing urban solid waste. Properly engineered waste disposal landfills are required essentially to protect public health and preserve key environmental resources such as ground water, surface water, soil fertility and air quality.

The majority of people are unaware that we have a severe but preventable solid waste problem in Harare and throughout the country. Due to the impending solid waste management challenges bedevilling Harare City as well as those responsible for managing waste. This calls for best practices and innovative approaches in tackling solid waste problems.





ELECTRONIC WASTE CHILDREN UNDER SIEGE

Tawanda Collins Muzamwese

COMING OF THE DIGITAL AGE

The digital evolution happening in the technological age, is one of the biggest breakthroughs of our generation. Advent of computers, mobile phones, printers and other electronic gadgets has become a pivotal facet of daily life. The gadget craze has literally gripped all age groups.

However, dealing with the waste products at the end of the life cycle is an issue which remains unresolved in many parts of the world, resulting in the generation of electronic waste. Electronic waste (e-waste) includes waste electric and electronic devices commonly referred to as WEEE – Waste Electrical and Electronic Equipment. Typical forms of e-waste include laptop screens, circuit boards, old fridges, freezers, electronic equipment containing Polychlorobiphenyls (PCBs), fluorescent tubes and batteries. More than 50 million tonnes of electronic waste is generated globally. City councils are normally used to dealing with general municipal waste

comprising of paper, plastic, glass, rubber, aluminium and other less complex waste constituents.

Electronic Waste is emerging as a special waste stream in many developing countries including in Zimbabwe. Controlling this waste stream is necessary in order to promote sustainable development. Stockpiles are actually building up in many African countries. In some countries electronic waste is accumulating under the guise of second hand imports of electronic goods. Smuggling also makes matters worse in the middle of the burgeoning crisis.

TOXICOLOGY OF ELECTRONIC WASTE

Toxicology refers to the dose-response effects of hazardous materials with relation to exposure of humans and other organisms. It gives us an indication of the adverse effects which are exhibited by a harmful substance. Electronic waste is well known to exhibit some toxic characteristics due to its composition comprising of toxic chemicals. In cases where electronic

waste is burnt, toxic emissions and Volatile Organic Compounds (VOCs) can be introduced in the environment at the detriment of air quality. Heavy metals such as lead, cadmium and chromium when burnt, can easily accumulate in fatty tissue of the body and later exhibit chronic effects in different body organs. Heavy metals in electronic waste and effects on children's developing nervous systems.

In young children, heavy metals can affect the development of nervous systems, thereby hampering their learning capabilities. Children can experience lead poisoning due to exposure to lead fumes. Children also face double tragedy as they do not have the ability to understand fully the conditions affecting their bodies. E-waste exposure can induce mental problems in young children through damaging the nervous system development. The World Health Organisation (WHO) warns that exposure to Electronic a waste can result in harmful effects on the mental health of children.

The world cannot continue to watch the growth of electronic waste without action being taken. A few private sector companies such as Enviroserve Dubai are implementing programmes and projects to deal with Electronic Waste. The Switch-Asia Project documented success stories of the proper way to deal with electronic waste.

Cell phone dealers and those who have got repair shops for electronic gadgets require thorough training in handling electronic waste. This will ensure that there is an environmentally sound manner of dealing with electronic waste.

According to information gathered by the Green Business Gazette, there is inadequate Personal Protective Equipment (PPE) in organisations which carry out dismantling of electronic waste and electronic gadgets, despite the inherent risk associated with it.

FOOL'S GOLD FUELLING ENVIRONMENTAL DAMAGE

E-waste recyclers in some countries are putting a lot of effort in burning circuit boards and constituents of electronic waste in order to recover precious minerals such as gold and silver. Despite earlier notions that believed that significant amounts would be found, it is apparent that the only reward has been significant exposure to heavy metals and health risk to humans. Commercial recovery is possible albeit advancement on recovery technology. Global experiences recognise the fact that 10% of global gold output is used to manufacture electronic products.

CHANGING PROCUREMENT PATTERNS

Consumers must wake up to the reality of the effects of electronic waste and begin to pile up pressure on the manufacturers of electronic equipment. This includes promoting communication on the hazardous constituents of electric and electronic products by manufacturers. Consumers can also purchase products which are rated for energy saving and those with less toxic substances.

POTENTIAL EFFECTS OF ELECTRONIC WASTE

- Adverse effects on the nervous systems of young children



- Contamination of foods
- Accumulation on body organs
- Inhalation of toxic fumes
- Dizziness
- Nausea
- Vomiting
- Birth defects

POLICY AND REGULATORY STRATEGIES

Countries are beginning to adopt policies and laws which govern electronic waste and electric waste. These laws restrict the unlawful dismantling of electronic waste. Training is becoming mandatory as well as the inspection of facilities. Some institutions are applying for waste management licenses under the guise of recycling waste but with an intention to recover precious minerals such as gold and silver. The belief which considers used electronic gadgets as having large amounts of gold and silver is a key driver of the illicit growth of the e-waste sector and is misguided in the context of sustainable development.

PLANNED OBSOLESCENCE

Some electronic equipment manufacturers produce goods in a way that they have to be replaced regularly. This scenario is called planned obsolescence. In the context of sustainable consumption and production, built-in obsolescence threatens the ability of the planet to attain sustainable development. As we focus towards the Post 2015 Development Agenda, the area of e-waste requires urgent redress if we are to attain the Sustainable Development Goals (SDGs) by the year 2030.



URBAN CONFLAGRATION IMPROVING OUR RESILIENCE

By Jairos Nzvimba

Photo: Green Records Company



Make cities and human settlements inclusive, safe, resilient and sustainable

Conflagration of a building also known as structural fire is an uncontrolled fire occurring in the built-up area of towns and cities, destroying infrastructure, and in many cases causing loss of human life.

Sustainable Development Goal 11 has a target of "making cities inclusive, safe, resilient and sustainable". The world is becoming more urbanized and over half of the world population is estimated to be living in urban areas. This also equates to increased demand for space, a growing number of slum dwellers and structures, overburdened structures, poor waste management and an unplanned urban sprawl. Such urban setups favour the outbreak and easy spread of urban fires and calls for urgent attention as nations aim at achieving the set Global Goals.

Fire outbreaks have become a common norm in today's cities with historical fires such as those of California, Tokyo, and Lagos among other world cities. Urban

infrastructure has always been affected by incidents of infernos bringing need to increase support on awareness, preparedness and rapid response. This would help solve the problem of late discovery and enhance quick detection of fire before the damage becomes extensive.

"It started as an electrical fault, a small spark and a smell from our kitchen. We tried to switch off the sockets and put out the small fire using water, however, the situation worsened when gas tanks exploded, we had to run outside and call for help but it was too late". "Street Kids were warming themselves burning old tyres and papers. They just left the fire unattended only to realize later that it had turned into a huge fire. They then disappeared and no one knows them by name". These are eyewitnesses of recent infernos.

Urban fire spread is highly variable and under the right combination of unlucky but possible circumstances having many

ignitions that can be avoidable and eliminated. Such include faulty wiring, reckless use of electrical appliances and heating gadgets, unattended stoves and gas cookers, children playing with matches, smoking and reignited discarded cigarettes that are not properly extinguished, damaged electrical conductors, overloaded sockets, extension cords, blown fuses, low quality electrical equipment, malfunction of electrical devices, loose electrical connections and lack of clearance between electrical heating devices and combustible material. Poorly designed fireplaces inside homes, heaters inside offices, street kids carelessly starting fire, collision during accidents are among other noted causes.

Cities tend to have a setup that fuels up the fire to become uncontrollable. Talk of many wooden structures in the market places, at the backyard of structures, in corridors and street pavements. Talk of heaps of old tyres in >



Photo: Green Records Company



A recent inferno in Harare's Siyaso market on the 5th November 2020. Property worth thousands of dollars was destroyed

the market place and backyard office. Large drums of used oils, petroleum reserves in plastic containers all stored under unsafe conditions. Poor waste management with illegal dumping in corridors close to structures and open spaces. Illegal parking bays and garages popping up almost everywhere. The setup, however, only requires an ignition to cause great disaster. This is coupled by the fact that the places are not easily accessible even by the fire fighters; the facilities don't have water and fire assembling points.

The losses are very high, much higher than expected and many would think twice especially investing in such environments considering the possibility of damage to property, loss of life, breaking up of economic activities, environmental pollution, exposure to dangerous and poisonous gases. Very emotional stories come from those that have been affected.

