Annual Report 2021

aqua minerals

That energizes!

Energy is everywhere and takes all sorts of forms. It literally keeps everything on the move, helps us advance physically, make products, achieve performances, and – amazingly – to keep our own bodies active and in condition. Sometimes energy is visible, but often it is not. In the latter case, it can be unpleasant, if something is hot or electrified, but it is certainly interesting. Every form of energy, be it visible or invisible, is after all a source of opportunities. And these are very much needed in these times of increasing scarcity caused by climate change and the disturbing geopolitical situation.

Energy naturally plays an important role in the daily activities of AquaMinerals. In the first place, we strive to manage it as economically and sustainably as possible. Our leased vehicle fleet runs on electricity, and we also do all that we can in the office. However, the transport of the residuals has a big impact when it comes to energy use. We are actively and consciously working on this: we transport with fully-loaded lorries, choose the shortest routes and, where possible, avoid interim storage. The next step: the lorries that transport the aquafer will run on HVO, that is, on 'blue diesel'.

We also frequently save energy through our activities. These are after all aimed at replacing primary raw materials, which are usually extracted and reprocessed using fossil fuels. The water sector is itself often an energy supplier: methane is produced from groundwater, the cold from the water is used to cool a blood bank and, in the future, surplus electricity will be converted into hydrogen. The digesting of sludge from wastewater treatment has a big impact: at more than 70 of their locations, the Water Authorities already account for 25 to 30% of the total biogas volume produced in the Netherlands.
All this starts off with energy of another kind: that of enthusiastic, driven and competent people. People who believe in innovation, in a circular economy and in sustainable energy. People who are untiring in their effort to develop the chains required, in processes that often demand great perseverance. Without the unflagging effort of these believers, new chains would never see the light of day. But it does not end there. Because once such a chain is put together, then constant attention needs to be paid to guaranteeing the quality and the supply assurance. And this typically demands lots more energy and effort when compared to the traditional linear chains.

Where do these people get this energy from? I think the answer is simple: contributing to something that really energizes you; I see it all around me. What could be greater than applying your talents to something that is so important? To our Earth and to our collective future!

Olaf van der Kolk
Managing Director

aqua minerals

This is who we are

AquaMinerals seeks destinations for the residuals generated by drinking water companies and Water Authorities. To this end, we develop suitable chains, which are then supplied and/or operated in a qualitatively high-value manner. Our organisation was set up in 1995 for and by all of the drinking water companies in the Netherlands. Over the course of time, the Flemish drinking water company, De Watergroep, and five Dutch Water Authorities also became members.

Although our organisation was created to solve the 'waste problem', we have long ceased seeing the generated residuals as waste, let alone as a problem. As things stand today, we have developed functional applications for most of the streams, and have made significant progress, both in our financial and sustainability performance. Circular working is our ultimate objective; we are increasingly able to reuse the materials in processes in the water chain, or supply them to other circular chains.

We do not do this on our own. We work closely with our participants in research and development projects, and frequently brainstorm possible new, preferably circular, opportunities. Research institutes share their knowledge and thinking with us. Our service providers operate as links between supply and demand. And we examine with the clients how we can best meet their desires, and how we can organise the right, sustainable chains for them.

This is what we do

For and in the name of our participants, we:

- ✓ direct the chain
- ✓ procure logistical services
- ✓ sell the residuals and raw materials
- ✓ innovate and valorise through joint ventures with participants, clients and knowledge institutes
- ✓ carry out the quality management
- ✓ arrange and maintain the required certificates and declarations
- ✓ monitor, lobby and advise in areas of policy, and legal and regulatory frameworks
- ✓ provide transparency in financial and product flows, as well as in the CO_2 footprint and the degree of circularity of chains

Our core values

AquaMinerals is a not-for-profit, shared service centre for the participants. For the market, we are a commercial raw materials supplier. The proceeds go to the participants, research and development.

Staff-member structure year-end 2021

Number of staff members in service	16
Number of FTEs	13.8
Number of men	9
Number of men in FTEs	8.2
Number of women	7
Number of women in FTEs	5.5

Age 26-35	3
Age 36-45	5
Age 46-55	5
Age 56-65	3
0-2 years in service	5
2-5 years in service	4
5-10 years in service	5
> 10 years in service	2

University (+) 4 Higher Vocational Education (HBO) 9 Vocational Education (MBO) 3

Our participants

At the end of 2021, AquaMinerals had sixteen shareholders: all ten Dutch drinking water companies, the Flemish drinking water company De Watergroep, and five Water Authorities. On 1 October 2021, the Waterschap Zuiderzeeland Water Authority was the latest participant to join our collective.

We have two types of shares: 'WS' shares (Water Authorities) and 'DWB' shares (drinking water companies), so that specific decisions, proposed by the Supervisory Board (SB), relating either to specific drinking water or Water Authority materials, can be made by the shareholders concerned.

DRINKING WATER COMPANIES

Vitens Share number 2,808 Interest 21.5%	brabant water Share number 1,968 Interest 15.1%	evides waterbedrijf Share number 1,242 Interest 9.5%	De Watergroep WATER. VANDAAG EN MORGEN. Share number 1.028 Interest 7.9%
PWN Share number 802 Interest 6.2%	wml Limburgs drinkwater Share number 614 Interest 4.7%	dunea DUIN & WATER Share number 574 Interest 4.4%	waternet Share number 527 Interest 4.0%
Waterbedrijf Groningen Share number 354 Interest 2.7%	oasen drinkwater Share number 275 Interest 2.1%	WMD water Share number 252 Interest 1.9%	**Subtotal DWB** Share number 10,444 Interest 80.1%

WATER AUTHORITIES

waterschap amstel gooi en vecht Share number 773 Interest 5.9%	Waterschap Aa en Maas Share number 546 Interest 4.2%	hoogheemraadschap Hollands Noorderkwartier Share number 537 Interest 4.1%	**Subtotal WS** Share number 2,592 Interest 19.9%
HOOGHEEMRAADSCHAP DE STICHTSE RIJNLANDEN Share number 479 Interest 3.7%	WATERSCHAP ZUIDERZEELAND UW WATERSCHAP Share number 257 Interest 2.0% *		

* Acceded on 1/10/2021

Total DWB + WS
Share number 13,006 Interest 100%

Highlights 2021

The numbers for 2021 were as anticipated:

- AquaMinerals disposed of more than 326,000 tonnes of residuals for the participants 2021, an increase of 27,000 tonnes, or 9% more than in 2020.
- The sales value continued to grow, reaching € 3,989,000, that is, € 243,000, or 6.5% more than in 2020.
- The turnover continued its growth to almost € 17.3 million. Growth occurred on all fronts; the strongest performance being in the residuals for the Water Authorities and hourly-based projects for third parties.
- The transport costs rose sharply, partly because of the increased tonnage and inflation, but also because new residuals require other forms of transport.
- The recycle percentage decreased because the Water Authorities' tonnage is to a significant extent not (yet) being recycled.
- The transport distance decreased slightly.
- The total balance was significantly reduced thanks to an improved internal processing of payments and billings.
- Sick-leave was halved compared to 2020, thanks to the return of two employees on long-term sick leave.

Key figures

	2021	2020	2019	2018	2017
Results					
Turnover residuals and consulting	€ 17,278,904	€ 15,792,924	€ 11,134,219	€ 8,670,780	€ 7,216,400
Turnover non-shareholders in %	5.1	10.8	7.4	7.2	4.0
Total disposal and acceptance expenses	€ 13,281,052	€ 12,064,083	€ 7,715,865	€ 5,588,800	€ 4,563,500
Sales value (pos.-value materials)	€ 3,988,703	€ 3,745,849	€ 3,446,367	€ 3,002,328	€ 2,666,025
Acceptance (neg.-value materials)	€ 6,786,926	€ 5,991,862	€ 2,137,179	€ 819,567	€ 593,454
Operating result (before taxes)	€ 54,548	€ 18,910	€ 158,650	€ 203,800	€ 74,800
Shareholders' contribution in €/t [1]	€ 5.38	€ 5.59	€ 5.63	€ 5.82	€ 5.23
Assets					
Balance sheet total	€ 3,860,230	€ 5,718,834	€ 4,773,586	€ 3,354,400	€ 2,864,400
Shareholders' equity	€ 1,433,884	€ 1,315,587	€ 1,298,711	€ 1,117,300	€ 847,400
Liquidity (quick ratio)	1.6	1.3	1.4	1.4	1.4
Materials' figures					
Supply in tonnes [2]	326,026	298,634	260,792	247,800	246,650
Recycle percentage [3]	73 (78)	75 (80)	81 (82)	87 (87)	83 (83)
Average transport distance	125 km	126 km	132 km	113 km	115 km
Personnel					
Number of employees FTE per report year	13.8	13.6	10.0	8.6	8.5
Absenteeism in % [4]	2.4	6.0	7.0	5.4	1.4
Average turnover per FTE	€ 1,252,095	€ 1,161,244	€ 1,117,103	€ 1,008,230	€ 848,988

[1] For '17-'18 incl. retention of 10% sales value.
[2] Tonnage of ADH, incl. tonnage of third parties in 2021, 333,685 tonnes transported.
[3] Material recycling. Parenthetic figure incl. upcycling into biofuel.
[4] 2019 and 2020: incl. long-term sick leave of 2 employees.

Welcome Waterschap Zuiderzeeland!

On 1 October 2021, the fifth Water Authority joined the AquaMinerals collective: Waterschap Zuiderzeeland. This Water Authority applies several techniques to increase the sustainability of its wastewater treatment, particularly through the production of biofuels and raw materials. Waterschap Zuiderzeeland has concrete plans for the extraction of cellulose at its Zeewolde treatment plant, and the production of struvite at its Tollebeek plant. The Water Authority also aims to reconfigure its five treatment processes in line with the concept of the Energy and Resources Factory (EFGF).

WATERSCHAP ZUIDERZEELAND
UW WATERSCHAP

Party! 25-year jubilee

In 2020 AquaMinerals turned 25; our birthday party was postponed twice because of COVID-19. In September it finally happened. We had an attractive substantive programme and it was great to get together with each other again. On a 'trade-fair floor' several residuals users showed all the possibilities these offer. We had a number of inspiring speakers who shared their perspectives on circularity. Hein van Tuijl presented his vision of the Cradle to Cradle philosophy, while Milan Meyberg explained how he goes about making festivals a little more sustainable. Jessie Kroon looked at how, from the consumer perspective, we can work together on making the world a bit more sustainable. Finally, Korneel Rabaey told us about what we can learn from space travel (technology) when it comes to circularity. It was a festive and inspiring day but, most of all, it was wonderful to get together again with 200 partners or so.

The energy of ... **Petra**

'AquaMinerals is 25: that had to be celebrated! Easier said than done, in the middle of the corona pandemic. Because of the restrictions we had to put the preparations repeatedly on hold. What is permitted, and what is not permitted? Uncertainty everywhere. But third time lucky: finally, at the end of September, we enjoyed a fabulous event. And the timing turned out to be perfect. Two months later the country was again locked down; but those summer months felt like a liberation. This made our birthday even more festive. We could finally meet each other live: the air vibrated with energy!'

