Annual Report 2022

TRANSFORMATION
A LEARNING PROCESS

AVR.

Rob de Fluiter Balledux, CFO, and Yves Luca, CEO

Transformation - a learning process

Yves Luca & Rob de Fluiter Balledux

In short, 2022 was a turbulent year with many uncertainties for AVR but the energy shortage on the other hand turned out to be a positive factor. CEO Yves Luca and CFO Rob de Fluiter Balledux put the good results into perspective and take the social and political developments into consideration.

How did AVR do in 2022?

Yves: "The financial result is positive. We started the year well already. The economy took an upswing after the corona pandemic, waste volumes were good, there was stability and then came Russia's invasion of Ukraine, an awful event with major consequences, for our industry too. In the first instance, energy prices rose sharply after the invasion. Since one of the things we do with processing waste is produce and sell electricity, the higher energy prices led to a rise in our turnover. That determined our result to a large extent. We may have hedged 80% of the electricity sales to ensure stability in the long run, but the result is that we profited from the remaining 20%. Naturally, that would have been much more if we had hedged less. But we're doing this for multiple years in advance so there was absolutely no excess profit in 2022. Since part of the energy we produce is sustainable, for some of out installations we received subsidies, which are dependent on the energy prices, in past years. Those subsidies have dropped to zero for the first time in the history of our company, thanks to those high energy prices. We thought long and hard about the consequences of those high energy prices, because they don't offer any security for the future. And in the second half of the year, we saw sectors pulling out due to those energy prices, and that impacts the waste volumes. At the same

time, products we use such as the chemicals for our flue gas cleaning, have become scarce and very expensive. There's no steady line in the economy and we're seeing that.'

Rob: 'That certainly characterises the year as far as the results are concerned. We're also seeing that the employment market is tilting. There are more redundancies and fewer young applicants, so there too, we're seeing shortages. People find a new employer more easily; turnover in the Netherlands is at an average of 20%. In our company, it's between 10% and 15%. It takes more effort to find qualified people and vacancies stay unfilled longer. You would like to fill them quickly but not at the expense of the quality. In the meantime, colleagues have to make an extra effort. And if that goes on for too long, work pressure becomes too high. We're looking into how we can retain our people longer, for example with internal training opportunities, so that they can develop here at AVR. And as a modern employer, we facilitate hybrid working where possible, because outside the installations work pressure is increasing too. In addition, we try to stay connected with our people in the workplace so we understand better what the issues are.'

Are you alluding to the Connection Project?

Yves: 'Yes. We started it up after the outcome of the employee satisfaction survey in 2021, the ESS. That showed that there was too much distance between the various echelons of the organisation. With the Connection Project, the board holds three live communication sessions with employees twice a year. We record those sessions and put them on the Intranet. We prepare for them with colleagues from the operation and staff departments, who invite their colleagues to submit topics. Operational management has also started holding communication sessions with the operational departments. People have become more individualistic; in all of society and consequently here too. The ESS showed that our people are hugely proud of AVR but that the collaboration between and within departments and levels of the organisation could be much better. We also organise Connection Days, which are all about understanding, listening and reply. And about personally taking responsibility. Pointing the finger at management is easy, but looking for yourself to see what you can change is harder. A process like that can't be completed in a year, so the Connection Project will run for three years.'

Rob: 'It actually starts with the question: what does connection entail? It's about listening, showing interest and looking for ways of helping each other. But also about calling people to account if something doesn't go well. We're now looking into how we can tackle that together in practice.'

Yves: 'During one communication session, the question was asked: "Do you, the directors, know what the concerns are at workplace level?". The impression is that the board is alienated from the workplace. As a director, it's important to stay in touch with the workplace and to be up to date with developments there. Even though it's impossible to see and know everything, I do find it important to go round regularly and communicate with our employees. Recently, for example, I heard that someone had used a clean forklift truck and put it away dirty afterwards, somewhere else. The question was: "Why don't you people do something about that?" The employees elevate their problem to a general one that we, on the board, should know about and resolve. And now that we understand this better, I realise that we have to fathom the structures and responsibilities more thoroughly. And the main one is "ownership". Once we have

set that up properly, there will automatically be more connection between the echelons.'

Have any other topics from the ESS been tackled?

Rob: 'Yes. The ESS revealed there was a sense of inequality between divisions. Employees in Rozenburg received a "Botlek allowance" but in Duiven they didn't. There used to be a legitimate reason for that, because Rozenburg was a more expensive living environment and we wanted to align it with that of Duiven. But that situation no longer exists. So we have now introduced that allowance in Duiven too, cancelling a wage inequality. Our HR team did a good job recognising that. We also realised that as a company, AVR profits from the high energy prices but that the opposite is true of our employees who are finding it difficult to heat their houses. So in November and again in January, we gave everyone a net bonus of 1,000 euros.'

Yves: 'There are more concerns. One element of Connection is workplace safety. The number of incidents is increasing. That can be explained: the older employees are retiring, and younger, less experienced ones are taking their places. That causes stress, because less experience can lead to more accidents. It is a development that is concerning to suppliers and contractors too. We need to make proper arrangements. And we need them for that, it's not something we can do alone. We've called in external help for this. And within AVR, we're starting a safety culture programme to reduce the number of incidents and accidents.'

How will the energy prices affect AVR in the long term?

Yves: 'We see our advantage from the increased energy prices reflected in a wave of inflation. And that worries us. Our costs are rising. What will happen to them if the energy prices fall? All European governments were entering into gas contracts, so those prices peaked. They're falling slightly now, but the costs continue to rise. That will reflect in the wages but they are subsequently never adjusted downwards. The question is whether there will be deflation.'

Can you tell us a bit more about the achievements in 2022?

Rob: 'We're very happy with the good result and everyone contributed to that. As we said, the rising energy prices were a help to us but if we zoom in a bit further, we see that we can also be satisfied with the achievements of our large Energy from Waste installations, the EfW. On the other hand, there was quite a lot of unscheduled maintenance of the smaller installations that support our core business: the post-separation installation, the CO_2 capture installation and the water plant. The feedstock for both our biomass power plants slowed, partly because the high energy prices caused an increase in demand for biomass. And part of the paper industry came to a halt due to the energy prices which meant that we didn't get any pulp, the biomass we convert into energy in Duiven.'

Yves: 'There is now an overcapacity for biomass. There are more and more plants but people don't realise that volumes are limited. We're going to see price increases there too.'

Were there any striking occurrences?

Yves: 'Certainly. We got an unpleasant surprise in September when a large amount of mercury was found in the waste collected. It was revealed during the water purification. We tried to restrict the consequences for people and environment to a minimum. We reported it and checked with suppliers, to no avail. Obviously, we're doing our very best to prevent such a thing happening again, because that's our concern. In our EfW installaties we incinerate 1,700,000 tonnes of waste and even a large amount of mercury is, due to the high specific gravity, like a needle in a haystack in trucks that are each bringing in 24 tonnes of waste. We managed to capture 99% of the mercury and that was a costly procedure. We had to purify the installations. There was only a small emission into the water, with low impact. But it's very worrying. Nothing escaped into the air, but employees could inhale fumes through water too. The risk of exposure caused a great deal of unrest in the employees, but we offered a medical examination to everyone who had been at risk and thankfully, no harmful effects were discerned. We are in open discussions about the incident with our staff and the competent authorities. We learned a lot from it and are looking into what is in our power to counter it.'

What's the situation with the acquisition of AEB?

Yves: 'In December 2021, we signed the acquisition contract and the ACM (the Dutch market regulator) is investigating whether that will lead to us having too great a concentration, forming a threat to the market. We've been the economic owner since July 2021, but we're not allowed to manage the company. The ACM keeps coming back with new questions and the timer on the decision period is stopped. That creates huge uncertainty, on many fronts, such as for our investments. But above all, it's tough on the people of AEB, who have big concerns. Their future is in our hands, or it isn't. The stress it's causing those employees is the worst thing as far as I'm concerned. And the wait is difficult for colleagues too. They've worked really hard on preparations for the integration; IT, finance, purchasing, HR, commerce and energy, for example. Now that there's no progress, they're rather running out of steam.'

Rob: 'We also have a dilemma with AEB, because we're entering a market of overcapacity. We supplement our own capacity with import flows, but that will become more difficult, partly due to the import levy. AEB has overcapacity, but we're keen to acquire the company so that we can work more professionally on a larger scale. We'll be able to invest better in development and systems, and in people, and be more flexible with maintenance stops. So acquisition is still a good idea. We hope to get a decision soon.'

Yves: 'There's another factor in the light of overcapacity, and that is that we're fighting for a level playing field for private and public companies. They're supposed to all have the same rights and responsibilities, but the tendering rules are not applied in the case of government-owned incineration installations. According to those rules, public companies may not carry out more than 20% of their activities in the commercial field and we are of the opinion that they exceed that percentage. The municipality owns the incineration capacity and is automatically allocated the waste volumes, meaning they don't have to import any waste. And there's a levy on that import for us. We are taking legal action due to those inequalities.'

How do you feel going into 2023?

Rob: 'The high energy prices are still working to the advantage of our turnover, but we're keeping a close eye on the development of the inflation and the upward pressure that puts on our costs. We still believe in our strategy, on which we know we can build. The contact with the employees is still a point of focus for us. We're putting a lot of effort into it and we hope it will pay off soon. We're very grateful to our employees for their ongoing commitment in this turbulent year and we count on them to be there for AVR again in 2023.'

Transformation - a learning process

We want the title of our Annual Statement to express the fact that despite a long track record in the separation and processing of waste and the production of sustainable energy, AVR is still a learning organisation. We learn from each other, from our contact with clients and suppliers and from the interaction with various regulating bodies and other government agencies. We also learn from societal and geopolitical developments and the effects of those developments on our company, such as the war in Ukraine, the shortages in the employment markets and the implementation of legislation. That all contributes to our transformation as a company. The transformation is gradual, with trial and error and with uncertainty. The ultimate goal is unknown but what is clear, above all, is that with everything we do, we are determined to get AVR ready for the future.

Number of employees
(FTEs)

+ 5

464

2021: 459

Safety
(IF rate)

+ 1.7

3.3

2021: 1.6

Sick leave
(percentage)

+ 0.6

5.6

2021: 5.0

EBITDA
(€ mln)

+ 12.1

150.8

2021: 138.7

Net result
(€ mln)

+ 3.7

46.3

2021: 42.6

Quantity of waste processed
(kton)

– 157

Household waste	724
Commercial waste	564
Hazardous waste	119
Imported waste	227
Subtotal residual waste for energy plant	**1,652**
Biomass: waste wood	116
Biomass: paper pulp	142
Wastewater	199
Total residual waste processed	**2,109**

2,109

2021: 2,266

Total energy output
(Petajoules)

– 0.6

7.8

2021: 8.4

Converted into household equivalents to whom we supply energy
(number of households)

+ 1000

159,000

2021: 158,000

CO_2 emission
(kton)

– 140

2,223

2021: 2,363

Visit to AVR

January - December

Our installations attract the attention of interested parties. We give guided tours of our grounds no fewer than 50 times, to companies, universities, secondary schools and others. We also have government officials visiting and we talk with members of parliament and the ministers of environmental and economic matters.

Connection Project

January - December

There are signals emerging from various echelons in the company that the communication in and between teams, and between levels and functional work environments could be better. So we are initiating the multi-annual Connection Project. We hold connection sessions in which employees from various parts of AVR meet up to discuss an issue or practical situation. Our aim is to change patterns in our culture - that intangible thing that characterises every company - and to find a good balance between working result-oriented and people-oriented. In order to break down patterns, we must have new experiences. And we do that in the Connection Project, which will run for three years.

Debottleneck: removing sticking points

January - December

Our Energy from Waste installation in Rozenburg was built in the 1970s and has been expanded and modified since then to meet changing demands. But the unbalanced composition of waste, the tighter guidelines for compliance and the stricter hygiene standards require modernisation. A study in 2020 revealed sticking points that we aim to resolve over several years. Examples of this are the improvement of the pre-treatment of the residual waste, the transport system of bottom ash and the flue gas cleaning. Once the modifications we intend to make have been completed, the installation will be able to operate safely, steadily and efficiently for at least another 30 years.

ISO 50001 certification

28 March

AVR is switching from the CO_2 Performance Ladder to the ISO 50001 quality management system. It will allow us to better monitor and maintain our energy management. Audits require conclusive substantiation for all goals and measurements and that means that we have to continually focus on those aspects. We expect to be able to improve our energy efficiency by 20% by 2030, thanks to all ideas, initiatives and projects. At the same time, we will be improving our operational excellence. These are two of AVR's strategic goals.

SDE++ subsidy granted

23 May

We receive word that we have been granted an SDE subsidy with which we can build a second, larger CO_2 capture installation. It can be in operation by 2025 and capture around 60,000 tonnes of CO_2 to be supplied to the greenhouse horticultural sector.

Open Day in Duiven: an unbelievable 1300 visitors!

17 September

On Saturday 17 September, for the first time in a long while, we are able to open our doors again to the general public. To the accompaniment of live music, we receive more than 1300 visitors at our Duiven location. They follow a route across the grounds, past the bunker, the control room, the ovens, the turbines and the CO_2 capture installation. At each point on the route, colleagues are waiting to explain the wide-ranging processes. The day will be a success.

Approval process regarding acquisition AEB

27 May

We are submitting a licence application to the ACM (the Dutch market regulator) for the acquisition of the Amsterdam company AEB. This heralds the start of the second phase of the approval process. We're hoping for a speedy process but the ACM needs more time and asks supplementary questions of AVR and AEB. At the end of 2022, there is still no decision. Although our patience is being tested, we continue to believe in a positive outcome.

AVR and WasteCraft at Dutch Design Week

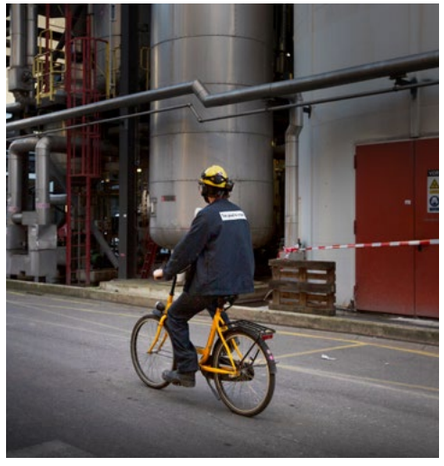
22-30 October

AVR has waste, children have ideas and WasteCraft turns that into something great. That's at the heart of a unique collaboration between AVR, the Petje af Foundation and WasteCraft - the latter are two good causes that we sponsor with our Perfect Days (see 15 December). We join forces with WasteCraft to make original design from valuable raw materials from separated municipal waste. By involving the Petje af Foundation too, we are raising awareness in children about the issues and opportunities in the circular industry. We launch the project at Dutch Design Week 2022 in Eindhoven. We hope to present the design product at Dutch Design Week in 2023.

Extra allowance for employees

November

In both November 2022 and January 2023, the employees receive an extra payment of 1000 euros net (based on full-time employment). AVR hopes it will help employees with the higher prices for energy and living expenses. It's AVR's way of contributing to easing the financial concerns.



Government grants SCE++ subsidy for large-scale CO_2 capture

12 December

With the help of the SDE++ subsidy, AVR can build a large CO_2 capture installation in Rozenburg, following the smaller on already in Duiven. The new installation will be able to capture 0.5 Mt of CO_2 from the flue gases from the incinerators. The CO_2 captured will be used in the greenhouse horticultural sector and in the long term, it will be possible to store it in natural gas field in the North Sea. There will also be a larger, extra installation in Duiven so that a total of 220,000 tonnes of CO_2 can be captured annually.

Updated Perfect Days

15 December

A Perfect Day is one on which absolutely everything goes well: no incidents, unplanned stops or overruns. And of course, a day that didn't go over budget, with a good flow of waste and a high yield of energy. For every Perfect Day, AVR sets aside money for a good cause. In 2022, 70% of that money is going to the Petje af Foundation, which helps children who could use a bit of support, supplementary to their education. The Petje af Foundation introduces them to inspiring role models and a variety of areas of work. That way, the children develop new skills and discover their interests and talents. AVR intends to collaborate with the Petje af Foundation for a longer period.

European round table

January - December

In the context of our efforts to improve European waste managements, we are forming a 'round table' of European Energy from Waste operators. We will meet with various officials of the European Commission, representatives of the member states and members of parliament who are involved in the negotiations on the Waste Shipment Regulation (EWSR).

Profile, mission, vision and strategy

AVR in brief

AVR specialises in the processing of various types of residual waste: household and commercial waste, wastewater, paper pulp residue, waste wood and hazardous waste. AVR strives continuously to achieve the maximum recovery of energy, raw materials and other materials from this residual waste through effective, efficient and safe business operations. We ensure that plastics, drinks cartons, films and metals are recycled and minerals are used in building and road construction. And by incinerating the rest of the residue, we supply sustainable steam, heat and electricity to our surrounding area, preventing the use of fossil fuels. We also capture CO_2 from our processes, which we then supply to the greenhouse horticultural sector. In doing so, AVR makes an important contribution towards the achievement of the Dutch and European climate and energy goals. And AVR does all of that with residual waste that other people often think is worthless.

AVR has two facilities: Duiven and Rozenburg. Four transfer stations are located in The Hague, Utrecht and Rotterdam. The central location of the facilities is very convenient, both for the waste clients and the buyers of energy and raw materials. The residual waste is transported by water where possible and where that is impossible, by road. At the end of 2022, AVR employed 475 people (464,2 FTEs).

Our mission: to create a clean world in which nothing is wasted

AVR gives a useful purpose to what everyone sees as worthless residual waste streams by converting them into raw materials and energy. The aim is always to convert all the rest of the residue that nobody else can do anything with into something worthwhile, and with minimum impact on the environment. We believe our solution is the best one currently available. It's our raison d'être and our motivation: to create a clean world in which nothing is wasted. We and our proud employees workday in and day out to bring about positive change.

Our vision: too good to waste

Supplies of vital raw materials are being depleted and harmful greenhouse gas emissions are changing the climate. If we want this planet to be liveable for future generations, we must make radical changes now. Changes like implementing a circular economy and an energy supply that is 100% renewable. The way we deal with residual waste is a key factor in making our planet more sustainable. The population of the world continues to increase, the global waste mountain keeps growing and, in many countries, the majority of the residual waste is still dumped as landfill, which results in huge emissions of methane and other greenhouse gases.

AVR makes an important contribution towards reducing difficult residual waste streams: as experts in handling the rest of the residue, we create new beginnings. In a world subject to many changes, that demands a flexible approach from AVR. With our sights set firmly on tomorrow, we offer the best solution for the rest of the residue today. At the same time, we ourselves are also constantly changing and adapting: to continue offering the best solution for the day-to-day challenges facing our society. We research how things can be better, cleaner and more efficient, with no emissions. You can't have one without the other: we are striving for a natural balance between economy and ecology. And with that, we have not only a social solution for keeping the streets clean, but also the capacity to be a driving force for far-reaching and high-risk innovations. Here's to a circular and sustainable 2050! AVR will be a part of it.

Our strategy

AVR has developed a strategy that will add substance to its mission and vision. The key elements are encapsulated in three pillars our organisation works on every day:

contracting of waste and residual waste, also in the long term;

maintaining operational excellence and improving it where possible;

maximising energy and raw material efficiency and minimising the CO_2 footprint and negative environmental impact.

The successful implementation of our strategy depends on our employees. They make the difference, in all three of the pillars. Which is why safety is always paramount in everything we do. It's also important that our employees are healthy and energetic, can develop their potential and personal growth and can carry out their tasks to the very best of their ability.

HOW WE ADD VALUE

Our mission Create a clean world in which nothing is wasted

Input

Residual waste
- 2,109 kton

People
- 475 people (464 fte)
- Competencies and Qualifications
- Sustainable employability

Means
- Strategic locations
- Plant and maintenance
- Logistics (IT infrastructure)
- Raw and auxillary materials and external services

Capital
- Financing structure
- Subsidies

Legislation & regulations
- Licenses
- Legal framework

Our business activities

- Maximum value from residual waste in energy and raw materials
- Transhipment and transport via water of (household residual waste
- Conversion of waste into energy in the form of district heat, steam and electricity
- Reprocessing of incineration residues for recovery of metal and minerals
- Capture of harmful emissions
- Separation of plastics and drinks cartons
- CO_2 capture and supply to the greenhouse horticulture sector

Output

Energy
- Steam (1.2 PJ)
- Heat (5.5 PJ)
- Electricity (1.7 PJ)

Raw Materials
- Metals (2.6%)
- Minerals (22.8%)
- Plastics (28.6 kton)
- CO_2 (42 kton)

Residues
- Fly ash
- RGR residue

Emissions
- Into the air
- Into water
- Into the ground

Outcomes

Environs and environment 1 2 7
- A reliable partner for customers and suppliers
- Minimise emissions and carbon footprint
- Compliance

Financial stability 8
- Dividends paid-out to shareholders
- Access to capital market / financing
- Credit rating

A good employer 5 6
- Job oppurtunities
- A safe and healthy working environment
- Promote sustainable employability

Material themes

1. CO_2 emissions
2. Reliability
3. Recycling
4. Renewable energy
5. A safe working environment
6. Sustainable employability
7. Other emissions
8. Financial stability

Impact

3 4

Contributing towards a clean world (by preventing landfill of waste)

Contributing towards renewable energy generation and eco-goal achievement

Contributing towards the transition to a circular economy

Social developments

AVR operates as a company in the context of society, both nationally and internationally. There are constantly changes happening in that context. Allow us to describe a number of developments that affected the waste industry in 2022. We explain in the themed chapters how we dealt with them and which results ensued.

