

A TIME FOR CHANGE: COMMUNITY VERSUS CLIMATE

THOUGHT LEADERSHIP ON THE GREEN FUTURE
FOR WASTEWATER INFRASTRUCTURE

Baleen Filters Pty Limited (Australia)

baleen
engineered by nature

"A human being is part of a whole, called by us the 'Universe' – a part limited in time and space. He experiences himself, his thoughts, and feelings, as something separated from the rest – a kind of optical delusion of his consciousness. This delusion is a kind of

prison for us, restricting us to our personal desires and to affection for a few persons nearest us. Our task must be to free ourselves from this prison by widening our circles of compassion to embrace all living creatures and the whole of nature in its beauty." Albert Einstein

"TODAY, SOME 90 PER CENT OF ALL POLLUTED WATER FINDS ITS WAY INTO RIVERS, LAKES, AND COASTAL ZONES, THREATENING HEALTH, FOOD SECURITY, AND ACCESS TO SAFE WATER (UN WWAP 2013)"

Baleen Filter's sewer mining programme is part of a plan to end marine pollution and counteract climate change, recover carbon-neutral waste for energy and reclaim water fit for irrigation.

University of South Australia start-up, Baleen Filters (technology of same name) are recognised experts in liquid/solid recovery and water re-use across industry, with more than 200 installations across Oceania, capturing product losses and enabling zero-discharge since 1999. The company pioneers best practice in wastewater infrastructure and seeks to facilitate cleaner production internationally.

BALEEN PROPOSES "SOLUTION" TO END CLIMATE CHANGE

Yuri Obst, Founder and CEO of Baleen, explains: "Visualise a future in which Earth's natural cycles and circular economies co-exist. Marine outfalls are transformed into sewer mining facilities with micro-plastics and non-biodegradables recovered (as recyclables) separate from energy-rich "Waste" (as feedstock) and nutrient-laden "Water" reclaimed for irrigation. Baleen is proven, durable and ready to form

part of regional waste collection systems involving co-digestion of other post-consumer energy-rich wastes (for example, food) for biogas conversion."

The Bible says that the intended habitat for humanity was a place called Eden, a place in which Humanity and Nature coexist in harmony. Our world is quite the contrary, fuelled by the freewill of every man and woman. Entire ecosystems and human cultures are diminishing on an unprecedented scale. Humankind has consumed much of the resources that had taken the Earth 250 million years to produce, placing the Earth's core physical systems at risk of abrupt and irreversible change.

HUMANITY HAS DISRUPTED EARTH'S ECOSYSTEMS

If we are to counteract this change we need to understand that the Earth, the biosphere which sustains us, is an ecosystem of which we form part and an ecosystem whether micro or macro exists only because of a symbiotic relationship among its parts. Humanity's neglect of Earth's ecosystems is not sustainable. Much like the global financial debt crisis, Earth's ecological debt continues to mount unabated. Truly, the Earth is far too precious to end up in environmental bankruptcy.

We need to reconcile our relationship with Nature to avoid impending catastrophe. The way to do this is by revitalising the ecological processes that sustain the biosphere. There are four fundamental processes which sustain an ecosystem: the water cycle, nutrient cycling, energy flow and community dynamics (to counteract change). Foremost, water is essential to any ecosystem. Water cycles through the atmosphere, soil, rivers, lakes, and oceans distributing nutrients to support life. This cycle also involves exchange of energy, which leads to temperature changes, contributing energy flow. These heat exchanges influence climate. Consequently, water has a profound influence on climate change and is essential to all processes.

WATER CYCLE IS KEY TO SOLVING CLIMATE CHANGE

The Ocean is the by far largest single ecosystem, home to the most abundant life on Earth, but has suffered as a consequence of industry and growing coastal populations. It is also the largest carbon sink on Earth, absorbing 90 per cent of global warming and 30 per cent of all carbon emissions (WMO GAW 2014), but its supporting ecosystems are collapsing as a consequence of pollution. Today, some 90 per cent of all polluted water finds its way into rivers, lakes, and coastal zones, threatening ►