Petra de Rooij, Executive Secretary

AquaMinerals management role in Water Authority ‘sludge crisis’

In recent years the Water Authorities have faced significant problems in the final processing of their WWTP sludge. This was caused mainly by the capacity shortfall at AEB in Amsterdam and by restrictions concerning the disposal of sludge in Germany. The results were unfortunate: a lot of sludge needed to be stored, the rates went up and some even needed to be temporarily landfilled. AquaMinerals was able to arrange for a number of (temporary) disposal channels for the participants, which provided some relief to this sludge crisis.

The collaborating Water Authorities do not want to see a repeat of this situation and decided to jointly create a safety net to deal with possible incidents. This should prevent having everyone act independently and thus getting in each other’s way, avoid sub-optimal solutions and keep prices from being driven up. Furthermore, this approach might even prevent a crisis situation from occurring. Commissioned by the Association of Water Authorities, AquaMinerals set up this safety net in the second half of 2021, and now looks after its management.

2021 also in the grip of the pandemic

Who would have expected it? The year 2021 began and again ended in lockdown. In January 2021, the vaccination campaign against COVID-19 started in the Netherlands. While in the beginning we were hopeful that this would be *the* way out of the crisis, things in fact turned out in practice to be more complicated. Partly because of the appearance of new variants, 2021 continued to be marked by restrictive measures. For AquaMinerals what this meant most of all was working from home and having less live interaction with stakeholders. Although the situation was not optimal and we missed the personal touch, we got through this period well. Only a few projects suffered delays.
A striking positive effect of the pandemic was that many organisations became aware of the degree of vulnerability of today’s supply chains of (linear) raw materials and products. These frequently begin in (distant) foreign countries and can evidently become disrupted. Local and reliable alternatives became interesting. Accordingly, AquaMinerals has recently received many inquiries from potential new clients.

The energy of … **Thari**

‘Energy, in all its forms, is what drives growth. Our growth as people, as colleagues, as an organisation. The new form of working, which we all had to get used to during the pandemic, required energy. But it also presented opportunities: we now find ourselves in a phase in which we can shape our working environment anew. A combination of home-working, in which the absence of distractions allows you to perhaps get more done, and office-working, where you draw energy from being and working together as a team. Thus we keep growing together as an organisation.’

Thari Scholman, HR manager

Research into success and failure factors in business development

Within the H2020 EU 'NextGen' project (grant agreement No. 776541), AquaMinerals has carried out research into circular business models and resource stream chains. An interesting question in this regard concerns how and with whom initiatives and research can best be organised with a view to actually getting the chains off the ground. AquaMinerals has an exceptionally useful database to this end; after all, we have now been doing research on setting up new chains for 25 years. For this research 100 innovative AquaMinerals projects were closely examined. The characteristics of each of the projects was then determined; for instance, whether it was subsidised or not, its position in the Ansoff matrix, and the involvement of the market or the participant. A determination was then made as to whether the projects were (partially) successful or not. In the case of unsuccessful projects, surveys of the former project leaders were carried out to identify the failure factors. The research showed that the chance of success of innovation projects is on average higher when 1) there is market involvement, 2) when the TRL is high, and 3) when market penetration occurs. We noted a lower average chance of success in projects related to Water Authority residuals, or for which the market still needs to be developed. By far the most important failure factor has to do with the attempt to establish a chain when the required technology is not yet ready. The outcomes of this research are highly useable for AquaMinerals; we will draw on them when prioritising and designing future innovative pathways.

nextGen
Circular Water Solutions

Team AquaMinerals wins Circular Challenge!

BlueCity is a circular city in the former Tropicana swimming complex on the Meuse River in Rotterdam. Many sustainable start-ups work actively on the site on their circular concepts. BlueCity has for several years organised a Circular Challenge. Teams of six young professionals try, over a period of six weeks, to find solutions to circular challenges in a wide variety of business sectors. In 2021 six groups set to work on the water sector. The professional supervision and the previous successes prompted us to propose a challenge, namely: find a circular solution for the iron-lime sludge residual. This led to several weeks with plenty of experimentation. Among the possibilities investigated by the team was that of using iron-lime sludge as a paint or a stain. At the end of the day, the jury found this application the most eye-catching.

'Gold' calcite pellets!

Our calcite pellets are certified Cradle to Cradle GOLD.
Read all about it on page 16.


No time
to lose

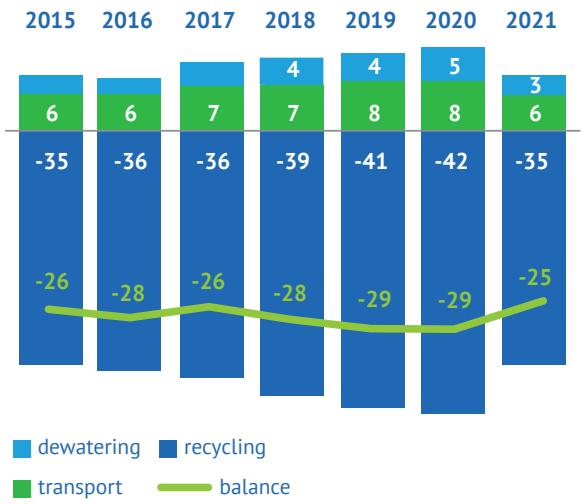
Sustainable results

A dip in climate benefit (and why this is still good news)

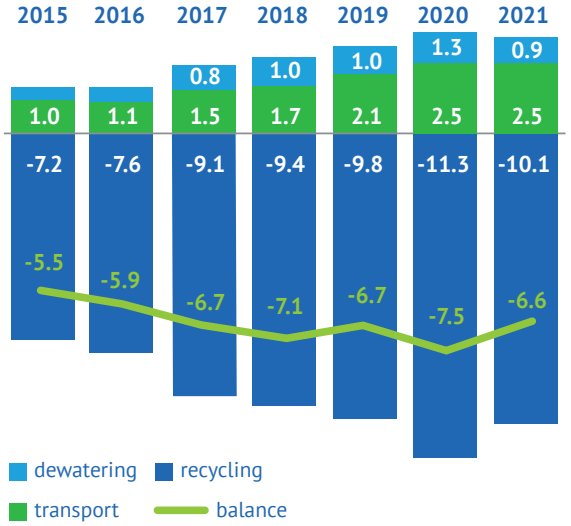
Along with our shareholders we strive to achieve 50% more climate benefit in 2030 compared to 2015. We speak of climate 'benefit', because the residuals chain footprint is negative, from the production process through to the application by the buyers. The CO_2 emissions avoided because of recycling are far greater than the impact of the transport and dewatering. We calculate the footprint every year by means of a lifecycle analysis (LCA).
In 2021 we see a big dip in the climate benefit, interrupting the rising line of the preceding years: a decrease from 7.5 to 6.6 million CO_2 kg equivalent.

The explanation is that a lot less dewatered aquafer than normal was delivered by the drinking water companies, while in 2020 the amount was actually above normal due to stock clearance. This residual accounts for a considerable part of the climate benefit at our clients. In fact, this is good news: most of the dewatered aquafer derives from the coagulation of surface water with ferrous chloride. Less dewatered aquafer therefore means less use of ferrous chloride. And less use is naturally better than recycling!

Footprint per tonne, only drinking water shareholders (kg CO_2-eq)



Total footprint (mln kg CO_2-equivalent)



Circular applications

We strive to maximise the return of residuals into a biological or technical resource loop. Examples include recycling the calcite pellets contained in glass or carpeting, aquafer in biodigesters that return the digestate to the land, and struvite in agricultural applications.
In 2021 72% of the drinking water residuals were used in a bio- or technical cycle, which means that the 2024 objective of 75% is within range. The Cradle to Cradle GOLD certification of our calcite pellets constitutes a wonderful milestone (see also page 16). We expect that this will enable us in the future to supply other additional attractive circular brands, as we already now do for Mosa and Desso-Tarkett.

