



YEARS OF
PROTECTING
OUR MOST
VALUABLE
RESOURCES

HYDROFLUX

December 2023

NEWS FOR CUSTOMERS AND FRIENDS OF THE HYDROFLUX GROUP

The
Future of
Biomethane

Empowering
Communities
Through Clean Water

Sustainable
Infrastructure
in the Pacific



Improving Water Stewardship Through Corporate Governance

FEATURED STORY

BY JAMES HALL

Water is an indispensable resource for various industries, but its scarcity and the urgent need for sustainable practices have triggered a worldwide movement towards enhanced water stewardship. In sectors such as construction, manufacturing, and cement production, the importance of water recycling and reuse has gained significant prominence.



Hydroflux, as a carbon-neutral certified organisation, is ideally positioned to support businesses in their pursuit of improved water stewardship through corporate governance. Our focus extends beyond perceiving water merely as a cost, as we strive to maximise its potential for reuse and

recycling through low-energy, site-specific solutions. With our expertise and commitment to sustainable practices, we can assist companies in implementing robust water management systems that align with their environmental, social and governance (ESG) goals.

Corporate Governance and Water Stewardship

Forward-thinking companies now recognise water stewardship as a fundamental element of their ESG strategy. Given the global emphasis on sustainability, corporate governance increasingly

emphasises responsible water resource management. Companies are expected to develop strategies that minimise water consumption, maximise reuse, and ensure compliance with environmental regulations. By implementing effective water management systems, businesses can reduce

their environmental impact while demonstrating their dedication to sustainable practices. Cress Consulting, a Hydroflux business, offers specialised services for water stewardship to facilitate this transition.

Another First for the Australian Water Industry

BY JOHN KOUMOUKELIS

QPRESS® Sludge Dewatering System and more.

We're proud to be Australia's first water treatment and technology company to achieve Climate Active carbon neutral certification for our entire organisation.

Our proprietary chemicals including HYDRABOND® Polymers, HYDRAPRIME® Coagulants and numerous other chemicals used in water treatment in municipal, mining and the industrial sector are also carbon neutral certified.

Now our journey continues – with the certification of our range of water technology and associated chemical products as carbon neutral under the Climate Active program.

Hydroflux has always been in the business of protecting our natural resources and we are delighted to be able to offer to all our clients at no extra cost certified carbon neutral technology, design, products and services.

This includes our Roadtrain® Decentralised Packaged Plants, BioCap® Digester Covers, HyDAF Dissolved Air Flotation, HUBER



Providing Climate Active certified products and services demonstrates that Hydroflux takes our climate responsibility seriously and is a natural partner in meeting your emissions reduction goals.

A world leader, Hydroflux believes in partnering with clients to create the biggest impact by designing water treatment systems using the latest technology and most efficient equipment creating

the opportunity to rewrite the rule book and deliver the smartest and most efficient of sustainable solutions. All this. Carbon neutral. Certified by the Australian Government through Climate Active.



Hydroflux Group is Proud to be Carbon Neutral

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FROM THE CEO



Australian Energy Decarbonisation - The Future of Biomethane



BY JOHN KOUMOUKELIS

Biomethane, also known as renewable natural gas, is a form of biogas that has been processed to remove impurities and made suitable for injection into the existing natural gas grid.

Biomethane can be produced from a variety of organic materials such as agricultural waste, sewage, and food waste, making it a promising alternative to traditional fossil fuels for energy production. Biomethane has the potential to greatly reduce total energy sector greenhouse gas emissions by driving a circular economic process.

Renewable gases will be an important element of the energy mix as we facilitate a smooth decarbonisation of the energy market. Blending renewable gases such as biomethane into the gas network has the potential to bolster supply. Australia's existing gas networks and pipelines are readying to deliver renewable decarbonised gas.

Biomethane is not the only renewable gas at our disposal.