Pictured: WORLD OCEANS: Humanity's future depends on its preservation

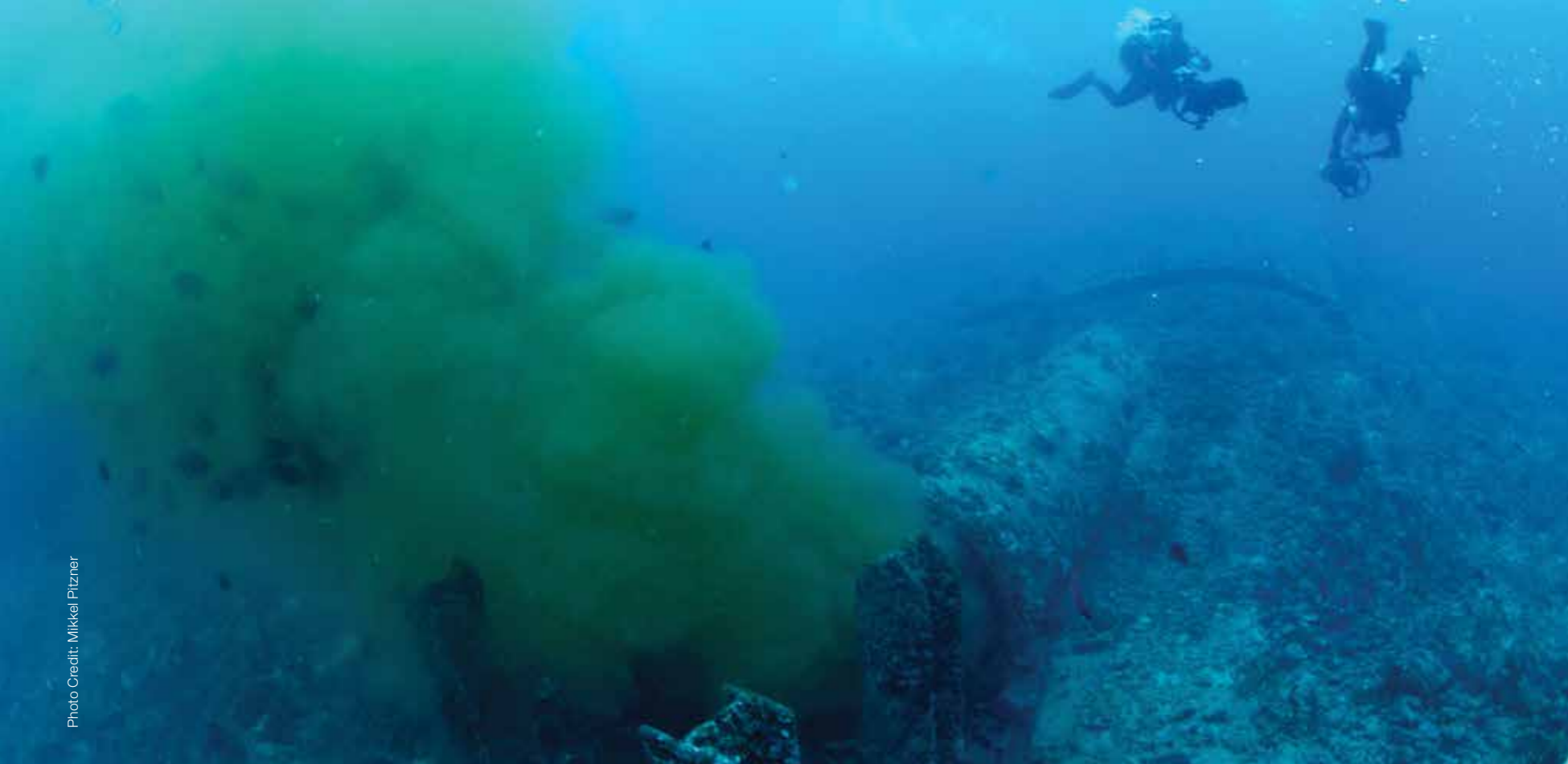


Photo Credit: Mikkel Pitzner

health, food security, and access to safe water (UN WWAP 2013). This has resulted in 500 dead zones around the world, affecting 250,000km², with the number doubling every ten years since the 1960s (UN 2013). These dead zones have neighbouring ecosystems that are part of a larger “still living” ecosystem, so it is feasible they could be revived should the causal factors be eliminated. This is where Community Dynamics plays a lead role in counteracting adverse change and enhancing the probability of the survival of its ecosystem.

Each and every organism forms part of a community that also supports neighbouring communities, and Humanity has dominion over these relationships. We are able to preserve these relationships in two practical ways. The first is through mitigation of pollution (to alter neither community dynamics nor nutrient cycling) and the second is through preservation of natural water cycles (to sustain life). Every person forms part of Earth’s governing community and every person can reduce pollution. Equally important, every person can return natural water cycles to Nature. Simply put, with will and resourcing, Humanity can restore natural order and end destructive Climate Change.

irrigation. If this approach is universally managed it would stop marine pollution and benefit natural water cycles indefinitely. Notably, the World Health Organisation (WHO) has published practical guidelines for “sustainable” irrigation (for developing nations) with anticipated review (for developed nations).