It is time to consider supporting (financially and morally) urban anti-fire capabilities. Families, businesses, owners of building and the authorities through construction of convenient fire stations, efficient water supply facilities, effective communication before, during

and after an inferno, cleared marked routes for fire-fighting, all business units having a fire management plan, fire equipment, emergency medical services, fire training and distant monitoring of urban fire; training program in hotspot areas, relief capability in emergency evacuation, assessing safety of buildings, considering the density of people concentration in an area, equipping wireless communication facilities for fire, safety management in crowded place, including fire management in school

curriculum, construction of buildings with fireproof materials, documentation of fire disasters towards improvement on monitoring and eliminating future disasters.

Reconstruction after a major urban conflagration should always result in the adoption of at least building back better, rather than making a temporary shelter or slum and ensure we make our cities inclusive, safe, resilient and sustainable.



Photo: Green Records Company

ZIMBABWE'S ENERGY MINISTRY TO INTENSIFY CITIZEN AWARENESS ON ENERGY MANAGEMENT

By Wallace Mawire

Zimbabwe's Ministry of Energy and Power Development is planning to conduct training and awareness activities for citizens on energy management in a bid to double the improvement in energy efficiency by 2030. This is part of government's commitment and obligations on the implementation of the Sustainable Development Goal (SGD 7).

Speaking on behalf of the Minister of Energy and Power Development at a national multi-stakeholder inception meeting on energy efficiency policy development, Deputy Minister in the same ministry, M. Mudyiwa said that the exercise is part of an overall national energy policy initiative that seeks to create an enabling environment for making clean and affordable energy accessible to all citizens in an Upper Middle Income Economy by 2030.

It is also reported that in line with the country's long term vision of achieving universal energy access to all by 2030, the process of developing a national energy efficiency policy has started with support from the United Nations Development Programme (UNDP).

In Zimbabwe, it is reported that the power demand is approximately 1470MW. The demand is met through local power generation and imports from neighbouring countries such as South Africa and Mozambique.

It is added that even though the country has a total installed generation capacity of around 2300MW, the achievable capacity is about 1100MW and is complemented by imports which range from 150MW to 400MW.

"It is only on dire situations that we resort to load shedding to manage the electricity supply demand mismatch. In fact, this is one of the reasons why energy efficiency is critical so that we use our resources prudently," the Deputy Minister said.

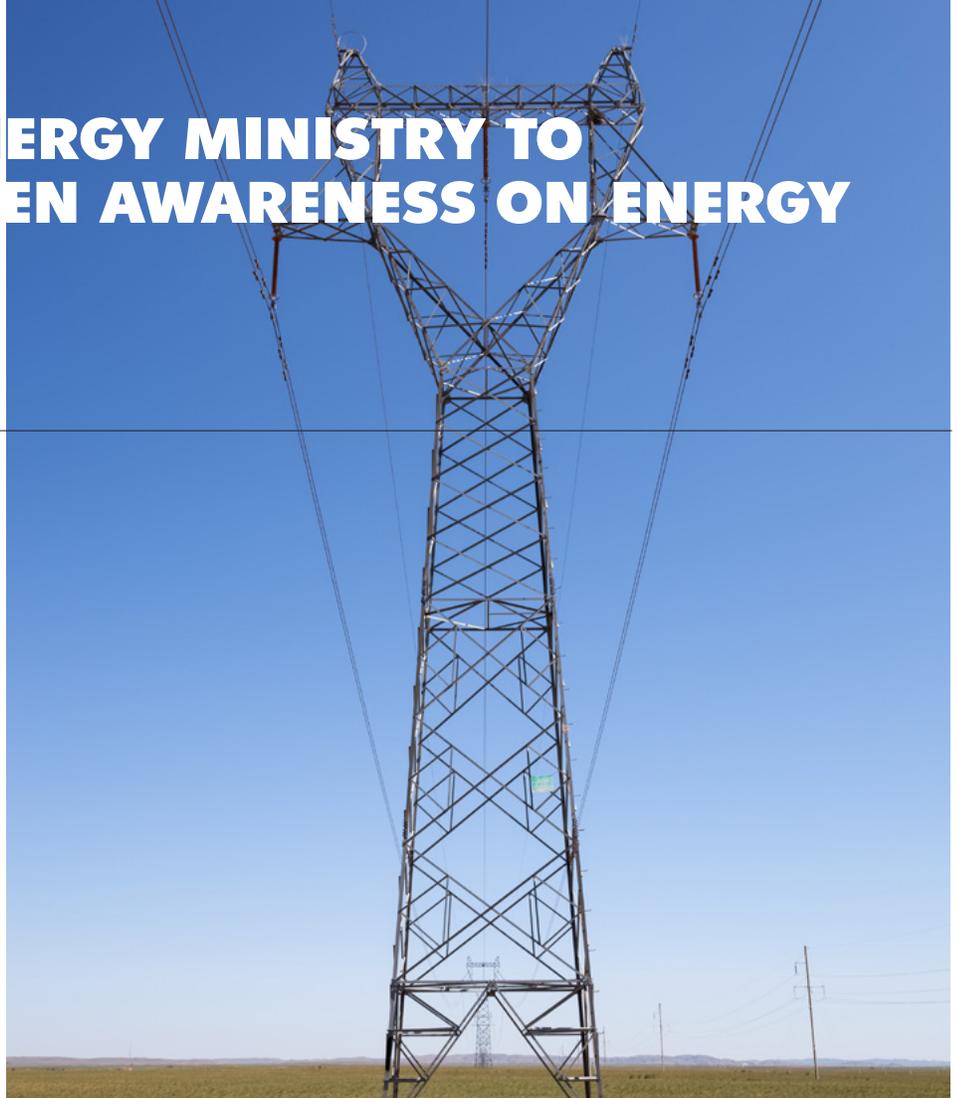
According to the Deputy Minister, it is reported that previous studies on the status of energy efficiency in the country by various consultants have shown that the country uses old equipment in the residential sector, in industry as well as the mining sector resulting in low energy efficiency levels. The studies have also shown that energy efficiency awareness by local citizens was lacking.

This is reported to lead to unnecessary energy losses. The energy ministry has emphasized the need for demand side management and energy efficiency measures to be put in place in order

to save energy, reducing imports and saving foreign currency.

It is also reported that inefficient use of energy is still prevalent in many households and institutions and the markets are flooded with inefficient products. It is also added that the country's energy intensity is still high as compared to international and regional benchmarks.

The ministry has also said that it is cheaper to create a virtual power station through energy efficiency initiatives than building a new power plant. In 2017 and 2018, the ministry of energy through the Zimbabwe Energy Regulatory Authority (ZERA) trained more than 100 engineers and technicians from industry on energy management and energy auditing. Some of the trained personnel are now certified energy managers.





BIOGAS - TURNING WASTE INTO A RESOURCE

By Diana Tapedzanyika

Biogas technology has found important applications around the world since its discovery in the 17th Century. Over the years, the applications have evolved from domestic uses to more advanced grid tied electricity generation applications as well as fuel for motor vehicles.

Biogas is a combustible gas generated from the anaerobic digestion of organic matter. Anaerobic digestion is a naturally occurring process that occurs when organic matter decomposes under anaerobic conditions producing methane gas. Natural systems that harbour this process include rumen digestive system of a cow and swamps.

The development of biogas can be traced back to China and India. The two countries developed self-named biogas units which became the backbone of biogas development. The Chinese biogas was known as the fixed dome pipe whilst the Indian biogas was known as the floating drum digester. Germany led the development of industrial biogas digester by developing a combination of the two types and significantly improving the biogas generation, storing and purification methods. To date more than 9000 biogas plants have been constructed. Biogas accounts for up to 8 % of the national energy supply of Germany and constitutes more than 50% of energy from renewables.

The emergence of biogas in Africa has experienced a number of false starts over the past decades. Lack of research, and limited financing of emerging technologies have led to Africa playing catch up in renewable energy technologies especially biogas development. Introduction of biogas in Africa was driven by missionaries with aim of solving both energy and waste management problems they came across as they developed their missionary infrastructure across Africa.

Tanzania, Ethiopia and Zimbabwe have been at the fore front runners in adopting the biogas technology. Tanzania has invested in research and adoption the technology for African conditions; the Centre for Agricultural Research Mechanisation and Rural Technology (CARMATEC) has adopted the fixed dome digester and some improvements to adapt it to African conditions. A model known as the Modified CARMATEC was developed and has gained popularity in Africa.