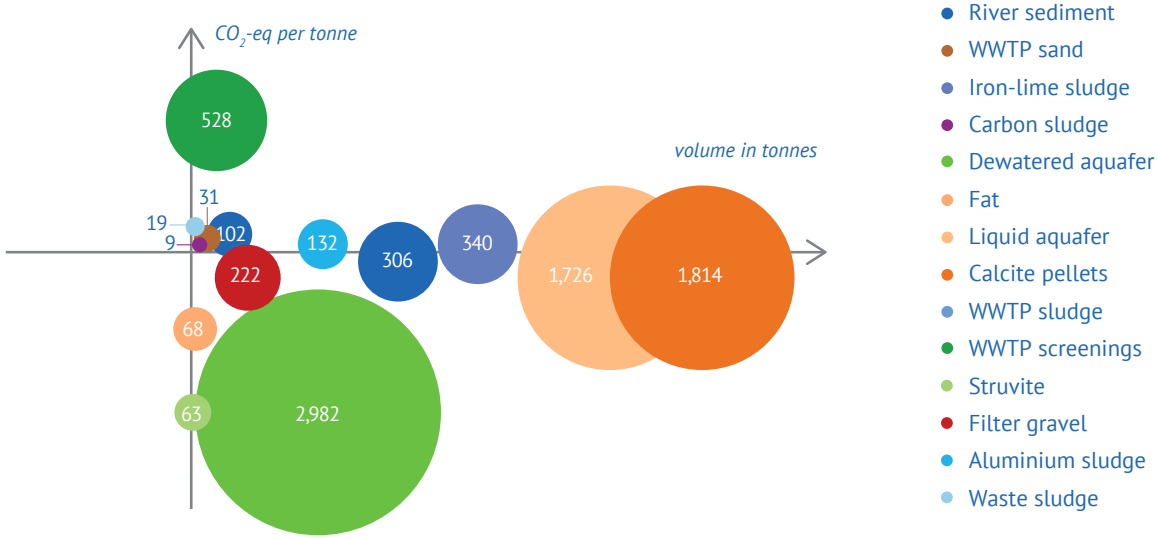
Picture Mosa

More and more climate-positive residuals

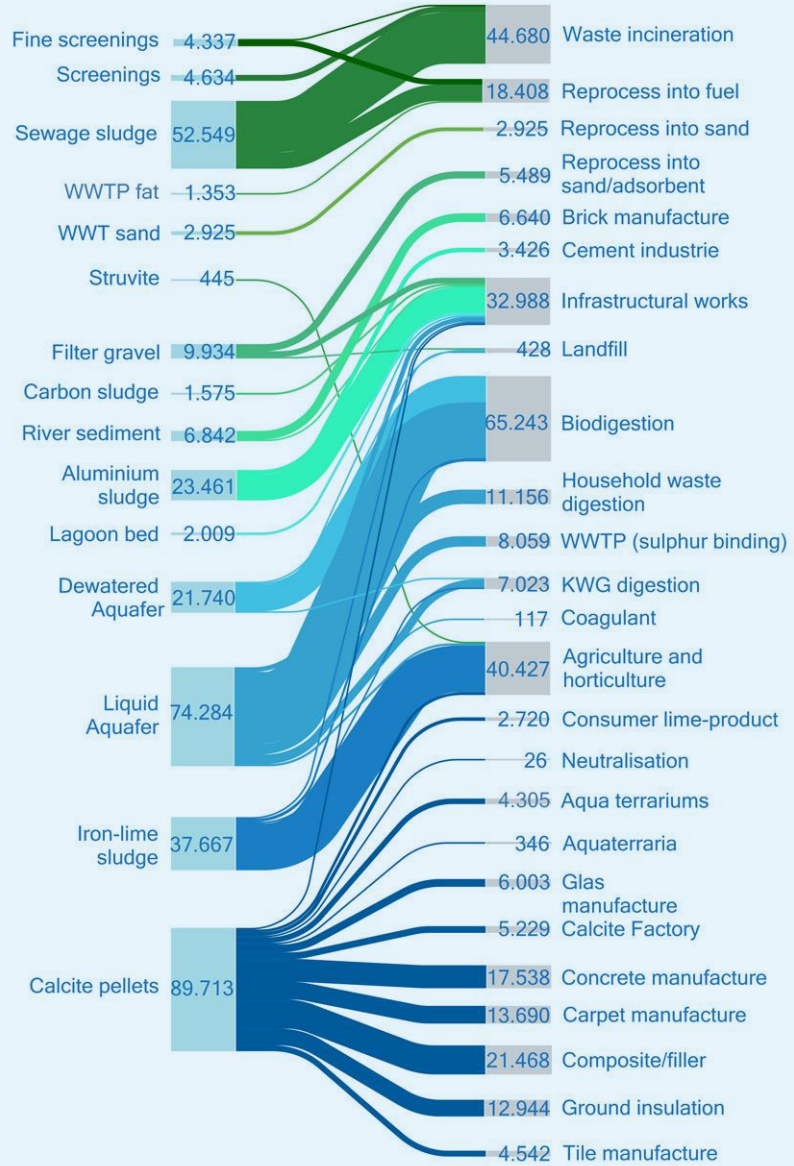
Calcite pellets, aquafer, filter gravel, struvite, fine screenings and fat have a negative footprint on balance and therefore produce a climate benefit. Dewatered aquafer in particular generates a benefit; the tonnage is relatively small but it contains large amounts of iron which, when used as a sulphur-binding agent in digesters, saves on the use of ferrous chloride. Furthermore, in 2021 AquaMinerals for the first time disposed of a large volume of fine screenings.

GMB biologically dries the fine screenings together with treatment sludge to produce biofuel. This chain generates a much bigger climate benefit than the direct combustion of fine screenings or sludge.
In the case of the other residuals the impact of the transport and processing is, for the time being, bigger than that related to the reduced use of primary raw materials by the buyers. Our goal is to have all residuals become climate-positive.

Climate benefit per material (negative = climate benefit) (tonnes CO_2-eq)



The bubble graph shows how far we have come. The size of the bubble indicates the climate impact or climate benefit for each material. On the vertical axis, the materials are ranked according to their climate impact per tonne. All those below the horizontal axis are climate-positive. The transport and combustion of screenings has the biggest environmental impact per tonne. While the greatest climate benefit per tonne comes from the processing of fat and screenings to produce biofuel, the use of struvite as a fertiliser and the application of dewatered aquafer as a sulphur-binding agent. On the horizontal axis the materials are ranked according to volume.



This Sankey diagram shows where the different residuals are applied (in tonnes). The width of the line indicates the volume of the relevant material.

Paper-less logistics

The switch from paper to digital accompanying documents is a logical step in reducing our CO_2 footprint. Moreover, it works faster, efficiently, transparently and 'corona-proof', because a signature is no longer required upon reception. Transport information and documents are directly easy to read, available and are centrally stored. Since the switch began in April, 5,287 of the 13,335 transports have been processed digitally: just under 40%. This percentage will be rising rapidly.

More focus on sustainable procurement

With a new procurement policy we commit ourselves to the sustainable procurement of transport, storage and services. Thanks to a centralised procurement department, each department will henceforth follow the same procurement process. Centralisation will lead to more efficiency, lower costs and standardisation of agreements and to sustainability. But we are not only focused on sustainability and reducing the CO_2 impact, we also take into account the extent to which a service or operation contributes to a circular chain. In this way, we aim to be a leader in the sector.

The energy of ... **Aalke Lida**

'Circularity requires energy. The circular application of materials often involves a reprocessing stage which consumes energy. For example, the grinding and drying of calcite pellets into seeding material for water softening. A non-circular application, which involves no processing, can easily score better on climate impact. But if we see a future potential – for instance, reprocessing using less energy or feedstock – then we go for circular, regardless.

When I read the report to the Club of Rome as a teenager, with its message about the depletion of natural resources, it hit me like a bombshell. To me it's amazing to be working on closing the chains. And to see that more and more companies are rising to the challenge!'

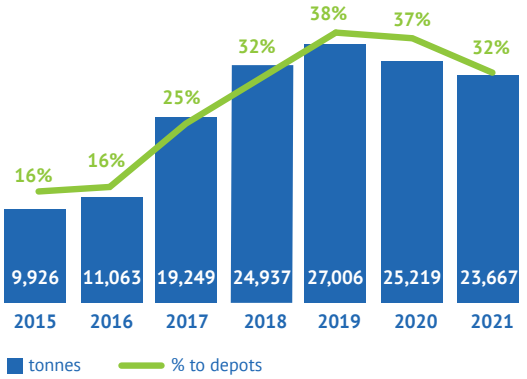
Aalke Lida de Jong,
Environmental and Sustainability Manager

Transport climate impact

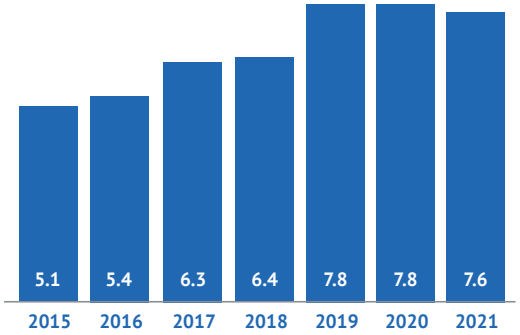
With more than 13,000 transports by lorry and by ship annually, we have a considerable environmental impact. We are trying to reduce this impact by planning efficiently, reducing the use of storage depots, making use of ship transport for large distances, and by selecting transport companies with sustainable lorry fleets. Our objective is to reduce the transport kilometres for the drinking water residuals by 10% between 2020 and 2024. In 2021, the use of depots where liquid aquafer is dewatered was cut significantly, from 37% to 32%. Consequently, the number of transport kilometres per tonne of drinking water residuals fell by 6%. The use of depots had previously increased because much of the liquid aquafer was too thin. In contrast, the number of kilometres per tonne for the Water Authority residuals increased slightly. We have less control options when it comes to these materials, in part because there is a limited choice of buyers and processors.

A second objective is to reduce the climate impact by 25% through cleaner transport. In our procurement we apply an internal CO_2 price of € 100 per tonne to determine the value of cleaner transport. In early 2021, part of the transport of dewatered aquafer and coagulation sludge was again put up for tender, with the result that it is now transported using HVO, or blue diesel. This led to an 85% reduction in fossil CO_2 emissions. A sharp decrease which, despite the fact that dewatered aquafer accounts for a small portion of the total transport, we already can see reflected in the average climate impact of the transport per tonne of residual. In the years ahead, we will progressively increase the sustainability of the transport.

Use of LIQ aquafer storage



Transport climate footprint
(kg CO_2-eq per residuals tonne)



The energy of ... **Angela**

'Sustainability and (re)circularity; as a purchaser this occupies me every day. The procurement of our transport is a major factor determining our CO_2 footprint. The transport sector is now fully engaged in becoming more sustainable. By benchmarking on the basis of different kinds of fuels, we have been able to opt for a fossil-free fuel for one of our residuals. This shrank our CO_2 footprint by almost 20%! We are also looking at the possibilities in the near future of having part of our residuals be transported with lorries powered by electricity and/or hydrogen – produced of course with green energy. Sustainable procurement is not simply a trend, it's the future!'

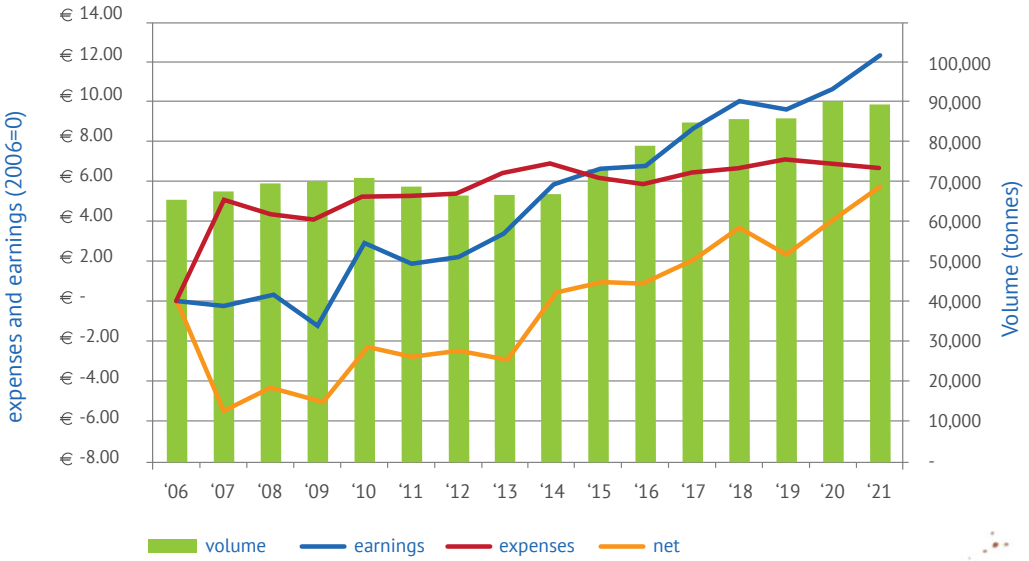
Angela Damen, Purchaser

Finding the right balance

Calcite pellets

Volume, disposal and transport

In 2021 the drinking water companies supplied a total of 89,713 tonnes of calcite pellets, which AquaMinerals sold on the market. The volume was practically the same as in 2020, which was entirely in line with expectations. No peaks were observed since the summer was not hot (no extreme water consumption). Ships transported 6,492 tonnes: 7.2% of the total volume. The cost of the transport increased across the board, reflecting the continued rise in fuel prices.



Calcite pellets are Cradle to Cradle GOLD

Cradle to Cradle is *the* worldwide standard for products with a positive impact on people and planet. In September we were proud to receive the Cradle to Cradle GOLD certificate for 'our' calcite pellets. This was the culmination of a thorough process, which included an assessment of the pellets' composition, recyclability, social and sustainability aspects. The production locations were also checked for their use of energy, water and chemicals. All drinking water production locations with calcite pellets have been certified: this amounts to over 50 locations of 11 drinking water companies. The buyers of the calcite pellets can incorporate the certificate and the underlying data into their own C2C certification. Sustainability leaders can thus proudly choose to use the circular calcite pellets as a raw material in their product.


CERTIFIED
cradle to cradle
GOLD

AquaMinerals BV

has successfully achieved Cradle to Cradle Certified® Gold for the product(s) under the name:

Lime pellets

Lime pellets with calcite core and lime pellets with sand core

The pellets are produced throughout the Netherlands and in Belgian Flanders at over 50 water production locations by 11 drinking water companies: Brabant Water, De Watergroep, Dunea, Evides, Oasen, PWN, Vitens, Waternet, Waterbedrijf Groningen, WMD, WML.

The following are excluded from the scope of the assessment: Use as soil amendment or treatment, use in food or feed.

This certification is considered provisional pending completion of the manufacturing facility site visit, which was postponed due to 2020-21 global travel restrictions.