War in Ukraine

On 24 February, Russia invaded Ukraine. Russia's conduct and the sanctions subsequently imposed on the country led to a shortage of energy in Europe and a corresponding price increase, after energy prices had just started to recover in 2021 following the fading of the corona effects. The stark rise in the energy prices had significant economic impact because it also resulted in scarcity of other goods that subsequently also became more expensive. For the waste industry, the main effect of this is a shortage of excipients and less feedstock while revenue from energy production increased.

Climate change

The fact that the climate is changing is becoming more and more noticeable, in our country too. Extreme heat and drought, in addition to heavy rainfall and even flooding, have ceased to be exceptional. In 2015, the Netherlands declared their intention to achieve the goals of the Paris Climate Accord and reduce the emissions of greenhouse gases, including CO_2. The Climate Accord states that CO_2 emissions must be 49% lower in 2030 than they were in 1990. The EU decided that this should be 55% and the Rutte IV Cabinet has said that the Netherlands is aiming for 60%. The goal for 2050 is 95% fewer emissions of greenhouse gases.

Shortage of raw materials

Sources of non-renewable raw materials (in particular fossil and mineral sources) are being increasingly exhausted. That forces us to recycle and reuse raw materials, preferably as high-grade as possible. The Netherlands has set a goal for 2030, to reduce their use of metals, minerals and fossil fuels by half that of 2014. And the goal of being completely circular by 2050 is included in the Grondstoffenakkoord (agreement on raw materials).

Nitrogen (NO_x)

The Cabinet wants all sectors to contribute equally to solving the nitrogen problem and a comprehensive approach in every sector, containing specific points of focus per sector.[1] Ambitious goals have been set for industry and mobility, to reduce emissions of greenhouse gases, such as CO_2, and of substances that are harmful to air quality, such as particulates and NO_x. All this is intended to combat climate change and improve air quality. Industry must reduce emissions of greenhouse gases by 60% between 1990 and 2030 and in the same period, agriculture must reduce emissions by 40%. According to the Minister, the measures to reduce CO_2 emissions often lead to a reduction in NO_x emissions too. However, CO_2 capture projects can lead to more nitrogen emissions in the construction phase.

The employment market

During the corona crisis, no-one could have guessed that the employment market would change so fast after opening up society again. Shortages quickly occurred in many sectors. They are particularly severe in technical and operational occupations. This is due in part to the fact that there are fewer students with practical training leaving training colleges. There is also a great demand for IT employees. And ageing of the workforce also plays a part in the shortages. Companies and organisations have to do their utmost to get new employees interested in a job and to retain them. Focus on the health and development of employees is an important factor in this.

Another trend in the employment market is the attention to diversity and inclusiveness. This applies mainly to gender and cultural background but also to vulnerable people in the employment market such as people distanced from that market and status holders. Companies are focusing more on creating a working environment in which everyone feels welcome.

[1] See letter: *Progress on integrated rural approach, including NPLG*. Parliamentary paper 34682, no. 114.

Our stakeholders and material themes

Our stakeholders

With our activities, we create value for our stakeholders and for society while keeping an eye on the needs of generations still to come. We have a great deal of contact with our stakeholders, both in daily business dealings and at special moments when we discuss their needs and our possibilities for meeting them. The contact moments take place in all echelons of AVR and at the stakeholders' organisations.

We distinguish the following ten stakeholder groups:

- Employees
- Shareholders
- Waste clients
- Energy clients
- Suppliers
- Financiers
- Policy developers
- Licensing authorities / enforcement officials
- Politics
- Environment

AVR reporting policy

AVR's financial and economic contribution is substantial. We are a strong and solid company with economic relevance. We also make an important contribution to society. We recover raw materials for recycling and re-use from residual waste and thus form a link in the circular economy. We convert the residual waste that would otherwise be dumped – the last residue of the residue – into energy. This is how AVR prevents the use of fossil fuels.

In 2017, we took an initial step towards an integrated Annual Report by gathering information through an internal stakeholders' dialogue. That information was used to determine our material themes and define important KPIs. To enable us to carry out the stakeholder dialogue, we identified and classified all the stakeholder groups. Later, we held a stakeholder day, on which a delegation of all ten of our stakeholder groups offered input about AVR's social contribution and impact and the subjects they felt were material. We provided accountability for that in the Annual Report which was also expanded to include governance information. We then took a critical look at our reporting structure and KPIs in order to anchor them better in our existing processes and to further professionalise the management information surrounding KPIs.

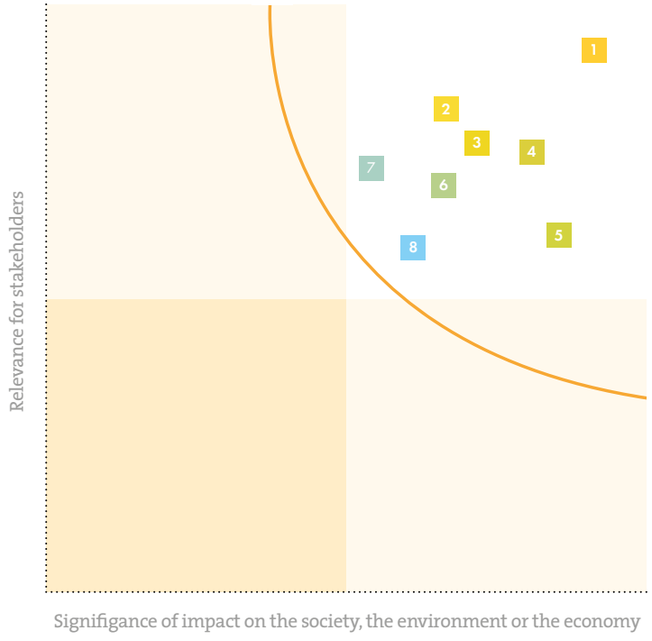
In April 2021, the European Commission adopted the Corporate Sustainability Reporting Directive (CSRD). The consequence of this directive is that more companies (including companies classified as 'large') must report on sustainability. The Commission's aim with this directive is to achieve more consistency between European companies in respect of their sustainability reporting. AVR also falls within the scope of the CSRD and will prepare its Annual Report in accordance with the directive from financial year 2025 onwards. In 2022, with the help of a consultant, we launched a project aimed at mapping the impact of this change and preparing the organisation for it.

On the basis of the results, we classified the themes again and divided them - in anticipation of our reporting according to the CSRD - into ESG (Environmental, Social and Governance). They form the elements on which we measure and report our sustainable and ethical trading practices.
We set up a roadmap which we will use to establish the strategic goals in 2023 and to make the KPIs more monitorable.

In 2022, we also carried out a stakeholder study in which we asked representatives from various stakeholder groups about the material themes and AVR's impact. The results gave us no reason to change our material themes. There were however ideas and recommendations made which we will take to heart.

Materiality matrix

Our material themes can be seen in the materiality matrix. They are ranked according to their relevance for stakeholders and their importance to society, the environment and/or the economy.



Material themes, goals and KPIs

The themes that are most material for our stakeholders have been linked to AVR's strategic goals. One or more KPIs have been specified per theme. The KPIs make AVR's impact on these themes measurable. Every year, we assess whether the KPIs sufficiently reflect the effects or whether an addition or adjustment is required. In 2022, we classified the themes anew. The theme of Innovation cannot, on reflection, be seen as separate from various other themes. So we no longer mention it as a separate theme in this Annual Report; it is explained when it is applicable to the other themes. Below is the full list of the ESG (Environmental, Social and Governance) and the corresponding themes. The Annual Report is structured according to this list.

	Material themes	Strategic goals	KPI
ENVIRONMENT	1 CO_2 emission	• Maximisation of energy and raw material efficiency and minimisation of our CO_2 footprint	• CO_2 emissions (in CO_2 equivalents) • Share of biogenic in CO_2 emissions • CO_2 emissions avoided through energy supply • CO_2 emissions avoided through recovery of raw materials
	2 Reliability	• Long-term waste and residual waste contracts • Continuation and improvement of our operational excellence	• Percentage availability of plants • Reliability in supplying steam and heat
	3 Recycling	• Maximisation of energy and raw material efficiency and minimisation of our CO_2 footprint	• Quantity/percentage of separated raw materials recovered
	4 Renewable energy	• Maximisation of energy and raw material efficiency and minimisation of our CO_2 footprint	• Total volume of energy supplied – heat, electricity and steam • Percentage of biogenic in the energy supply
	5 Other emissions	• Continuation and improvement of our operational excellence	• Nitrogen (NO_x) • Particulates • Dioxins
SOCIAL	6 Safe working environment	• Continuation and improvement of our operational excellence • Promoting and guaranteeing a safe working environment	• IF rate • Number of Safety Observation Rounds (SOR)
	7 Sustainable employability	• Continuation and improvement of our operational excellence • Increasing our employees' potential	• Percentage of sick leave
GOVERNANCE	8 Financial stability	• Long-term waste and residual waste contracts • Maximisation of energy and raw material efficiency and minimisation of our CO_2 footprint • Continuation and improvement of our operational excellence	• Revenue • EBITDA • EBIT • Net result • Cash flow • Cash position • Investments

Main theme

Environment

Theme 1 of the ESG

The E in ESG stands for Environmental. At AVR, this covers the material themes with which we have a positive impact on the environment, through the production of sustainable energy and the recycling of raw materials and also our reliability in those matters. It covers themes with which we have a negative impact too, such as emissions.

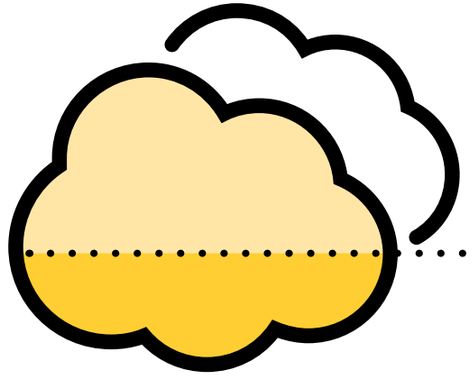
Subthemes

- CO_2 emissions
- Reliability
- Recycling
- Renewable energy
- Other emissions

CO_2 emissions

Towards a climate neutral AVR

We separate as much as possible for recycling, sometimes in multiple stages. That leaves us with a valuable part that we use to generate heat, steam and electricity. The process is sustainable because this energy does not have to be generated by burning fossil fuels. We make the processes we use to generate energy as efficient as possible in order to achieve the highest possible yield. And we capture as much as possible of the CO_2 in the flue gases for useful purposes. Our goal is to have climate-neutral operation in 2050.



Total CO_2 emissions in CO_2-equivalents
(kton)

2,223 – 140

2022: 2,223
2021: 2,363
2020: 2,359

Share of biogenic CO_2 emissions
(percentage)

60% =

2022: 60%
2021: 59%
2020: 59%

CO_2 emissions avoided through supply of energy
(kton)

619 – 65

2022: 619 kton
2021: 684 kton
2020: 709 kton

CO_2 emissions avoided through recovery of raw materials
(kton)

232 – 10

2022: 232 kton
2021: 242 kton
2020: 226 kton

CO_2-emissions	2020	2021	2022
CO_2 footprint (kton)	2,359	2,363	2,223
Proportion of CO_2 emissions that is biogenic	59%	59%	60%
CO_2 biogenic (kton)	1,395	1,383	1,342
Fossil emissions AVR (kton)	964	980	881

Goals

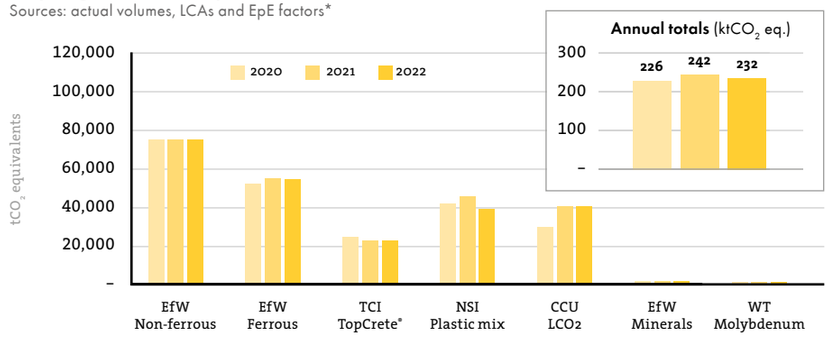
AVR aims to emit no additional CO_2 into the atmosphere during the processing of residual waste by 2030. That means that emissions due to waste processing must at least be compensated for by measures taken at the source (Scope 1) and validated savings for the buyers of our products (Scope 4[2]). In order to achieve this goal, we capture CO_2 for useful applications or storage and avoid our clients emitting CO_2 through our supply of energy and raw materials. AVR's operation must be fully climate-neutral by 2050.

CO_2 capture in Duiven

AVR is a pioneer in the field of CO_2 capture. Since 2019, in Duiven, an installation has been operating that captures CO_2 from the flue gases from the incinerator. That CO_2 is supplied in liquid form to the greenhouse horticultural sector for the stimulation of plant growth. The installation has captured a total of nearly 43,000 tonnes of CO_2. The supply of liquid CO_2 was slightly more than in 2021 but we did have to deal with a number of obstacles. Despite successful optimisations and modifications carried out in the winter of 2021/2022, there were still too many unscheduled stoppages and the use of excipients and raw materials was still not at the desired level during the production season[3] in 2022. And a scheduled total plant shutdown in May and June at the Duiven location (a maintenance stoppage of the whole location) meant production was impossible for around ten days. In addition, the greenhouse horticultural sector faced extremely high energy prices, resulting in a number of its entrepreneurs leaving their greenhouses empty, sometimes temporarily, which meant that demand fell. Due to the high price of gas, various fertiliser factories in Europe decided to reduce production or stop it completely, putting pressure on the supply of conventional CO_2. This was a reason for AVR to keep the capture installation operating for longer, but with a reduced production capacity.

Recycling raw materials prevents more and more emissions

Sources: actual volumes, LCAs and EpE factors*



Data in the diagrams comprises actual volumes of raw materials recovered from (residual) waste entrusted to AVR. Because most of the emissions from this are 'scope 3', AVR follows how emission factors develop. (LCA = Life Cycle Analyses; EpE = Enterprises pour l'Environnement)

CCUS

One of the major technologies for AVR to apply in structurally reducing the CO_2 footprint in the coming decade is the large-scale capture, reuse and storage of CO_2 - Carbon Capture, Utilisation and Storage (CCUS). We will be applying the experience we're gaining now with the existing installation in Duiven to the decisions for new installations. And in order to better safeguard and supervise knowledge gained, improvement programmes and coordination with chain partners, we've set up a CO_2 knowledge centre at AVR. Diverse professional disciplines collaborate at the centre, such as process technologists and staff from the operational side, from the SHEQ division, business developments, strategic projects and finance. We have been granted subsidy for CCS and CCU with which we can build new installations.

[2] Scope 4 emissions is an unofficial term used by companies to categorise and quantify emissions avoided through the use of their products by clients, that's to say outside the company's own value chain.

[3] The CO_2 capture installation normally operates only in the months in which horticulturists need CO_2 (April through September).

New CO_2 capture installations

We're happy about the SDE++ subsidy confirmation we received in May, for the construction of a second CO_2 capture installation at the Duiven location. Once that has been completed, AVR will have the security of knowing that the financially unprofitable top for the supply of CO_2 to the greenhouse horticultural sector is covered for an exploitation period of 15 years. With this new installation, AVR aims to capture 60,000 tonnes of CO_2 a year, from 2025, and supply it to the greenhouse horticultural sector. We will be making the final investment decision in this in 2023.

In late 2021, AVR submitted an application for SDE++ subsidy for CCS and CCU for the Rozenburg location. The government department RVO (Netherlands Enterprise Agency) decided early in 2022 to reject all CCS applications because there was insufficient confidence that the necessary central infrastructure (offshore transport and storage facilities) could be created within five years of the subsidy being granted. That rejection affected not only AVR, but all the companies in the Netherlands that had plans for large-scale capture of CO_2 and with that, the national goals for reduction of CO_2 as well. For that reason, the government raised the SDE ++ budget for 2022 to 13 billion euros, and extended the realisation period specifically for CCUS projects to six years after the decision date.

AVR resubmitted the project plans for CCUS for Rozenburg and CCS project plans for Duiven for the SDE++ round in 2022. In December, the RVO honoured all these projects. AVR entered into an implementation contract with the RVO and the necessary bank guarantees have been issued.

The decisions to grant the SDE++ bring the plans for CO_2 capture in reach. We expect that from 2026, AVR will capture around 450 ktonnes a year in Rozenburg and roughly 220 ktonnes in Duiven (including those from the existing installation). Half of this capacity is destined for reuse in the greenhouse horticultural sector (CCU). The rest will be stored permanently (CCS) in depleted gas fields in the North Sea. In Rozenburg, part of the CO_2 will be supplied to the surrounding greenhouse horticultural businesses in gas form, through the infrastructure of OCAP[4] and part will be transferred to the offshore CCS infrastructure of Aramis[5] through the onshore pipeline Porthos[6] (still to be laid) and will eventually be stored. The collaboration agreements necessary for this were entered into in 2022. Part of the CO_2 in liquid form will be supplied by Duiven to the greenhouse horticultural sector. The other part will go the CCS infrastructure in Rotterdam harbour by way of what's called an evaporator. AVR may well decide on a phased putting into commission: reuse (CCU) by 2026, and the permanent storage (CCS) as soon as the joint CCS infrastructure is ready. This is planned for 2028.

[4] OCAP is a supplier that purchases CO_2 from producers and distributes it to customers in the greenhouse horticulture sector. OCAP has its own infrastructure for this.

[5] Aramis is an initiative of EBN, Gasunie, Shell and TotalEnergies to realize a large-scale CO_2 transport infrastructure that enables storage of CO_2 in depleted gas fields under the North Sea.

[6] Porthos is a collaboration between the Port of Rotterdam Authority, Gasunie and EBN for the storage of CO_2 from industry in the port of Rotterdam in empty gas fields under the North Sea. Porthos stands for Port of Rotterdam CO_2 Transport Hub and Offshore Storage.

For AVR, being granted the SDE++ subsidy is an important precondition for taking a final decision to invest. The fact is that this exploitation subsidy covers some of the costs AVR has to reimburse for the CCS infrastructure outside AVR grounds and makes the market price risk of energy (natural gas and electricity) manageable for supply of CO_2 to the greenhouse horticultural sector for many years. Due to the CCS plans, AVR can fulfil the goal for 2030 imposed by the government: a 35% reduction compared to the historic fossil CO_2 emissions.

The preparations will start in full force in 2023, so that we can take the final investment decision at the end of 2023 or beginning of 2024. Preparations include getting the ground ready for construction, entering into agreements with various chain partners, engineering, selecting the technology, launching a call for tender and applying for the necessary permits. Given the magnitude of these investments, we are setting up a separate project organisation from within the strategic projects department.

ISO 50001

Up till the spring of 2022, AVR used the CO_2 Performance Ladder to measure our own CO_2 emissions but that method gave us too little insight into our energy performance. So we switched to ISO 50001, and gained our certificate in March/ April. ISO 50001 is an energy management system aimed at an efficient distribution of our energy flows. The system mainly focuses on saving energy. We're going to inventory, monitor and reduce the losses in our own energy consumption with it. To that end, we have organised a number of projects to run till the end of 2030. We have established an energy number (formula) in which our accomplishment is visible. That is the ISO 50001 R1 formula, with a goal of 20% reduction in 2030, compared to the reference period 2014 - 2019. We communicate our accomplishments every day. A number of the projects have already been realised, including our new steam back pressure turbine F in Rozenburg. We take energy efficiency compliant with ISO 50001 into consideration in the decision making on projects and maintenance. Awareness of and continuation of this programme keep demanding the necessary attention of management.