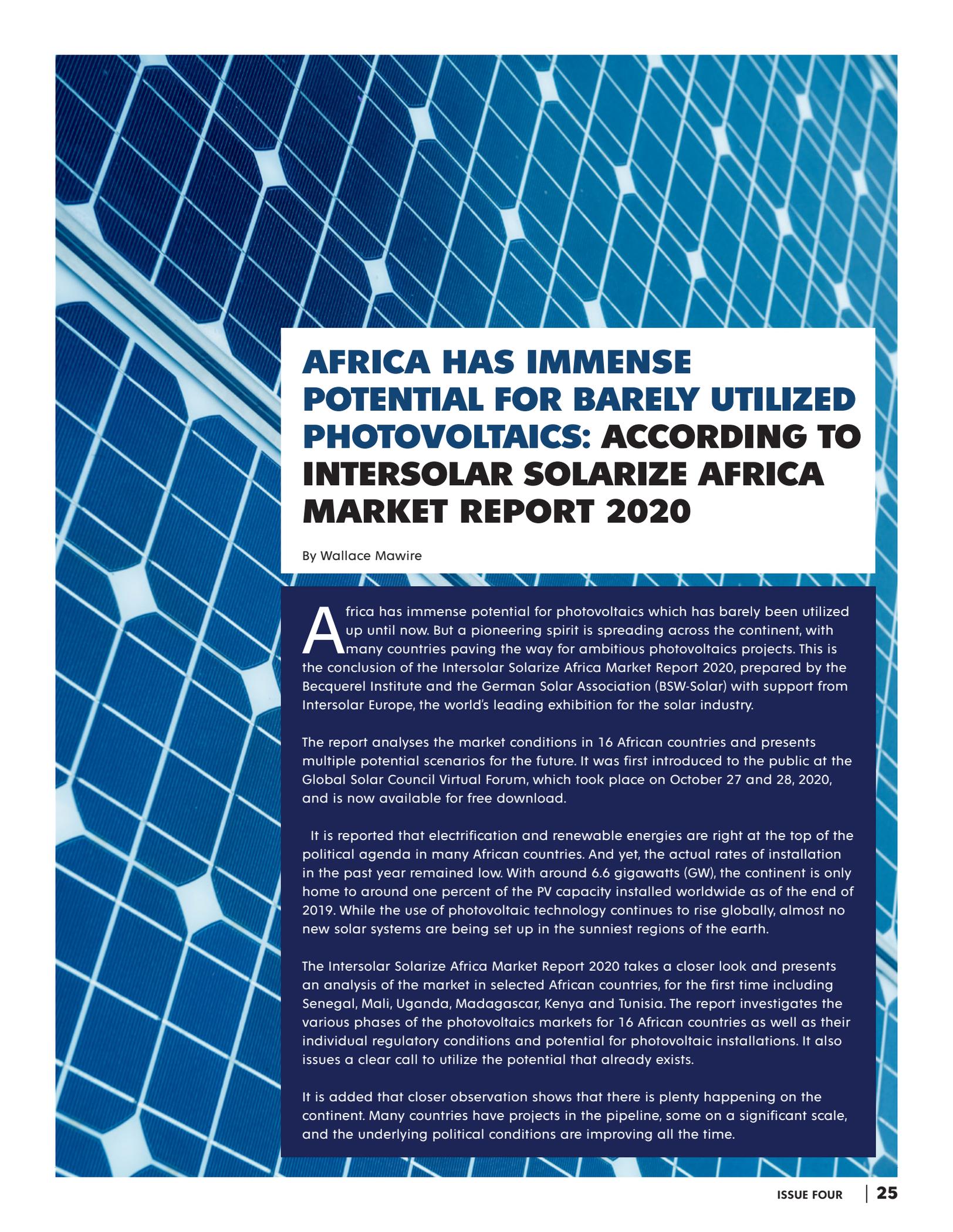
Zimbabwe has developed two biogas programmes, the

Zimbabwe National Domestic Biogas Programme (ZNDBP) and the Zimbabwe Institutional Biogas programme. Both programmes are aimed at increasing capacity of local institutions and builders to support biogas development, dissemination of biogas information to create awareness and construct biogas digesters. Under the ZNDBP, over 120 builders have been trained to construct digesters and 300 biogas digesters constructed, whilst the institutional biogas programme trained 23 builders and has constructed 80 to date. According the National Renewable Energy Policy, Zimbabwe has a target to construct 8000 domestic biogas digesters and 283 institutional biogas digester

According to the World Biogas Association (WBA) anaerobic digestion has the potential to reduce greenhouse gas emissions. Indeed, it has been reported that emissions can possibly decrease from 4,360 to 3,290 Mt CO₂eq, which is equivalent to 10-13% of the world's current greenhouse gas emissions. This result can be achieved through the anaerobic digestion of wastes and landfill gases, in addition to supply of energy biogas produces organic fertiliser, therefore the technology available enables, fossil fertilisers manufacture, crop burning and deforestation are avoided. The sum of these actions results in greenhouse gases reduction. According to the WBA report, despite the 50 million micro-digesters, 132,000 small, medium and large scale digesters and 700 upgrading plants operating globally, we are tapping into just 1.6-2.2% of the global potential of AD. The potential for the growth of the biogas industry is therefore extraordinary and involves every country"

Biogas cooking can also improve the livelihoods of rural households, as by-products of biogas production such as slurry and fertiliser boost agricultural productivity. Modern biogas use reduces the amount of time spent by women and children collecting wood. Despite these clear advantages, the potential of domestic biogas has not been fully exploited due to constraints including;

- Limited awareness about biogas applications
- The initial cost of installation
- Lack of skilled labour for installation and operation
- Inadequate and intermittent government support; feedstock availability
- The need for consistent maintenance
- Behavioural and social acceptance
- Competition from fossil-based alternatives.



AFRICA HAS IMMENSE POTENTIAL FOR BARELY UTILIZED PHOTOVOLTAICS: ACCORDING TO INTERSOLAR SOLARIZE AFRICA MARKET REPORT 2020

By Wallace Mawire

Africa has immense potential for photovoltaics which has barely been utilized up until now. But a pioneering spirit is spreading across the continent, with many countries paving the way for ambitious photovoltaics projects. This is the conclusion of the Intersolar Solarize Africa Market Report 2020, prepared by the Becquerel Institute and the German Solar Association (BSW-Solar) with support from Intersolar Europe, the world's leading exhibition for the solar industry.

The report analyses the market conditions in 16 African countries and presents multiple potential scenarios for the future. It was first introduced to the public at the Global Solar Council Virtual Forum, which took place on October 27 and 28, 2020, and is now available for free download.

It is reported that electrification and renewable energies are right at the top of the political agenda in many African countries. And yet, the actual rates of installation in the past year remained low. With around 6.6 gigawatts (GW), the continent is only home to around one percent of the PV capacity installed worldwide as of the end of 2019. While the use of photovoltaic technology continues to rise globally, almost no new solar systems are being set up in the sunniest regions of the earth.

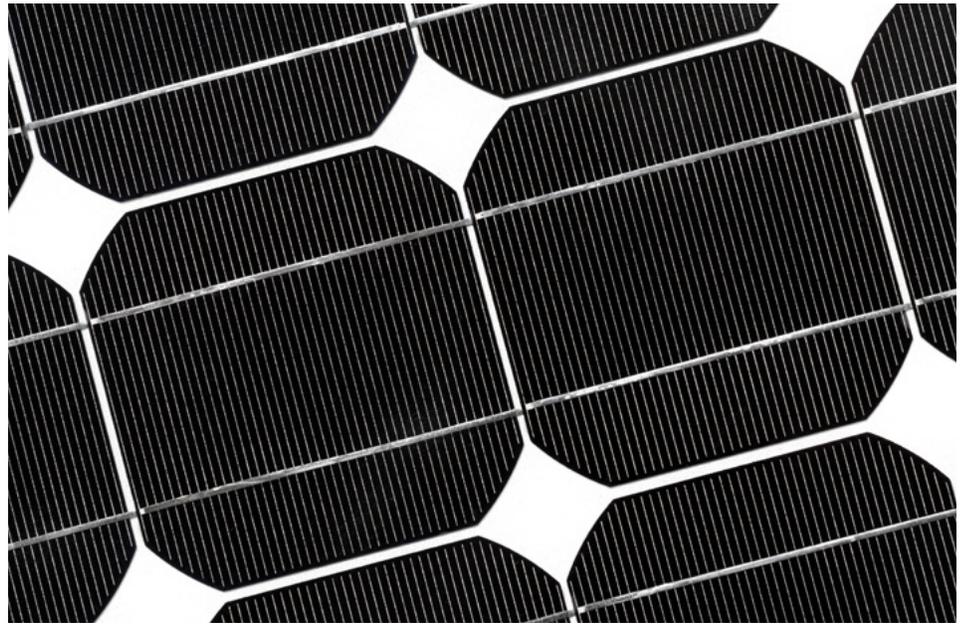
The Intersolar Solarize Africa Market Report 2020 takes a closer look and presents an analysis of the market in selected African countries, for the first time including Senegal, Mali, Uganda, Madagascar, Kenya and Tunisia. The report investigates the various phases of the photovoltaics markets for 16 African countries as well as their individual regulatory conditions and potential for photovoltaic installations. It also issues a clear call to utilize the potential that already exists.