Certification Number
4994

Standard Version
3.1

Lead Assessment Body
EPEA GmbH - Part of Drees & Sommer

Material Health Assessment Body
EPEA GmbH - Part of Drees & Sommer

Effective Date
13 September 2021

Expiration Date
12 September 2023

Peter Templeton
President & CEO
Cradle to Cradle Products Innovation Institute

cradle to cradle products innovation institute

See the Cradle to Cradle Certified Product Registry at www.c2ccertified.org for additional details
Use of the certification marks is subject to the terms and conditions of the C2CPII Certification Agreement and Trademark Use Guidelines
Cradle to Cradle Certified is a registered trademark of the Cradle to Cradle Products Innovation Institute

The energy of ... **Wendy**

'You can give and you can receive energy – if this is in balance, then the process runs optimally. I receive energy from the sun; literally, the feeling of recharging and becoming energised. Recharged with new energy, you can give it out again. The energy I give out in my position as account manager, I receive back in spades, so that for me each day is both different and challenging. The greatest thing is when everything comes together! As in this project. The grinding requires lots of energy, but the Van Zutven grinding operation is entirely powered by solar energy! That means a sustainability benefit in the chain and a higher score in the LCA calculation.'

Wendy Bouma, Account Manager

Calcite pellets in feed and food

The food industry – both for animal (feed) and for human (food) consumption – sets strict requirements on the raw materials it uses. To be able to make deliveries, all parties in the chain must hold a GMP+ certificate for the feed sector and an ISO 22000 certificate for the food sector. There is also strong demand in the market for the substantiation of the sustainable origin of the residuals. We had already been granted the GMP+ certificate at an earlier date. In 2021, we received the ISO 22000 certificate in a collaborative effort with Brabant Water, which was also was given the certificate.
A few years ago, the processing of the wet, round calcite pellets for such high-value applications seemed utopian. In Van Zutven in Veghel we found the perfect partner: they grind the calcite pellets into fine calcium carbonate. This processing and the certification have finally made delivery to the food industry possible. As far as we know, this is the first time in the world that a residual from drinking water production has been granted this certification.

Dewatered and liquid aquafer

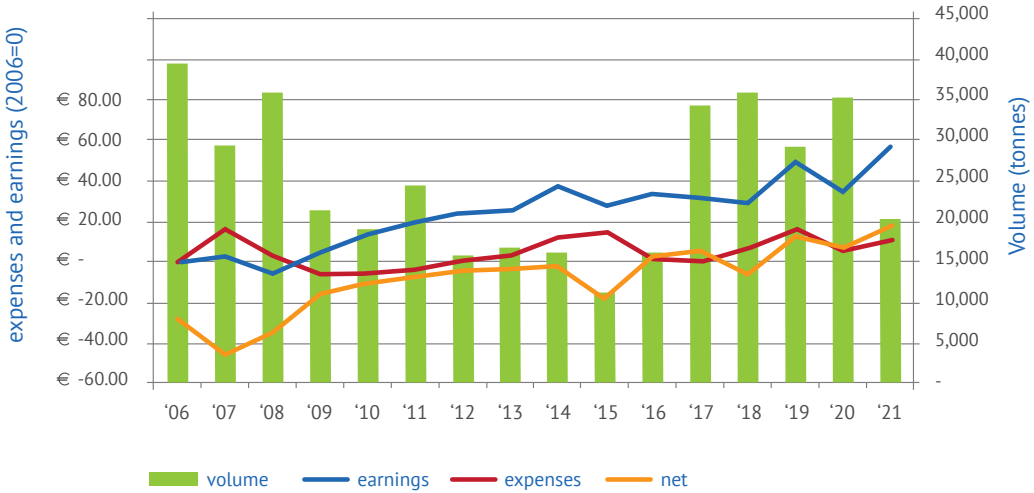
Volume, disposal and transport

In 2021, 69,669 tonnes of liquid aquafer was sold to clients. This volume is practically the same as that disposed in 2020. In addition, 20,554 tonnes of dewatered aquafer was sold; a drop of about 40% compared to 2020. The reason is that the quality of part of the stock had to be improved, and this will be only done in 2022. The decrease was according to forecast. Of the total volume 16% was transported by ship.

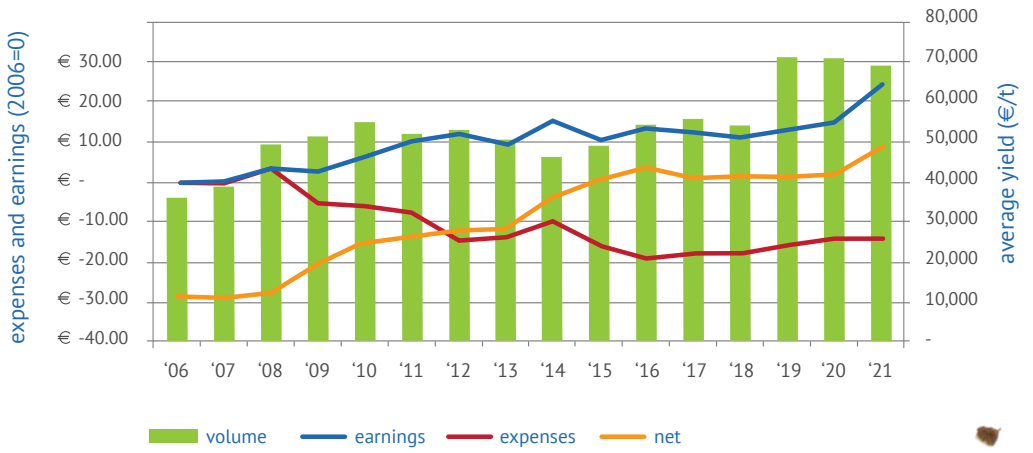
Satisfied clients

A satisfaction survey conducted with 28 regular Dutch aquafer buyers showed that they are very satisfied with our service. AquaMinerals is seen as a reliable supplier. The delivery speed and reaction time in particular scored highly. Several buyers felt that the billing speed and the billing method could be improved. We are working on this.

Dewatered aquafer



Liquid aquafer

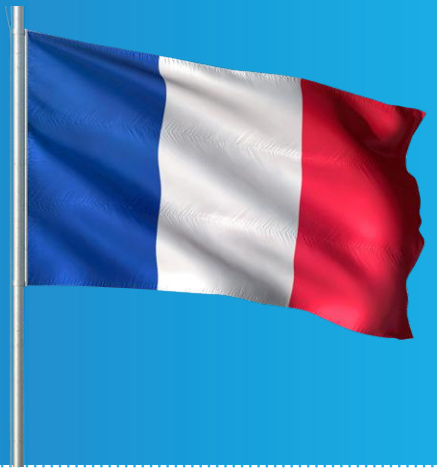


Iron as fuel: 100% circular

Together with KWR and Metalot (an Eindhoven University of Technology spin-off), AquaMinerals has started investigating the use of aquafer as a fuel. Although this may sound a little strange, combusted iron is nothing new: we call it rust. Research shows that aquafer can be reconverted into iron. The iron is then combusted, which produces rust. The rust is then regenerated to again produce iron. The application is therefore 100% circular. The combustion process generates energy that can be used for multiple purposes. Now that aquafer has been successfully converted into iron, we will investigate whether the physical properties are also suited for the use of aquafer as a fuel. Not only iron is formed in the process of conversion of aquafer into iron, but various other materials are degraded, which probably opens up other new opportunities.

Upcycling French aquafer and calcite pellets

Giving a second life to water treatment process residuals in France and realising the circular economy. With this objective in mind, the French company Seitiss (a subsidiary of Strane Innovation) entered a partnership with the Dutch Allied Waters and AquaMinerals. Together, we can significantly improve the sustainability of the water sector in France. Sharing experiences internationally is in everyone's interest: we look forward to this collaboration.



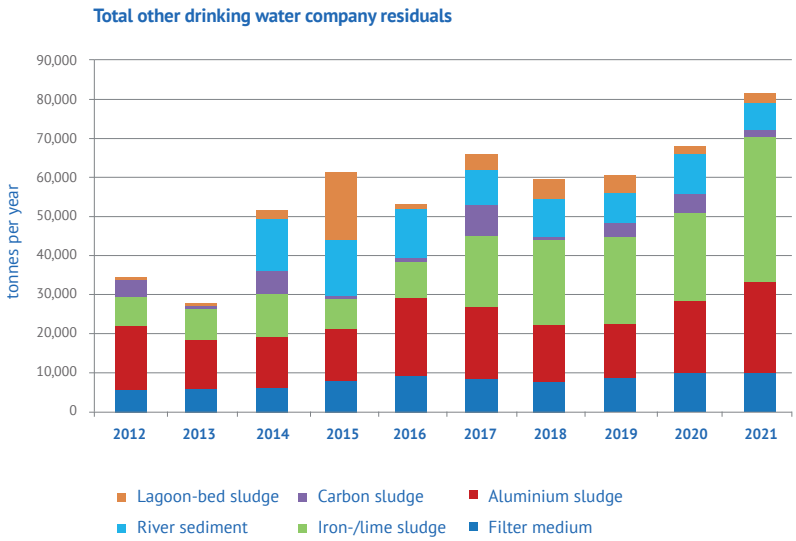
HerCauWer research postponed

The objective of the HerCauWer project is to research the possibility of producing new coagulant from aquafer. Unfortunately, because of corona, this multi-annual project has undergone delays. The final test is planned for 2022 at the Bath WWTP location, where the coagulant produced from aquafer will be tested on a large scale.

Aquafer polishing pellets

AquaMinerals has long been investigating the production of iron pellets from aquafer. Earlier research was aimed primarily at studying the optimal binding capacity. The binding capacity of the pellets produced so far has always exceeded expectations, but we found that the physical quality of the pellets could be better. In the research we are now conducting a more robust pellet is being produced, one that is better than the products typically available on the market, but that still has sufficient absorption capacity. Moreover, the pellets will no longer leach any organic material and manganese, so that they will also be suited for the removal of arsenic in drinking water production processes.

Other drinking water company residuals



Filter gravel

Filter gravel binds to the phosphorus in the water, thus preventing the growth of algae and keeping the water nice and clear. Moreover, the phosphorus becomes more available for the water plants which therefore grow faster and bigger. Last year filter gravel was sold to a variety of parties. These are frequently private initiatives, for example for bathing and ornamental ponds, but also for the removal of phosphorus in discharges into surface water. Now that the pandemic is hopefully behind us, the sales of products via Green XL Pond Products can get going again; the European travel restrictions made this difficult. At the end of 2021 we saw that things began moving again.


Picture KWR

Iron-lime sludge

In 2021 the drinking water companies supplied 70% more iron-lime sludge compared to 2020. This was entirely due to the unplanned clean-up of the loading reservoir at PWN's Prinses Juliana production location. Most of the iron sludge still finds its way to the agricultural sector, where iron-lime sludge is used as slaked lime fertiliser. The material that is not usable is applied as a construction material, after having been dried. Because of the PFAS issue, it is becoming increasingly difficult to dispose of construction materials, even those originating from a clean industry like drinking water production. As a consequence the disposal cost of this material continues to increase.

Aluminium sludge

More aluminium sludge was disposed of in 2021 than in 2020, but also more than was budgeted. The increase is entirely related to the higher production of aluminium sludge by Waterbedrijf Groningen. The water company had to increase the aluminium dosing at the De Punt production location, because the water from the Drentsche Aa River contained more suspended (organic) matter. This was a consequence of nature measures taken by the Water Authority in the upper reaches of the Aa. The measures increase the nature value of the Aa, but also the amount of suspended matter, which Waterbedrijf Groningen then has to remove.