Hydrogen, or more specifically green hydrogen, is made using renewable electricity to electrolyse water and separate the hydrogen and oxygen atoms. Thus, Australian policymakers have three broad pathways to choose from with regards to decarbonisation of the national gas grid:

- 1. Biomethane, provides a carbon neutral equivalent to natural gas.**
- 2. Green Hydrogen, which produces no greenhouse gases when burnt as a natural gas substitute.**
- 3. Direct electrification of the grid, converting natural gas uses to electric.**

The key challenge is to find the right mix of these pathways to reach net zero emissions while ensuring energy security and minimising the overall cost of the energy system. Higher production and supply costs are pushed onto consumers, meaning everyone has a stake in the method by which the gas network is decarbonised.

In their Gas Vision 2050 report,

Energy Networks Australia suggests that "An orderly transition, underpinned by a level playing field across decarbonisation pathways, will work in the best interests of consumers."

Policymaking is a key pillar of the transition to renewable gas, and indeed to a renewable energy sector as a whole. They are responsible for creating the legal and regulatory framework that governs the energy sector, as well as setting policies and incentives that encourage the development and deployment of clean energy technologies. In the case of a transition to a renewable gas network, policymakers have several important responsibilities.

First is the establishment of renewable energy targets. Policymakers can set ambitious targets for the production of renewable gases like biomethane and hydrogen. These targets can provide a clear signal to the market and drive investment in the development of these technologies through strong incentives. Similarly, governments can

regulate emissions by setting emissions standards for the energy sector while enforcing penalties for companies that exceed these standards. This ensures the transition to a renewable gas network is done in an environmentally responsible manner.

Policymakers can also provide funding and support for research and development into renewable gas technologies. This can help to overcome technical barriers and drive down costs, making these technologies more accessible and attractive to consumers and businesses.

Another lever available to policymakers is to create financial incentives and subsidies to encourage investment in renewable gas technologies. For example, they can provide tax credits or other incentives for companies that invest in renewable gas projects. While this mechanism can be more costly to a government's hip pocket, it can serve as a very effective means by which to hurry the market's transition.

Lastly is the assurance of grid interconnectivity. Policymakers can promote the development of the infrastructure needed to transport renewable gases from production sites to customers. This may involve upgrading existing pipelines or building new ones to ensure that renewable gases are delivered to where they are needed.

We started the year with our ten year anniversary celebration and as we start to wind down for the Christmas and end of year break - we have a lot to reflect on.

Over the year we have expanded our technology capabilities with the addition of bioenergy solutions, which covers biomethane upgrading in addition to anaerobic waste to energy technology. We also have expanded our HyPure® membrane based technology that includes NX's ground breaking hollow fibre nano-filtration modules, allowing us to deliver low energy solutions to tackle PFAS, emerging contaminants and water reuse issues.

In this issue our diverse range of wastewater technologies and solutions, our local reach in terms of customer support, and our commitment to sustainability is demonstrated within the articles presented.

2024 is shaping up to be an exciting year - we have some great innovative projects in the pipeline across all of our market sectors; so we are looking forward to continuing our mission of *Protecting our Most Valuable Resources*.

Hydroflux aims to deliver the highest level of engineering and scientific know-how to the emerging issues of sustainability, climate adaptation, and environmental protection with a specific focus on water and wastewater. Hydroflux employs over 100 staff and operates throughout Australia, New Zealand, and the Pacific Islands, with office locations in Sydney, Melbourne, Brisbane, Perth, Auckland and Suva.

I hope you enjoy the issue.

John Koumoukelis, CEO

IMPROVING WATER STEWARDSHIP THROUGH CORPORATE GOVERNANCE - Continued

Shifting Perspectives: From Cost to Opportunity

The scarcity of water resources and rising costs have compelled industries to shift their perspective, recognising water as more than just a financial burden. Instead, water is seen as an opportunity for innovation and resource optimisation. In response, industries are investing in water recycling technologies to maximise the potential for reuse and recycling. By adopting low-energy, site-specific solutions such as advanced filtration systems and water treatment technologies, companies can significantly reduce their reliance on freshwater sources.