Above: ALTERED OCEANS: Partially treated wastewater discharged to Ocean
Left: WASTEWATER: contains energy-rich ‘Waste’

WASTEWATER KEY TO WATER CYCLE

Wastewater is a water-carried “waste” typically containing 99.9 to 99.99 per cent water, so it comes as no surprise that more and more farmers across the globe are turning to reclaimed wastewater as an alternative source for crop

“ENDING MARINE POLLUTION IS NOT JUST THE RIGHT THING TO DO, IT IS ABSOLUTELY NECESSARY FOR OUR CONTINUED SURVIVAL”

“It is a great use of the waste and the nutrients it contains. The best answer is not to ban the practice, but to improve it. Even without expensive infrastructure, common sense measures can make wastewater irrigation safer.”
Colin Chartres (IWMI) in an interview with New Scientist reporter Fred Pearce, August 2008

There is much to gain from “WasteWater”. From a resource standpoint, “Waste” (less than 0.1 per cent content) is largely organic and rich in energy while nutrients (less than 0.01 per cent content) found soluble in “Water” are ideal for land application. The “Waste” being carbon neutral offers a renewable source of electricity and an effective means for reducing greenhouse emissions and the affects of global warming.

“The energy content of (community wastewater) sludge is greater than oil shale or tar sand.”
TEXACO R&D 1991

Disappointingly, modern treatment plants are not engineered to mine wastewater and instead devour energy and consumables destroying “Waste” and “Nutrients” before discharging spent “Water” into marine environments. But fortunately, associated sewer networks DO allow for Greenfield infrastructure.

“The organic matter found in wastewater has some 10 times the energy required to operate today’s conventional treatment plants.”
NYSERDA MWH 2015

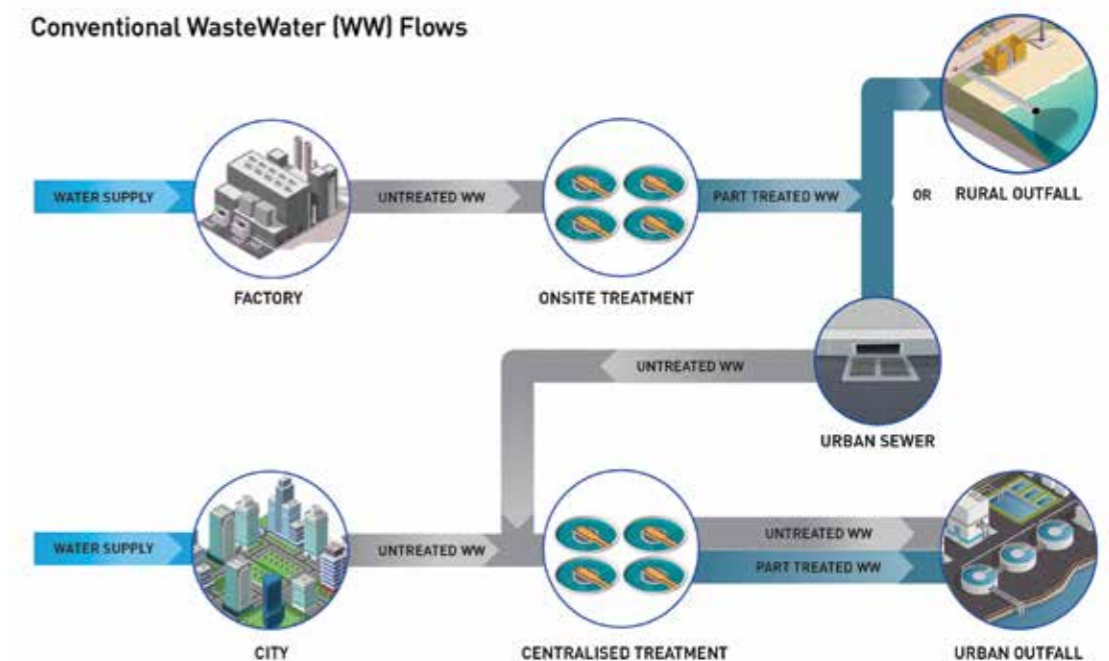
The CO₂ released by modern wastewater treatment plants (estimated at 3 per cent of total global emissions, IPCC 2008) originates from

two sources, the microbial breakdown of “Waste” organics and the burning of fossil fuels needed to operate the plant itself. The true extent of associated emissions does however represent an area of uncertainty when considering the adverse effects of marine discharge. Microbes that normally sustain the natural dynamics of ecosystems are instead systematically tackling pollution (in response to ecosystem change).