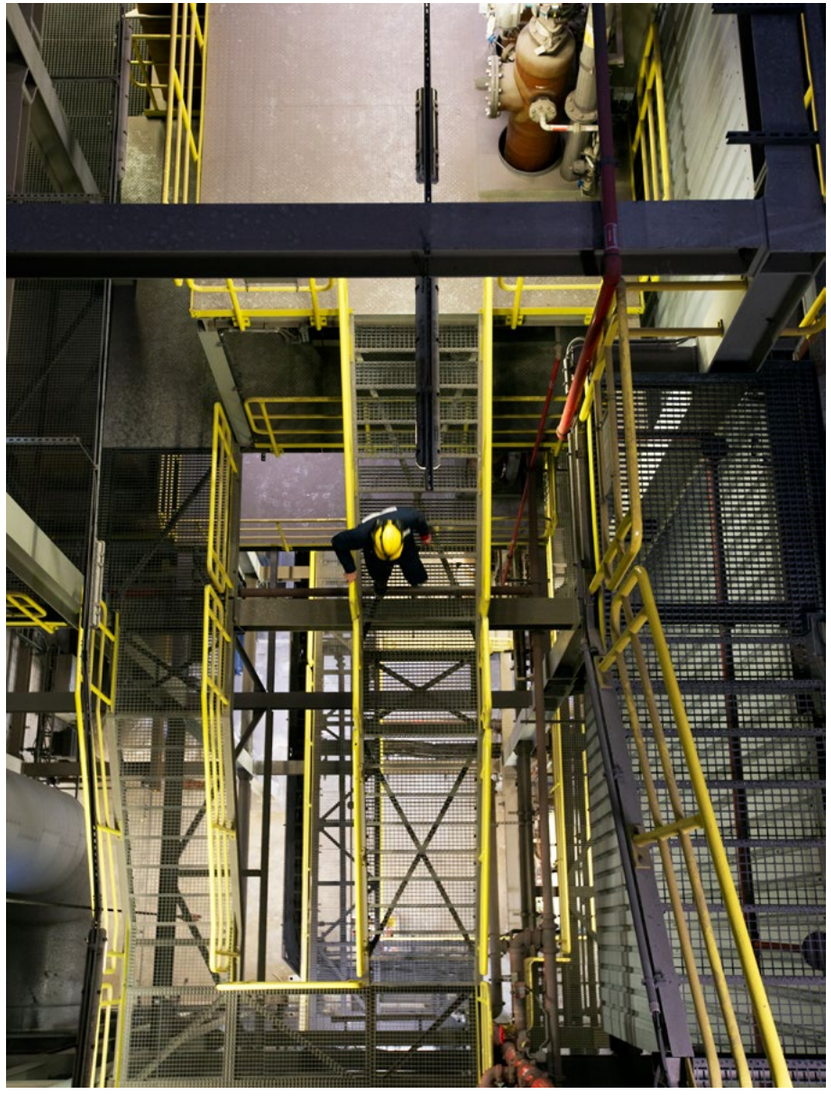
More sustainable waste transport

AVR operates an active policy for reducing the emissions during necessary transporting. Our company cars all have minimal tables of at least C and more and more employees are opting for a fully electric company car. In their private lives too, employees are increasingly choosing to drive electric. We have charging points at our Rozenburg and Duiven plants for employees' company and private cars and those of visitors. We intend to expand the number of charging points in 2023. The electricity involved will be 100% renewable.

Goals for the future

AVR continues to fully commit to the supply of more heat (residual) and the expansion of the supply of steam. We are researching the future viability and efficiency improvement of the steam turbine parks in Duiven and Rozenburg. We also expect to be able to recover extra heat from the Debottleneck programme for flue gas cleaning (see page 46). That extra heat supply will enable us to further reduce the CO_2 emissions (Scope 4) of our buyers.

All CCUS projects with a total capture capacity of between 650 and 700 ktonnes of CO_2 must be fully operational by 2030. Capturing CO_2 uses energy but at the same time ensures that residual



heat with a low temperature becomes available for supply to district heating networks.

In the more distant future, the CO_2 emissions avoided as a result of the supply of energy (electricity) will decrease because more renewable energy will be being generated in the Netherlands. Supply of residual heat will retain an important place. New waste processing concepts and CCUS form the major factors for AVR in a transition to climate neutral by 2050. AVR is a proponent of negative emissions, storage and/or use of biogenic CO_2 also being included in that transition path.

Reduction target of CO_2 tax

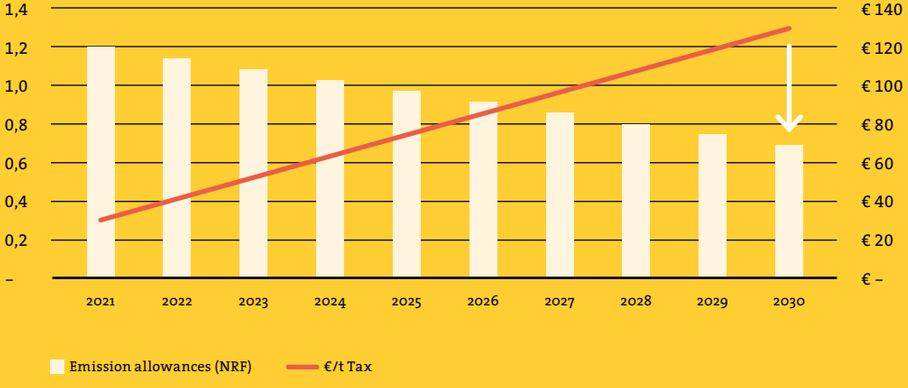
Since January 2021, the Netherlands has a tax on CO_2 with the aim of reducing the industry's CO_2 emissions. If a company fails to meet the target reduction, it must pay tax on the excess CO_2 emitted. For our Energy from Waste installations (EfW), the target set is for a 35% reduction in 2030 compared to the average historic fossil CO_2 emissions in the period 2014 through 2018. Such historic emissions are determined on the basis of the waste flows processed. The tax is set up in such a way that annually, the tax-exempt emission (threshold value) falls and the tax due rises until 2030. The threshold value for the tax base on this reference amounted to 120% for 2021 and follows a linear decrease to 68.7% in 2030. The CO_2 tax began in 2021 with € 30.48 per tonne of excess CO_2 emissions and follows a linear increase to € 128.71 per tonne in 2030.

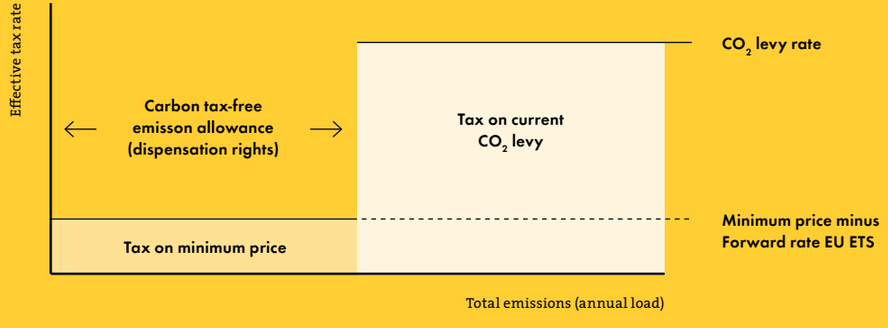
By keeping CO_2 emissions below the threshold value, it's possible to collect dispensation rights, and in the case of a shortage or surplus, dispensation rights can be traded. For EfW, the emissions in Scope 1 (the direct emissions) are leading. So reduction is only possible by lowering the fossil emissions per installation and/or capturing and storing CO_2 (CCS).

The number of dispensation rights for the CO_2 tax from 2021-2025 is determined on the basis of the historic activity level. That activity level is the average fossil emission from 2014-2018. For AVR's two EfW installations, that is set at 678 ktonnes. The number of dispensation rights is determined with a factor of 0.97 on the historic emissions.

With the realisation of CCS project plans, AVR aims to reduce the fossil CO_2 emissions by a minimum of 250 ktonnes, bringing the total emissions in 2030 in line with the maximum emissions allowed.
As of January 2023, there is in addition a minimum CO_2 tax for the fossil CO_2 emissions, comparable to the tax already applied to electricity production. The underlying idea is that by charging more for greenhouse gas emissions, companies will take such emissions into more consideration in their activities and investments. In addition to the higher tax on the taxed emissions, the basic tariff also applies to what is known as the tax-exempt emissions. The government has set the minimum price of CO_2 for industry at the same level as that for the production of electricity. That means that the minimum price of CO_2 for industry - without the applicable reduction with the EU ETS[7] forward rate - follows a linear increase from € 16.40 in 2023 to € 31.90 per tonne CO_2 in 2030. Correction with the EU ETS forward rate applies to all companies, so also for EfW installations that are now not required to fall under EU ETS. Due to the EU ETS price correction, the tax will probably not lead to an extra tax in the coming years.

[7] EU ETS stands for European Union Emission Trading System. With it, companies can trade in emission rights. Each year, fewer rights are available. Roughly 400 Dutch companies, that together are responsible for half of the COii emissions in the Netherlands, are required to take part in the EU ETS.





"At birthday parties, I'm able to explain that my work is socially relevant"

Erik Zonneveld
Energy & Residual Process Technologist, Duiven

'I started at AVR in May 2022. I had studied chemistry and gained a Master's in energy techniques and sustainability. My study brought me to the waste sector, because many disciplines come together there including logistics, electrical and mechanical engineering, ICT, chemistry and physics. In politics too, this sector is in motion, with a recent implementation of CO_2 tax and a tightening of controls for biomass destined for biomass plants. Such developments also offer AVR opportunities for great new projects. So my work is divers and socially relevant. At birthday parties, I have no difficulty explaining what my contribution is.
Before I started at AVR, I was a process technologist at another waste processing company, in the fields of incineration and wastewater and emissions management. That company also had a project running for a pilot installation for capturing CO_2 and I thought it was a really interesting technique. When I moved to Arnhem in 2022, I responded enthusiastically to a job vacancy at AVR Duiven, working on the optimisation of the CO_2 capture installation. That's a chemico-physical factory with a major sustainability aspect: it captures CO_2 from the flue gases of the waste incineration lines at Duiven. However, there's also a downside, because it uses really quite a lot of energy and chemicals to achieve that.
In the CO_2 capture installation, flue gases are first cooled to 40°C. At that temperature, the CO_2 binds with our solvent - MEA. The CO_2 captured is then separated from the MEA by a temperature of more than 100 degrees. Before the MEA can be used again, it has to be cooled anew to 40°C. It's that heating up and cooling down that uses the most energy. In the subsequent stages, the CO_2 is washed, compressed and cooled to -25°C to make it suitable for transport to the greenhouse horticultural sector. We're currently looking into the possibility of reducing energy use in both processes.
AVR is going to build a second CO_2 capture installation in Duiven and one which is five times the size in Rozenburg. That takes an enormous investment. We will be making use of the lessons learned from the first installation. We currently supply CO_2 to greenhouses but if we can raise the quality, the CO_2 could also be suitable for other uses. So there's plenty to work on in the future.'

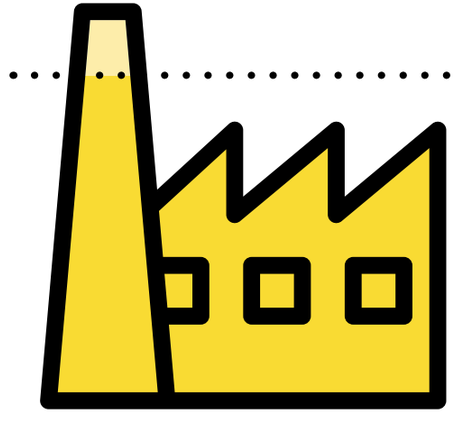
Reliability

Continuity through availability

Our clients' satisfaction goes hand in hand with the continuity of our off-take of residual waste and the reliability of our supply of energy. In order to guarantee that supply, our installations must continue operating. That demands the necessary maintenance. Our performance is also influenced by external factors, such as the composition of the waste delivered. And in order to keep our service at a high level of quality, we make sure our installations are in good condition and we invest in new technology.

Incinerator availability
(AVR-wide)

90.1% – 0.6



2022: 90.1%
2021: 90.7%
2020: 91.2%

Reliability of heat and steam supply

99.0% + 0.2

2022: 99.0%
2021: 98.8%
2020: 99.6%

Definition of the KPIs

The availability of our installations determines the reliability of our energy delivery. The goal of our commitment to reliability is long-term continuity. We aim to achieve good reliability of energy supply by investing in future-proof installations and efficient working methods.

Incinerator availability

We have achieved our goals for availability AVR-wide, with a good result. With the observation that we had more unplanned stoppages than expected. The reason for that was that the composition of the waste has changed to such an extent, since 2021, that we are experiencing more problems achieving good processing in our incinerators. AVR incinerators are less suited to waste with a higher calorific value. Also, there is an increase in the mono flows from recycling which demands more intensive mixing in and outside our silos. We have succeeded in adapting these processes better to the new types of waste.

Duiven

In Duiven, in 2022, there was a planned total plant shutdown (TPS). We normally only carry out maintenance on one line while the rest of the factory operates as usual, but once in every ten years, the whole plant has to be shut down for maintenance on our common systems. Because of this TPS, the installation's availability was lower than usual in 2022. The TPS, one of the biggest projects that are carried out on our installations, ran on time and on budget.

In 2022, we gave a lot of attention to the CO_2 capture installation. The installation is now in operation for its third year and we're still working on optimising it. It is, after all, the first large-scale CO_2 capture installation at a waste processor in the world. Thanks to our efforts, the reliability of delivery has increased, as has the stability of the production. We will be working on improved availability in the coming years. We've taken on extra staff to that end.

We have researched our maintenance scheduling at our location in Duiven and concluded that we are going to run a different stoppage regime. We're switching from a long biannual maintenance stoppage to an annual one. We will carry out a brief stoppage, in two consecutive years, followed by a long stoppage in the third year. This ensures a better availability and reliability of delivery for the clients with no change to costs. We have also filled our maintenance management system fuller to design preventive maintenance better and set up sound maintenance concepts. That will increase predictability.

Rozenburg

The availability of our waste incinerating installation (Energy from Waste - EfW) in Rozenburg was really good. We did however have problems with an unstable incinerating process which caused slag to form in the incinerating ovens. We've taken major steps to resolve this, with long-running programmes by the slag and e-performance teams. Thanks to them, the incinerating process has become much more stable.

We had a TPS in Rozenburg some years ago which meant we had to extend the revision interval to five years. In the ensuing years, we constantly had structural availability problems with the lines that were in the fifth year of the interval - in 2022, they were Lines 3 and 4. We're now seeing this effect occurring in Line 0 too, but we expect to get that line stable again after the revision which is scheduled for 2023. After that, we will go back to a revision interval of four years.

The availability of the installations for production of energy (turbines, reducing sections and conversion assets) was very good. That allowed us to respond optimally to the market circumstances surrounding energy.

The availability of the other installations Rozenburg did not achieve the desired result.

In the post-separation installation (NSI), there were many problems with the ballistic separators, particularly in the first half of the year, which resulted in the total installation availability failing to meet our expectations. Thanks to a different management concept for the maintenance, the availability has increased significantly. To achieve that, we entered a strategic collaboration with Banzo, a company specialised in recycling installations.

In the bio-energy plant (BEC), the schedule was often deadlocked in the first half of the year. Intervention by Long-Term Maintenance and our in-house contractor solved the problems. Performance gradually improved during the last months of 2022. The recent period has been used to inventory the various smaller technical problems. They have all been tackled systematically by a multidisciplinary team. That led to more stability of operation by the end of 2022. We will resolve the remaining problems in the revision in April 2023. After that, we expect to go back to the stable situation we're accustomed to at the BEC.

Debottleneck programme

Three years ago, we started modernising our EfW in Rozenburg. Given the lifespan of the installation and the demands made on it by the changing waste being brought in in recent years, problems were occurring. We're resolving various sticking points, one at a time, in the Debottleneck programme. In 2022, we did the following things in this programme.

Support systems

The processing of leachates on the slag removers caused many exposure issues (H_2S). In 2022, we modified the water storage in the cellar of the boiler room. That resulted in a huge reduction in the number of exposure reports.

Line 2 of the water purification installation has been refitted, so that the process is more robust. The first results are very hopeful. The emission of heavy metals, for example, has been radically reduced. When Line 1 is refitted early in 2023, we expect an equally large impact.

Electrical installation

The cables in the cellar of the boiler room are in the way, preventing us from carrying out work on the slag transport belts. The system is also experiencing disruptions due to ageing. So we're moving all the cabling upstairs. At the end of 2022, all the ovens have been converted. And all the old cabling will be removed in the spring of 2023.

Various frequency drives (controls of large electrical motors) on Lines 3 and 4 had reached the end of their lifespans and have been replaced. This will make the installation more reliable in the long term.

Turbines

We have launched the HEAT project (Heat Efficiency and Availability for Tomorrow) to change the deployment of the existing turbine park. With the HEAT project, we aim to keep the turbine park operationally stable in the future.

Pre-treatment of waste

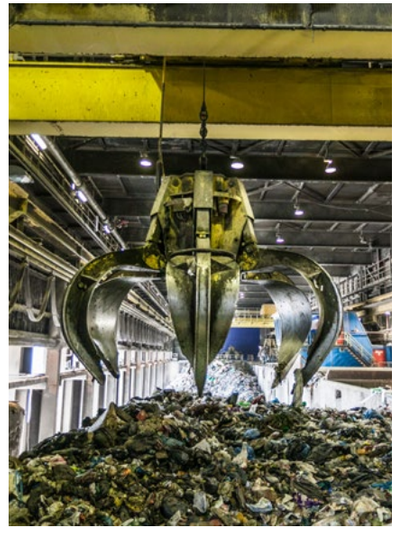
We looked into whether AVR is prepared logistically for the future. The study looked primarily at the current assets and the development of the waste market. The outcome is positive: by temporarily storing commercial waste in the small buffer warehouse it's possible to spread the dispatch of waste to the silo. The other logistics assets, combined with this small buffer warehouse, enable stable operations now and in the future.

We're running a project to modernise the hardware for the waste cranes and to automate (partly) the work activities on those cranes. The current waste being brought in demands a very intensive working method - mixing and blending. With this project, we aim to be able to prepare the waste more sustainably in the future.

Incinerators

We have taken a major step in the reliability of the incinerating process which will result in fewer occurrences of slag forming. In the future, we expect the composition of waste to change even more and the processing to be more difficult meaning we need to further develop in this area.

Disruption of the air supply for the incineration leads immediately to problems in the process. So we're converting the air management of Lines 1 through 6 to a more sustainable system. Lines 3 and 4 were already converted in 2021, resulting in the air control valves being accessible and maintainable. Line 6 will be converted in 2023.



In the current de-slagger, the funnels under the boiler get blocked by a floating layer. This disrupts the supply of primary air to the oven. By way of a pilot, an installation component (bubble line system) has been installed on Line 3, which should prevent that floating layer. The results of the pilot are good so the other lines will be fitted with a similar system in 2023.

In 2022, we did tests with a camera that gives a good image of the temperature of the combustion chamber in the EfW. This enables the person operating to follow the stoking process better and makes slag forming easier to manage. The tests show that this system is of great value. We will be installing these cameras in 2023.

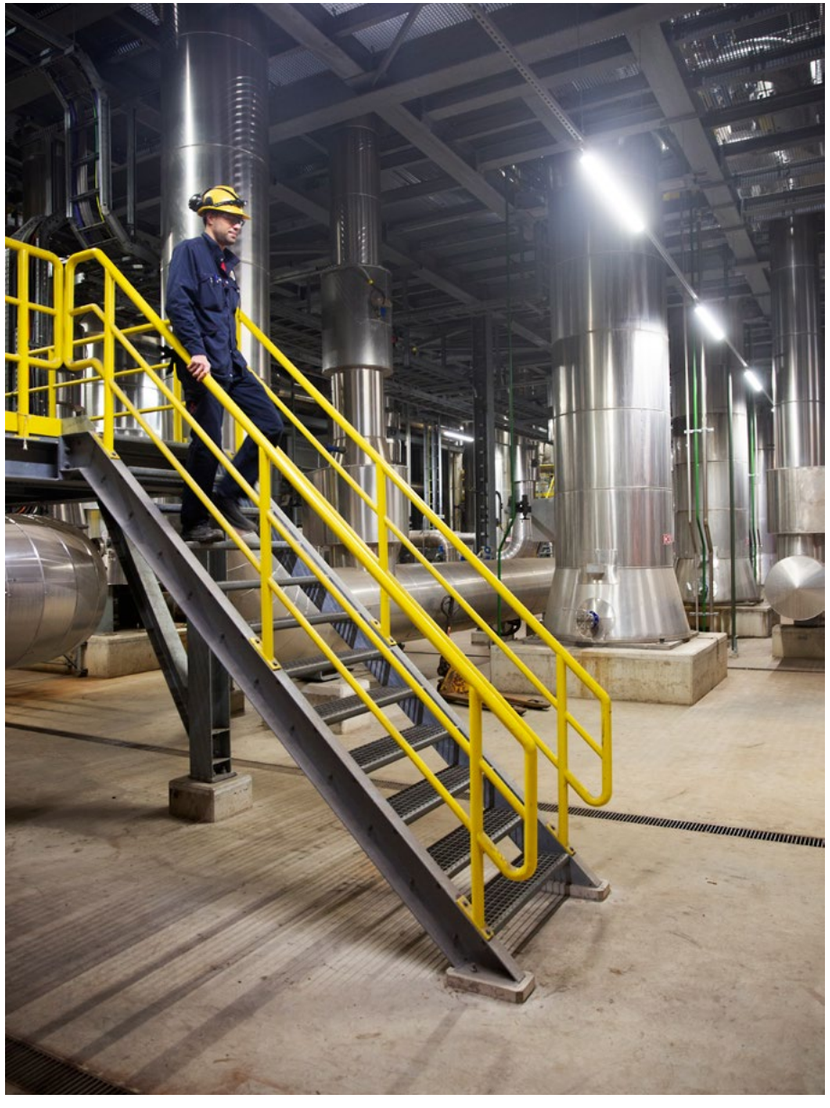
New slag transport system
In 2022, we started replacing the present slag discharge system (including the storage of bottom ash). This causes a lot of inconvenience, because it's a project in a busy operational environment. In 2023, we will construct the storage building, the access through the plant and the slag tunnel. In 2024, we will convert the various lines and the system will go into operation.