The energy of … **Martijn**

'Every week wastewater treatment processes – like those at Waternet, the Hoogheemraadschap Hollands Noorderkwartier and Evides Industriewater – produce a constant stream of sludge. And there is always some matter requiring our attention: maintenance, a malfunction, shortage of lorries, or a request to temporarily dispose of the WWTP sludge of another Water Authority and to find a good destination for it. This demands a lot of energy, but it is also is very energising to solve that demand and supply puzzle every week. And the sludge itself? That's where the various processors extract energy from.' Now and then, in my free time, I go for a cold-water swim. The water in the Haarrijnse Plas lake is about 6 degrees. Physically and mentally it takes a lot of energy to jump in, not to speak of staying in. But when I come out, I am recharged with loads of energy. It's worked again!'

Martijn den Heijer, Supply Chain Manager

Carbon sludge

Carbon sludge is one of the most difficult residuals to dispose of for AquaMinerals. It is used at various production locations as the last stage in bringing drinking water up to specification. Powdered carbon removes all organic matter that is not degraded in the process; and these are toxic substances for the most part. It works perfectly, but these substances accumulate in the powdered carbon. The concentration of toxic substances is extremely small, but new legal and regulatory provisions, such as those for PFAS, make it increasingly difficult to use this material – even in applications in which the adsorbed toxic substances could cause no harm.
Carbon sludge with sufficient binding capacity and containing no toxic substances offers plenty of opportunities for new chains. AquaMinerals is working with its partners on the techniques to this end; we have already succeeded in degrading PFAS in carbon sludge by 80%.

PWTP sludge

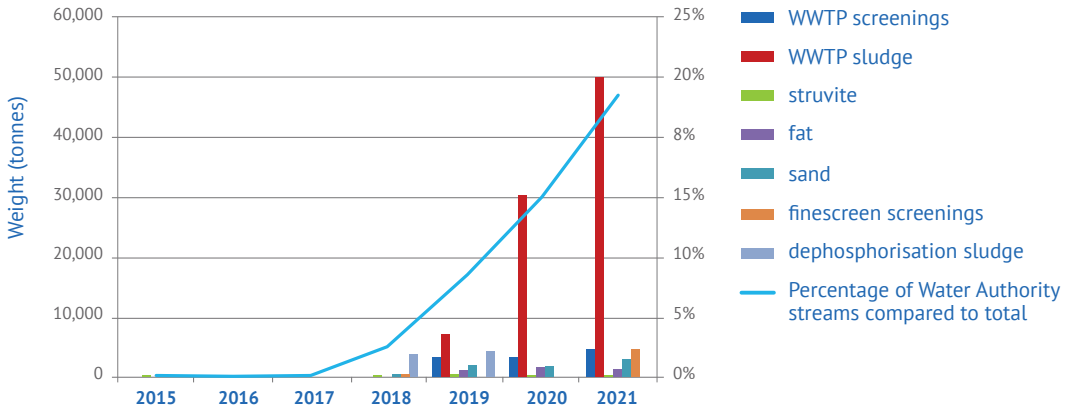
A number of our participants, besides their regular drinking water production, conduct commercial activities as industry water companies. This could, for instance, involve the production of process water for an entire industrial park or for a single company. The production of process water is very similar to the production of drinking water.
Some industry water companies are also involved in the treatment of the wastewater for companies. This activity generates process water treatment plant (PWTP) sludge. The disposal of this sludge has recently also become part of AquaMinerals activities. We have plenty of experience with the disposal of wastewater treatment plant (WWTP) sludge; the disposal of the PWTP sludge is a fine addition to the activities we carry out for the drinking water companies.

Jumping into the deep together

Water Authority residuals

The disposal of residuals from the Water Authorities continued to grow in 2021. In 2020 AquaMinerals disposed of 37,000 tonnes for these participants, and in 2021 the amount rose to 63,000 tonnes. In relative terms, the impact of the Water Authority residuals also increased, from 12% of the total in 2020 to 20% in 2021. This can be attributed entirely to the extra volume of treatment sludge that AquaMinerals disposed of for the Water Authorities. If we disregard the treatment sludge, the Water Authorities supply about 4% of the total residuals volume.

Water Authority streams



Fine screenings

In 2021, for the first time, AquaMinerals disposed of fine screenings for the Hoogheemraadschap Hollands Noorderkwartier and the Hoogheemraadschap Stichtse Rijnlanden Water Authorities. In this first year, we processed a little less than 5000 tonnes of fine screenings for them. Together with the Stichtse Rijnlanden Water Authority, we studied the possibilities of building an installation at their location for the reprocessing of cellulose. We anticipate that this process can become generalised in 2023, at which point we will be able to supply new clients.

Screenings

This volume continued to grow in 2021 because AquaMinerals also began disposing of the screenings of the Hoogheemraadschap Stichtse Rijnlanden Water Authority. In addition, we acquired Blueroof's research results on the use of screenings as a substrate in green roofs. Together with the research bureau Van Waarden, we sought out parties interested in working with AquaMinerals in taking this initiative further. And with success: we found a number of interested parties. In 2022 this process will be continued, and hopefully result in further development.

Struvite

Struvite has long been the show-piece of the resources recovered by the Water Authorities. Although there are plenty of possibilities of placing this material on the market, the production of struvite still falls far short of the existing recovery capacity. The Water Authorities have begun a project aimed at optimising and increasing the recovery of struvite, so as to serve more clients.

Sand

The Water Authorities' sand has for years been sent to a large sand recycler, where it is washed to become attractive, clean sand. Unfortunately, this company has noticed that the quality of the Water Authority sand has been deteriorating for years. This applies not only to that from the WWTPs, but also to the sand that is vacuumed from the sewers. The quality deterioration results mostly from the fact that we, as citizens, are discharging more and more into the sewers. The sand traps at the Water Authorities' WWTPs contain more and more organic matter and less and less sand. This increasingly causes odour and infestation problems at the recycling site. The recycler has therefore stopped accepting sand that causes too much nuisance.

WWTP sludge

The volume of sludge from wastewater treatment plants grew further in 2021; AquaMinerals disposed of this residual for both participants and non-participants. Last year a number of Water Authorities encountered production problems, and turned to AquaMinerals for the processing of their dewatered sludge. See also page 8, 'AquaMinerals management role in Water Authority "sludge crisis"'. The Water Authorities expect that within the next two years they will have sufficient processing capacity of their own for the treatment sludge, and that this will allow them to accommodate any incidents.

The energy of ... **Jouke**

'It's where you feel there's most energy that you'll be able to move ahead together. Sometimes there are materials in which we see a huge potential, but for which the participants lack enthusiasm; then it's difficult to get things off the ground. One project that attracts lots of energy and resolve is green gas. The key challenge facing every one of us is of course to consume less energy: what you don't use you don't need to produce. By extracting biogas, upgrading it into green gas and then feeding it into the existing gas network, the Water Authorities make a fine contribution to meeting gas demand. Some might say that it's only a drop in the bucket, but at the same time: every cubic meter we don't extract in Groningen or import from Russia is still one cubic meter!

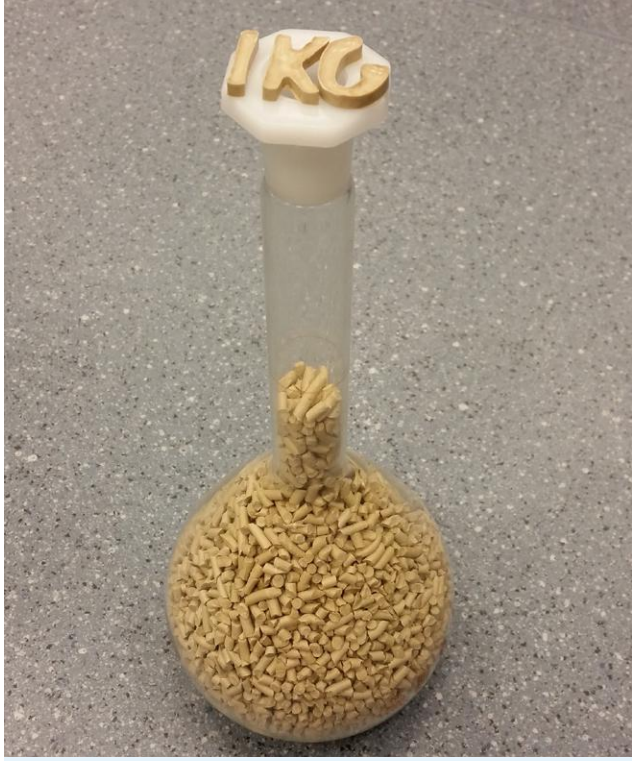
Jouke Boorsma, Project Manager /Business Developer, Energy and Materials Factory

Product and market development of Water Authority residuals

AquaMinerals began in 2019, under a commission from the EFGF, to work on the development of a new value chain for the residuals generated in wastewater treatment processes. We see that the path chosen for the product and market development aligns with the wishes of both parties. Together, we have made significant advances for the different residuals. What follows is a list of the progress made for a number of them.

- Important steps have been taken with the Hoogheemraadschap Stichtse Rijnlanden Water Authority for a plant to reprocess of fine screenings into **cellulose**. It is expected that the plant will be operational in 2023.
- Several Water Authorities have for a number of years been producing **struvite**, for which AquaMinerals developed a new disposal route in 2021. The application of struvite as a macronutrient in industrial treatment extends the disposal routes and thus increases stability. However, we also observe that, for a variety of reasons, in 2021 there was a decrease in struvite production volumes.
- AquaMinerals is actively engaged within the PHA2USE consortium in the market development for PHBV, and is providing advice about the end-waste framework. PHBV is a natural plastic substitute which is made from residuals. It shares many properties with plastics, but is unique in its greater degradability if it ends up in the environment (also in the water and the soil). Last year many important advances were made, and the first 18 kg of this plastic substitute was produced as a prelude to the demonstration project starting in 2022. The test material has been divided among large European market actors, for its further development in products, including biodegradable foams, plant plugs, fertiliser coatings, degradable agricultural plastics and horticultural clips. During the demonstration phase, we want in the consortium to develop supply agreements on a larger scale for an investment decision on the chain at the end of 2023.
- **Carbon dioxide (CO_2)** is a new residual stream for the Water Authorities. In 2021 the first plant producing liquid CO_2 began operating. The initial focus is on how the green CO_2 can be used in the water chain; this would constitute maximum circularity. While exploring other routes, we are favouring applications in which the CO_2 is captured in products, so as to create negative CO_2 emissions.
- An important material stream at the Water Authorities is **biogas**. Water Authorities have for decades used the biogas, which is released in the digestion of treatment sludge, for the cogeneration of heat and power by means of combined heat and power units (CHPs). In recent years there has been a clear movement away from the Water Authorities using the gas themselves, and towards supplying it directly to the gas network. In this manner, **green gas** can be used where it offers the greatest value, both financially and in terms of sustainability. In 2021, AquaMinerals initiated a new purchasing group within the EFGF for the development, evaluation and implementation of a new business case for green gas.
- In 2021 the emission price per tonne of CO_2 rose sharply. To keep companies from having to pay this charge alternative fuels are being sought. **Dried treatment sludge** offers a potential biofuel in this context. AquaMinerals explored this route in 2021 and encountered some interesting possibilities. These will be further researched in 2022.