It is added that closer observation shows that there is plenty happening on the continent. Many countries have projects in the pipeline, some on a significant scale, and the underlying political conditions are improving all the time.

For instance, Algeria is planning to install photovoltaic systems with a combined capacity of 4 GW by 2024, while the end of 2019 marked the completion of Egypt's Benban Solar Park. With a total installed capacity of 1.5 GW and six million photovoltaic panels, Benban is the largest solar park in Africa and amongst the biggest in the world. Egypt is planning to install another 3.5 GW of solar energy capacity by 2027. Kenya had plans to set up commercial PV installations with a total capacity of 500 megawatts (MW) as of 2019 and contracts were recently finalized to build a solar park of the same size in Mali. "Africa is on the threshold of a major transformation, which can best be described as a kind of wave that just keeps swelling. We are excited to see what will come next," says David Wedepohl, CEO of the German Solar Association (BSW-Solar).

The report presents four potential scenarios for the future of photovoltaics in Africa. The "policy-driven" and "business as usual" scenarios are based on the various countries' current expansion goals and assume cumulative photovoltaic capacity of approximately 70 GW by 2030. More probable is the "solarize Africa accelerated" scenario, which presumes that photovoltaics in Africa will develop broadly in the same way as in other parts of the world, giving 170 GW of installed capacity by 2030. The central assumption of the fourth scenario – the "solarize Africa paradigm shift," which builds on the current atmosphere on the continent – is that the African markets are in some respects skipping over the fossil fuel age altogether. It combines the installed PV capacity with the targets laid out in the Paris Agreement. With a cumulative capacity of 600 GW by 2030, this scenario envisions Africa as a very important region on the future global PV market.

It is added that since half a billion people in sub-Saharan Africa live without access to electricity, this year's report analyses the competitiveness of standalone local power grids, or microgrids, for the first time. It is estimated that Africa makes up about half of the world market for these grids.

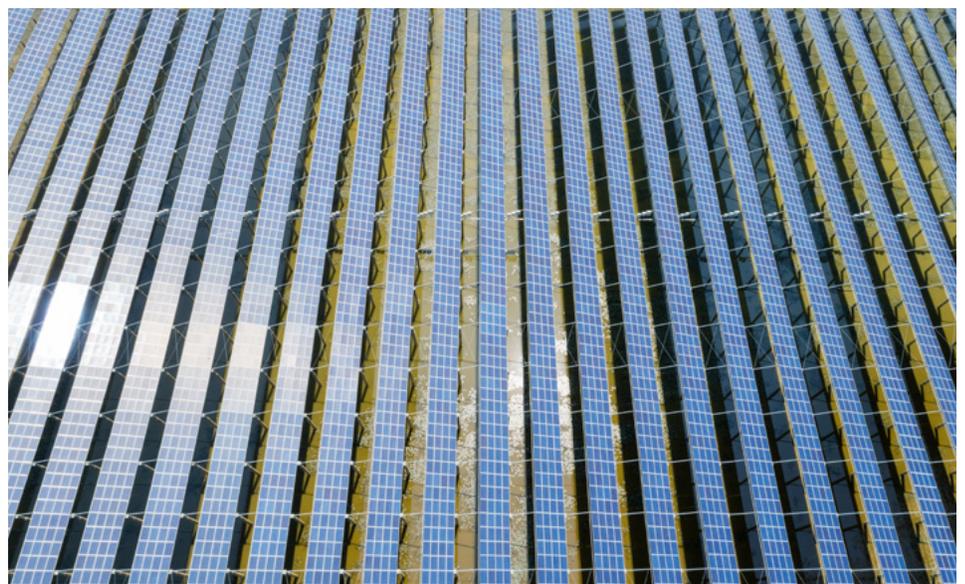


Clean and reliable electricity is key to improving economic and societal conditions in African countries.

This year's report also considers the potential offered by combining solar energy and water for the first time. A billion people in Africa do not have access to clean drinking water. Water desalination and purification plants as well as pump units powered by photovoltaic systems are needed as one of the building blocks of a safe and environmentally friendly water supply. The lack of clean water is thus also a driving factor for photovoltaics deployment worldwide

– while photovoltaics forms part of the solution to the many challenges present in this area. One example of the rise in innovative solutions for water and photovoltaics in Africa can be seen in Kenya. A solar-powered microgrid desalination plant on the coast supplies 25,000 people with fresh water every day. Floating photovoltaic installations are also already in use in parts of Africa.

On November 10, 2020, Intersolar Europe will introduce the Intersolar SOLARIZE study during its webinar "Africa on the rise," taking place as part of the digital event series "The smarter E goes digital."



Biogas Digesters Gain Ground In Africa

By Tendai Guvamombe

Most African nations are currently experiencing energy shortages emanating from a plethora of challenges ranging from low technological advancement capacities to lack of embracing energy efficiency. In an attempt to find lasting solutions, governments are developing legislation aimed at harnessing renewable energy.

South Africa put in place renewable energy policies in 2003 which became complete and sound in 2013. Kenya is projected to be entirely powered by green energy starting this year 2020 and is part of its developmental agenda to achieve a successful low carbon economy by 2030. Zimbabwe launched important documents on Renewable Energy and Biodiesel Policies early this year. The forms of legislations are a clear response to the current global trend where energy issues are at the core. This has also become the major basis to support the development of green energy based on sustainable development agendas.

Biogas is becoming more prominent in addressing energy inefficiencies as it provides a more sustainable energy source especially when comparing to traditional sources of wood fuels. Most African nations are now embracing the use of biogas digesters as part of strategic ways to achieve a non-pollutant environment and at the same time reducing carbon emissions. It is a known fact that traditional sources such as wood and charcoal demonstrate inefficiencies and result in many environmental impacts.

Africa as a continent has been facing challenges of deforestation, land degradation and accumulation of general waste in the public spaces. Biogas presents an opportunity to reduce the rate of deforestation and will be instrumental in providing clean energies. It has a strength in providing lasting solutions to generation of waste through the adoption of latest waste management approaches.

Biogas is produced through a process of anaerobic digestion of organic compounds where waste from feedstock and water are mixed in an inlet pipe. Feedstock is further reduced in size and shape in an airtight chamber by anaerobic microorganisms to give an ending result product of methane and carbon dioxide. Biogas is approximately anticipated to contain more than 60 percent methane and less than 30 percent carbon dioxide.

This can be used for household cooking and lighting purposes.

Ghana is an example of an African country where biogas technology is prominent since 2004. It is estimated that by 2010 a tune of 3.4 million households were into livestock production and this would generate more than 350 million cubic metres of biogas. Since 2011, biogas technology have been embraced in countries such as Benin, Senegal, Cameroon, Tanzania, Ethiopia, Uganda among others.

According to Kenya Biogas Programme the country has an approximate number of more than 100,000 people reported to have installed bio-digesters in their homes. As of 2020 the country recorded one of the success stories of biogas as Kenya's biogas sector recorded investment involving six companies. The move inspired employment opportunities for many people.

In 2014 a tune of 24,990 bio digesters were placed in more than nine countries of Africa and this has been instrumental in the amelioration of people's livelihoods in both urban and rural areas. The biogas technology transfer has also found its way to Zimbabwe. This follows a successful launch of Renewable Energy Policy and Biodiesel Policy of 2020. This also comes at a time when local authorities are failing to proffer waste management best practices.

A number of entrepreneurs continue to inspire the society through biogas production. Safe and clean environment is guaranteed. In Zimbabwe, Greencraft Company in partnership with the government is spearheading biogas Programme in the rural areas aimed at incorporating farmers in the production of clean and safe energies. Recently the Ministry of Energy and Power Development engaged farmers in the remote areas of Mudzi District to unleash the Biogas Programme to local farmers.

Speaking to Green Business Gazette(GBG) crew, Mark Tabora a local farmer from Mudzi who is part of the Biogas Programme said more than 60 farmers in the remote area embraced biogas production while 10 have acquired bio digesters. "Farmers are now aware of the importance of using Biogas digesters and benefits to the environment. This is a lasting solution to save our environment from accumulation of waste, land degradation and deforestation as well. A local company called Green Craft Company have so far installed 6 bio digesters to some farmers while more than 60 have embraced the idea."



Greening Our Events

By Jairos Nzvimba

As the year ends, corporates, associations and families look forward to gathering and sharing the good and bad times, the profits and losses, reflecting and planning for the coming year. As business grows worldwide, the desire for networking opportunities, building new relationships and markets, expanding our knowledge, providing solutions to the daily challenges, pitching our ideas, becoming and positioning ourselves as experts, gaining the inspiration we want, having fun out of home and office, having a send-off for our beloved ones always lead us to an event.