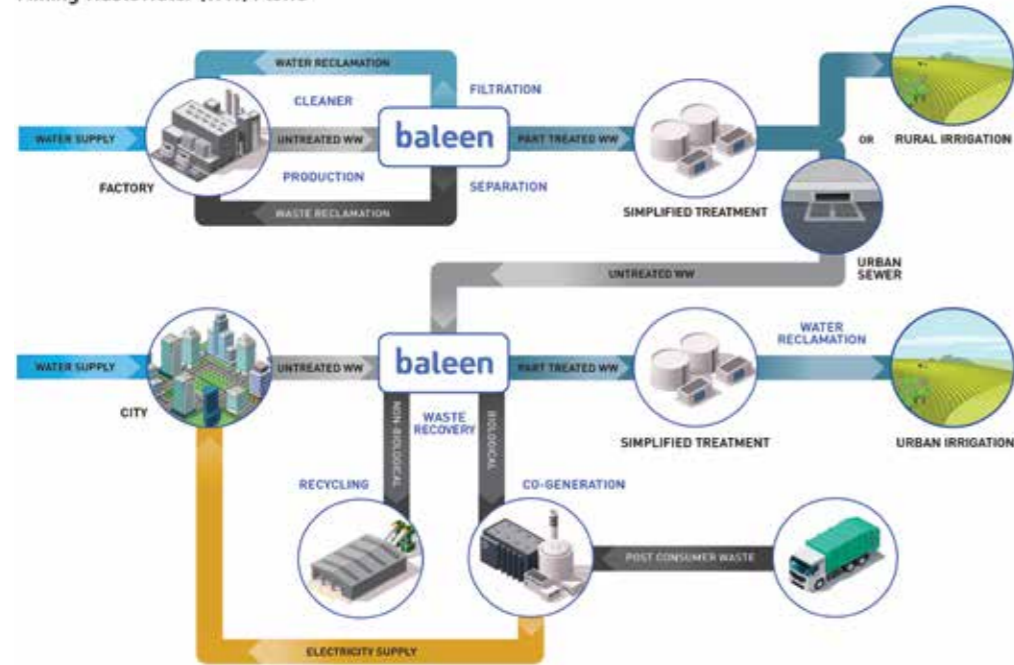
Should these microbes die, the methane (alternately released from decomposition of “Waste” organics) would disastrously end up as additional greenhouse emission (some 30 per cent more in fact). Given the Ocean is responsible for keeping our planet cool, we need to do all that is possible to preserve it – ending marine pollution is not just the right thing to do, it is absolutely necessary for our continued survival. Furthermore, reclamation of “WasteWater” for land-application will revitalise a plethora of ecosystems, thereby preserving the second most influential means to cooling the planet, the Earth’s flora – returning natural water cycles in symbiotic relationship with the Ocean. Humanity has drained the land of water for far too long, it is now essential for Humanity to return water to the land to quench its own ecosystems.

Infrastructure change through mining “WasteWater” instead of disposal would reduce all related emissions to near zero, and at the same time contribute significant quantities of oxygen to the atmosphere through a return of natural ecological processes. But to implement System Change requires political, legal and economic instruments and cooperation of the global community. ➤

Conventional WasteWater (WW) Flows



Mining WasteWater (WW) Flows



“When you have very tight budgets, it is natural to go with what you know, or be very careful and certain that something new is going to work before you spend the money. You have to be right, because you do not have extra money to retool if it does not work.”

George Hawkins (DC Water) in an interview with Water Online Editor Kevin Westerling, March 2016

The capital requirements, though considerable, are comparatively low when acknowledging the financial cost to address the problem of ageing infrastructure (simply to maintain status quo) is estimated at some US\$200 billion each year (UNESCO 2015). The question is not whether such a System Change is necessary or would work, but more so “Can we make the leap to a new paradigm?”.

Let us now explore the determinable global benefits from such a System Change:

“Wastewater produced globally is estimated at 1,500 billion tonnes annually; six times more water than all the rivers of the world.”
UN WWAP 2003

From emission-based estimates (UNEP 1998) there is enough energy-rich “Waste” to yield a greenhouse benefit of some 3.34 billion tonnes of CO₂ avoided annually (Vs estimated global emission of 9.50 billion tonnes, US EPA 2011), immediately reducing known CO₂ loading on oceanic ecosystems by one-third. Resulting cleaner “Water” containing free fertilizer in the form of nitrates and phosphates could supply one-third of global water for agriculture (UN, UNESCO and FAO).