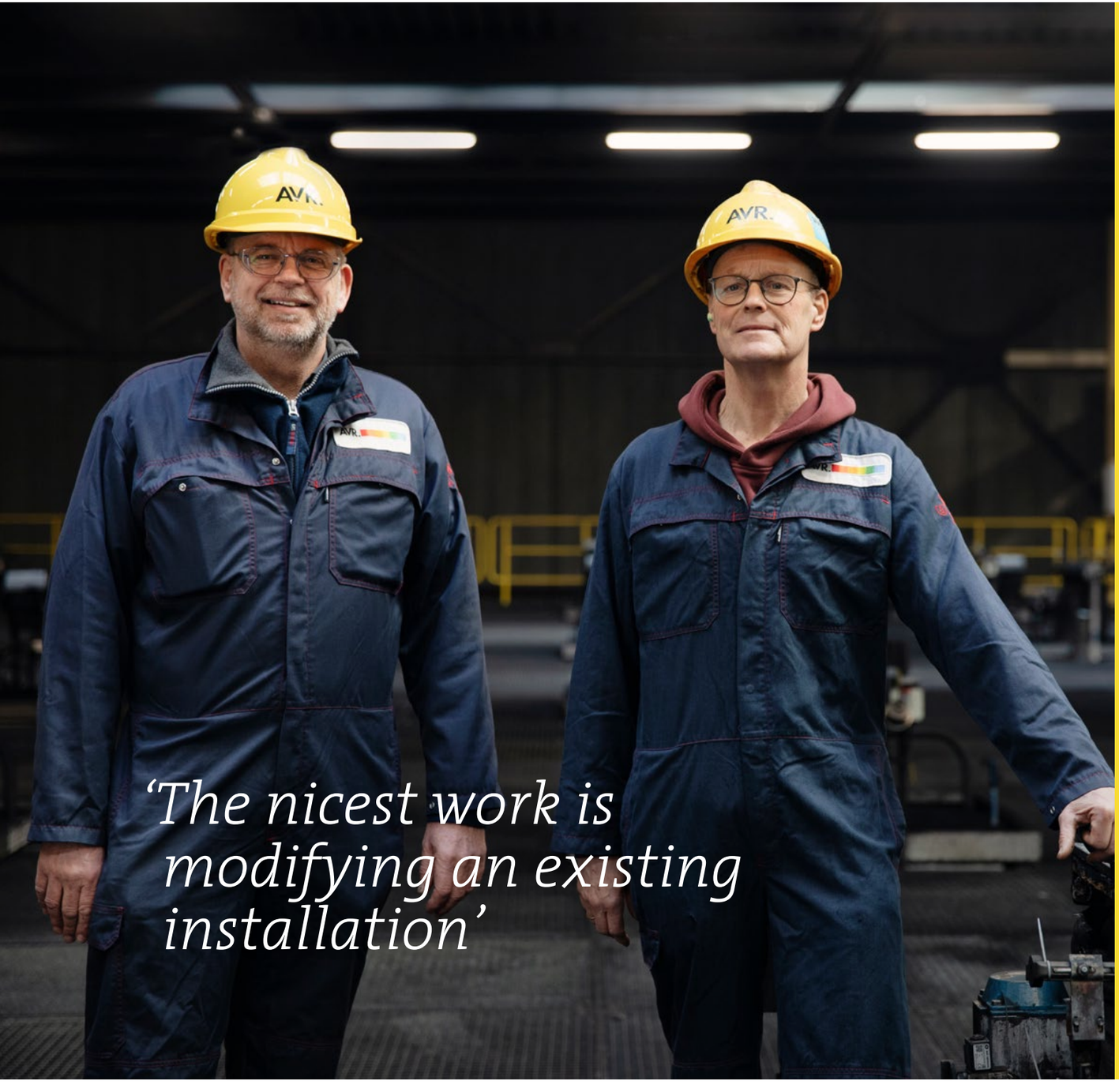
Flue gas cleaning
In 2022, we carried out a study to determine how efficient our flue gas cleaning is. The study looked at work hygiene, compliance, robustness, sustainability (circularity as starting point), future resilience and suitability for decoupling to the future CO_2 capture installation and the total cost of ownership. The conclusion of the study is that our flue gas cleaning is basically a good concept and very future resilient.

Further investigation of a number of components is necessary and we will do that in the next two projects. Firstly, we will carry out a project with the temperature of the flue gases that are emitted from the boiler before they are cleaned. New regulations require us to lower this temperature in order to prevent the formation of dioxins and furans directly at the source. We also expect to realise heat recovery in this project. In addition, we are protecting the electrostatic filters better. The second project concerns the active carbon filter. It is now at the end of the technical lifespan and the work hygiene no longer meets the current standard. The project teams are researching how we can get this part of the installation into the condition it need to be in to meet the requirements for the points mentioned. The projects have only just started up; we don't yet know what the solution will look like and when the first line will be modified.

Looking forward to 2023

For good reliability of supply, it's important that we have enough staff. Another challenge for the reliability of supply is the more intensive mixing of waste and better management of supply times in order to be able to deploy material and people well in the mixing process. We will train many new employees who were taken on in 2022, because there was turnover due to the shortages in the employment market. We're going to develop the new stop regime in Duiven and raise the availability further, mainly by preventing unscheduled stoppages. The thermal conversion installation (TCI) had a stoppage of a few weeks in 2022 due to the low availability of pulp, but we have entered into new contracts which should prevent this happening in 2023.





'The nicest work is modifying an existing installation'

Teun Kalle
Reliability Engineering team leader, Rozenburg

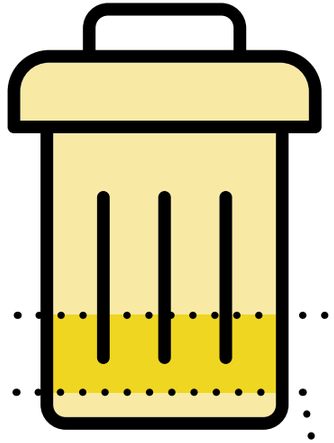
Arie Moerkerk
Reliability Engineer, Rozenburg

Teun: 'We're working a lot on the availability and reliability in the long term of the installations in Rozenburg - on all the places that disruptions can occur, so that people can work safely.
Arie: 'Teun is on the electro, instrumentation and automation side of things and I have more of a mechanical point of view. We complement each other. If an installation is shut down during a stop, you can see everything, including damage that won't stop operations now but will require attention in three years. And for the period after that, we have to predict what we're going to come up against and how much it will cost.'
Teun: 'We're also involved in the construction of new installations. We're there from when it's a field of grass until it's a plant. We make sure that maintenance can be carried out efficiently and select equipment and materials in such a way that there will be as few disruptions as possible in the future, and all that for an acceptable price. Not everyone can drive in a Rolls Royce but we do want quality. And we take the wishes of production and maintenance people into account. But the nicest work is modifying existing installations, because then you really have to puzzle.'
Arie: 'Dealing with the interests of departments and managers is also an art in itself. Managers want high availability for the lowest possible costs and in the shortest possible time. Understandable, but those are sometimes conflicting interests and you have to convince them that it has to be more expensive or take more time.'
Teun: 'Our work is still enjoyable, even after 35 years at AVR. I started here in 1987.'
Arie: 'I started in 1988 and we've been working together for a number of years now. The department was split into daily and long-term maintenance in 2011. At that time, the fact that long-term maintenance is really important was acknowledged. Since then, availability has risen from 86% to sometimes 92%.'
Teun: 'We now have a different challenge: finding people with knowledge of installations, who can oversee how everything interacts. The turnover is not high but it is problematic when employees leave. They've cost time and the knowledge is also gone. We're now going to train people who already work at AVR ourselves. That way, they can develop personally. The nice thing about AVR is that technically, you can go in any direction, from old to the very newest. And it's all interesting.'
Arie: 'I go to work with pleasure every day. I know the people and the culture and the installations. And I have the mechanical knowledge to understand disruptions. That's why I dare to take decisions.'

Recycling

Recovering raw materials for high-grade reuse

Residual waste contains colossal numbers of valuable raw materials that are suitable for re-use. And preferably as high-grade as possible. Plastics, for example, or minerals and metals. AVR contributes to the circular economy by recovering those materials from the waste flows. And we close the circuit by supplying them to processing partners. That way, we help avoid the extraction of new raw materials and the emission of greenhouse gases.



Quantity of recovered or separated raw materials

Minerals
(as a % of the quantity of waste)

22.0% −0.8

2022: 22.0%
2021: 22.8%
2020: 22.8%

Metals
(as a % of the quantity of waste)

2.6% =

2022: 2.6%
2021: 2.6%
2020: 2.5%

TopCrete
(kton)

25 −3

2022: 25 kton
2021: 28 kton
2020: 31 kton

Molybdenum
(ton)

120 −40

2022: 120 ton
2021: 160 ton
2020: 163 ton

Plastics
(kton)

25 −4

2022: 25 kton
2021: 29 kton
2020: 26 kton

CO_2 applications
(kton)

43 +1

2022: 43 kton
2021: 42 kton
2020: 31 kton

Avoided emissions

Recycling raw materials and other materials means sustainability gains in a number of areas. It prevents the use of (fossil) raw materials for extraction or production and it avoids CO_2 emissions. In 2022, AVR avoided 232 ktonnes CO_2 emissions in this way. For more information about the avoided CO_2 per recovered raw material see the section CO_2 emissions on page 30.

Post-Separation Installation

KPIs post-seperation	2022	2021	2020
Volume throughput (kton)	382,0	428,1	415,0
Volume output (kton)	24,8	28,6	25,5

Performance in 2022

At the end of 2018, the post-separation installation (NSI) went into operation to separate plastic, foils and beverage cartons from residual waste, for recycling. Since then, the throughput volume, separation yield and output volume have seen a structural improvement. But 2022 saw several operational and technical challenges, so performance of the NSI was lower than the previous year for the first time. We were plagued by a relatively high number of unscheduled stoppages as a result of mechanical problems with multiple components of the installation. So in 2022, we carried out a modification, replacing two optical separators with two new ones that perform better. That improved the separation yield and the quality of foils. The separators we replaced were then deployed to separate more hard plastics and beverage cartons. The modification did not succeed in providing the expected improvement in separation yield and quality in 2022, particularly with the foils. So we started up an improvement project in September and took organisational and operational measure to improve the availability and stability of the installation.

Beverage cartons

In the summer of 2022, the only buyer of separated beverage cartons (in Germany) stopped recycling this material. The energy-intensive paper industry is suffering greatly from the high energy prices and has downscaled production, meaning there's less demand for recyclate. For that reason, at the end of July 2022 and at the request of our recycling partner Nedvang, we decided to stop separating the beverage cartons at AVR and incinerate them with the rest of the residual waste instead. There was still no new buyer for the beverage cartons at the end of the financial year but Nedvang is working on contracting new recycling partners. We expect there to be a new buyer early in 2023 and we will then be able to start separating the beverage cartons again.

Outlook NSI 2023

In 2023, we aim to reach a high, stable availability of the installation and to recover more foils, also improving their quality. We will continue with the actions for improvement that we took in 2022 and which led to positive results.

We have an important project planned for the first quarter. By modifying the wind shifters in both lines of the installation - they suck up the light and dry material - we can prevent unsafe actions during maintenance and disruptions. It will also increase the recovery of foil.

New legislation

There has been much development in the legislation for packaging and packaging waste.
On 1 January 2023, the expansion of the existing (extended producer responsibility (EPR)) for commercial plastics takes force. It will also introduce a system of compensation, from the packaging industry, for source or post-separated plastics from commercial waste. AVR is looking into the possibility of expanding the capacity for the post-separation of commercial waste.

The new European directive, Packaging and Packaging Waste Directive, is in a concluding phase and the Dutch government has further developed the Single Use Plastics (SUP) Directive which took force in 2021. These directives are aimed mainly at reducing the amount of packaging waste, making packaging more suitable for recycling (Design for Recycling) and increasing the sale and application of recyclate.

These new rules are not expected to have a big impact on AVR's NSI immediately, but they will in time affect the amount and composition of plastics in the residual waste being brought in.

Perspective in the longer term

In addition to separating plastics from commercial waste, increasing the number of fractions to be post-separated from mixed residual waste is a possible direction to take. This is also in line with the increasing number of detailed producer responsibilities (EPR) for specific waste fractions, such as the EPR for textile waste which is expected to take force mid-2023.

In the autumn of 2022, AVR took part in an external test to remove aluminium coffee capsules from

the residue flow of the NSI. This took place with the help of Eddy Current techniques, with which the capsules are magnetised briefly with a magnet after which another magnet pushes the cups out of the waste. The test results may possibly lead in the future to specifically separating the coffee capsules for far-reaching recycling.

We also foresee a role for post-separation installations and related sorting and reprocessing operations in specifying the necessary raw material (feedstock) for chemical recycling. There are many projects in chemical recycling in development, in particular pyrolysis installations, for which plastics waste forms an important feedstock. The quality of the feedstock for such processes must meet very strict demands. So as more pyrolysis installations become operational, there is more demand for the reprocessing of, for example, post-separated plastics to make them suitable for chemical recycling.

For now, with all these developments, AVR is focusing on exploring the possibilities and the feasibility. In any case, AVR prefers processes and business models that are aimed at converting plastic to raw material rather than converting plastic to fuel.

Innovation

Recycling of difficult packaging
AVR is taking part in a study to develop innovative solutions for plastic packaging that is difficult to recycle. The partners in this collaboration are Obbotec, Unilever and Rotterdam Municipality. The municipality's participation comes through the Rotterdam Circulair programme, in which Rotterdam chain parties share knowledge and expertise and join to shape the transition to a circular economy. The pilots for an advanced recycling technology, called Selectieve Plastic EXtractie (SPEX), are being carried out by Obbotec's new test factory that opened on 22 April 2022. If the pilots are successful, it will be possible to process more complex plastics, for example from the NSI, into new, high-grade secondary raw materials.

From bottom ash to cement bulking agent
At the end of 2022, we started construction of a test factory in Duiven, for making a cement bulking agent from bottom ash. The project is an initiative of CEMPR, a subsidiary of Blue Phoenix, that is a worldwide specialist in the reprocessing of bottom ash. It is being supported by an EU Life subsidy. The general aim of this demonstration project is to show that even the smallest group of bottom ash can be safely and usefully applied. The product from the previous pilot phase was recognised, both nationally and at a European level, as a substance that can be safely applied. This will lead to a reduction in CO_2 emission in the chain, during the making of concrete, since this substance replaces cement. Extra metals will also be recovered. We expect the first results of this in 2023. The project is in line with the development of new reprocessing technologies where residual minerals can be given a higher-grade application when there is a maximum recovery of metals.

Recycling residue from flue gas cleaning
In 2022, AVR joined the Swedish company, HaloSep AB, to carry out a feasibility study. We looked to see whether the residue from flue gas cleaning can be recycled to divided flows with little or much lower environmental impact. HaloSep offers a patented chemical recycling process for this, that converts fly ash and acid wash water streams from the flue gas cleaning process into a metal fraction and a mineral product. At present, the flue gas cleaning residue is still being immobilized and landfilled. The first step has now been taken and a draft design has been provided, including information for the application for the necessary environment and building permits. If the market study about to follow displays a positive business case, we can integrate this installation into the modernisation of the flue gas cleaning in Rozenburg, the Debottleneck project (see page 46).

Legal ruling on end of waste status CO_2

On 17 February 2022, the State Secretary of Infrastructure and Water Management published the legal ruling on the end of waste status of our CO_2 and it's beneficial for AVR.

There are two criteria that have to be met in order to gain this status:

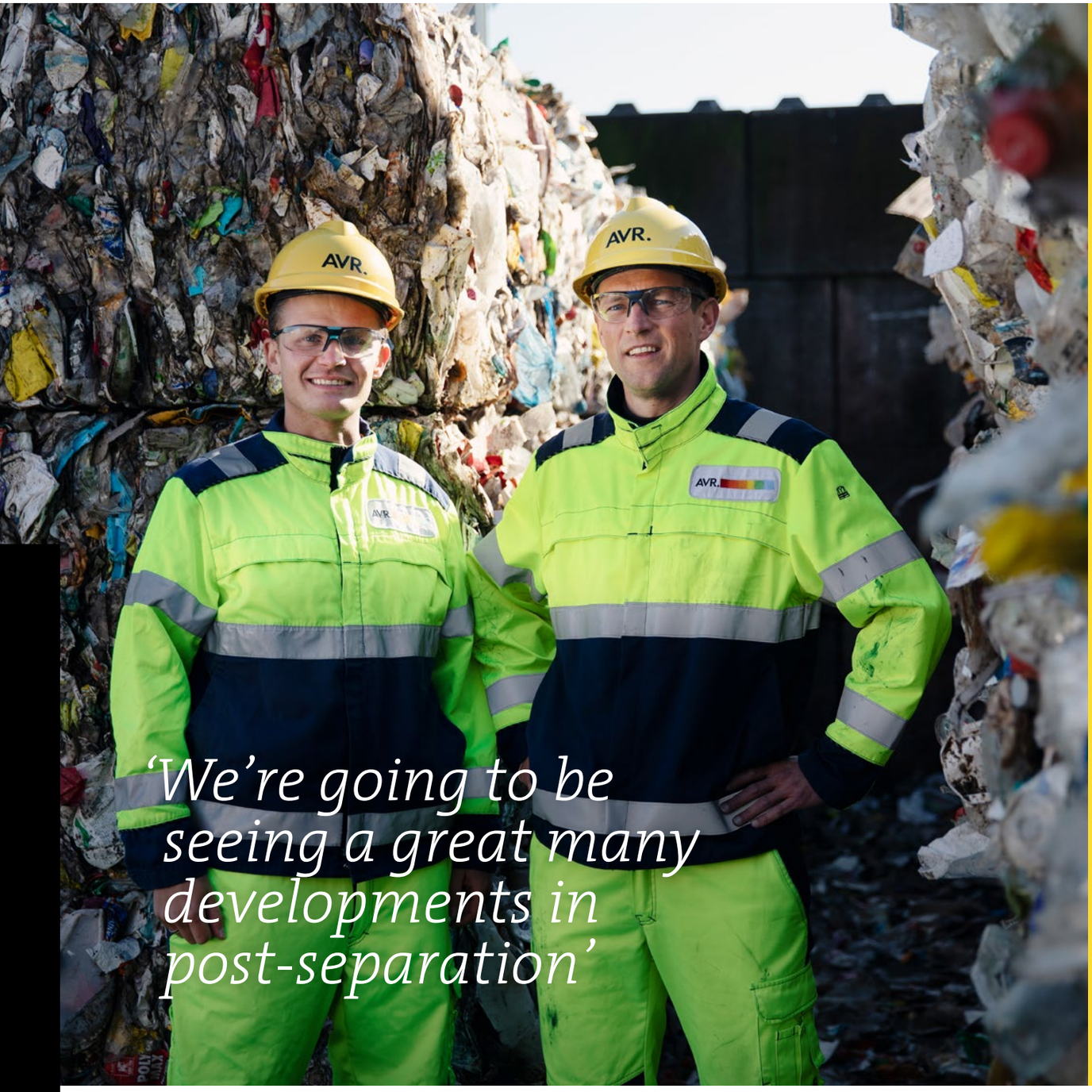
1. *It concerns a waste material.* AVR incinerates waste and in that process, flue gases occur that contain gases including CO_2. After cleaning, the flue gases are emitted into the air through the chimney. That makes these gases waste materials. We recover the CO_2 from the flue gases after cleaning but before they exit the chimney. In other words, AVR makes use of waste materials during the processing.
2. *There is a useful application involved:* In a number of stages, we make the CO_2 that we capture from the flue gases suitable for a subsequent application in another process - the greenhouse horticultural sector. That is a useful application.

The ministry has ruled that AVR meets both criteria. So the CO_2 that AVR captures is no longer a waste material in the sense of the first paragraph of Article 1.1 of the Dutch Environmental Management Act.

This gives all relevant partners in the chain - including horticulturists, industrial gas suppliers, waste companies and licensing bodies - advice and transparency about the safe application of CO_2. A great example of the transition from waste material to raw material.

Importing waste

AVR is regularly asked why importing residual waste is useful. The Netherlands currently has processing capacity available for countries where combustible waste is still dumped in landfill. Dumping waste is really harmful because many landfills emit huge amounts of methane, a greenhouse gas that is between 30 and 70 times as strong as CO_2. Research with satellites showed that from the landfill at Buenos Aires in Argentina alone, 27 tonnes of methane are emitted. The effect of this on climate change is the same as the greenhouse gas emissions from 1.5 million cars on an annual basis (source: SRON in *Science Advances*). CO_2 emissions are not tied to national borders but due to calculation rules, their allocation sometimes leads to undesirable solutions. No flue emissions in the Netherlands doesn't automatically mean there are no emissions elsewhere. If we utilise the spot capacity in the Netherlands, we can limit the import of fossil fuels, like LNG, and help neighbouring countries with the transition to a circular economy. Those countries can subsequently invest in recycling with the help of sorting and recycling installations and harness the existing thermal capacity somewhere else - in the Netherlands for example - for the incineration of their residual waste.