Every event be it a workshop, business meeting, conference, training, awards ceremony, soccer match, birthday party, wedding or funeral has a footprint on the environment. This footprint needs to be considered given that we are in a millennium presented/faced by a series of global challenges regarding resource scarcity, climate change, water availability, waste management and pollution.

Events of all types have a lot of potential impacts on the environment we live in. With the growing number and size of the events, it is critical to ensure that events play a more positive role in terms of their environmental and social performance. This could prove to be a powerful tool for both the development of a green economy and a sustainable future.

Imagine a future where events shift from being perceived as just formal or social gatherings to becoming a strategic component in achieving solutions and eliminating the world's challenges. Events that leave a legacy of furthering the attainment of the United Nations Sustainable Development Goals (SDGs), demonstrating a positive environmental and social impact.

An event should always aim at getting the 'green' reputation. A green event leads to sustainability and in doing so reducing the costs of hosting an event,

helping improve on resource efficiency and enhancing corporate image.

In order to green the event, certain considerations must be factored in. The venue, timeframe, nature of participant, numbers expected, food requirements, impact of every participant, possible transport options for participants, communication needs before, during and after the event. The location of the venue should be central or within walking distance of local points of interest. Use of public transport should be adopted compared to use of private vehicles. This reduces the carbon footprint and consumption of more fuel energy.

Green procurement also referred to as Eco-procurement is very critical in sustainability of events. Organisers should develop supply chains that deliver goods and services that are; in a way, minimise or eliminate negative impact on the environment. Venues that implement environmental good

practices such as energy efficiency and waste reduction should be a prioritised in the selection criteria. Local, seasonal and organic meals should be encouraged.

Preference should be given to suppliers and sub-contractors that implement eco-friendly practices hence promoting sustainability. An example is choosing suppliers that provide renewable energy sources rather than non-renewable sources (generators vs solar for energy provisions).

Energy Efficient ways should be done throughout the event such as considering natural lightning and ventilation to reduce energy consumption. Event organisers can request the electricity meter readings before and after the event for monitoring electricity usage in order to manage consumption for future events. When going for a tea break, lunch and

after the event itself, organisers and participants should endeavour to switch off all lights and air-conditioners.

Water consumption should be minimized by selecting venues that implement water conservation practices through policy and action. Such include use of towel/linen laundry; avoiding bottled water where possible and opting for bigger containers and reusable cups. This saves water whilst reducing the amount of waste from plastic bottles.

Use of paper should be minimized by replacing the copy registration forms with electronic registration or online ticketing. Most of fliers, presentation and printed paper are most relevant during the event and when it's done, participants regard it as waste and most is left on chairs, tables or floor. Investing in use of disks, emails and webpages is encouraged and when printing is the only option, opt for minimum copies,

sharing option, double sided printing, and summarising presentations.

Use of recyclable or re-usable name tags where possible that can be used for future events than personalising tags. If awards or gifts are being distributed, use of biodegradable, recyclable and ethically sourced goods is encouraged. An example is wrapping using biodegradable paper than plastic. Above all, it is important to ensure that organisers do communicate with participants about being environmentally friendly – giving reminders to all participants encouraging green acts before, during and after the event.

Rural or Urban, "Whenever and wherever" we meet – be it a business workshop, training, celebration, award giving or a funeral- whether it is a small group or a couple - we have an opportunity to make a difference for the betterment of our environment.



URBANIZATION A THREAT TO HARARE GREEN SPACES

By Bright Chituu

"Destroying a green belt land for immediate economic gain is like burning your children's inheritance to cook a single meal" – Phil Harding

Green spaces represent an important environmental asset of urban areas which cover all undeveloped spaces primarily covered by vegetation in and around urban areas. They consist predominantly of land that is unsealed, permeable, "soft" surfaces such as soil, grass, shrubs and trees. Green spaces are often natural or semi-natural in nature and include parks, gardens, allotments, wetlands, fields and forests.



The concept of urban green spaces emerged at the beginning of the 20th century. At first this was in the form of green belts, like those surrounding the city of Vienna, while later, as a result of the persistent growth of cities and traffic, it developed more in the form of radials, such as in Berlin (Insert Pictures). Urban ventilation was the most important reason for the creation of green belts around towns and cities. Some parts of the green belts and radials were used for agricultural purposes.

Green spaces offer immense benefits to the urban populace such as improving air quality, enhancing physical and psychological wellbeing, ameliorating local climate, creating avenues for recreational opportunities as well as increasing values of properties sited around them. Gardens and tree covered spaces are valuable resources for physical activities of urban residents and have the potential to reduce chronic illness and improve health. It has actually been proven in a number of studies that people living in cities with streets lined up by trees are happier and healthier. However, over the past years the land use change detection done using Remote Sensing has shown a decline in the coverage of green spaces in

and around the capital city Harare . Such destructions have been largely associated with urbanization either through an increase in the built environment of the urban core or the outward expansion of urban areas which is taking place in the urban fringe. Harare is suffering from rapid deterioration of its greenbelt and the loss can be explained by the removal of green spaces such as parks and street trees to make way for housing, industrial areas and grey infrastructure without other greening measures. The protection of such land is often ad-hoc, occurring on a parcel-by-parcel basis in reaction to local development pressure and land-owner's decisions.

The general public in Harare is not committed in preserving parks, nature reserves, wetlands and forest reserves in the city. They have destroyed most of the lawns and shrubs planted in the Central Business District (CBD) which were meant to beautify the city. In most cases such places are used as walkways or spaces to sell their items.

The poor maintenance of green spaces in Harare has also given rise to intrusion of green belts by land developers and individuals. They perceive such lands

as lying idle, not serving any purpose and therefore encroach them for their personal interests.

According to the United Nations, the global percentage of people living in urban areas reached 50% in 2010 and is expected to increase to nearly 70% by the year 2050. This will result in expansion or densification of urban areas. As migration to urban areas is on-going globally, the need for sustainable urban development is becoming increasingly important. Increasing urbanization irrevocably stimulates greater demand for land for roads, homes, industry and recreation. As a consequence, more finite green resources which are in green spaces will be consumed.

As the world's cities come to be increasingly congested and polluted, urban green spaces play a crucial role in providing a wide range of ecosystem services that could help combat many urban ills and improve life for city dwellers, hence need to be protected from disappearing. Bringing green spaces to the urban setting stimulates a better relationship with the environment while supporting important services.



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AIRLINES RESUME TRAVEL WITH AN IMPACT ON CARBON FOOTPRINT

By Freedom Muranda

The aviation sector is one of the sectors which was hit hard by the covid-19 global pandemic. When the World Health Organisation (WHO) declared covid -19 a global pandemic in 2020, airlines around the world ceased operations and aeroplanes were grounded. Countries implemented lockdowns in an effort to curb the spread of Covid -19 due to travelling. The implementation of national lockdowns all over the world resulted in a reduced amount of greenhouse gas emissions from air travel. In 2016, civil aviation, as a whole, emitted around 814 million tonnes of Carbon dioxide (CO₂), which is roughly 2% of man-made carbon emissions.

As the battle against Covid-19 continues, many governments have decided to prioritise the economy whilst devising ways to reduce the spread of the virus. The global supply chain has been affected; economies around the world have faced massive recession. Many countries have started lifting up lockdowns. Flights around the world have resumed under strict Covid -19 restrictions and measures to reduce the spread of the virus.

The resumption of flights by the airline industry definitely has an impact on the civil aviation carbon footprint. Covid- 19 has definitely come as a great challenge to many countries all over the world. The notion of carbon footprint is here taken to comprise the overall climate impact of aviation, due to increased net emissions of several climate gases which include Carbon dioxide, Nitrous oxides, ozone, methane and water vapor.

According to the World Bank, measuring and managing the greenhouse gases of air travel involving individual passengers poses challenges at several levels. A major policy challenge arises in the international arena, since emissions from international travel for the most part do not physically take place in any one given country. The other main uncertainty lies in calculating the actual average GHG emissions per travelled distance which is key in measuring the carbon footprint of a specific air travel profile. This depends on a wide set of parameters which include class of travel, load factors, weight factors and other flight-specific factors such as flight length and average altitude. Current standard methods for calculating

air travel footprints do not reflect the larger footprint attributable to premium travel. The carbon footprint of air travel tends to vary systematically and strongly between travel classes economy, business and first class; perhaps also according to other class categories when these can be specified.

The average flight length and types of airplanes used are some of the determining factors for the carbon footprint per mile for air emissions. First class air travel has a much higher carbon footprint average followed by business class which has a high average as well then lastly economy class. The seats of the first class and the business class take up a large average floor space in most airplanes. Different "load factors" which refers to the rate at which average seats are occupied on a given flight tends to be lower on average in business class than in economy class, and lower in first class. In the plane's first class and business sections, there is greater floor space for each seat and only a few among available seats are occupied resulting in a smaller number of passengers transported per unit of floor space.