Hydroflux's Solutions for Specific Challenges

Water recycling in the industrial sector entails addressing specific challenges, including heavy metal contamination, chemical oxygen demand (COD) reduction, raw material recovery, and overall water cycle management. Hydroflux has a proven track record in designing and constructing advanced treatment processes and technologies that efficiently reduce pollution levels in industrial wastewater, enabling the implementation of comprehensive water cycle management strategies. Our low-energy solutions, such as the innovative NX system, facilitate efficient COD reduction and can be combined with other proven processes like activated carbon filtration and Ion Exchange.



The global movement towards improved water stewardship in the industrial sector has prompted companies to adopt sustainable practices and recognise water recycling as a vital component of their operations. Hydroflux, with its expertise and track record, is well-equipped to partner with companies from concept to implementation, providing comprehensive solutions. By shifting away

from viewing water as a mere cost and instead maximising its reuse and recovering raw materials through low-energy, site-specific solutions, both environmental and economic benefits can be realised, contributing to a more sustainable future. By embracing these practices, the industrial sector can play a pivotal role in conserving water resources and addressing the global water crisis.



Empowering Communities Through Clean Water

BY KURT HANLEY

Clean water and sanitation are essential human rights that many of us often take for granted. Turning on a tap and having access to safe drinking water and sanitary facilities is a luxury we seldom think twice about.

Yet, millions of people worldwide do not have this basic necessity. The consequences are dire, affecting health, education, and economic opportunities. It's a crisis that cannot be ignored, and at Hydroflux, we believe in doing our part to address this issue.

Hydroflux was honoured to support WaterAid as a Gold Sponsor at this year's NSW WaterAid Gala Ball at the iconic Sydney Town Hall. This incredible event was more than just a glamorous evening; it was an opportunity to make a real impact. The Gala Ball raised an impressive \$430,000 to provide clean water, sanitation, and hygiene to those deprived of these life-saving essentials.

WaterAid is a global organisation dedicated to ensuring that everyone, everywhere, has

access to clean water and sanitation. Since 1981 they have reached 28.1 million people providing them with access to clean water directly within various communities worldwide, but this is just the tip of the iceberg. WaterAid's work goes beyond simply providing water. They empower communities to develop long-term solutions, promoting hygiene education and sanitation facilities to ensure lasting change.

WaterAid's mission aligns with our core values of sustainability,



Above: Hydroflux staff and partners at the NSW WaterAid Gala Ball

environmental responsibility, and improving the quality of life for people worldwide. We believe that working together and supporting such worthwhile events can empower communities and make a tangible difference in the world.

We invite you to join us in this journey to provide clean water, sanitation, and hygiene to those who need it most. Your support, whether through donations, volunteering, or spreading awareness, can contribute to building a better future.



How Optimising Your Chemical Treatment Plant Can Cut Costs



BY ANDREW MILEY

When operating a physical chemical treatment plant such as a DAF or clarifier, the performance of the plant is highly dependent on the chemical program used and the respective dose rates and generally speaking, the more chemicals you add, the better the treated water quality is.

Whether the physical chemical treatment system is discharging water to sewer or further treatment processes onsite, it is quite common to find that the physical chemical treatment system is configured to produce a treated water quality far in excess of what is actually required, and whilst it may be aesthetically pleasing to have clear and

colourless water discharging from this physical chemical treatment plant, it is quite probable that the way the system is operated is not so attractive to the bottom line.

What You Can Do

There are many variables in play when operating a chemically assisted primary treatment plant, so the first step is to identify what those variables are. We will use a wastewater treatment plant discharging to the trade waste as an example to put this in perspective.

If a water authority charges \$1.00 per kg for total suspended solids (TSS), and your DAF system is consistently producing good

quality water at 100 mg/L TSS, then with a flow rate of 1 ML/day, your TSS daily mass charge will be \$100/day. This is a simple linear equation, so if your DAF was not performing as well and producing a discharge at say 500 mg/L, this mass discharge cost will increase to \$500/day (assuming that 500 mg/L is not in breach of any trade waste agreement).