'We're going to be seeing a great many developments in post-separation'

Vincent Matthijsse
Chief Operator of the day shift at the NSI, Rozenburg

Gert Hamelink
Manager Operational Excellence, Rozenburg

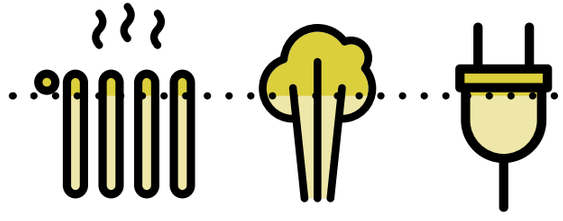
Vincent: 'I was here during the construction of the NSI in 2018 and after several positions, I've been interim production manager since November 2021.
Gert: 'I have been supporting Vincent in his interim role since the beginning of 2022. We're mainly working on maintenance, to increase the availability of the installation, and with the cleaning of the installation and of course, with the most high-grade recovery of materials possible.'
Vincent: 'In the first couple of years, we had a lot of wet organic fraction, a mess left behind after the post-separation. It was on the floor, the platforms and the stairs. It now looks relatively good and you can walk around safely. But I'm not satisfied yet. We're working on that. Everyone who starts work here says: 'What a mess', but you end up loving it and it becomes more hobby than work.'
Gert: 'When I got involved with the NSI, I was often asked what I was doing there but what we do here is the future. And that makes it fantastic. But we've had a bad year, with some recovery in the last quarter. At the beginning of 2020, we switched from the preventive maintenance regime to a predictive one. Preventive maintenance is generally more expensive because you replace things earlier than is necessary. But in 2022, we were faced with a lot of unscheduled stoppages so we had to revert to preventive. One problem was the availability of vital component parts, but we tackled that and the availability has improved. However, we now have to get it up to 80.8% and that requires taking more steps for improvement.'
Vincent: 'We're also doing more to separate foils well. They're in demand in the market but the processors set requirements for the purity of sorted foils and you want to meet those requirements because the recycled product will consequently be of a higher quality. That's how you get valuable applications. I like that about my work.'
Gert: 'That relevance is important to me too. In addition, AVR is a highly technical environment, making it interesting for me as a food technologist. We have a fantastic team too - young and energetic. And we're going to be seeing a great many developments in post-separation. Flows must be better separated for processors and there is more often a demand for other flows in our waste that are also interesting for recycling. Those issues are really innovative.'
Vincent: 'There are government goals, AVR strives towards circular, there will be more and more studies and applications. For example, we're going to test with camera technology and robotics to see if we can improve the purity of foil. Yet another innovative step.'

Renewable energy

Renewable energy from residual waste

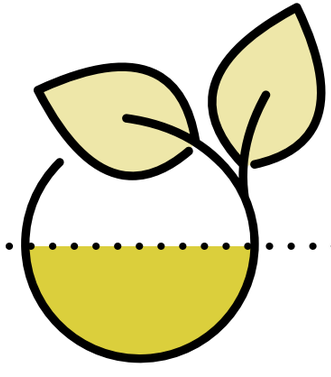
The residual waste that AVR receives still contains many valuable raw materials and materials. We separate them from the waste after which a residual flow is left which is still valuable. We convert it into steam, heat and electricity through incineration. We then supply that energy to industry in our vicinity or to the regional district heating network and the public electricity grid. Since this means that we are preventing the use of fossil fuel, the production of this energy is sustainable.

Total energy output
(PJ*)



7.8 – 0.6

2022: 7.8
2021: 8.4
2020: 8.3



Proportion of biogenic/green in the energy supply
(percentage)

55% +1

2022: 55%
2021: 54%
2020: 58%

* 1 PJ (1 Petajoule) is equal in electricity to 277.78 kWh. And if you were to generate heat using natural gas, you would need 31.6 million m3 to generate 1 Petajoule.

Division into heat, electricity and steam (in PJ)

	2022	2021	2020
Heat	4.9	5.5	5.4
Electricity	1.9	1.7	1.7
Steam	1.1	1.2	1.3

Definition of renewable energy

AVR follows the official definition of sustainable (renewable) energy used in the Electricity Act and by Statistics Netherlands (CBS): energy to which society has access for an unlimited period and the use of which is not to the disadvantage of the living environment or the possibilities for future generations.

Every year the government determines the energy percentage that is fixed in the biodegradable fraction, known as the fixed part. This was 54% in 2022. That means that 54% of the energy output of our waste incineration installations was classified as renewable and certificated with guarantees of origin. The energy we generate in the thermal conversion installation (TCI) in Duiven and in the bio-power plant (BEC) in Rozenburg is 100% sustainable.

The part of the residual waste that is not bio-degradable is also converted to energy in our EfW installations. According to the definition, industrial residual heat and energy from non-biodegradable residual waste do not constitute renewable energy, but they do reduce the use of fossil resources. We also process industrial wastewater to recover industrial residual heat that we then supply to households in the form of district heat.

Results

AVR strives to achieve a maximum yield (energy) from incineration of residual waste and biomass residual flows. We optimise this yield every day based on client demand, availability of the installations and ecological and economic parameters (see also ISO 50001 on page 36).

Customer demand is particularly important in the supply of process steam to industrial buyers and the supply of heat to households that are connected to the heating networks of the district heating companies in Rotterdam and the Arnhem region. The fact is that the demand is determined by the economic market circumstances and by maintenance planning by our industrial buyers, and the temperature outdoors is an important yardstick for district heating although in 2022, it was revealed that the energy crisis also impacts the demand for heat. AVR meets the client demand as contained in the conditions agreed in advance. If AVR is unable to meet all or part of the client demand now and then, we compensate by deploying alternative sources such as auxiliary heat plants (HWC) on natural gas in the city or heating oil for buyers of our district heating and gas-fired steam boilers for our industrial buyers.

Depending on the demand for steam and heat, an electricity portfolio follows, a part of which we use in our own business procedures. The rest is sold on the spot market through a broker or supplied bilaterally on the wholesale market, or supplied to industrial buyers through what is known as a 'direct line'.

The demand for district heat and steam in 2022 did not meet expectations. That was due, in part, to an overrun in maintenance work at one of the large steam buyers in Rozenburg and to the temperature outdoors.[8] The demand for district heat also declined due to the government campaign telling people to set their thermostats to a maximum of 19 degrees, reducing the dependence on Russian gas.

The AVR Energy Desk, that aligns the demand for energy with the supply, continuously anticipated the changing client demand and rapidly rising prices for raw materials and energy in 2022. AVR prioritised the use of industrial residual heat from the Water Treatment installation (WT), for example. That supplied more residual heat in the first half of 2022 because the supply of watery waste flows was larger than was budgeted for. Deploying this heat has priority, from an ecological point of view, because there is no other useful application is for it.

For the good of chain optimisation, AVR bought steam on the Botlek Stoompijp in order to also be able to improve energy efficiency and reliability

[8] Degree days determine the demand for natural gas and district heating. For the calculation of degree days: see https://www.knmi.nl/over-het-knmi/nieuws/graaddagen-in-gasjaar-2021. The number of degree days in 2022 was 2512.1, which is less than the number in 2021, which was also low due to the mild winter: 2818.8.

of supply in the chain. In the slightly longer term, this steam pipe will also have to act as a *common carrier* - that's to say a public transport pipe - with which multiple steam producers (suppliers) and industrial buyers aim to further reduce the use of fossil fuels and with that, of CO_2 emissions. On 24 June 2022, the Rotterdam harbour complex stakeholders involved signed a project development contract for this, to further expand the infrastructure.

Production of electricity was higher in 2022 than was budgeted for, thanks to a lower demand for heat, more deployment of industrial residual heat, an optimum deployment of steam turbines - including the Turbine F that we put into operation late in 2022 - and purchasing of process steam from third parties.

War in Ukraine and its consequences

Russia's invasion of Ukraine caused a great deal of human suffering, and it also had a huge influence on the energy markets. The economic boycotts on goods and the lower supply of Russian natural gas to the European market were reasons for concern about certainty of supply and led to great volatility in the prices. The high spot prices for electricity, combined with the rising natural gas prices - which had already risen in 2021 - led to exploitation subsidies (SDE+) for AVR for the supply of energy falling off in 2022. In the case of these subsidies, it is assumed that the provider of a sustainable energy source will also receive more market income when energy prices rise. In practice, this is more nuanced since district heat prices are fixed for a year - the point of reference is a day in December in the year prior to the supply - and AVR operates a price risk policy which means that in the year of supply, a minimum of 80% of the price risk is fixed by way of hedging[9]. The higher market prices for the non-fixed part of the price resulted in more revenue on the energy portfolio but a large part of that extra revenue was negated by subsidies falling off and higher costs for the necessary auxiliary and raw materials (including biomass).

AVR also provides services intended to preserve the balance of the Dutch high-voltage grid. The demand for this was 250% higher in 2022 than in 2021. There is more reliance on the available capacity for adjustment of all parties connected to the Dutch power grid because and increasing number of sources (sustainable) are being connected that are not, or only to a limited extent, adjustable.

Acquisition Heating Company Rotterdam

At the end of 2021, Rotterdam Municipality decided to discontinue financial support to Heating Company Rotterdam. A procedure followed, in accordance with the WHOA (the act on the confirmation of out-of-court restructuring plans) which led to the sale of Heating Company Rotterdam to Vattenfall. With that, the continuity of supply in the Vattenfall concession areas in Rotterdam is safeguarded. AVR is in talks with Vattenfall about future expansions to Leiden (WLQ+) and commercial agreements that are in line with the new Dutch Heating Act announced.

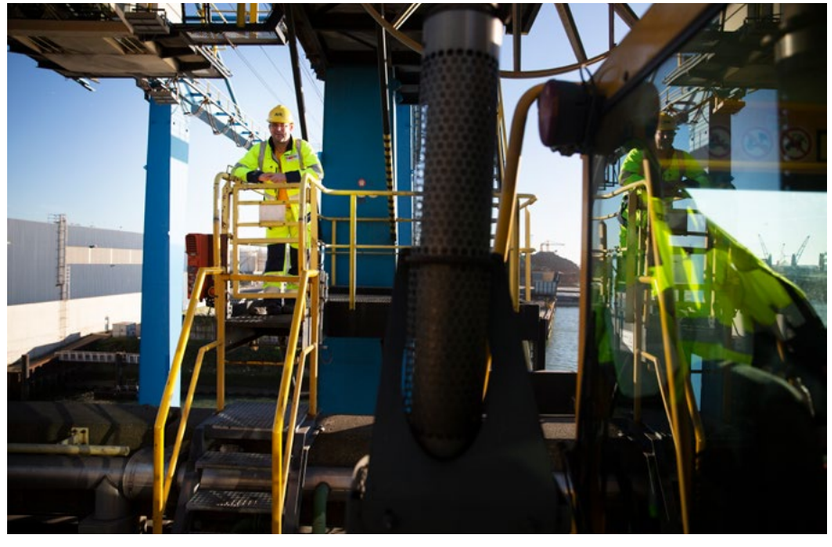
Future-proof AVR

Maximising the energy yield is a part of one of AVR's three strategic pillars. Safeguarding and

[9] Hedging is forward hedging: buying future production of electricity in advance for a fixed price in order to protect against future drops in price.

implementing our energy management in compliance with ISO 50001, which we have been doing since March 2022, is a good example. In 2022, we were able to capitalise on the first full year that our new steam back pressure turbine F was in operation in Rozenburg, and a follow-up study into the future resilience of our existing turbine parks in Rozenburg and Duiven is ongoing. Plans for large-scale CO_2 capture in combination with the expected development in demand from district heating offers prospects for further optimisation, including continued cascading of heat application at temperature. One of the optimisations being looked into is extra recovery of low-temperature heat from the flue gases. We're also investigating the feasibility of storage - such as in the form of hot water or of electricity in batteries - and further flexibility (power-to-heat). A good example of this is the track we've started up with Waterschap Rijn en IJssel to look into whether residual heat from our flue gas cleaning can be deployed for the fermentation process, resulting in more 'green gas' being applied usefully.

AVR is closely monitoring the development of new processing techniques for residual waste. There are various research tracks for the processing of specific waste flows. For example, we are researching separation techniques and thermal pressure hydrolysis with Rotterdam Municipality and Obbotec, a developer of solutions for the re-use of organic and plastic waste flows.



Consequences of policy and legislation

The EU has decided to introduce a price cap for producers who generate electricity with inframarginal techniques (with lower marginal costs) such as renewable power sources including sun, wind, waste and biomass. The Netherlands will adopt this price cap from 1 December 2022 through 30 June 2023. There will be a differentiated tariff of €240 per MWh for biomass and €130 per MWh for the other inframarginal techniques. The legislation (fiscal) needed for this is expected to be put before parliament for approval in the first half of 2023. AVR's product portfolio is fully covered by this measure but the existing (long-term) price agreements and any financial hedge positions will be considered in determining this. The government intervention in existing energy trading markets could affect the liquidity and with that the possibilities for covering price risks. AVR is keeping a close eye on these developments. Where necessary, we will adjust our risk policy.

In October 2022, the Minister for Climate and Energy announced that a majority of shares (50% plus one share) in new heat networks must become public property by 1 July 2024. There will be an assimilation period of seven years (from July 2024 through July 2031) in which municipalities must allocate heat production companies to parcels for which public ownership is not yet possible. Existing heat networks are exempt from this obligation for 30 years or for the remaining duration of a concession. After that period, they will be expropriated. A new tariff scheme will also have to be introduced on 1 January 2025. As a result of these decisions, several private heat production companies have announced that they will be making no new investments for the time being. In his letter, the Minister acknowledged that deciding on public infra will slow down the achievement of the climate goals in built-up areas in 2023. This announcement has no consequences for AVR in the short term because we supply energy to existing concession areas. The adjusted tariff scheme is expected to become an element of negotiations, new or renewed.

AVR is holding national and international consultations with stakeholders in the heat production chain to reach a uniform allocation of the CO_2 emissions to the heat supply. What is known as a CO_2 emission value is allocated to the heat (district heat) that AVR supplies, on the basis of the fact the more electricity has to be produced elsewhere in the country, while there is already also a CO_2 emission linked to the primary waste processing procedure. AVR advocates seeing heat from a waste incineration installation as residual heat and allocating emissions to only the primary process. This will prevent double-counting and the CO_2 footprint of a heat network can be reduced even more, while the reduction goals for the waste processing installation continue to be enforced.

'I find getting the maximum energy out of the installation with each other the most important thing'

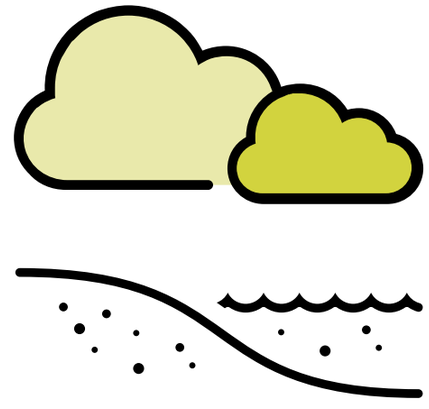
Kasper van der Veen
Production Manager, Duiven

'I started work at AVR in 2007 as a process technician and for the last two years, I've been head of Production. My position covers all the production units in Duiven, so that includes those for energy, heat and CO_2.
The energy supply in Duiven works differently to that of Rozenburg. In Duiven, we have developed an energy model that includes the outdoor temperature, and that determines the heat demand of the heat network. Using this model, we predict every Friday the heat demand for the following week. On the basis of the quality of the waste and the planned deployment of the installations, we calculate how much energy we produce next to that. We supply a large part of that to the electricity grid. A market price is determined based on demand and supply of the total electricity grid. That can also be negative. Taking this market price, AVR can adjust the business operations, to a limited extent. To do that, the energy desk in Rozenburg gets together with the foremen in Duiven.
Our heat supply goes automatically, because we have a single client - the district heating network. The client communicates with us online. We let the client know how much we have available and let us know how much they want to buy. Subsequently, a matrix determines which heat exchangers will provide the heat. That way, the heat network is served optimally. The client themself controls the flow of water in the heat network so we work closely together.
We budget the production a year in advance. We hedge 80% of it and have the risk of the free market for the remaining 20%. Given the high energy prices, that was a windfall for AVR in 2022, but it can also go the other way. So we continue to consult about our availability. Because if we don't get that 80%, we have to purchase the deficit on the free market and with energy prices as they are now, that's something you want to avoid.
The second CO_2 installation that AVR is going to build also uses heat and electricity. We're currently trying to figure out the output of our steam turbines, because one of the critical factors in such a new installation is the alignment with the existing business operations. It's really nice collaborating with all the departments on that. Things are always in motion here, that's the great thing about AVR. We were the first to come with a large-scale commercial CO_2 installation and now there's going to be a second one. That's making some nice steps towards the circular economy and for the climate. But I find getting the maximum energy out of an installation with each other the most important thing.'

Other emissions

Emit as little as possible

By processing the residual waste, we have a considerable positive impact because we recover raw materials and produce energy. In that process, in addition to CO_2, other hazardous substances are released which we have to deal very carefully with in order not to burden our surroundings or the environment. We clean the flue gases released from the incinerator, sparing our environment as much as possible. To achieve that, we invest heavily in all kinds of technologies.



Rozenburg

NO_x emissions (kg/ton waste)	Fine particulate emissions (kg/ton waste)	Dioxin emissions (g/ton waste)
0.31 +0.02	**0.0026** +0.0002	**0.00000028** +0.00000016
2022: 0.31	2022: 0.0026	2022: 0.00000028
2021: 0.29	2021: 0.0024	2021: 0.00000012
2020: 0.31	2020: 0.0035	2020: 0.00000017

Duiven

NO_x emissions (kg/ton waste)	Fine particulate emissions (kg/ton waste)	Dioxin emissions (g/ton waste)
0.26 +0.02	**0.0023** +0.0006	**0.00000012** −0.00000005
2022: 0.26	2022: 0.0023	2022: 0.00000012
2021: 0.24	2021: 0.0017	2021: 0.00000017
2020: 0.23	2020: 0.0019	2020: 0.00000023

Definition of other emissions

Our process results in the release of not only CO_2 (see the section on CO_2 emissions) but also of other harmful substances such as nitrogen oxide (NO_x), particulates and dioxins. To this end, we have established KPIs on which we report in this annual report. The residual waste we receive also contains substances of very high concern (SVHC). We call the emissions of all substances other than CO_2 'other emissions'. Under this heading, we also include the smell from the residual waste we process, the noise made by our activities and litter on our grounds.

KPI: Nitrogen (NO_x)

The industry is responsible for 2.1% of the nitrogen emissions in the Netherlands (compare: agriculture - in particular livestock farming - emits 45%). AVR is on the list of the 100 largest industrial sources of NO_x. In order to reduce NO_x emissions, ammonia is added to the flue gases, converting NO_x to nitrogen and oxygen. The yield of this process is not 100%, so there are always some NO_x emissions. Not only that, but there are ammonia emissions because this process also fails to give a 100% yield and the ammonia not absorbed by the reaction described is emitted through the chimney. We carry out multiple projects with which we minimise the effects of process disruptions and in turn, of the emissions.

We're looking into whether reductions are possible in the industry. New legislation on this is expected in 2023. The government's goal is to make tailored agreements with companies that have high CO_2, NO_x and NH_3 emissions. AVR is keeping a close eye on these developments, because they could affect the lead time on new projects. There are projects running with which AVR can meet the new norm in the long term.

KPI: Total dust (particulate)

Our major tools for curbing particulates are electrostatic filters. They are a component of the flue gas cleaning installation for dust extraction which is the first step in cleaning the flue gases leaving the grate incinerator. The unit 'kg emission per tonne of processed waste' was set up to interpret emissions that can vary as a result of changes in business operations.

KPI: Dioxins

Dioxins occur in minute amounts in the flue gases and cannot be measure continually. We have measurements carried out twice a year, as is legally required. Because dioxin emissions are measured only twice a year and are difficult to estimate on the basis of process parameters, we notify DCMR Milieu Rijnmond, our regulatory body, immediately if the threshold value of the emissions is exceeded. In such a situation, we also schedule a remeasurement in the very short term. If that measurement reveals deviations, we shut down operations of that installations for inspection and maintenance. After operations recommence, there is another measurement to check the emissions and the effect of the flue gas cleaning. A remeasurement is needed to check the accuracy of the measurement.

Stopping and restarting the installation in between times is accompanied by extra emissions. In addition, it takes a while before the flue gas cleaning is operating stably again and the installation operating representatively for remeasurement. For those reasons, we agreed the following procedure with DCMR: if a measurement gives an increased value in the future, there will be a new measurement within just a few workdays. We will only cease operating the installation if the second measurement confirms an increase in emissions.