INTERNATIONAL AVIATION CARBON OFFSETTING

The aim of carbon offsetting in international aviation is that by 2050 the aviation's net CO₂ emissions need to be reduced to half of what they were in 2005. Achieving this goal will require continued investment in new technologies and strong support mechanisms for the deployment of sustainable aviation fuels. A four pillar strategy is the method being used by aviation to address the challenges of achieving its climate goals.

- Identifying weight savings in airplanes and in turn allowing the airplane to burn less fuel thus reducing greenhouse gas emissions. Engineers have also been working on the development of more efficient aircraft engines that can substantially reduce CO₂ emissions. These new technology aircraft are on average about 15 -20% more fuel efficient than the older models.
- Airlines have been investing in light weight cabin

equipment, swapping heavy pilot manuals with tablet computers. Pilots have been engaging operational measures that involve single engine taxiing, idle reverse thrust and procedures that involve continuous descents into airports and traffic flow management that avoid unnecessary airborne holding.

- The industry has remained confident that technology, operational measures and better infrastructure can provide long term solutions to ensure the sustainable growth of the aviation industry. This growth will be through partnership between industry and government. A global market-based measure is needed to fill any remaining emissions gap until those other measures have taken full effect.
- Aviation has also been using the infrastructure pillar of the strategy which involves making better use of airspace, navigational improvements and streamlining the routes taken by aircraft. These measures cut down on flight time, and optimize airport layout and also improve throughput and prevent unnecessary holding.





Climate Change Impact On Proliferation Of Invasive Alien Species

by Wadzanai Diana Manyame

Photo: Green Records Company

Climate change is a phenomenon that can be identified by noting changes in state of climatic properties (by means of statistical tests) that would have taken place over an extended period of time, decades or longer. These changes have been noted to have an effect on invasive alien species proliferation, management and control. The extent to which these two factors are linked is yet to be determined as more studies are being done across the globe. It has been noted that, effects of climate change on invasive species might differ depending on type of species and geographical location, where it can either be positive or negative. In most cases however, climate change has been envisaged to promote growth and invasion of foreign invasive species.

Climatic alterations being felt on different aspects of the environment include changes in temperature, precipitation and frequency of extreme events. These climatic conditions influence species distribution and growth. According to the findings from the United States Global Research Program, these two phenomena

are some of the highly considered anthropogenic changes threatening ecosystems today and could have highly devastating effects in the future if not well managed. Invasive species, not only do they invade and affect growth and function of the natural inhabitants in the affected area. They are also threatening agriculture and food security as evidenced by the proliferation of species such as *Opuntia Fulgida* in the Matebeleland South Province of Zimbabwe.

Approximately 2355 hectares of land has been invaded in Gwanda District taking up land that could be used for livestock rearing and in some instances farming of drought resistant crops. Cases of livestock chocking and death by *Opuntia Fulgida* have also been recorded. According to the Environmental Management Agency of Zimbabwe, about 1500 households have been severely affected in the districts of Gwanda and Beitbridge alone. This situation can worsen as the effects of climate change come to play unabated.

Invasive alien species are non-native species that are introduced

into a foreign environment where it dominates and impairs the structure and function of natural habitats and also displaces and damages native inhabitants. These are regarded as one of the greatest drivers of biodiversity loss as they contribute a huge threat to ecosystem integrity and function. Some of the examples commonly known in Zimbabwe are *Prostephanus truncatus* (Larger grain borer), *Lantana camara*, *Acacia mearnsii* (Black wattle) and *Cylindropuntia fulgida* (*Opuntia fulgida*) commonly known as the jumping cholla.

A number of factors have been listed by the Food and Agricultural Organization (FAO) as key contributors that aid the spread of invasive species among which climate change has been mentioned as a key factor. Other factors include economics and trade, tourism, biological control programme and land use changes.

The effect of invasive species can be compounded by climate change and there is a rise in concern on the significance of climate change to invasive species proliferation and control in the world. There are ways that are being put to table for use to try and understand the

dynamics of this relationship between the two as there is need for more scientific and practical knowledge on how climate change impacts invasive species patterns and survival. In 2017, translational ecology was formalised. It is a subfield that allows for scientists, natural resources managers as well as decision-makers to work together to develop scientific research which will assist in the management and control of climate change with special reference to invasive species.

Climate change can interact with a number of prevailing stressors that affect the distribution, spread, abundance, impact, management and control of invasive species in what can be termed as the invasion pathway. There are 5 consequences of climate change on invasive species that should never be excluded. These include, playing a part in the transportation and introduction of new invasive species, altering climatic constraints on invasive species, contributing to species distribution of those already existing in an environment, impacting on already existing invasive species and lastly affecting the effectiveness of management strategies.

Climate change will most likely lead to changes in the distributions of species through extreme weather events such as floods, cyclones, hurricanes. Species can be transported across countries and regions allowing them to spread to new areas, providing opportunities for dispersal. As climate change takes its toll, non-resilient native species can



Photo: Green Records Company

be affected and might fail to survive the harsh climatic and environmental conditions. A shift in species range might occur as native species are outcompeted or migrate. This in turn creates ecological space for foreign and newly introduced species to proliferate and become invasive. It is also important to note that invasive species thrive better in disturbed environments and such extreme weather affected environments tend to be ideal for growth and flourishing. Invasive species have short generation times and broad

environmental tolerances thus allowing them to cope in harsh environments and adapting to rapid changes. As predicted in climate change studies, temperature increases will continue to be experienced as the decades go by. This coupled with the continued release of carbon dioxide and nitrogen in the atmosphere provides a highly suitable environment for most invasive species to thrive. Invasive species especially plants favour environments rich in carbon dioxide, nitrogen and enough sunlight for growth. Increase in resource availability has therefore been noted to allow species to invade arid environments. The survival and spread of the *Opuntia fulgida* in the Zimbabwean Matebeleland South Province, for example.

As noted in text, climate change does have an impact on invasive species but to what extent? How will phenomenon such as desertification which can be exacerbated from climate change affect the growth of invasive species such as *Opuntia fulgida* and what impact will these have on habitants of areas such as Matebeleland South.



Photo: Green Records Company

PESTICIDES AND THE ENVIRONMENT; COUNTING THE COST

by Wadzana Diana Manyame

In this highly industrialized era, agriculture and human health are key aspects that are never to be neglected as they anchor life on this planet. The agricultural sector is very key in the food and pharmaceutical industry among others where agricultural by-products are used. Humans are the dominant species and are working day in day out to ensure health is safeguarded to protect lives across the globe. Pesticides therefore become a critical resource to ensure high agricultural yields and the minimization of incidence and spread of vector borne diseases or any other pest induced diseases.

Approximately two billion people in the world work in the agricultural sector and use pesticides as a mechanism to guard their crops and livestock from pests. These include chemicals, bio-pesticides and biological agents, with chemical pesticides being the commonly used. Pesticides are used in manufacturing industries as a control measure especially the food industry under Food Safety Management Systems (ISO 22000) and Prerequisite Programs – Good Manufacturing Practices and Good Hygiene Practices among others. They are also used in homes as a public health measure to control insects such as mosquitoes and help in the fight against deadly diseases such as

malaria. As much as there are different kinds of pesticides, the mostly widely used and highly recommended in terms of effectiveness are chemical pesticides. Contrary to them being a need in certain sectors, pesticides are some of the most harmful chemicals to the environment and human health in the after math.

Of the 12 listed dangerous persistent organic pollutants listed by the Stockholm Convention on Persistent Organic Pollutants “The Dirty Dozen”, 9 are chemical pesticides, DDT included. Persistent organic pollutants are chemicals that do not easily biodegrade and thus remain in the environment for decades after their use.

They accumulate in fatty tissues of exposed organisms and increase along the food chain, they have a variety of toxic endpoints, and can travel long distances from source areas through atmospheric or aqueous transport. DDT (Dichlorodiphenyltrichloroethane) is well known for its bioaccumulation and acute toxicity to non-target organisms to the extent where it has been banned and restricted in most countries. In Zimbabwe it is restricted and is only used for indoor residual spraying in malaria prone areas under the Malaria Eradication Programs. An environmental health conundrum.

The United States Environmental Protection Agency (EPA) spells out that pesticides are designed to kill, repel, attract, regulate or stop the growth of living organisms considered to be pests and there are what are termed target organisms. The fate of the pesticide after introduction into the environment is determined by a number of factors. Thus it finds itself exposed to non-target organisms with similar functionalities as target organisms and acts. Thereby posing harm. It is from this that pesticides have been concluded to have deleterious effects on the environment and human health.