WASTEWATER TO DISPLACE 1/3RD GLOBAL EMISSIONS AND 1/3RD IRRIGATION NEED

Electricity generation potential (UNEP 1998) estimates this “Waste” resource to offer around 583 billion kilowatts of useful power (Vs a global demand of 23,322 billion kilowatts, IEA 2013), indicating the amount of energy that can be reclaimed from “WasteWater”, though just 2.5 per cent of global demand, is higher than the combined total of 2 per cent from wind, solar, geothermal and biomass (REN21 2014).

HUMANITY’S WASTE TO REPLACE FOSSIL FUEL

Interestingly, this equates to 57 per cent of total electricity demand provided by oil or 6 per cent by coal (IEA 2013). Considering that China, India and the United States represent 38 per cent of global opportunity with the domestic, cereals and meat sectors headlining 72 per cent of all “WasteWater” produced (Pacific institute 2011), it means that Change could be instrumented quickly. And unlike non-renewables, “WasteWater” is found where communities reside, which means it could more efficiently power the transport industry (including electric vehicles) in lieu of existing coal-fired or oil-combustion sources, to encourage a move from fossil fuels.

Some 12.6 million people die each year as a consequence of an unhealthy environment, and over 4 billion people live with severe water scarcity

“THE CRITICAL NEXT STEP MUST BE THE CREATION OF GLOBAL WILL WITH FIRM COMMITMENT AT ALL LEVELS TO INVEST THE NECESSARY HUMAN AND FINANCIAL CAPITAL FOR ITS IMPLEMENTATION”

Call for Action:
Help Baleen pioneer
Change to end Pollution
Visit www.baleen.com or
Contact yuri@baleen.com



Above: Yuri Obst with clean-safe “Water” from “WasteWater” in just 3 steps

(WHO 2016), which is set to worsen due to population growth and increasing industrialisation. Without System Change, millions more people will die each year with further losses in biodiversity and ecosystems, undermining prosperity and global efforts for a sustainable future.

“GLOBAL WILL” NEEDED TO FOSTER CHANGE

This Thought Paper introduces a genuine opportunity for Humanity to transform our world from one devastated by marine and atmospheric pollution, mining and oil spills, and climate change to one that embraces Nature. It requires the Global Community to facilitate a shift in paradigm. The scientific and economic benefits of mining “WasteWater” resonate with good sense. The critical next step must be the creation of global will with firm commitment at all levels to

invest the necessary human and financial capital for its implementation.

In direct support, Baleen Filters (Australia) would fast-track technology transfer through strategic arrangements which encourage locally built technology at local pricing so as to expedite Change and limit the carbon footprint in full pursuit of such a momentous undertaking.

Baleen Filters’ vision for a green future centres upon ending marine pollution by deploying containerised plant to each and every outfall location; to harvest “waste-energy” for ancillary power generation (on a carbon-positive basis) while simultaneously reclaiming “water-nutrients” for “fit-for-purpose” irrigation (on an eco-sustainable basis). In turn, this process of “Community by Community” change will help to alleviate drought and poverty while combating climate change simply by returning natural order to Earth’s ecosystems. Peer reviewed economic models support an investment return measured in months.

“A single idea, well-timed and thoroughly researched, can change the fate of many.”
Kevin Westerling ‘On New Water Technology’ 2016

If we acknowledge that in any ecosystem ALL is inter-linked, that what impacts one part impacts all parts and that symbiotic relationships must be preserved, then Humanity and Nature can and will coexist. Perhaps in the process we may discover Eden.

“Climate Change presents our global family with the opportunity to embark on a path of spiritual renewal’ defined by deeper awareness and greater ecological action. Every act to protect and care for all beings connects us to one another, deepening the spiritual dimension of our lives. We must reflect on the true nature of our interrelationships to the Earth. It is not a resource for us to exploit at our will. It is a sacred inheritance and a precious home which we must protect.”
Interfaith Climate Change Statement to World Leaders on 18 April 2016. ■

ABOUT YURI OBST

Yuri Obst is an internationally experienced chemical engineer and environmental scientist, Founder and CEO of Baleen Filters. Mr Obst invented the unique self-cleaning filter/separator (known as Baleen) during his doctorate at the University of South Australia, where he was initially employed and where he completed some 27 projects on Cleaner Production.