On 2 November 2022, the emissions of dioxins showed a peak in the flue gases from the biomass power plant. 80% of the load in Rozenburg (so 80% of 0.00000028 grams per tonne of waste) is attributed to this sample collection. The calculation of the load is based on three observations, taking into account 100% of the emission excess in the period between 2 and 24 November.

Carbon monoxide (CO)

The change in the composition of the waste mix (see also Reliability of supply on page 42) results in disruptions to the process that lead to slag in the installation and this in turn affects the CO emissions. The degree of emissions says something about the completeness of the incineration. Since 2019, several optimisation projects on this

have been running, including deploying our special slag team. This leads to a better and more manageable incinerating process and with that, to a reduction in the number of occurrences of exceeding the daily CO average (see Tom Huntink explains about daily averages on page 79).

Serious incident with illegal mercury being brought in

On 22 September, an increase in mercury emissions to water was measured during AVR's daily checks of the water purifications. We measured unexpected, extremely high concentrations of mercury in the process checks that followed immediately. We decided to take Line 1 of the water purifications out of operation straight away and switch to reserve Line 3, assuming that the mercury concentrations measured were the result of a failure in the water purification. After the switch, the concentration of mercury increased in the wastewater from Line 3 too. On 22 September, we notified Rijkswaterstaat[10] directly about the incident and subsequently continually shared all measurement data with them.

The additional process inspection on 23 September made it clear that the cause was in the waste. A load containing mercury had been delivered, despite the licensing and commercial agreements. The pressure on the water purification was so great that the capture capacity available was not enough to be able to discharge within the threshold value of the emissions. A total of between 8.4 and 9.6 kg of mercury landed in the Nieuwe Waterweg, most of it on and shortly after 22 September. In addition, all the ovens showed a significant rise in mercury levels. We had to assume that the material containing the mercury was spread across the tipping area. We estimate the total amount to be between 1,000 and 1,500 kg. On 23 November, AVR once more met the discharge norms for mercury and the concentration had fallen below 15 µg/l.

The consequences for AVR were considerable. The potential effect on our employees was of huge concern. There was unrest because employees might have been exposed. In response, we deployed a stricter policy for personal protection equipment: employees started wearing full-face masks and protective clothing. Blood samples were taken from employees, and because the results took weeks to be made known, uncertainty for the employees lasted a long time. The unrest that quite rightly occurred was a lesson for us: we should have communicated more with our employees. To everyone's huge relief, none of the employees exhibited values that were too high. The potentially huge impact on nature and the water catchment areas was equally worrying, but on reflection that negative impact either failed to happen or was extremely slight. The event also had consequences for our installations. Our water purification was seriously polluted by the mercury and had to be cleaned by an experienced party. The material containing the mercury was stored on AVR grounds until it can be reprocessed by a certified processor.

We went through our own processes to find the party that had delivered the material and we reported it to Rotterdam seaport police. Despite all our efforts, the origin of the material containing the mercury has not been found yet. In consultation with the Public Prosecution Department, Rijkswaterstaat, DCMR and Rotterdam seaport police are investigating the circumstances and handling of the incident for possible criminal and civil legal proceedings. Both the delivery of the material containing the mercury by an unknown party and AVR's compliance with the licensing regulations for receiving and checking waste and the disclosure obligations surrounding such incidents are being looked into. We also informed the sector association (Vereniging Afvalbedrijven) about this incident so that other companies can take precautionary measures.

Impact of global developments

Various developments around us have affected our business operations. The energy crisis has as a consequence that excipients that AVR needs to lower emissions have become scarce and therefore very expensive. We use ammonia, for example, which is a by-product of the manufacture of fertiliser. Fertiliser factories use a lot of energy and have scaled back their production, making it difficult for us to obtain ammonia. Caustic soda, a by-product of the energy-intensive production of chlorine, is also scarce. In addition to the energy crisis, climate change played a role in the form of low water levels which influenced the transport over water of materials we use. And availability of raw materials decreased as a result of the war in Ukraine. Our Purchasing Department has to go to a lot of trouble to find excipients, not only in the Netherlands but also in the Czech Republic, France and Spain. We scaled back our production in Duiven for a short time because we were unable to meet our emissions thresholds due to a shortage of excipients.

[10] Part of the Dutch Ministry of Infrastructure and Water Management and responsible for the design, construction, management and maintenance of the main infrastructure facilities.

Substances of Very High Concern (SVHC)

AVR has a programme for measuring and following up on SVHC. The detailed SVHC reports we made were a help in the mercury measurements because we knew where to look.

In the context of the discussion in the media about the Chemours PFAS discharge, we investigated the extent to which changes had taken place in our own residual flows and emissions in that respect. Nothing particular was revealed. The policy that AVR deploys in the processing of specific waste flows which are suspected to contain PFAS, does not result in demonstrable emissions into water and air. It is however clear that it is difficult to establish the presence of PFAS.

Complaints about nuisance

There were no incidences of smell, litter or noise in 2022. We took extra measures to combat nuisance from smell and vermin in Rozenburg by moving the storage silos for residual waste on our grounds to increase the distance from surrounding companies. This has led to less nuisance from smell. We also covered the silos with nets against flies and other vermin. We had only two complaints in 2022 compared to 11 in 2021.

Plastic catcher

When skipping waste, it's unavoidable that there will be littering. Our location in Rozenburg is situated in a 'dip' in the harbour that waste drifts to easily. We used to fish it out of the water manually with a garbage boat, which was labour-intensive and not always efficient. Since December 2022, we have the plastic catcher: a system that captures all the litter in the water. We collaborated on this with Clear Rivers, the organisation that developed the plastic catcher.

Contact with the local community

We actively make contact with the local community. So in Rozenburg, AVR joined Burengesprek Botlek Europoort. Burengesprek (neighbour's dialogue) is a platform on which companies, partners and authorities maintain an open dialogue with residents from surrounding municipalities. The partners are Rotterdam Municipality, DCMR environmental agency and Rotterdam-Rijnmond Safety Region. The dialogue is shared on the Platform's website, Facebook page and Twitter account and, where possible, physical meetings are organised.

Although there is a reasonably large distance between AVR's facility in Duiven and the inhabited world, maintaining good contact with local residents is important there too. AVR participates in the InnoFase Taskforce (Innofase is the name of the industrial estate in Duiven where the AVR facility is located), focusing primarily on communication with neighbouring companies. Taskforce InnoFase is all about collaboration and consumption of raw materials and energy. The industrial estate has been voted the most sustainable one in the Netherlands. One new development is research into a Smart Energy Hub on the industrial estate. AVR takes an active part in the Gelderse Energieakkoord and the Green Metrolpolitan Region. AVR has good contact with Stichting Milieuvrienden Duiven (Environmental Friends Duiven). That association strives for a good working and living environment for residents of Duiven and the surrounding area and for the preservation and improvement of nature, the landscape and natural-historical values. AVR is also involved in Duiven in Milieu Gelderland and we participate in Groene Allianties de Liemers – a regional collaboration of the promotion of sustainability and circularity between companies.

'We ask for a little more leeway in order to reduce emissions'

Tom Huntink
SHEQ coordinator , Duiven

'I am the point of contact for the competent authorities when it comes to the environment permit that contains the emission norms for AVR in Duiven. The daily and monthly averages apply to emissions. The latter is not set up so that you can do your best for the first 20 days and just let things go for the rest of the time. The daily average prevents that happening.
Paper cannot be recycled any more after seven times. Pulp is what remains and we incinerate that in the thermal conversion installation, the TCI. That has a daily average for the nitrogen emissions and we sometimes exceed that average. The quality of paper pulp varies greatly and there's no such thing as 100% pure pulp. The technical measures we took turned out not to be enough for all situations. The problem lies in the balance between fuel and air in the pulp feed.
We press the paper pulp brought in through a matrix with holes in it to make pellets, so that we get a nice, constant incineration. But one stone or a glove in the pulp and the system blocks. That causes the incineration to change and a peak in emissions occurs. If that happens, you have to compensate the rest of the day for that peak in order to stay below the daily average. In Duiven, we have a daily average for the NO_x emissions that is equal to the monthly average. It's better for us to work with a strict monthly average and a slightly more favourable daily average. That way, we emit less nitrogen. So we actually ask for a little more leeway in order to reduce emissions. We're in talks with the competent authorities about that.
This work gives me energy, I really like it. I'm an environmental scientist and now act as intermediary between the government and industry. I speak both their languages. And in the discussion about nitrogen, you have to understand which tightrope the licensing authority is walking. It's not a question of unwillingness on the part of either side, we're both trapped in a system and we need to understand that about each other.'

'We discovered the mercury violation thanks to our daily sample checks'

Oscar van Vuuren
Account manager Sales Support, Rozenburg

'I'm a member of the commercial team and I mainly maintain contact with clients who supply commercial waste, hazardous waste, waste wood and wastewater.
In September, during regular process checks, extremely high concentrations of mercury were observed in the washers and water purification of our EfW installation. We had never before experienced such a significant violation. The Production and SHEQ departments - which deal with environment and safety - and the laboratory subsequently worked incredibly hard to get the mercury out of our process as fast as possible and minimise any more mercury emissions. It was no easy task.
On the basis of measurement data, it was clear that a large amount of material containing mercury had been brought in illegally. Mercury and mercury fumes are colourless and odourless and mercury also has a high specific gravity so a relatively large amount is still limited in size. That's why we were unable to observe it during the discharge and accompanying acceptance procedure.
We subsequently tried charting every possible delivery in order to ascertain who had brought it in. To do so, we collected all the available data, photos and camera images that the logistics department gathers through the weighing system and also the data from our own acceptance app. We expect the load was tipped in the tipping area for hazardous and special industrial waste. Our department approached every client who delivered waste to that area in the previous 48 hours, and asked them if there was any risk of such amounts of mercury having been present or if we could exclude those loads. You have to word such questions carefully; you don't want to make accusations straight away but you do want to be able to eliminate things. On the basis of their responses and additional analyses, we were able to exclude many waste flows delivered but despite all our efforts, we have unfortunately been unable to ascertain the source. We handed the follow-up investigation over to the competent authority.
A multidisciplinary team was set up to study possible measures and scenarios with which to prevent incidents like this happening in the future. Because a repetition could have huge consequences for our business operations and for delivering on agreements about waste processing and energy supplies.
The mercury violation was discovered thanks to our daily measurements and sample checks for the control of our internal procedures. So AVR does well, continually monitoring emissions into water and air. It would be interesting to know whether other waste processing companies also observe such increases in emissions. There are now talks about that in the sector association now.'

Main theme

Social

Theme 2 of the ESG

Themes with a social impact, in particular, are covered by the S in ESG, for Social. At AVR, those are Safe Work Environment, our most important material theme and Sustainable Deployment of our Employees.

Subthemes

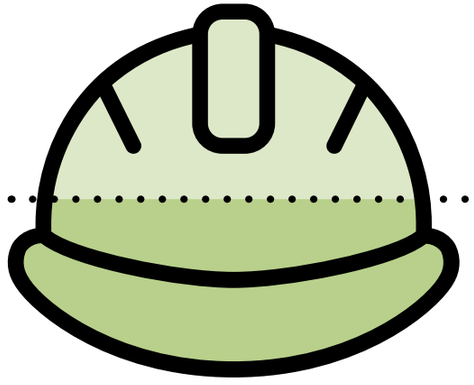
Safe working environment

Sustainable employability

Safe working environment

Safety as a top priority

There are complex installations at AVR and they operate 24/7, so our employees have to be constantly aware of the dangers. Working safely is therefore our number one priority. We pay a lot of attention to the safety of our employees and anyone else on our grounds. Keeping an open dialogue about this is one of the ways of increasing awareness. Our goal: to send everyone home safe and healthy after every workday.



IF rate*

3.3 +1.7

2022: 3.3
2021: 1.6
2020: 2.4

Number of Safety Observation Rounds (SOR)

1,435 +44

2022: 1,435
2021: 1,391
2020: 1,167

* The IF rate (Injury Frequency rate) is the number of accidents resulting in sick leave per million hours worked (throughout the calendar year

SOCIAL

KPI: Accidents

Our IF rate increased to 3.3. There were relatively many accidents. The number of accidents for which medical treatment was necessary and accidents after which an employee had to do modified work more than tripled: at the beginning of the year, the Total Recordable Cases Frequency (TRCF) was at 7.3 and it rose to 14.7 at the end of 2022. The statistic for Lost Time Incidence (LTI) which stands for accidents involving sick leave was 4. The 'almost accidents' were extremely worrying in particular. The cause can be found in insufficient training and too little awareness of and focus on safety in both employees and management.

In 2022, we had an external consultant analyse our safety performance (see also Roel de Bijl explains on page 90). The results of that analysis have led to us getting ready to launch a safety culture programme on 1 January 2023, the core of which is safety leadership. It centres around the idea that all employees take responsibility for their own safety and that of their colleagues. Our goal is to see everyone be able to go home safe and healthy when they finish work and in order to achieve that, AVR has to create a safe place for all employees, contractors and visitors and to work on safety awareness.

We're taking the work permit procedure as starting point for focusing on behaviour and awareness with regard to safety. In that framework, the safety culture programme has a number of components with which we want to close the gaps in the safety mentality.
Firstly, we want to learn from incidents in order to prevent repetition. Creating awareness of the employees' own actions is central to that. We want to reduce the number of outstanding reports and speed up settling them. The incident reports have to be analysable too and we want to create a focus on potentially large risks.

The second focus point is Lock-Out/Tag-Out, LOTO for short. This refers to securing the work environment for maintenance, which means that there is a chain of measures necessary before you finally have a safe situation in which an employee can get to work. For example, completely switching off an installation before maintenance can be carried out, or switching off electricity before an employee starts working on equipment.
The third point in the programme is working on improving order and tidiness and preventing any exposure to hazardous substances such as fly ash, washing water, wood dust and a-cokes. Here too, creating awareness and ownership in employees is important, so that order and tidiness become structurally safeguarded. In addition, we are raising the standard in a number of problem areas where exposure occurs.

In all subject, we are improving the procedures but also paying attention to the work methods in the workplace, the behaviour and the available resources. Safety leadership is central and we are measuring the progress on three priorities. If we meet the requirements on one priority, we move on to a new subject.

Contractor management
In 2022, we focused a lot on contractor management because contractors on our grounds most often work on the installations, with the risk of an accident. We are responsible for offering everyone a safe workplace and that also means that a contractor must work according to AVR's safety regulations. To realise that we are improving the onboarding of contractors. Until recently, external employees were not included in our training programmes but that is about to change. We're going to make sure that a contractor knows exactly which rules we adhere to and what is potentially dangerous. This component is also included in the safety culture programme.

KPI: Number of Safety Observation Rounds

Our target is a minimum of 900 Safety Observation Rounds (SOR). We have been exceeding that number for several years now: we're approaching the 1500. The corona period has not affected the number of rounds. During the SOR, we hold regular talks with employees about working safely, to raise awareness of it. We're also going to use the SOR in the safety culture programme.

AVR Safety Award

Contractors and sub-contractors spend many hours at work on our grounds and things sometimes go wrong. Not wanting to focus only on the latter but also wanting to note what does go well, AVR has presented the AVR Safety Award every year since 2017 to a contractor who demonstrates excellent quality in the field of safety. In 2022, the prize went to Bang&Clean, the company that carries out detonative cleaning work on our installations in Rozenburg and Duiven: the slag and other pollution in the boilers is removed using explosives. Bang&Clean is proactive in exchanging ideas on safety and provides useful input in the contractors' meetings. Plus, there have been no incidents involving Bang&Clean in the past year. The prize was presented in February.

'There is much to be improved in the field of safety, especially in the human factor'

Hans Kort
Foreman, Rozenburg

Jos de Haan
Site manager, Rozenburg

Hans: 'I've been working at AVR for 35 years and I've been a foreman since 2004. I enjoy that. I've also been a volunteer fire-fighter for 30 years, so I have a lot of experience in the field of safety.'
Jos: 'I came to work at AVR eight years ago and I've been site manager since 2021. As such, I'm kept busy with safety awareness.'
Hans: 'Safety awareness is for everyone, from the highest position to the lowest.' It's safe in an office but in a factory, you're confronted every day with the importance of working safely. For example, our installations are 50 years old and wearing, with the risk that hazardous substances could unintentionally be released. It's no longer enough to carry out emergency repairs if the installations leak anew, resulting in them having to be shut down in the end for definite repairs. That's now been put on the map.'
Jos: 'The installations from the 1970s were built to the standards in place then but the requirements have changed drastically since then. That's a challenge. And employees are right to be critical of that. On the other hand, there were also accidents, near-accidents and medical treatments that could easily have been avoided. One argument frequently heard is that in particular other people or other departments have neglected the safety surrounding critical matters. Employees place their own influence with others while they could often do more themselves. Everyone is responsible for their own safety and that of their colleagues. We're good in procedures at AVR, and in thinking up modifications to the factories but much can still be improved in the human factor. For that reason, we are starting a safety programme next year aimed at increasing awareness.'
Hans: 'There are some things that you score easily with, such as a tidy workstation. But safety awareness goes much further. That's a question of knowledge, ability and discipline and it sometimes requires a sound plan of action. You often see a bit of nonchalance, in the sense of: just quickly do this. Under pressure, you take well-intentioned risks that in retrospect were not so smart. For example, if your goggles steam up in a hot environment and you take them off in order to see better, that's dangerous because you could get something in your eyes. So what is the safe solution? Clean the goggles and put them back on. We have to call each other to account and carry on the dialogue. Because we want everyone to be able to go home healthy after finishing work.'

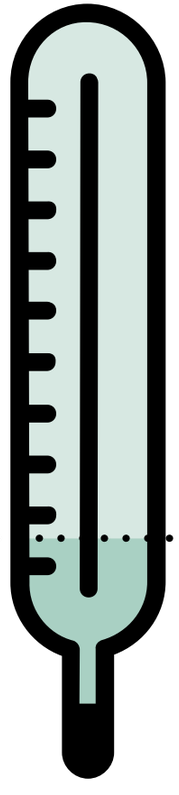
Roel de Bijl
Director Operations

'As Director Operations, safety and environment are my responsibility and we discuss performance in these important areas very frequently at board level. A good environmental performance is our licence to operate and safety is our primary priority. There is more chance of something going wrong in our installations than there is at home on the couch. It's our responsibility, as management, to minimise risks and set a good example. At the same time, everyone at AVR has a responsibility to work safely.
The number of accidents rose during 2022 and the number of medical treatments more than tripled. There were also near-accidents which could have gone very badly. I became concerned about that in the spring of 2022. We were also hearing from the employee satisfaction survey and the Works Council that employees were becoming increasingly worried about their safety. So something really had to happen.
In the summer, we engaged a really experienced former operational director from the petrochemicals industry to advise us on how to improve our safety performance. He made a quick scan in Rozenburg and Duiven which then served as a critical sounding board. We discussed his analysis and recommendations in detail with the operational management team and on 1 January, we launched a multi-annual AVR-wide safety programme.
Since contractors are often involved in accidents, we also asked them what kind of things they come across and we involve them intensively in the safety programme. As management, we intend to work more actively and with more focus on safety and to that end, we have started a monthly steering group where the consultant will continue to support us for the whole year.
There is still a lot to be done. For example, we have to train new employees and contractors better, and we should continue to train our own regular people to keep them alert to the importance of working safely. Thoughts such as: 'We've been doing it like this for 20 years already,' or: 'I've done this so often, that safety check really isn't necessary' can end badly. In our industry, you have to be alert all the time, for yourself and for your colleagues. And also be prepared to learn, to improve and to do things differently. If an accident happens, everyone is really shocked but all too often, that alertness dwindles again. We have to learn more from accidents so we can prevent them. My responsibility is increasing that awareness and keeping it increased. It's a tough process that takes constant attention.'

Sustainable employability

Fit and energetic employees

AVR would not be what it is today without fit and healthy employees. And because we like to see our employees give of their best and be fit, we contribute a lot to vitality. Growth and development make the work interesting for our employees so we offer a wide range of training courses and opportunities. That way, they come to work with pleasure and are able to apply their workmanship, knowledge and talents to the utmost.



Sick leave

5.7% + 0.7

2022: 5.7%
2021: 5.0%
2020: 5.4%

Definition of sustainable employability

Sustainable employability is a material theme because energetic, fit employees form the basis of our company. Our success depends, to a great extent, on how resilient, energetic and knowledgeable they are. That's why we focus a lot on our employees' health and well-being.

KPI: Sick leave

The average percentage of sick leave at AVR in 2022 was 5.7%. However, for a large part of the year, our sick leave was well below 5%. And that was significantly lower than in the sector, where it fluctuated around 6%. Sick leave in the first quarter of 2022 was 7.5% and that pushed up the average resulting in the annual figure being higher than that of 2021.

We took a number of measures to keep sick leave numbers down.

In 2022, we introduced sick leave 'grids' that made sick leave and frequency of reports and sick leave per department clearer so that we could determine which actions were necessary. We charted structurally the frequent sick leave per department. The employability coach/case manager asked the direct supervisors which actions they had taken to reduce frequent sick leave in the department. In a number of cases, employees were invited to an interview about the frequent sick leave and in others, the direct supervisor was able to provide the report of an interview. On the basis of those reports, the employability coach/case manager offered tailored recommendations on how to increase the quality of the interviews, such as making a follow-up appointment and checking whether there are any structural limitations which need other interventions in order to prevent long-term absence.