The physical and chemical properties of a pesticide, soil, physical and environmental site conditions, management practices and climatic factors influence the behaviour and fate of pesticides. Pesticide introduction into the environment however differs. It can be through intentional application, disposal or accidental spills. These processes also determine pesticides movement and persistence. Physical, environmental and climatic factors are very important factors to take note of as these can allow for the adsorption, movement and spread of the pesticide in an area where the target organisms could be or further transport it where non target organisms can be affected, thus posing environmental damage.



Photo: Green Records Company

An example is that of fresh and groundwater bodies contamination especially with bio accumulating pesticides as this presents a ripple effect to consumers on the higher end of the food chain, the human beings. The fate of pesticides falls into 3 main categories adsorption, transfer and degradation and it important to understand the fate of pesticides in the environment for the proper handling, management and control of pesticide related cases.

The use of pesticides though beneficial in a number of ways is associated with far reaching costs both direct and indirect. The use of pesticides has ripple effects where not only one aspect of life is affected but all the other surrounding the initial are affected, obviously depending on the physical and chemical properties of the pesticide being used. Costs associated with pesticides are classified into 4 broad categories which are regulatory costs, human health costs, environmental costs and defensive expenditures.

Regulatory costs can be defined as costs associated with mandatory measures to prevent unnecessary pesticide exposure, remove residue pesticides to protect the environment and human health from the potential damage likely to be caused or to repair damage already inflicted. Examples include:

- Monitoring and decontamination of tap water
- Mandatory pesticide handling and disposal
- Public research and communication on new findings on how best to handle and manage pesticides

Human health costs are the costs on the wellbeing and life of humans exposed. Depending on the exposure route, exposure period, toxicity of the pesticide and sometimes the amount adsorbed by the human body, the fate of the exposed can be determined. Death can be instant, an acute illness can be experienced, a chronic one too. Some pesticides are also known to inhibit endocrine disrupting characteristic and thus fall under the EDCs (Endocrine Disrupting Compounds) whilst some

will be carcinogenic, teratogenic, hepatotoxic among others. The cost on human health and life cannot be directly calculated. Medical costs are then used instead.

- Preventive medicine, annual check-up
- Medical bills for those suffering from the aftermath of exposure

Environmental costs are costs experienced from pesticide damage to the soil, plants, animals, aquatic life, algae and other microorganisms as well as pest resistance to pesticides. These costs can be local, regional or the impact can be felt large scale. Mostly environmental costs if not managed well have a ripple effect and stem off into other costs such as the cost on human health.

- Fresh and ground water bodies contamination
- Disruption of life and health terrestrial and aquatic organisms
- Soil degradation
- Pesticide resistance affecting yields and resulting in spread of diseases
- Pollination decrease affecting yields and plant life
- Spill incident clean ups to detoxify the environment either through containment or buffering

Defensive expenditures cover all expenses associated with the prevention to pesticide exposure. These can be implored as an emergency preparedness measure or as a measure to manage exposure after an incident. However it is mostly done as a defensive mechanisms well before an occurrence of any pesticide incident.

- Installation of containment systems
- Protective clothing purchasing
- Regular training of an emergency response and community communication
- Banning consumption of certain fresh foods from suspected areas, purchasing organic foods
- Purchasing and consumption of bottled water in areas where water contamination is suspected

The widespread application of pesticides has been favoured by the benefits they provide, in particular, they positively impact crop and livestock yields. They have also played a role in improving human health but in the later, pesticide residue gives rise to yet other environmental and health problems that could even be more devastating and get in the way of human life and sustainability, thus stirring a lot of controversy.



Photo: Green Records Company

DRIP IRRIGATION GAINS MOMENTUM WITH LOCAL FARMERS

By Tendai Guvamombe



Government of Zimbabwe and various stakeholders have over the past two decades combined efforts to cascade new agricultural models to farmers through various capacity building initiatives. The relevant farming techniques and models are a response to the current global trends and challenges ranging from Sustainable Development Goals (SDGs), employment gaps and poverty alleviation among others. Zimbabwe is specifically faced with multifaceted challenges in the wake of climate change which include drought, low agricultural yields, low food security and hunger. The Government is still convinced to invest more in the agricultural sector which is still believed to be the backbone of the economy.

Drip irrigation is a component of agricultural programs that has gained momentum over the recent years. The inception of irrigation schemes since 2004 has assisted in mitigating the impacts of drought and hunger, especially to small scale holder farmers in Zimbabwe. Scientifically drip irrigation is classified as a micro-irrigation system which sustainably saves water and nutrients by enabling water to gradually filter through the roots of plants without causing leaching of nutrients. Ideally the concept is to allow a continued irrigation scenario which targets watering of roots in a mechanized manner that minimizes the processes of evapo-transpiration.

The whole irrigation system is composed of valves, pipes, tubing and emitters. These would ensure maximized activities of local farmers who are now continuously kept attached in their respective fields all

year round. Various farmers under the mechanization programme went through training sessions focused on operating various types of irrigation and these include sprinkler irrigation which is sometimes referred as surface irrigation. A capacity building workshop on small scale farmers held in the Capital in February this year by Oxfam was ushered in convergence of ideas from small holder farmers who are now relying on drip irrigation.

It is believed that drip irrigation is classified as primitive drip irrigation in ancient China and was adopted around 1860 in Germany when a group of researchers were consenting to experiments. Broad knowledge on drip irrigation was later expanded in 1920s and onwards in countries such as Australia and Israel. The earliest models came from United States of America with the inception of first drip tape, named Dew Hose developed by Richard Chapin of Chapin Watermatics in the early 1960s. Today Jain Irrigation in United States of America is reported to have acquired the Chapin Watermatics in 2006.

When the government embarked on the mechanization programme which is still sailing under the wheels of Command Agriculture, some farmers received irrigation equipment. This concurrently ran parallel with drip irrigation. Drip Irrigation is ideal in modern farms, greenhouses, gardens and is viable in areas with abundant water. Locally, the secluded type of irrigation has given rise to the production of sugarcane, maize, tomatoes, cotton, coconuts, egg plants, grapes, trees, bananas, citrus and many more.

A visit to Mashonaland Central Province particularly in the commercial areas of Mazowe and Bindura observed some synchronized drip irrigation system. The irrigation system has been instrumental in providing a ready market for horticultural products at Mbare Musika all year round. This proved to become a source of income for most farmers situated in Mazowe close to Harare.

Anesu Trizumbar, Founder of Farm Fresh Produce and a Horticulture expert based in Mazowe says she relies on drip irrigation for her crop production which is produced even during off season. "I rely more on drip irrigation and it is quite relevant in my field work as I concentrate more on maximizing horticulture products. This has enhanced

high quality products for my crops which are now sort after by major retailers and supermarkets in Zimbabwe." To date the youthful farmer has mentored more than hundred farmers regarding horticulture and drip irrigation.

Current global trends have seen professionals calling sustainable use of resources without compromising the future generation. Farmers situated in the peri-urban areas are hyped to use recycles waste water from municipalities in a manner that protects environment and its habitants.

Francis Vengai, Deputy Director in the Department of Agriculture Education and Farmer Training said drip irrigation is becoming more relevant in the wake

of climate change related scenarios through its multifaceted characteristics. "Drip irrigation is more viable during the current drought seasons. It is the way to go because it uses simple methods such as bucket system were one can pour water where it is directed along drip lines. Is labour and cost saving, and it is directly applied on the plant at the same time it is not wasteful. It is conservative in terms of soil and water."

According to Dr Vengesa, Drip Irrigation is mainly used in peri-urban lands and gave examples in areas surrounding Bulawayo and parts of Matebeleland. "Locally drip irrigation is mainly practiced in peri-urban farmers, irrigation colleges, Matebeleland area just outside Bulawayo and farms."



Clean Water Solutions

New Technologies

By Jack Chimbetete

In a country where water has been a challenge for a lengthy period of time with facilities struggling to meet the demand in water purification solutions and chemicals, Mayin Waters comes with solutions that just might be what we need as a country. Water is not just a Zimbabwean challenge however there are many factors in Zim that have caused our supply to be reduced especially in the major cities Harare and Bulawayo. The rapid building and commercialization of wet water lands has caused the natural siltation of water in the underground to be disturbed in channelling to rivers, the major dams have been prone to contamination from either dumping or different kinds of problems that have made it more difficult to clean the source when being distributed and a variety of other concerns that find different areas receiving water either once or twice a week if any in the cities.



In a lengthy interview with the CEO of Mayin Waters Dr Taurayi Imbayarwo this is what he had to say about their organisation as a way of Introduction:

Tell us a bit about Mayin Waters and what it does ?