Although this increase in cost may seem considerable, in order to achieve the lower \$100/day cost, you would normally need to be dosing more chemicals, and this in turn will generate more sludge. It is often found that the costs for additional chemicals and sludge disposal are higher than lowering the chemical dose rate and paying a little extra for the additional TSS mass discharge.

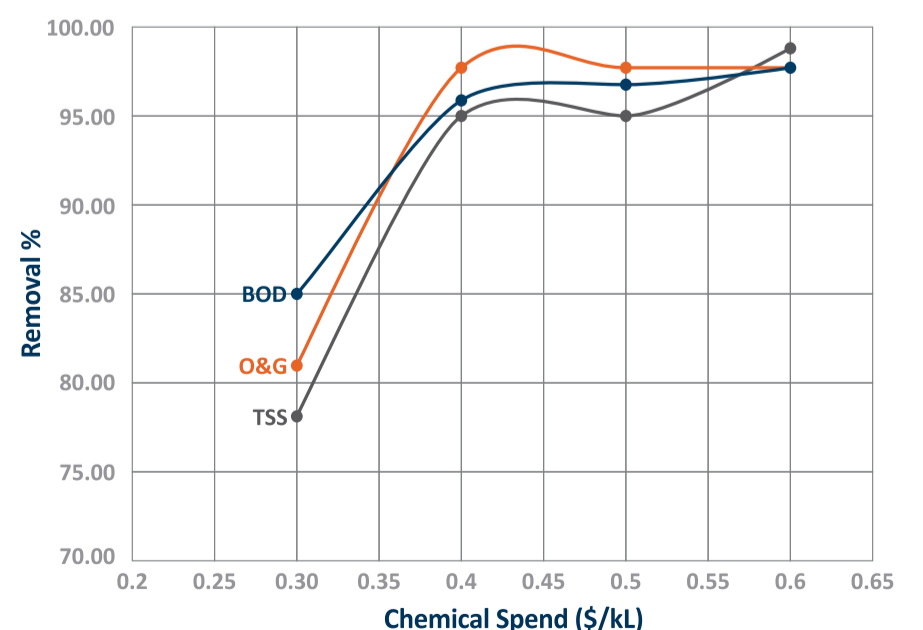
The chart below is an example of a performance vs chemical cost assessment on a DAF system (recently conducted by Hydroflux Utilities at a food processing plant). The customer was originally getting 95% TSS removal at a chemical spend of about \$0.50/kL. When the chemical dose was reduced, the chemical spend went to \$0.30/kL

and the TSS removal decreased from 95% to 75% removal. While more TSS was discharged, the TSS concentration (and mass) were still below the agreed limit, and the mass cost for TSS only increased marginally – the outcome was a lower cost to operate.

In this basic example alone, there are multiple variables including the actual chemical program used and the amount of sludge it generates, the cost of the chemicals, delivery methods, the dry solids concentration of the sludge, chemical costs of conditioning sludge, sludge classification and disposal

cost to name just a few. If we considered an example whereby the wastewater is discharge to an onsite secondary treatment plant, then power consumption and waste activated sludge volumes also come into play.

Engaging Hydroflux Utilities to conduct a wastewater treatment plant optimisation study can reduce the operating costs of your wastewater treatment plant. We have the process knowledge, skills, speciality chemicals and a national presence to provide this service to any type of business operating a physical chemical wastewater treatment plant.





Preserving Paradise: Sustainable Infrastructure in the Pacific

BY PAUL COBBIN

The Blue Pacific Continent is made up of eighteen nations whose life & livelihood centres around protecting natural capital.

Nowhere is this more critical than in the Island nation of Fiji where 40% of its national GDP stems from tourism and a significant portion of that can be found on Island developments like Nawi Island Marina in Savusavu Bay, Vanua Levu. The Savusavu Bay region is designated by the Fijian Department of Environment as a marine ecological zone,

which means a higher compliance level is required to protect the reef ecosystem the development is located in.