There were also structural consultations about the vitality budgets of Rozenburg and Duiven. The one for Rozenburg was fully used and that of Duiven more or less. The referrals by the company physician ensured that employees received the right treatment to shorten or prevent sick leave.

AVR gave the company physician, the employment expert and the employability coach/case manager a guided tour. That led to the workload of a number of jobs being re-charted so that the experts can determine the right process for the reintegration, with the aim of shortening the sick leave.

KPI: Education and training

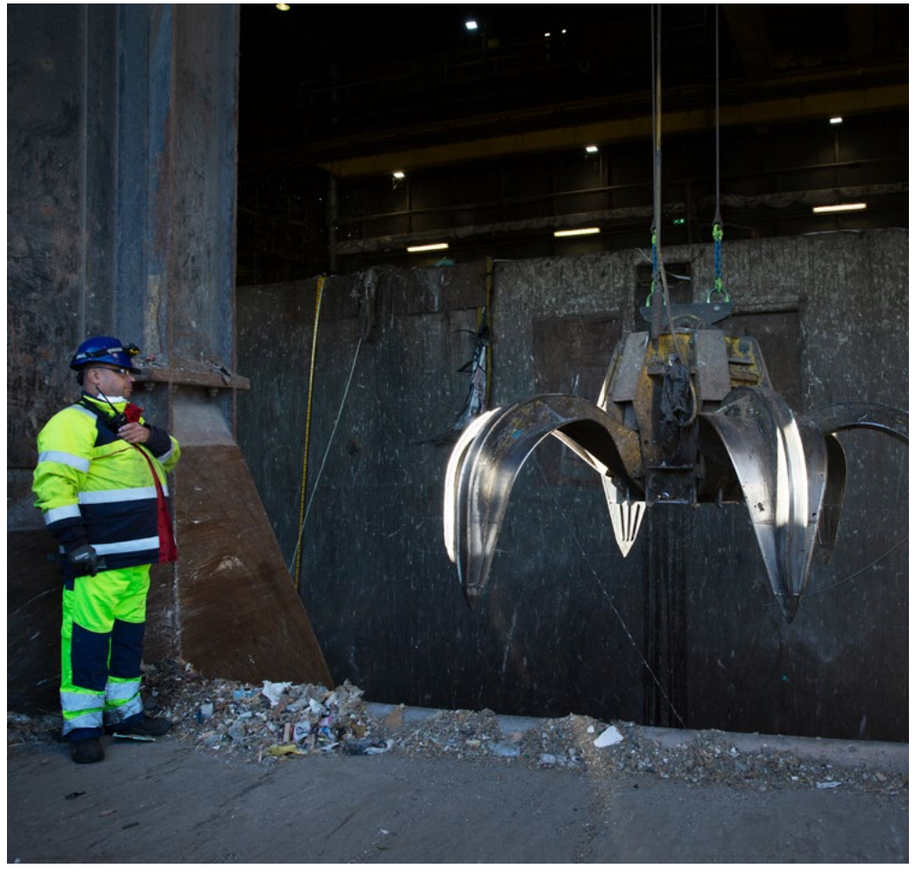
Training and education	2022	2021	2020
Training costs as % of gross wages	3.2%	2.4%	2.5%

Training courses in the field of safety and for Emergency Response Officers (EROs) are well attended. In 2021, 90% of these compulsory training courses were taken, and in 2022, this was even 94%. We don't achieve 100%, because it's difficult to schedule free time for training courses for our employees, particularly those in shifts. Therefore the courses are regularly rescheduled, but eventually the vast majority of the courses are completed. In collaboration with the SHEQ Department, the supplier and the production departments, the Heatstress training course was modified and organised, in both Rozenburg and Duiven. This training course is important for AVR because work is often carried out in extreme temperatures.

Leadership programme

The Logistics Department started a leadership programme in 2022 for all foremen and assistant foremen in the department. The basis was an Insight Discovery profile, aimed at giving insight into the personal preferred styles of behaviour, and also that of others in the team. The insights ensure more mutual understanding and improve communication and collaboration in the department. In additions, the participants set personal goals to work on, with a coach. In 2023, the Leadership programme will be developed further.

The Young Potentials also started up a leadership programme. They started with the same Insight Discovery profile and went on to be coached in subjects such as inspiring and coaching, dealing with difficult situations and finding the key to personal leadership. The group was enthusiastic and has set personal goals which will be followed up on in 2023.



In Duiven, a number of first operators started their chief engineer training with which they can go on to become chief engineer and foreman. The programme will be supplemented in 2023 with a leadership programme that is aimed at their future role as supervisor.

Getting to know Lean and the AVR process

We have developed a game in which we can combine Lean awareness with knowledge and optimisation of the work process at AVR.
Lean is a work method aimed at reducing wastage to get the maximum value from the work. In 2022, we gave ten training sessions to a total of around 100 colleagues from various departments. The training sessions are fun, accessible and suitable for everyone. During the sessions, the basic principles of Lean are explained using a simulation of our own process: from collecting waste to selling energy. We're going to continue this in 2023.

Internships at AVR

AVR is very positive about offering internships. Interns form an important source of recruitment for new and good employees and help raise awareness of the name of AVR. Successful internships often result in a positive appearance to the various training institutes. So AVR increased the internship allowance in 2022. We also made it extra interesting for interns to come to work at AVR after their internship by offering them a financial incentive. This scheme has not been running long enough to result in more permanent staff but it has provided 18 extra internship placements in Production, Maintenance, NSI, HR, Operational Excellence and the Vessels department. It's a result we're proud of.

Number of employees

At the end of 2022, AVR employed a total of 475 people (464.2 FTEs). This includes interns in the professional practical skills course but no other interns.

Employee satisfaction survey

The outcomes of the employee satisfaction survey (ESS) are important for us as a guideline in leading AVR. We want AVR to be an organisation where everyone feels seen and heard. Every opinion counts and is equally important.

NPS stands for Net Promoter Score. That is a number between -100 and +100 that indicates how likely an employee is to recommend AVR as an employer. AVR's NPS was significantly improved in November with a -9 compared to a -18 in May. We're heading in the right direction.

The 'distance from and to the board', which was mentioned as a problem in previous ESSs, has become shorter. It might be too soon to draw conclusions but we believe that two matters have contributed positively to the improvement in employee satisfaction. In March 2022, we launched the Connection Project, with meetings and communication sessions with the board and managers from various echelons of the organisation and employees.

There is also increased focus on safety, for which programmes have either started in the meantime or will start soon.

The results of the last ESS will be processed and discussed at a departmental level. For example, we will be looking with the supervisors at what runs smoothly in the departments and where improvement is possible or necessary. On the basis of that we will determine together steps for realising improvement.

Inflow, through-flow, outflow

Inflow (Get Started)

At AVR, we strive to let every employee get the best out of themselves, making them become and remain sustainably employable. That starts as soon as a colleague comes through the doors as a new employee at AVR. It's important to us that new employees feel at home quickly and find their way around. For that reason, the introduction programme was developed in 2021. It is kept up to date continuously in line with the developments at AVR. For example, an app was added to the programme in 2022. New employees are given a link to that app which gives them access to all major subjects in the introduction programme.

Through-flow (Be your best)

AVR is keen to get employees enthusiastic about making sure they work at AVR healthy and happy and with the most up-to-date knowledge. What they need to realise that differs from one person to another. During the performance review with the

supervisor about their employability, they discuss which area an employee would like to develop further in or needs support in.

Be Expert
Knowing what you're doing and why is the basis for working well, safely and with pleasure. That means that employees make sure they are always up to date with the latest developments in their professional field. There are enough options for development or promotion to another position. This is often a matter for tailoring. AVR likes to invest in employees who want to develop themselves.

Be Fit
Our vitality programme Be Fit prevents sick leave and supports the vitality of our employees. That support is possible in a number of areas. Some examples are an external financial coach, workplace study to reduce physical problems and a bike scheme.

Outflow (Exit and pension)
The time comes for everyone to take things easier or even retire, after a working life. At Outflow, employees can find information about everything to do with retirement.

Diversity and inclusiveness

Responding to diversity and inclusiveness is of major importance in this current tight employment market. AVR has focused more on this, company-wide, when recruiting new personnel, in the contributions during the purchasing process and in looking at the possibilities in internal through-flow. We collaborate with specialised partners on this.

Social Return

In our social role, we find it important to offer employment for people who are distanced from the employment market.

We use the Social Enterprise Performance Ladder (SEPL), the scientifically substantiated quality mark of TNO (Dutch research organisation) that objectively measures and makes comprehensive the degree of social enterprise. We reached Aspirant status on the SEPL on 1 January 2021. That means that AVR has a plan of action for increasing employment possibilities for that target group in our organisation. We do that not only by facilitating jobs in our own organisation but also by stimulating our suppliers and clients to enterprise socially. AVR got to work on this enthusiastically. At the end of 2022, a second measurement was taken that will be audited in February 2023. AVR is expected to reach Rung 1 on the SEPL. Rung 1 indicates that we perform above average in helping people with a vulnerable position in the employment market to find a job, in a sustainable and qualitative way.

In the last reference year (from 01-09-2021 through 31-08-2022) we employed 37 people from the target group. This is 6.9% FTEs of our total number with an employment contract with AVR plus hiring. We offer opportunities to people from the Participation Act and people who are partially disabled for work too. We gained insight into this through improving our internal processes both in the request on entering employment and in the inventory of our whole workforce.

'The Young Professionals Programme is educational and great fun'

Amber Nijkamp
HR Business Partner, Rozenburg

Wesley de Bies
First operator (trainee Foreman), Rozenburg

Amber: 'I came to work at AVR in November 2021. I discussed strategic personnel management with the site manager at Rozenburg and we concluded that AVR needed a programme aimed at commitment, retaining and training young people. I knew a static traineeship from my previous work but it had to be more pragmatic for AVR. We then set up a Young Professionals Programme. The manager subsequently said: You meet the criteria'. And that's how I became both initiator and participant.'

Wesley: 'After various training courses and jobs, a recruiter approached me for a job as operator at AVR. I went to the website and saw the traineeship, which seemed very interesting because I like to commit to personal development. I'm now in the group with ten trainees who work in nine different departments. That makes for an interesting group dynamic. Our first training session was about gaining self-insight based on personality traits. That training came at just the right moment for me; I was searching for where I was to a certain extent.'

Amber: 'That introspection is linked to the DISC profiles, an instrument designed to display styles of behaviour. It helps you find your strong and weak points, particularly in communication. My profile is red. That means I'm rather direct and result-oriented and that can sometimes come across as hard. The introspection is important because if you know your pitfalls, you can build on them. I've also learned to empathise better with people in a different profile. That ensures understanding of the other person and mutual connection. All the participants got learning goals from those profiles. You work on them, also with individual coaching.'

Wesley: 'For me, the main thing is discovering which skills I need to develop more. The traineeship is flexible and anticipates this well.'

Amber: 'We feel connected and go to each other if we come up against any problems. It's nice to be able to ask: How was that for you?'

Wesley: 'Yes, that's nice. What I also appreciate is that we have a mentor, someone in a higher position and with lots of organisational knowledge and experience. That coaching gives you a good sparring partner who helps you achieve goals.'

Amber: 'That's right, it's a great encouragement. I hope to learn a lot still. The programme lasts two years and we've only been in it for eight months. So plenty of opportunities still to be had.'

Main theme

Governance

Theme 3 of the ESG

The last letter of ESG stands for Governance. This is where we place the material theme of Financial Stability.

Subthemes

Financial stability

Other chapters

Corporate governance

Financial stability

Remaining healthy and investing

A stable financial foundation makes it possible for a company to invest. That's important for AVR because innovations are necessary if we are to remain healthy in the long term and achieve our goals. Financial stability also keeps us agile as a company in uncertain times, such as those we are experiencing now. Reason enough to keep working on that.

EBITDA
(in millions of €)

150.8 + 12.1

2022: € 150.8 mln
2021: € 138.7 mln
2020: € 138.5 mln

Net result
(in millions of €)

46.3 + 3.7

2022: € 46.3 mln
2021: € 42.6 mln
2020: € 36.1 mln

Revenue
(in millions of €)

352.4 + 34.9

2022: € 352.4 mln
2021: € 317.5 mln
2020: € 281.6 mln

EBIT
(in millions of €)

93.3 + 13.4

2022: € 93.3 mln
2021: € 79.9 mln
2020: € 75.4 mln

Investments
(in millions of €)

67.4 + 9.7

2022: € 67.4 mln
2021: € 57.7 mln
2020: € 51.5 mln

Cash flow
(in millions of €)

-7.9 – 8.2

2022: € –7.9 mln
2021: € 0.3 mln
2020: € 9.3 mln

Cash position
(in millions of €)

22.2 – 7.9

2022: € 22.2 mln
2021: € 30.1 mln
2020: € 29.8 mln

Definition of financial stability

We define financial stability as a solid financial basis which guarantees that AVR can continue to exist, is profitable, can make strategic investments and can absorb unexpected setbacks. We have budgets for our goals and KPIs approved by our regulatory body. Those KPIs are driven by our activities, which we have described in the other sections of this Annual Report.

Our financial stability in uncertain times

After the uncertainty that resulted from corona in 2020 and 2021, 2022 was characterised by the consequences of the war between Russia and Ukraine. The consequences for the energy and raw materials markets were significant and AVR was also affected by them.

AVR was positively influenced by the strong rise in electricity and gas prices, given that we sell electricity, steam and heat (price correlation between those and gas). On the other hand, the rising energy prices had a negative effect on the subsidy tariffs which meant that we did not receive any SDE subsidy in 2022. In addition, the situation led to rising costs for fuels, gas, chemicals and materials. The greatest risk was that installations would have to be shut down as a result of insufficient excipients and materials being available. Luckily, we were able to prevent that happening.

In the end, the result for 2022 was influenced positively and the financial situation remained stable.

Results

AVR's closing financial result developed positively in 2022: the net result for 2022 amounted to €46.3 million, €3.7 million higher than the result for 2021. The operating result (EBIT) is €13.4 million higher than in 2021 due to a combination of higher revenue and higher costs. Both the higher revenue and the higher costs contain the effects of rising prices plus the result, compared to that of 2021, is positively influenced by a number of one-off effects.

KPI: Revenue

Revenue (including other income) rose from €317.5 million in 2021 to €352.4 million in 2022. The waste volumes fell compared to 2021, as a result of a change in the composition and calorific value of the waste and a reduction in the processed volumes in our water plant. The volume of district heat delivered fell due to a drop in demand compared to 2021. The lower heat sales did lead to higher production of electricity. Despite the drop in volumes, the price development of both waste and energy resulted in a growth in revenue. As a result of the rise in the energy tariffs, we received no subsidy on energy (SDE subsidy) in 2022.

KPI: EBITDA and EBIT

As well as the increase in income by €34.9 million, the operational costs also rose by €22.8 million, so that the EBITDA in 2022 comes out at €150.8 million, €12.1 million more than in 2021 (€138.7 million). The increase in costs entails a positive effect on the one hand, due to one-time negative posts in the 2021 result with regard to a write-off related to a contract for district heat delivery and costs surrounding the intended acquisition of AEB. In addition to the one-time posts, the costs of excipients and energy in 2022 in particular were higher, both driven by sharply rising prices. Due to amortisations that were €1 million lower than in 2021, the operational result (EBIT) for 2022 comes out at €93.3 million. That's more than €13.4 million higher than in 2021 (€ 79.9 million).

KPI: Cash flow

AVR realised a negative cash flow over 2022 of €7.9 million. The negative cash flow was planned and is mainly caused by sizeable advance payments on energy derivatives. The total cash flow over 2022 consist of a positive cash flow from operational activities of €133 million, expenditure for investments of €67 million and for financing activities of €73 million. The cash flow from financing activities consists of interest payments (€28 million), dividend payouts (€41 million), lease payments (€3 million) and paid financing costs (€1 million).

KPI: Cash position

The cash position fell slightly from €30 million to €22 million.

KPI: Investments

In 2022, AVR invested €67.4 million compared to €57.7 million in 2021. These were investments in both the existing installations and in innovation and optimisation, such as the new slag transport system in Rozenburg and the renovation of the transfer station in Utrecht (OSSU).

Financing structure

AVR has a prudent financing structure: nearly 50% of the financing is through shareholder equity and subordinated loans from the shareholder. This financing structure is reflected in the relationship between the company's debt and its operating

result before depreciation and amortisation (EBITDA) – known as leverage. At the end of 2022, AVR has a leverage ratio of around 2x, - the net debt amounts to approximately twice the EBITDA. AVR strives to achieve the long-term retention of a maximum leverage of 3x. This makes it clear that our strategy is focused on long-term stability that enables us to absorb unexpected negative financial effects and continue investing in developing AVR and making it more sustainable.

AVR's outstanding loans and credit facilities with banks and investors amount to €400 million. Additionally, AVR received bridging finance from two banks throughout 2022 of €260 million. The bridging finance may only be used to finance the planned acquisition of AEB and has a maturity of six months (with the option of extending for another six months). AVR intends to replace the bridging finance shortly after the acquisition date with longer-running financing, with maturities of between five and twelve years. We have already entered into a financing agreement with four of our existing banks for a bank loan of €100 million with a maturity of five years (and two options of extending, each for one year). And on the basis of this financing agreement, AVR's existing credit facilities will be increased from €100 million to €130 million. That makes the new credit facilities large enough for the future new company. The new financing agreement is subject to approval by the ACM of the AEB acquisition.

Financiers have faith in AVR's innovative strength, the steps we are taking towards a circular and climate-neutral world and the results of these steps. As a result, AVR was advanced what is known as a Green Syndicate loan by five banks. We have linked sustainable targets to this loan and receive discount on the interest rate if we achieve those goals. This form of financing shows that banks recognise the importance of the steps AVR is taking to promote a circular economy. We intend to further 'green' our financing in future financing rounds.

Kees de Winter
Manager Financial Accounting, Tax & Treasury, Rozenburg

'We have already taken significant steps with our reporting, but there are more to come. Traditionally, companies reported on financial figures and only the annual accounts were compulsory. Now, the EU has developed legislation to make reporting on non-financial information more uniform and more in line with society's needs. That is done with the CSRD, or Corporate Sustainability Reporting Directive, which all large companies in Europe are obliged to meet. The implementation will take place in three stages. In 2024, it's the turn of the listed companies. Other large companies, including AVR, follow in 2025. The medium-sized companies then follow in 2026.
A social report was not compulsory for AVR but we started making one, voluntarily, five years ago. It seemed sensible not to wait for the legislator. We are now profiting from our investment, because we've laid a good foundation. And accelerating with CSRD is exactly what we want.
The fact that CSRD forces companies to not only go for profit, but also for social value. And that will be an end to greenwashing. Anyone who doesn't go along with these risks becoming the object of scorn. It energises me to work at a company that is not only financially healthy but that also resolves social issues.
We did a zero measurement, with a consultant, and drew up a roadmap for being CSRD proof in 2025, with a fully integrated report that can be audited by an accountant. It's an intensive and interesting process in which many people at AVR are involved. We also intend to engage a reporting specialist in the field of CSRD to further develop this. That shows how important we find this, not only externally but in particular, internally. That controller will collaborate with various departments at AVR and ensure that we focus even more on non-financial KPIs.
Our report is now accessible and approachable and is well received. We'd like to keep it that way, but we can't escape obligations and standards. That increases the comparability. This is an opportunity for AVR, because our social contribution is still not always appreciated in the political landscape and with this, we can demonstrate how relevant we are.'

Corporate governance

Governance, supervision and accountability

AVR stands for good corporate governance, proper supervision and transparent accountability to all its stakeholders, also in respect of the social role the company wants to play.

Legal structure

The ultimate holding company of AVR, Dutch Enviro Energy Holdings B.V. (DEEH), is a private company incorporated under Dutch law to which the structure (partially exempt) regime is applicable. On the grounds of this regime, a Supervisory Board was appointed in 2017. AVR applies the Anglo-Saxon model of a one-tier Board in which the Supervisory Board members (or non-executive directors) and the Directors (executive directors) work together in a single Board. The executive directors are responsible for the day-to-day management of the company and the non-executive directors supervise the executive directors.

One-tier Board

Since the appointment of executive director Simon Ka Keung Man mid- 2022, the one-tier Board comprises nine directors: four non-executive and five executives. The Board meets at least six times a year. The Board has formed four sub-committees of its members giving scope for a more in-depth appraisal of specific topics: the Remuneration Committee, the Audit & Treasury Committee, the Commercial & Operations Committee and, since 2022, the ESG committee. The members of these committees are directors from the one-tier Board.

The members of the one-tier Board are CEO Yves Luca, CFO Rob de Fluiter Balledux, six representatives of the shareholders and a non-executive member nominated by the AVR Works Council.