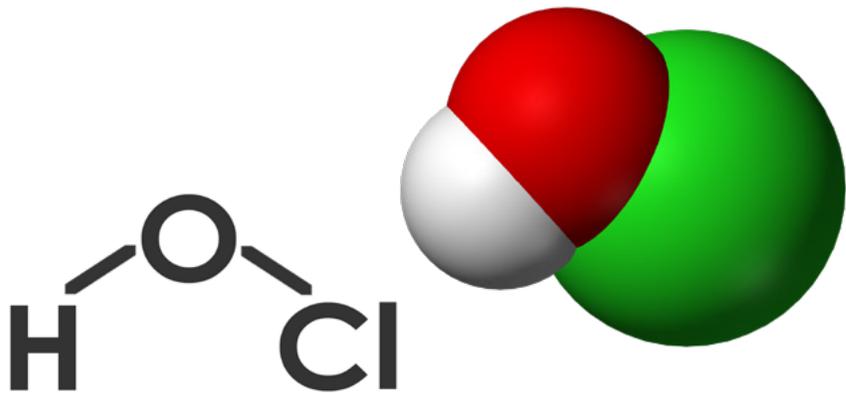
Mayin Waters ("Rain Waters") is a company that focuses on the implementation of green technologies in the WASH, Hygiene and Sanitation sector. Our core business areas are 1) installation and servicing Electro-Chemical Activation (ECA) Technology, 2) production of natural, non-toxic, eco-friendly and cost effective and yet potent hygiene & sanitization products 3) borehole inspection and rehabilitation as a quality assurance measure and cheaper alternative to new borehole drilling, 4) bulk water services and bottled water and 5) health communities where as social entrepreneurs we have participatory shared value with our communities.

Tell us about the technology that you use and please give examples of its effectiveness?

Electro-Chemical Activation (ECA) Technology is the latest green technology that borrows from nature to provide solutions to human challenges- biomimicry. (A local example of biomimicry is the Eastgate Centre in Harare, Zimbabwe which typifies the best of green architecture and ecologically sensitive adaptation. Designed by Mick Pearce, the office block has no conventional air-conditioning or heating, yet stays regulated year-round with dramatically less energy consumption using design methods inspired by indigenous Zimbabwe masonry and the self-cooling mounds (churu) of African termites (majuru).

Bio-mimicry is an exciting concept give us a little history about your products and how it is really connected and related to other bio-mimicry products?

Similarly, ECA is a scientific process that mimics the body's own natural defense process, which takes the water, salt and electricity in own bodies and converts these elements into a powerful disinfectant (Anolyte) and disinfectant (Catholyte) at pH neutral (neither acidic nor alkaline). The active ingredient in the



disinfectant is hypochlorous acid (HOCl). HOCl is extremely effective at eliminating bacteria and viruses, fungi, yeast, biofilm and moulds. All mammals produce HOCl and for this reason it is a natural, non-toxic, non-flammable chemical yet potent, which is safe to use in and around humans and animals. Its applications are wide ranging from water treatment (green alternative to traditional chemicals e.g. chlorine), industrial chillers & cooling towers, food & beverage safety, live animal treatment, hospitality, surface disinfection, sanitizer (non-alcohol), microbial control, shelf-life extension, wound treatment and many other applications.

Water is a unique challenge in Zimbabwe and even in different parts of the world how is a product like yours able to help alleviate this challenge and also contribute in having a safer, cleaner environment for the country?

MW has partnered internationally with the developers of the technology. We have set up in Harare an ECA plant both for demo purposes for the those interested in acquiring the technology as well as produce the disinfectant which we have branded "Ano-Care". We have various products by application which include Ano-Care WaterShield (potable water treatment), Ano-Care Disinfectant (general purpose, e.g. surface disinfection, cleaning etc), Ano-Care Bleach, Ano-Care Catholyte Degreaser, Ano-Care Wound Buster (powerful antiseptic for wound care), Ano-Care BaVi Kill (Bacteria and virus kill for poultry breeding), Ano-Care Muriwo Long Life (for shelf-life extension for perishables such as fruits, vegetable etc) and last but not least Ano-Care Sanitiser (Non-Alcohol sinitiser). With our technology we provide ecological, cheaper and yet effective solutions across all industry sectors in terms of hygiene and sanitation because we produce it onsite. Our products are a very good example of import substitute when it comes to the importation of water treatment chemicals. HOCl produced onsite can replace HTH, gas chlorine, Sodium Hypochlorite, ammonia, chlorine dioxide and algae kill among other chemicals.

Your products especially the disinfectant are timely given the Pandemic how effective will its use be going on in the next few months and generally after Covid?

Ano-Care ECA solutions (HOCl) have been successfully tested by Standard Association of Zimbabwe (SAZ) and the Ministry of Health's government labs. In this era of COVID19 pandemic, our disinfectant is timely for it is effective, non-toxic to humans and the environment. It allows for the effective disinfection of companies, schools, homes and public spaces in the presence of employees and children, thus allowing businesses and schools to operate without much interruption.

MW has had a silent introduction of the technology and product into the Zimbabwean market and has recently embarked on a nationwide campaign to introduce and market the product in Zimbabwe. Our experience so far is that there has been slow uptake; this possibly attribute to the fact that our people are averse to change and new products. We have a "lets wait and see" approach before "we use". Therefore, through the campaign we hope to educate our people about the product and urge its usage during the pandemic and beyond.

TOWARDS A CLEANER ENVIRONMENT EFFORTS UNLIMITED

As a follow-up to my article in the last issue about cleaning up the mindset I would like us to take a deeper look at factors that contribute to having a clean environment. It is important to note that when an environment is clean it also reduces the contamination of surfaces, products and food which reduces bacteria that cause various diseases. In the era that we are currently in the COVID 19 Pandemic has taught us that contamination of surfaces and an unclean environment can be very harmful to human beings hence the need to work very hard to improve our upkeep in this light. This pandemic is not the first threat though especially for Africa and more specifically Zimbabwe there has been cholera, which was mainly spread due to contaminated water supply. Besides these diseases there are various others and instead of focussing on these challenges we would like to look at how positive behavior can lead to a clean environment.

The latest epidemic has taught us that we should never be reactive to situations rather we should be proactive meaning that even in the home areas and spaces it is a responsible behavior to be able to pack up our waste, litter and garbage and dispose of it in the cleanest and safest ways. Where waste management trucks pass through it is important to be able to have a fluent system to make sure that they pick up but more importantly where it is not then we implore individuals and organisations to take the initiative to be able to collect waste and arrange systematic methods of making sure that they are delivered to dumpsites.

This is a very common culture in different parts of the world where the community takes care of its nature, environment and health as a way to support the already existing efforts by government bodies and friends of the environment who are either overwhelmed or sometimes lack enough resources to effectively

distribute their services to every corner of the country. The duty then lies on you and me to make a difference in our neighborhood. There are various residents associations in Meyrick park Mabelreign, Borrowdale, Milton Park, Highlands among others to note that do a brilliant job of taking ownership in their areas and contributing resources which allow deliberate efforts to cleanliness, waste management, water and nature conservation. If these models can be looked into more and encouraged among most of the citizens in the country then this would definitely translate into clean cities. Bulawayo and Mutare are also cities of note that generally have a very naturally clean environment and where more effort is made greater can and will be achieved.

A huge concern of mine is that most Zimbabweans are not yet in a culture of volunteerism and that presents a challenge because the state resources are very limited to be able to really deeply look and effectively service some of the needs that we have. In this light if every individual took an extra effort to pick up litter and put it in the right place, politely remind those that will be dumping waste in the wrong places not to do that and most of all volunteer, trucks, personnel and protective wear and resources to periodically make efforts it would ease the burden of state services and they would now also concentrate on logistics and improving systems. Business councils, Community groups and religious organisations have in the past been holding random clean up campaigns which is a really commendable, the challenge is to take a more active systematic step towards this area and engage in conversations that lead to extra efforts being made and the environment being clean. Green Business will also showcase various monetizing methods that can be taken by individuals from recycling and selling to various other greening efforts that are profitable.

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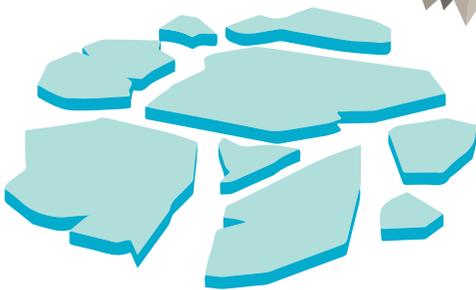
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An eagle can survive for **15-30 years** lifetime.



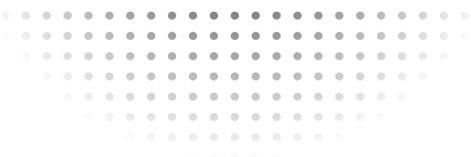
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Ice caps are melting at a rate of 9% per year due to climate change.



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