Balancing the needs of capital investment against the needs of protecting the natural capital of Savusavu Bay is where the Hydroflux Pacific Sustainable Infrastructure Program provided the Marina owner with a solution to manage the long term sustainability of liquid waste on the Island.

In the case of Nawi Island, the program commenced its

support phase in design mode considering two key constraints.

1. The Island development was to be staged over a number of years.
2. The treatment process had to remove nutrients such as nitrogen & phosphorous.

A Hydroflux EpcO RoadTrain Advanced, with an MLE process foundation, was selected for the first 100 cubic metre stage with an integration of MBBR technology incorporated for future capacity.

With the process selected, the

support phase continued with development and acquisition of the Department Of Environment permit on behalf of the client.

Moving into the delivery phase of the program saw in-country production of the Hydroflux EpcO RoadTrain in Ba, Viti Levu. In-country production is a Hydroflux standard for the Pacific because it increases economic value in the countries we operate and it allows us to reduce our carbon footprint and proudly stand up to be counted as the first water sector company in the Pacific to be certified carbon neutral.

On-site, the plant was installed under Hydroflux supervision using local contractors and it will be commissioned onto live sewage

shortly, but that's not where the Hydroflux Pacific program ends.

In fact, the protection phase of the Sustainable Infrastructure Program never ends because protecting assets and natural capital doesn't have a fixed timeline like a construction project. The protection phase of the Nawi Island RoadTrain will last indefinitely, providing the client with operator training, guidance, spare parts and chemicals for the life span of the Nawi Island development.

for Pacific utilities, industry and communities by providing sustainable water solutions to help preserve water security and optimise water use in an effort to build resilience and mould a secure water future.



Ultra-Pure Water for Major Food Company

BY MITCHELL HASTINGS

Hydroflux has been engaged to provide a process for producing ultra-pure water for a large-scale dairy in New Zealand.

This high purity water will be used in the production of drinks, yogurt, and cheese. The aim is to replace an aging ion exchange demineralisation system with a more efficient and sustainable solution. We look forward to the future & continuing to make a positive impact on the environment. Here's to another 10 years!

During the initial engagement, Hydroflux worked closely with the client to develop the optimal technical solution which involved a thorough review of conventional cation/anion/mixed bed ion exchange and reverse osmosis/electrode ionisation technologies to determine the best approach. After careful evaluation, the membrane-based solution was chosen as it offered a more sustainable option, eliminating the need for caustic and mineral acid regeneration.

Hydroflux's proposed membrane

solution incorporates several key technologies, including media filtration, reverse osmosis, and electrode ionisation. The equipment is designed to produce two different grades of process water being 35 m3 of ultrapure EDI dilute water per day for cheese production, along with an additional 185 m3 of demineralised RO permeate for other applications within the factory.

"The project has been a great team effort, with process design led by Caitlin Brown and Andrew Devlin, supported by the



Hydroflux Membrane Group. The container is currently en route to New Zealand, and our local team is preparing for site installation and commissioning," stated Ivano Simonetto, Hydroflux project manager.

All equipment is housed within a plug-and-play 40-foot shipping container, simplifying the overall project execution. The entire process is controlled by a PLC and HMI, with remote access provided through HyConnect.

HYDROFLUX QUIZ - DIFFICULTY: HARD

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HYDROFLUX

The Hydroflux Group aims to deliver the highest level of engineering and scientific know-how to the emerging issues of sustainability, climate adaptation and environmental protection with a specific focus on water and wastewater.

As part of its vision and mission, Hydroflux has always taken its climate responsibility seriously. In 2022, Hydroflux became Australia's first water treatment and technology company to achieve Climate Active carbon neutral certification for its organisation and products. It knows that partnering with customers and clients is the most significant impact it can have in its journey.

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