ENERGIE EN Grondstoffen FABRIEK



End-of-waste status

In order to put residuals on the market they need to have an end-of-waste status. This is a challenge for practically all residuals. In 2021 a big effort was put into getting legal rulings for struvite and cellulose. For all the other materials that we see coming our way, we have launched a process with the Association of Water Authorities and the EFGF to facilitate the joint acquisition of an end-of-waste status. To achieve a 100% circular economy in 2050 it is essential that this obstacle be removed.

Expectations for 2022

Uncertainty due to geopolitical developments

At the end of February 2022, the world was shocked by the Russian invasion of Ukraine. First and foremost, this had and continues to have extremely sad consequences for the population, and has caused senseless destruction of buildings, infrastructure and, unfortunately, lives as well.
At the time of the war's outbreak there was already a great deal of uncertainty in the market, resulting for instance from rising inflation, personnel shortages and supply-chain disruptions. Much of this was a direct or indirect consequence of the pandemic which we were just getting out of. The war feeds this uncertainty: inflation is rising faster, we realise that the transport (particularly in Germany) relies on East-European drivers, and access to energy, certain raw materials, products and components is increasingly difficult. Uncertainty – especially when it is beyond one's control – is by definition bad news for the transition to a circular economy. Business cases become uncertain, delivery times and thus schedules become unreliable, and in unsettled times companies become more risk averse. All the more reason to move towards the circular economy.

High inflation

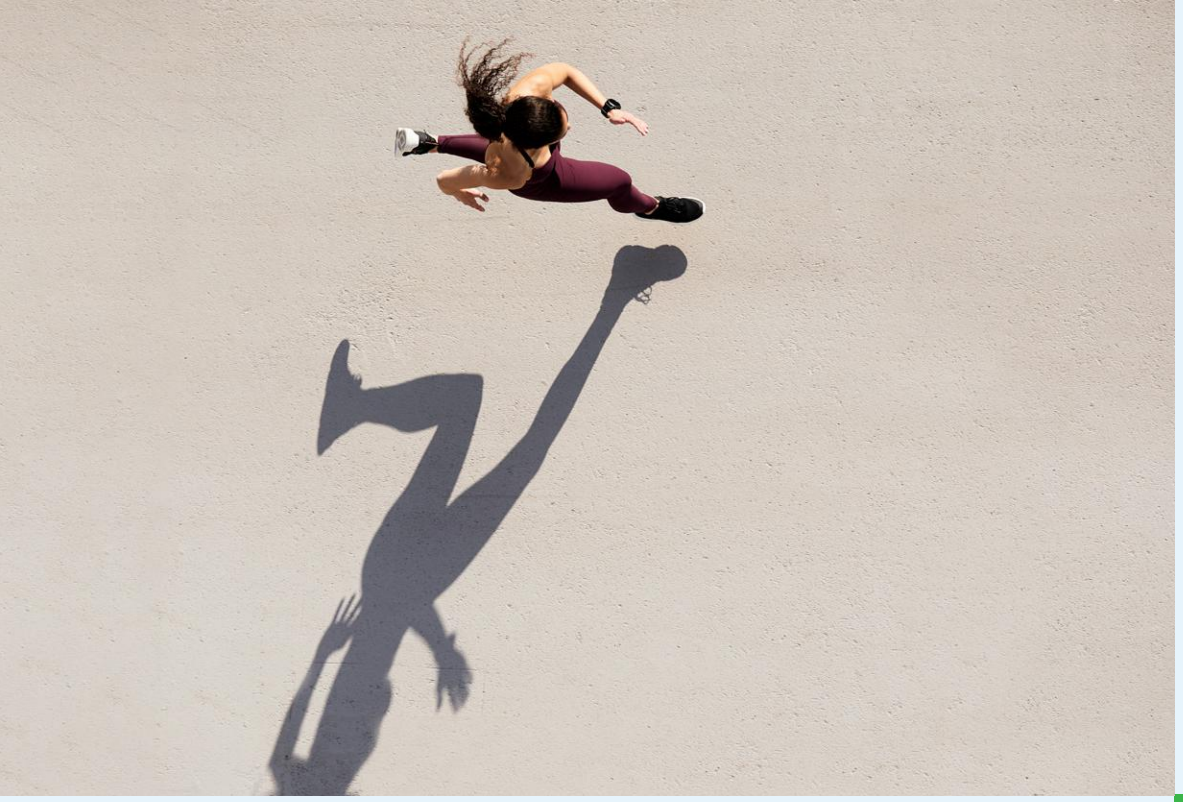
While annual inflation over the last few years has ranged roughly from 0 to 2%, as of August 2021 it began to rise significantly and surpassed 6% around the turn of the year 2021-2022. This was largely due to volatile prices of energy and food; some economists stated that the inflation would soon drop again. But then came the geopolitical tensions. AquaMinerals assumes that inflation will remain high for the time being; we see this reflected in the logistical and in contracting services in particular. Through a good mix of short- and long-term contracts we can cushion the impact somewhat. Moreover, the higher inflation allows AquaMinerals to stipulate higher sales prices for the residuals; we will deal with this matter cautiously.

Result of CO_2 pricing

AquaMinerals has since 2021 applied a fictive price of € 100 per tonne when developing (new) chains and procuring services. This has proved to be an extremely useful tool, which allows us to weigh the financial objectives against the environmental ones. This pricing opens up the possibility of other choices which – within the set standard – produce a smaller CO_2 impact. This means we not only reduce CO_2, but we also assist companies in the chain in making other, more sustainable, choices. We will continue to closely monitor the costs and benefits, and control whether this CO2 saving is actually realised.

Working with new software

AquaMinerals has grown considerably since 1995. Our software packages have accompanied this growth, while new activities have typically involved the acquisition of new packages. In 2020 a decision was made to significantly reduce the number of packages, and to reorganise our internal administrative processes. In 2021 the changes were gradually implemented and, starting in 2022, we switched over to AFAS for our financial administration. The financial processing of orders will therefore be faster, and with the new process we have complete control of the data streams, and thereby of the order status.



International collaboration

AquaMinerals will in the time ahead collaborate more with parties in foreign countries; this will always concern residuals in the public water sector and occur principally in North-West Europe. Through this collaboration we can gain better access to new technological developments, valorise our knowledge and position, and serve emerging markets with our participants' residuals. But it offers more than simply business-economic benefits; it also allows us to help other regions move towards the circular economy, notably in places where most residuals are still barely valorised at all.

Breakthrough in chains for challenging residuals

Over the last few years AquaMinerals has paid relatively great attention to the development of new chains for residuals for which applications were actually still far off. In many instances this involved a combination of challenges in the legal, technical and financial dimensions, in addition to the absence of a (mature) market. This concerns the smaller volumes from the drinking water companies which, in the past, simply attracted little interest, as well as the newly recovered residuals of the Water Authorities. In the period ahead, we expect these efforts to produce results, for instance, in the area of dried WWTP sludge, fine screenings and aluminium sludge.

Circularity gains in urgency

Our economy must become more circular – everybody agrees with that. Consumers are increasingly opting for more sustainable products and the national and European governments have set ambitious goals: 50% reduction in the use of primary raw materials in 2030, and complete circularity in 2050. But things are not moving fast enough, and pressure is increasing on companies and public authorities to take more control of this transition. High-impact global developments, like the climate problems, the pandemic and the war, have made the extent of our dependence on foreign sources for our raw materials – and thus of our vulnerability – even clearer. A more circularly organised economy – and in terms of our own sphere of influence: more circular chains – significantly reduces this dependence. This realisation will further strengthen the sense of urgency.

Governance, financial policy and risk management

Governance

According to the statutes of the AquaMinerals company, the most important powers are vested in the managing director and the Supervisory Board. The General Meeting of Shareholders (GMS) appoints the SB members upon the recommendation of the SB; the SB appoints the managing director.

The managing director leads the company, is responsible for achieving its objectives, the strategy and associated risk profile, the financial results and societal aspects. In this regard, the managing director is accountable to the SB in its role as supervisor, and to the GMS as the economic proprietors of the company. The managing director provides both entities, in a timely manner, with all information they need to exercise their tasks.

AquaMinerals is not obligated to implement the principles and best practice provisions of the Dutch Corporate Governance Code. Nonetheless, the levels of transparency and responsibility established by the Code fit seamlessly with our objectives and operational management. To reflect in more detail the principles of the Governance Code, in 2011 various regulations and statutes were implemented or adjusted and, in 2012, the treasury statute was added.

Financial policy

Treasury

In accordance with the treasury statute, the final dividend test has been instituted. On this basis, the management will assess whether the company, following a distribution made to the shareholders, is able to continue paying its due debts. On the basis of this assessment, a maximum amount of € 81,000 is deemed responsible. With this maximum amount, AquaMinerals remains within the financial standards it has set itself. Nevertheless, the decision was made, given the uncertain macro-economic situation, not to distribute any dividend for 2021, and to add the positive cash flow from business operations to savings. In 2021 AquaMinerals had not deposits or investments, nor did it lend any funds to third parties.

Liquidity risk

The quick ratio per 31 December 2021 was 1.6, compared to 1.3 in 2020, and thus remains above the standard target of 1.2. The solvency at the reporting date was 37%, that is, 14% higher than year-end 2020. The solvency ratio therefore meets the standard target of 30%. The average settlement period by clients dropped from 52 days in 2020 to 37 days in 2021. The average settlement period of AquaMinerals in 2021 was 34 days, a 9-day decrease compared to 2020 (43 days).

Shareholders' Equity Lower Limit

The Shareholders' Equity Lower Limit of AquaMinerals is set at one annual salary of full-time employees, with a minimum of € 100,000. Per 31 December 2021, this amounted to € 1,352,000. At the same time, shareholders' equity amounted to € 1,433,884.

Risk management

Risk management forms part of the AquaMinerals management model, and is discussed on a regular basis with the SB. We apply a risk-inventory system aimed at providing a clear, transparent and reproducible picture of priority risks. The following have been identified as the key risks for 2021:

Risk 1: Role and position of AquaMinerals insufficiently clear to shareholders/ stakeholders

The activities of AquaMinerals are an extension of its participants. The organisation has no interests in the chain nor profit motive, and can therefore operate in complete independence. In water practice, there is frequently a lack of clarity concerning which standard activities AquaMinerals carries out for the participants. In addition, AquaMinerals is sometimes seen – particularly at the Water Authorities – as a market player, with an individual, commercial interest. This situation is undesirable and makes for sub-optimal collaboration and information sharing. This is an important item in the Strategic and Operational Plan 2022-2024. To begin with, we are going to expressly draw our participants' attention to which standard services we perform, or can perform, for them.

We are going to focus on improving the communication and collaboration with the Water Authorities, so that they see AquaMinerals as an extension of themselves and not as a commercial enterprise. By including this matter in the strategic plan we can be assured that the risk is managed and receives specific attention.

Risk 2: Residuals for which no good destination has (yet) been found

AquaMinerals is presented with a multiplicity of residuals, and we have already found satisfactory destinations or applications for most of them. But for a number of materials this is more difficult, from the financing, image and/or sustainability perspective. There are various reasons for this, but it can over time result in the supplier losing patience or interest. We tackle this risk along two lines. First of all, we appoint internal 'owners' for specific residuals. This centralises the knowledge and allows for better monitoring of developments. While in the past the responsibilities were scattered (legal, sales, supply chain, etc.), now these owners can clearly set objectives and make arrangements. An identical approach applies to the attitude taken by the participants. They too have assigned internal responsibility. Together, we can ensure that the participant's pattern of expectation is managed, and that no (overly) large gap develops between expectations and real progress.

Risk 3: The production lags behind the development of new chains/residuals

AquaMinerals develops and improves chains for new and existing residuals, by means for example of new techniques, or by increasing the financial attractiveness, reliability or sustainability of existing chains. On occasion in recent years, parties during this process, and even after the chains had been set up, supplied no residuals, or a lot fewer residuals than had been agreed. This costs an unnecessarily large amount of money, time and energy. It can also cause damages to other stakeholders in the chain, who might respond by making claims. We have now taken action aimed at managing both the causes and consequences of volume shortfalls. Jointly with the participants, we have set out 'ground rules', like charging possible consequential costs to the account of the participant concerned. Furthermore, the new ICT system provides a far more updated picture of the situation, so that we can intervene more rapidly in case of any anomalies. At the same time, we are examining why certain volumes are affected by shortfalls (as is now the case for struvite), and we are learning from participants who do effectively achieve the targeted volumes. We have asked that more attention be paid to the timely and complete reporting of the anticipated transport volumes, and will remind the participants of the rights, obligations and agreements.

Supervisory Board

The Supervisory Board (SB) oversees, among other things, the policy of the managing director and provides the latter with advice. Its supervision also concerns the financial performance and developments, regulatory compliance and risk management.

Guïljo van Nuland,
SB chairperson since 1 January 2021

'Circularity and self-sufficiency are more urgent than ever. Non-committance is no longer an option. Here and now, at this juncture in time, it's all coming together: climate, geopolitics, energy and raw materials. Climate change is proceeding faster than the models predicted; addressing rising temperatures is becoming increasingly difficult. And the geopolitical situation demonstrates that we have to free ourselves of our dependence on Russia or other totalitarian countries. It is more than ever necessary to exploit local and circular opportunities; energy and raw materials are increasingly extensions of each other.
Being part of the work on circularity and self-sufficiency strongly appeals to me, and I was happy to take on the role of SB chairperson. AquaMinerals is a fine company, with a great, driven team, dedicated, and with short lines of communication. This is still possible at this scale. But the organisation's rapid growth requires that we, as the Supervisory Board, in close association with the participants, think about how best to guide the development towards greater volumes and levels of resilience. Looking across the national borders can offer a complement, whenever it is effective from an environmental and economic perspective. The rate at which the Water Authorities are joining up, adds new energy. Both literally and figuratively. The question is no longer whether becoming a shareholder is a permanent move for a Water Authority, but how soon all the Water Authorities will become members. Besides growth, this extension brings with it more vision and broader scope on secondary raw materials that can become primary raw materials. Different products, different questions. This we could not have imagined three years ago. As the water sector – drinking water companies and Water Authorities – we are connected to each other; we can no longer operate in a fragmented manner. AquaMinerals is one of the instruments for closing the water cycle.'

Activities of the SB in 2021

The Supervisory Board met on four regular occasions in 2021 and, among others, addressed the following items:

- monitoring the results of the company in light of the budget and the Business Plan 2019-2021;
- accession of Waterschap Zuiderzeeland to AquaMinerals;
- determination and monitoring of actions related to priority risks;
- determination of the 2020 annual figures and profit appropriation that year;
- budget and annual plan for 2022;
- periodic self-evaluation;
- assessment of the new earnings model introduced in 2019;
- prioritisation of the strategic subjects and adoption of the Strategic and Operational Plan 2022-2024;
- the organisational development in relation to the growth in volume, turnover and activities.

In addition, the SB members were involved on an ad hoc basis in a number of issues and meetings.

Activities of the GMS in 2021

The General Meeting of Shareholder was held twice in 2021, and took the following decisions:

- approval of the Annual Report and Financial Statements for 2020;
- discharge of the managing director and his management and members of the SB for their supervision during fiscal year 2020;
- the profit appropriation for 2020;
- approval of the accession of Waterschap Zuiderzeeland to AquaMinerals, and the issuance of new shares in the name of this new participant;
- participation in workshop about strategic issues 2022-2024;
- ratification of Strategic and Operational Plan 2022-2024;
- approval of annual plan and budget tor 2022.

Composition of the Supervisory Board on 31 December 2021

Name	Profile	Appointed	Reappointed	Resigned	Functions and other positions
Mr G.J. van Nuland (1956), Chairperson	Managerial	1 January 2021	(possible) 1 January 2025		Chairperson SB, VB Groep (Building and Project Development); Chairperson SB, Stichting Neos (Healthcare); Chairperson SB, Rabobank 's-Hertogenbosch e.o.; Advisor of the Nationaal Register; Member, Advisory Council, Gubbels BV (Infra); Treasurer, Central Administration, Brabants Landschap.

Mr J.E. Janssen (1969), Vice-Chairperson	Legal	1 July 2016	1 July 2019	1 July 2023	Lawyer/Partner Stek Advocaten.

Ms M. Demmers (1967), member	Business and innovation	1 January 2017	1 January 2020	1 January 2024	Director, Stichting Natuur en Milieu; SB, FMO; SB, DRIFT; Executive, SKAO; SB, Stichting Sustainable Industry Lab (SIL, UU); Strategic Advisory Council, TNO SA&P; Sustainable Pension Investments Lab (SPIL, UU); Sustainability Advisory Board, Van Oord; Advisory Council, Environmental Sciences Group (ESG, WUR).

Ms J. Spoeltman (1969), member	Financial	15 March 2019	(possible) 15 March 2023		Director, Grootzakelijk, Rabobank Kring Midden-Brabant; Member SB, Stichting De Nieuwe Arbeid Noord-Oost Brabant.

Financial Statements

Explanatory notes on the Financial Statements

Principles of evaluation

General
AquaMinerals B.V. (with its registered office in Rijswijk ZH, Chamber of Commerce number 30130247) is domiciled at Nieuwegein, Groningenhaven 7, 3433 PE.
The company's most important activity is relieving the drinking water companies and the Water Authorities of the residuals generated by the production of drinking water and the treatment of domestic wastewater.
The company has prepared its financial statements in accordance with the legal provisions of Title 9, Book 2 of the Dutch Civil Code.

Comparative figures
The comparative figures are only restated for comparative purposes. This concerns netting of receivables and payable items, which have been offset against each other.

Intangible fixed assets
The intangible fixed assets are valued at acquisition prices minus depreciation.
The depreciation period is 5 years.

Tangible fixed assets
The tangible fixed assets are valued at acquisition prices and depreciated straight-line on the basis of the expected operating life of the asset concerned.
The rate of depreciation applied is 20%.

Cash and cash equivalents
The cash and cash equivalents are valued at nominal value.
Unless otherwise indicated, these are freely available.

Other assets and liabilities
These are valued at nominal value.

Receivables
Receivables are stated initially at real value, including transaction expenses, and subsequently stated at the amortised cost price, less provisions for uncollectable debts.
The initially stated real value and the amortised cost price are equal to the nominal value, unless there is a question, in the initially stated value, of transaction expenses, premiums, or discounts, and other disparities between the real value and the nominal value.

Principles for the determination of the result

Earnings, expenses and interest are attributed to the period with which they are associated.
The earnings concern the passed-on disposal expenses plus the realised earnings (positive and negative) from clients and consulting services provided.
The direct disposal expenses concern outlays for extraction, transport, storage and analysis.

Pension expenses
The pension obligations towards employees fall under an industry pension fund. Payable pension contributions are incorporated into the profit and loss account in the year with which they are associated. Furthermore, an assessment is made as to whether, besides the premium, the employer has any other obligations related to the performance or insurance agreements, or to commitments to employees. In the event, a provision will be created. If the term of these obligations stretches over several years, the provision will be valued at cash value, calculated using an interest rate based on the average interest earned on high-grade corporate bonds.
Liabilities (other than premium settlements) related to the performance or insurance agreement, such as profit sharing and restitutions following a decision of the pension fund, will be included in the balance sheet only if their receipt is irrevocably established.
The coverage ratio of the pension fund (ABP), per 31 December 2021, was 110.2% (2020 93.2%).
The recovery plan aims to achieve a coverage ratio of 126.6 % at the end of 2029. This will not require taking any drastic recovery measures.

Corporate tax
Taxes are calculated based on prevailing rates on the pre-tax result, according to the profit and loss account, taking into consideration the permanent differences between the fiscal profit calculation and the profit calculation according to the annual financial statements.

Continuity assumption
The manager has drafted an explanatory note concerning the assumption of continuity, which is available upon request. On the basis of the company's solid shareholders' equity, as well as the financial agreements with participants and clients, the activities and associated obligations of the organisation are assured for a period of at least 12 months. Accordingly, the financial statements are drawn up on the basis of continuity.

Balance sheet per 31 December 2021

(after profit appropriations following recommendations)

	31-dec-2021	31-dec-2020
	€	€
ASSETS		
Fixed assets		
Intangible fixed assets	16,146	21,528
Tangible fixed assets	50,088	65,808
Current assets		
Receivables and accrued income	2,108,598	3,550,856
Cash and cash equivalents	1,685,398	1,326,261
	3,860,230	4,964,452
LIABILITIES		
Shareholders' equity		
Issued and paid-up capital	593,138	559,649
Share discount	11,923-	11,923-
Share premium	147,404	108,258
Legal reserves	-	-
Other reserves	705,265	659,604
	1,433,884	1,315,588
Current liabilities		
Current liabilities and accrued liabilities	2,426,346	3,648,864
	3,860,230	4,964,452

Profit and loss account for 2021

	2021	2020
	€	€
Earnings		
Turnover residuals	16,967,453	15,518,897
Consulting	311,451	274,027
	17,278,904	15,792,924
Shareholders' annual contribution	1,753,916	1,670,361
Total earnings	19,032,820	17,463,285
Operating expenses		
Direct disposal expenses	6,494,126	6,072,222
Acceptance expenses	6,786,926	5,991,862
Distributed earnings	3,325,174	3,192,830
	16,606,226	15,256,914
Gross turnover result	2,426,594	2,206,372
Operating expenses		
Personnel	1,518,920	1,461,964
Depreciation	22,021	29,057
Costs of sales and PR	122,769	153,880
Research and consulting costs	254,382	219,633
Premises	82,212	75,759
Other operating expenses	367,881	243,869
	2,368,185	2,184,162
Total expenses	18,974,411	17,441,076
Operating result	58,409	22,210
Interest income/expenses	3,861-	3,300-
Pre-tax result	54,548	18,910
Corporate tax	8,887	2,033
Result	45,661	16,877

Explanatory notes on the balance sheet

	31-dec-2021	31-dec-2020
	€	€
ASSETS		
Fixed assets		
Intangible fixed assets		
Book value per 1 January	21,528	37,152
Plus/Minus: investment/divestment		242-
	21,528	36,910
Minus: depreciation fiscal year	5,382	15,382
Book value per 31 December	16,146	21,528
Tangible fixed assets		
Inventory		
Book value per 1 January	65,808	39,153
Plus: investments	919	40,329
	66,727	79,482
Minus: depreciation fiscal year	16,639	13,675
Book value per 31 December	50,088	65,808
Total depreciation	33,493	30,388
Decommissioned assets	13,534-	-
Cumulative depreciation	19,959	30,388

	31-dec-2021	31-dec-2020
Current assets	€	€
Receivables and accrued income		
Receivables	1,847,249	3,345,533
Tax receivables	49,258	-
Other receivables	60,000	-
Provision other receivables	60,000-	-
Accrued income	212,091	205,323
	2,108,598	3,550,856
Receivables		
Nominal value	1,847,249	3,345,533

The receivables are due in less than one year.
Under the receivables position per 31-12 2021, there are receivables from other legal entities and companies that participate in the legal entity or within which the legal entity has a participation of € 1,057,733.

Other receivables
Recognised judicial claim for legal expenses incurred of € 60,000 is provided for prudentially.

Accrued income		
Earnings yet to be received	824	50,244
Pre-paid contract costs	34,894	8,055
Pre-netted earnings on stocks	176,373	147,023
	212,091	205,323

Per 31 December 2021 several storage depots held shareholders' stocks of lime pellets and aquafer.
The stock value is equal to the pre-calculated earnings on the stocks.

Cash and cash equivalent		
Rabobank current account	984,815	723,669
Rabobank savings account	100,000	-
ING payment account	500,583	355,349
ING savings account	100,000	247,243
	1,685,398	1,326,261

LIABILITIES	31-dec-2021	31-dec-2020
	€	€
Shareholders' equity		
Issued and paid-up capital Drinking Water Companies		
Status per 1 January (issued)	475,201	475,201
Share issue*		
Status per 31 December (issued)	475,201	475,201
Issued and paid-up capital Water Authorities		
Status per 1 January (issued)	84,448	84,448
Share issue*	33,489	
Status per 31 December (issued)	117,937	84,448
The authorised share capital amounts to € 910,000, divided into 20,000 shares of a nominal value of € 45.50. Of this amount € 593,138.30 is paid up.		
Share premium		
Status per 1 January	108,258	108,258
Change during fiscal year	39,146	-
Status per 31 December	147,404	108,258
Share discount		
This item arose through the same of 568 shares with a discount of € 21.00 per share.	11,923	11,923
Legal reserves		
Research and development reserve		
Acquisition value	-	50,000
Addition to the reserve	-	-
Withdrawal from the reserve	-	50,000-
Status per 31 December	-	-
Other reserves		
Status per 1 January	659,604	632,727
Sale of own shares	-	-
Change of allocation of legal reserve R&D	-	10,000
Plus: profit allocation	45,661	16,877
Status per 31 December	705,265	659,604
Current liabilities		
Current liabilities and accrued liabilities		
Payables	1,344,719	2,182,840
Taxes and national insurance contributions	483,688	603,087
Other debt and accrued liabilities	597,939	862,938
	2,426,346	3,648,864
Under the payables position per 31-12-2021, there are payables to other legal entities and companies that have a participation in the legal entity of € 53,994.		
Taxes and national insurance contributions		
Value added tax	483,689	536,857
Corporate tax	-	17,643-
Pension contributions	-	-
Payroll tax and national insurance contributions	-	83,873
	483,689	603,087
Other debt and accrued liabilities		
Accrued expenses	130,627	142,667
Earnings yet to be settled	106,250	391,315
Revenues received in advance on depots	45,253	39,228
Received in advance in connection with future REACH	19,751	19,751
registration	153,601	152,817
Received in advance for R&D projects	36,943	33,558
Holidays	24,526	20,219
Holiday pay reserve	80,988	63,383
Collective Labour Agreement obligations	597,939	862,938

Off-balance-sheet items

AquaMinerals has signed a rental contract for its premises through to 30 June 2022, and contracts for lease cars, the last of which runs until September 2025.
The lease and rental obligations for 2022 amount to € 71,765.
In 2021 a Flemish digesting company gave AquaMinerals a notice of default for the delivery of aquafer that did not comply with the current legal requirements.

The Flemish government, after the conduct of multiple sampling and analyses, then declared that the aquafer does comply with the requirements and may be delivered.
To date, the digesting company has not withdrawn its notice of default, nor has it made known what damage it has incurred as a result.
It is the assessment of AquaMinerals B.V. that this will not lead to a cash outflow.

Explanatory notes on the profit and loss account

	2021	2020
	€	€
Earnings		
Turnover residuals		
Settled disposal/acceptance expenses shareholders	12,623,621	10,532,669
Settle disposal expenses non-shareholders	628,000	1,240,379
Earnings (post)sale residuals shareholders	3,704,595	3,510,064
Earnings (post)sale residuals non-shareholders	11,237	235,785
	16,967,453	15,518,897
Consulting		
Consulting for shareholders	77,369	50,931
Consulting for non-shareholders	234,082	223,096
	311,451	274,027
Total earnings	17,278,904	15,792,924
Direct disposal and acceptance expenses	13,281,052	12,064,083
Turnover of non-shareholders of AquaMinerals B.V.	873,319	1,699,260
Idem in percentage	5.1%	10.8%

	2021	2020
	€	€
Operating expenses		
Personnel		
Direct salary expenses	1,046,551	935,339
National insurance contributions	186,728	175,831
Pension contributions	161,102	137,872
Indirect salary expenses	51,858	45,643
Short-term staff	85,581	197,769
Sick-leave allowance	12,900-	30,490-
	1,518,920	1,461,964
Staff		
In 2021 there was an average of 16 staff members, whom all were permanent staff.		
Cost of sales		
Travel and accommodation costs	75,250	72,485
Contributions	0	5,208
PR	47,519	76,186
	122,769	153,880
Research and Consulting costs	254,382	219,633

Other information

Statutory profit appropriation

Article 28 of the company statutes establishes the following provisions regarding the profit appropriation:

1. The General Meeting of Shareholders has the right to designate the profit appropriation established in the Financial Statements, and to make dividend distributions to the extent that the shareholders' equity exceeds the reserves that need to be maintained in accordance with the law.
   In the event of a distribution, the amount distributed for each share shall be calculated according to relation of the nominal amount of the share concerned to the amount of the issued capital.
2. A decision to make a distribution has no effect as long as management has not given its approval.
   The management can refuse approval only if it knows, or can reasonably expect, that the company, following the distribution, will not be able to meet the payments on its outstanding debts.
3. In the calculation of each distribution, no account shall be taken of shares or certificates held by the company nor shares and certificates held by the company in usufruct.
4. The General Meeting of Shareholders may decide to make interim distributions, provided they respect the provisions of items 1 and 2 of the present article. A decision to issue an interim dividend from the earnings during the current fiscal year may also be made by the management.
5. The General Meeting of Shareholders may decide that dividends shall be paid, in part or in whole, in a form other than cash.

Appropriation of 2021 result

In anticipation of the decision to be taken in this regard by the General Meeting of Shareholders, the 2021 result has been added to other reserves. This decision, which has yet to be taken, has already been incorporated into the 2021 financial statements.

Auditor's report

MOORE MTH

INDEPENDENT AUDITOR'S REPORT

To the shareholders of AquaMinerals B.V.

A. Report on the audit of the financial statements 2021 included in the annual report

Our opinion
We have audited the financial statements 2021 of AquaMinerals B.V. based in Nieuwegein.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of AquaMinerals B.V. as at 31 December 2021 and of its result for 2021 in accordance with Part 9 of Book 2 of the Dutch Civil Code.

The financial statements comprise:

1. the balance sheet as at 31 December 2021;
2. the profit and loss account for 2021; and
3. the notes comprising a summary of the accounting policies and other explanatory information.

Basis for our opinion
We conducted our audit in accordance with Dutch law, including the Dutch Standards on Auditing. Our responsibilities under those standards are further described in the 'Our responsibilities for the audit of the financial statements' section of our report.

We are independent of AquaMinerals B.V.in accordance with the Verordening inzake de onafhankelijkheid van accountants bij assurance-opdrachten (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence) and other relevant independence regulations in the Netherlands. Furthermore we have complied with the Verordening gedrags- en beroepsregels accountants (VGBA, Dutch Code of Ethics).

We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

B. Report on the other information included in the annual report
In addition to the financial statements and our auditor's report thereon, the annual report contains other information that consists of:

- the management report;
- other information as required by Part 9 of Book 2 of the Dutch Civil Code.

Based on the following procedures performed, we conclude that the other information:

- is consistent with the financial statements and does not contain material misstatements;
- contains the information as required by Part 9 of Book 2 of the Dutch Civil Code.

MOORE MTH

We have read the other information. Based on our knowledge and understanding obtained through our audit of the financial statements or otherwise, we have considered whether the other information contains material misstatements.

By performing these procedures, we comply with the requirements of Part 9 of Book 2 of the Dutch Civil Code and the Dutch Standard 720. The scope of the procedures performed is substantially less than the scope of those performed in our audit of the financial statements.

Management is responsible for the preparation of the management report in accordance with Part 9 of Book 2 of the Dutch Civil Code and other information as required by Part 9 of Book 2 of the Dutch Civil Code.

C. Description of responsibilities regarding the financial statements

Responsibilities of management ans supervisory board for the financial statements
Management is responsible for the preparation and fair presentation of the financial statements in accordance with the accounting policies selected and disclosed by the entity, as set out in note Principles of financial reporting to the financial statements. Furthermore, management is responsible for such internal control as management determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

As part of the preparation of the financial statements, management is responsible for assessing the company's ability to continue as a going concern. Based on the financial reporting framework mentioned, management should prepare the financial statements using the going concern basis of accounting, unless management either intends to liquidate the company or to cease operations, or has no realistic alternative but to do so.

Management should disclose events and circumstances that may cast significant doubt on the company's ability to continue as a going concern in the financial statements.

The supervisory board is responsible for overseeing the company's financial reporting process.

Our responsibilities for the audit of the financial statements
Our objective is to plan and perform the audit engagement in a manner that allows us to obtain sufficient and appropriate audit evidence for our opinion.

Our audit has been performed with a high, but not absolute, level of assurance, which means we may not detect all material errors and fraud during our audit.

Relaties bouwen
Waarde creëren

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements. The materiality affects the nature, timing and extent of our audit procedures and the evaluation of the effect of identified misstatements on our opinion.

We have exercised professional judgement and have maintained professional scepticism throughout the audit, in accordance with Dutch Standards on Auditing, ethical requirements and independence requirements. Our audit included among others:

- identifying and assessing the risks of material misstatement of the financial statements, whether due to fraud
  or error, designing and performing audit procedures responsive to those risks, and obtaining audit evidence
  that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion,
  forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtaining an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control;
- evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management;
- concluding on the appropriateness of management's use of the going concern basis of accounting, and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause a company to cease to continue as a going concern.
- evaluating the overall presentation, structure and content of the financial statements, including the disclosures; and
- evaluating whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the supervisory board the planned scope and timing of the audit and significant audit findings, including any significant findings in internal control that we identify during our audit.

We provide the supervisory board with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

Lelystad, 17 June 2022
Moore MTH B.V.

Was signed

drs. B.M. Tinge RA

aqua minerals

Colophon

Publication
AquaMinerals B.V.
Groningenhaven 7
Postbus 1072
3430 BB Nieuwegein
Tel: 030 – 60 69 721
website: www.aquaminerals.com
email: info@aquaminerals.com

Entered in the Commercial Register of the Chamber of Commerce in Utrecht under number 30130247

Editing, design and production
Skrebbel Communicatie, Chantal Wuijster, Rosmalen
Melding ontwerp enzo, Oisterwijk

Photography
FMD.works, Dirk van Straaten / Iris Wuijster Fotografie / Own photos of participants, clients and suppliers

Printing
CS Grafimedia, Schijndel

June 2022

www.aquaminerals.com