Shareholders

Since 2013 all the shares in AVR capital have been held by a consortium in Hong Kong led by CK Infrastructure Holdings Ltd. (CKI). CKI, a Hong Kong listed company with over 130,000 employees spread across participations in Hong Kong, China, Europe (including the UK), Canada, Australia and New Zealand, is a world player in the field of infrastructure. Other shareholders are CK Hutchinson Holdings Limited, Power Assets Holdings Limited and CK Asset Holdings Limited.

Personalia

Currently the one-tier Board of DEEH comprises the following members:

Neil McGee

Chair and non-executive director

Neil McGee (71), Australian national, has a long track record in the CK Hutchison Group. Neil's other positions include Executive Director of Power Assets, the energy company in Hong Kong. In recent years, he was also Managing Director of Hutchison Whampoa Europe S.a.r.l. in Luxembourg. Neil has a Bachelor of Arts degree and studied Law.

Hing Lam Kam

Non-executive director

Hing Lam Kam (76), Chinese national, has been the Group Managing Director of Cheung Kong Infrastructure since it was established in 1996. He is also Deputy Managing Director of CK Hutchison Holdings Limited and Deputy Managing Director and Executive Committee Member of CK Asset Holdings Limited. He studied construction and business administration.

Duncan Macrae

Non-executive director

Duncan Macrae (52), British national, is Head of International Business at CK Infrastructure. He has over 27 years of experience in the field of infrastructure investments. Duncan is a member of the Institute of Directors in the United Kingdom. He studied philosophy, politics and economics.

Ed Nijpels

Non-executive director

Ed Nijpels (72), Dutch national, is a former Minister of the Environment and Queen's Commissioner in Friesland and the Chairman of the Progress Consultation Climate Agreement. He is also quartermaster climate table for Bonaire and Crown- appointed member of the Dutch Social and Economic Council (SER). Ed studied Law.

Andrew Hunter
Executive Director

Andrew Hunter (64), British national, is Executive Director of CK Infrastructure and Executive Director of Power Assets. Andrew is also a member of the Scottish Institute of Chartered Accountants and the Hong Kong Institute of Certified Public Accountants. He has almost 40 years of experience in accountancy and financial management. Andrew has a Master of Arts degree and studied business administration.

Simon Ka Keung Man
Executive Director

Simon Ka Keung Man (65), Australian national, is the Alternate Director of CK Infrastructure and General Manager of CK Asset Holdings Limited. He has a long track record within the CK Hutchinson Group and more than 42 years of experience in accounting, auditing, taxes and financing. He studied economics.

Charles Tsai
Executive Director

Charles Tsai (65), Canadian national, has worked for Power Assets since 1987 and since 2014 as CEO with responsibility for all foreign participations. Charles is a Registered Professional Engineer and Chartered Engineer. He studied mechanical engineering.

Yves Luca
Executive Director

Yves Luca (57), Belgian national, is the CEO of AVR and a member of the Board of the Dutch Waste Management Association. Yves has 25 years of experience in the waste sector. His previous positions included COO of Van Gansewinkel. Yves studied economics.

Rob de Fluiter Balledux
Executive Director

Rob de Fluiter Balledux (59), Dutch national, is the CFO of AVR Rob's positions prior to joining AVR included Financial Director of Martinair and CFO of Van Gansewinkel. He studied business economics.

Bram Witsenburg
General Counsel-Company Secretary

Bram Witsenburg (51), Dutch national, acts as Secretary of the one-tier Board. Previously, he was attorney-at-law and company lawyer for companies including ARCADIS and McGregor Fashion Group. He studied Law.

Message from the Board

On behalf of the one-tier Board of Directors of AVR, I am pleased to present to you the Company's annual report for 2022.

Due to the COVID-19 pandemic, the start of 2022 was still quite challenging. After that, geopolitical events, rising inflation, energy challenges, supply chain disruption and the pressing need to address climate change led to difficult circumstances world-wide. I am proud that AVR managed to deal with such challenges and was able to continue making a positive contribution to the society we all share.

After more than 2 years of COVID-19 restrictions, our one-tier Board of Directors was finally able to meet in person in the course of last year. I really appreciated seeing the directors in person instead of through a video screen.

The Company again managed to outperform its financial targets in 2022. The Company benefited from the higher energy prices through unhedged energy deliveries (20%). The Energy from Waste activities were the main contributor to the financial result while the other installations, including the biomass installations, the plastic waste separation facility and the Water Treatment plant were affected by operational issues throughout the year.

From a health and safety perspective, 2022 was a challenging year, with an increasing number of safety incidents. None of the incidents led to serious personal injuries. External safety experts are advising the Company on how to further improve a safe working environment so that everyone can leave work safe and healthy at the end of the day. Meanwhile, AVR has started an internal safety program to raise safety awareness among staff.

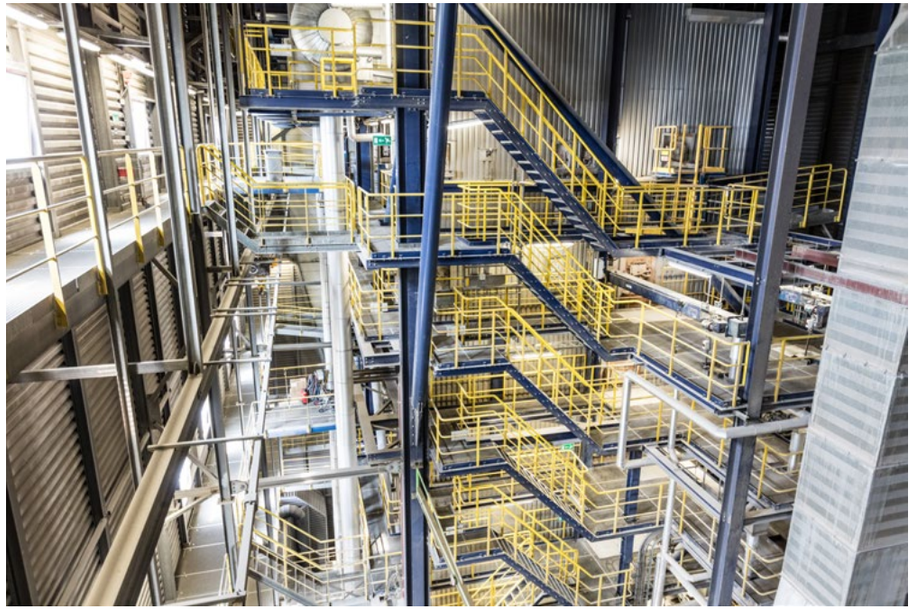
In the coming years, the Dutch waste market is expected to be characterized by a growing over-capacity. Maintaining a solid long term feedstock portfolio is therefore of the utmost importance. The company is pursuing a strategy of focusing on attractive high- margin waste streams. Building on existing customer relations and further expanding and diversifying our feedstock portfolio are key.

It is worth mentioning that by year end 2022, the Company had secured relevant SDE++ subsidies for its CO_2 capture installations in both Duiven and Rozenburg. Those installations will enable the Company to capture, store and use CO_2, significantly reducing the company's carbon footprint.

I would like to thank each and every one of our dedicated staff for their hard work, enthusiasm and perseverance. Our people, and the wide range of skills and experiences they bring to work every day, form the motor of our success.

On behalf of the Board,
Neil McGee, *chairman DEEH*

Compliance



AVR's Directors and shareholders set great store by the correct adherence to the applicable legislation and regulations. To safeguard this compliance, the organisation has drawn up internal policies and procedures for its operating processes. Compliance is a continuous process of improvement, certainly given the increasing regulatory pressure and its complexity.

A number of spearheads in the area of compliance apply to AVR: compliance with environmental law (licences), public procurement law, accounting law, energy law, consumer law, financial law and privacy law. The latter also in light of the introduction of the General Data Protection Regulation (GDPR). Compliance with the legislative fields mentioned above has direct consequences for AVR's 'licence to operate'. Preventing fines and other enforcement measures is also essential, to maintain the Company's good reputation. The SHEQ (Safety, Health, Environment and Quality), IT and HR departments and the General Council support the organisation and its operations with solicited and unsolicited advice and, when necessary, the knowledge required.

AVR will further define its ESG policy in 2023. ESG stands for Environmental, Social and Governance. This is also in preparation for the obligations under the Corporate Sustainability Reporting Directive (CSRD). As of 2025 and on the basis of the CSRD, AVR, as a large company, will have to communicate its sustainability policy and the results achieved. With the integration of the CSRD directive, large companies are obliged to report more transparently on the impact of their policies and activities on people and the environment.

Safety, Health, Environment and Quality (SHEQ)

In 2022, AVR successfully completed the ISO audits for interim certification for ISO 9001 (quality), ISO 14001 (the environment) and ISO 45001 (safety and health). The ISO recertification takes place in 2023. Furthermore, AVR has been able to successfully certify for the ISO 50001 for energy. With the audit for the Major Accident Hazards Decree (BRZO) three violations have been found that have already been rectified.

2022 was the year in which we left the corona crisis behind us and the corresponding measures were revoked. That crisis taught AVR how resilient we are as an organisation and how we were capable of maintaining consistent business operations.

Integrity

Integrity is an important theme for AVR. Our Code of Conduct demonstrates which rules of conduct we have at AVR, so that everyone is aware of which behaviour is acceptable and which is not. This provides clarity and a pleasant working atmosphere. In 2022, we were also a victim of theft at our facilities. It involved the theft of tools and also the excavation and removal of copper pipes. This was carried out in an organised context. We find this unacceptable. Earlier, we had consulted a corporate investigator who looked into the matter again in 2022. To prevent theft, we are going to carry out a security plan in 2023. The plan contains various measures, such as stricter control of access to the site, camera surveillance and inspections.

In addition to theft, another important subject emerged in 2022. The employee satisfaction survey showed that there are instances of unacceptable behaviour. Unfair treatment of colleagues and use of power terms and swear words are just a few examples. The hardening of society is probably the cause of this, but we want everyone to feel safe in a social sense at AVR and to be treated with respect. So we will be giving this more attention.

Until recently, AVR had a male confidential counsellor for employees to turn to if they experience undesirable behaviour or abuses are suspected. In September, we also introduced a female confidential counsellor since it can be a barrier for women to turn to a male confidant. If someone would prefer to talk to a counsellor outside AVR, they can do that through the company doctor.

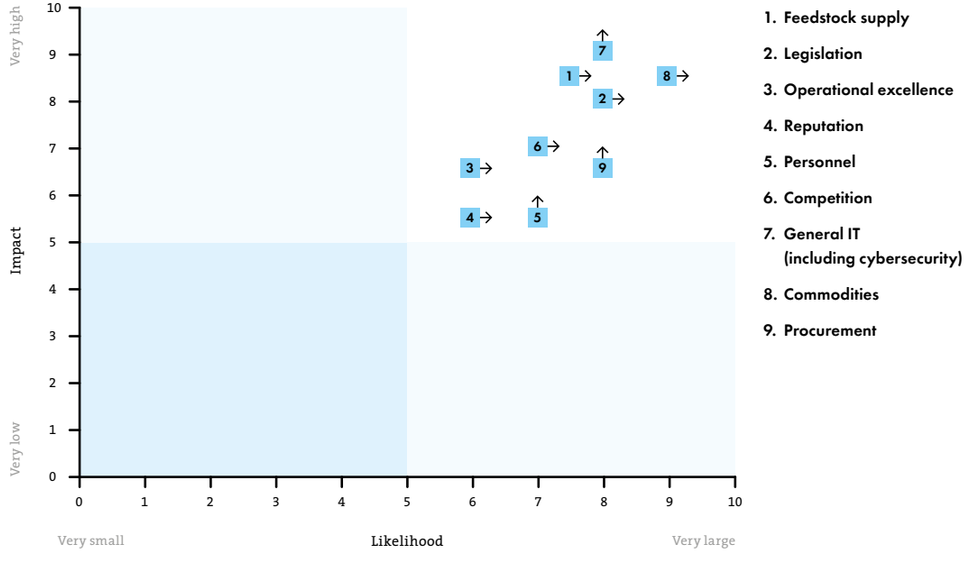
Risk management

Operating risks

AVR evaluates the operating risks each year. The risk areas that are the most important for AVR on the basis of its strategy have been identified. Each year the risks related to those areas and the effect of the measures in limiting the risks are evaluated.

This 2022 Annual Report discusses the major nine operating risks for AVR, and changes in them, and describes the measures the company has implemented to mitigate these risks.

Risicomatrix
The likelihood of preventing the risk versus the impact of the risk (without taking control measures into account)



1. Feedstock supply
2. Legislation
3. Operational excellence
4. Reputation
5. Personnel
6. Competition
7. General IT (including cybersecurity)
8. Commodities
9. Procurement

Risk matrix

The risk matrix includes the nine major risks identified by AVR in the assessment for 2022. It indicates the likelihood of the risk being prevented versus the impact of the risk, without yet taking into account the internal control measures implemented by AVR. This is followed by descriptions of the control measures.

For 2022, the procurement risk has been included in this analysis for the first time, following the market developments (price increases and scarcity of goods) in 2022.

Commodities
This is the risk that AVR will suffer losses as a result of the volatility of commodity prices (electricity, gas, diesel and metals). This risk applies particularly to the prices of the energy and residual materials supplied by AVR. We follow an active hedging policy, intended to cover at least 80% of the raw material price risk for one year ahead through hedging contracts and 40% of it for at least two years ahead. This policy is included in the financing conditions that AVR has agreed with its banks and investors.

During 2021, natural gas and electricity prices rose explosively worldwide. The rise, which was due to an increasing demand for energy and a slower-than-expected supply, continued into 2022. A growing global economy and the conflict in Ukraine are to blame for this. Price volatility remains high. The result of this development is that the inherent risk for AVR in respect of commodity price volatility also remains high.

Waste offered
This is the risk of volatility in the volume and quality of the residual waste offered by waste customers in both the short and the long term. We regularly check the balance between our contract portfolio and our medium/long-term capacity. We aim to achieve an optimum mix of various streams (domestic residual household waste, domestic commercial waste and imported waste) in order to limit, as far as possible, the volume and quality of residual waste being dependant on individual streams.

The risk assessment of insufficient waste being brought in has remained unchanged since 2021. In 2022, however, increasing pressure on the amount of waste was noticeable for several months, but AVR anticipated this in time by making optimum use of the inventory of waste still to be processed (including increasing the maximum storage capacity).

Regulations
This is the risk that the introduction or extension of legislation or regulations will have a negative effect on the stability and development opportunities for AVR's activities. We are represented in various branch organisations and also maintain contacts with regulatory bodies and policy makers so we can promote our interests. In our communications strategy, we strive to make the outside world aware of the leading role AVR can play in themes such as circular economy and energy transition.

On 1 January 2021, the CO_2 tax came into force in Dutch Law, which has a significant impact. AVR responds to this with the current capture of CO_2 in Duiven, the large-scale capture of CO_2 at our Rozenburg facility and an increased CO_2 capture in Duiven. The CO_2 tax and investments in CO_2 capture and storage were already taken into account in our risk analysis of 2021. In Belgium, it has been decided to cancel a deduction scheme for exporting commercial waste from Belgium to other countries as of January 2023. This decision is driven by a waste shortage for Belgian waste processors. Our assessment of the risk in respect of legislation and regulations has, therefore, remained the same (and high).

General IT including cyber security
This is the risk that disruptions in the IT sphere as a result of general IT disruptions or cybercrime could lead to outages of primary operating processes. AVR has outsourced the majority of the technical and functional IT support for the process automation and office automation to external specialists. In recent years, a considerable amount has been invested in further improving security. In the field of cyber security, we work with security software that is always up to date and implement an active awareness-building programme among our employees. AVR has taken out cyber risk insurance.

We are seeing cybercrime becoming more and more prevalent all over the world. The war between Russia and Ukraine also contributes to this development (for example by the frequent use of hostage software). Because of the significant importance of IT to AVR's operation, the risk assessment based on these developments has been raised.

Procurement
This is the risk of shortages in the delivery of goods, risks related to the quality of goods and services and inflation of prices for goods and services. In recent years, this risk was assessed to be relatively low. However, that has increased significantly and is therefore mentioned for the first time in this paragraph.

Prices of goods and services rose sharply the last year. This is especially true in the case of materials that have an energy component (fuels, gas and chemicals). Also, major problems arose in the supply chain of many goods and services as a result of the conflict in Ukraine. AVR tries to minimise the effects of this through 'supplier management' and entering into sustainable relationships with suppliers.

Personnel
This is the risk of AVR being unable to recruit or retain sufficient competent, motivated and professional employees to enable it to carry out its activities. Employee health is also covered by this risk. We endeavour to ensure that we retain existing employees and attract potential new employees through our 'Be your best' programme.

The current scarcity in the employment market has also made it more difficult for AVR to attract well-qualified personnel. By using specialised recruiters and employment market campaigns, AVR is still able to keep the number of open vacancies limited. The developments in the labour market did however result in an increase of the estimated risk.

Operational excellence
This is the risk that, due to process and plant inefficiencies, AVR is incapable of operating at competitive cost prices or is unable to process the agreed volume of residual waste or supply the agreed quantity of energy.

A focus on operational excellence was a spearhead in recent years through the Frontrunner (Koploper) project. The focus on operational excellence has been further shaped by the establishment of the Operational Excellence Department. We can see the positive results of the increased focus on operational excellence. This leads to a lower risk assessment.

Competition
This is the risk that AVR's competitiveness will deteriorate.

The introduction of a waste tax on the import of residual waste to the Netherlands has adversely affected our competitive position. In the medium term, this could lead to the current stream of waste from the UK to the Netherlands drying up and, as a consequence, increased competition for domestic waste volumes. The ban on export of Belgian commercial waste may also contribute to this.

To limit its dependence on individual waste streams as far as possible, AVR strives for an optimum mix of several streams (domestic residual household waste, domestic commercial waste and imported waste). We also strive to gain a competitive advantage in the provision of services to municipal waste customers through the post-separation of waste and the partial capture of CO_2 emissions from the incineration process. The assessment of the impact of this risk remains unchanged.

Reputation
This is the risk that the external communications about AVR's goals and developments are insufficiently effective as a result of which the concept of, or the support for, AVR's goals and developments is undermined. Our communication strategy is aimed at making the outside world aware of the trend-setting role we can play in the circular economy and the energy transition. The assessment of the impact of this risk remains unchanged.

Financial risks

AVR's business activities mean it is exposed to financial risks. We explain the most important risks.

Price risk
This is the risk of price fluctuations on both the sales (energy and waste) and purchasing sides. For commodity prices, a hedging policy is applied, as is also described under the operating risk Raw Materials. The high volatility in energy prices however made it more difficult in 2022 for AVR to find counter parties for financial hedging transactions. AVR reduces their dependence on counter parties by working with at least three different brokers. The risk related to waste prices is limited because AVR has many long-term contracts with fixed price agreements and indexing.

Due to inflationary pressure, prices rose sharply in 2022 on the procurement side. As described above (Procurement), AVR mitigates this risk through 'supplier management' and through entering into sustainable relationships with suppliers.

Interest rate risk
This is the risk of interest-rate fluctuations. Based on financing documentation with banks and investors, AVR is obligated to cover 75% of the interest rate risk. At the end of 2022, AVR had over € 300 million in outstanding financing of which only € 10 million with a variable interest rate and € 290 million with a fixed interest rate. The interest rate risk on current financing is therefore covered for 97%.

At the end of 2024, existing loans amounting to € 125 million will expire. Because of the sharp rise in interest rates in 2022, AVR may have to refinance these loans at a higher interest rate. AVR reduces that risk by splitting the total financing requirement into separate parts, each with a different maturity and repayment date. This reduces the likelihood of total interest costs rising sharply.

Credit and counterparty risk
This is the risk that counterparties cannot make good on their financial obligations to AVR. AVR works with creditworthy parties (D&B reports of credit ratings) and avoids the concentration of major credit with individual counterparties.

Liquidity risk
This is the risk of a shortage of liquidity that results in AVR being unable to meet its immediate long- and short-term payment obligations. The risk is obviated by AVR's current financing structure, which in the short term gives AVR access to sufficient unused credit facilities and in the long term limits the refinancing risk by splitting the total financing requirement into separate parts, each with a different maturity.

Currency risk
AVR received financing in American dollars. The currency risk on those loans in foreign currency is fully covered by means of cross currency swaps. Apart from those loans, AVR is not involved in any transactions in foreign currency.

Condensed financial statements

This is a condensed financial overview.
These statements have not been audited.
Audited financial statements have been
filed with the Chamber of Commerce.

CONSOLIDATED STATEMENT OF FINANCIAL POSITION AS OF 31 DECEMBER 2022 (x € 1,000)

	31 December 2022	31 December 2021
ASSETS		
Non-current assets		
Property, plant and equipment	534,554	520,113
Right-of-use assets	15,678	15,439
Goodwill	316,417	316,417
Other intangible assets	36,103	40,386
Deferred tax assets	39,384	50,053
Derivative financial instruments	12,119	6,120
Other non-current financial assets	-	-
Total non-current assets	**954,255**	**948,528**
Current assets		
Inventories	10,603	8,297
Trade and other receivables	34,112	43,989
Derivative financial instruments	1,874	-
Prepayments	1,317	3,798
Cash and cash equivalents	22,194	30,075
Total current assets	**70,100**	**86,159**
Total assets	**1,024,355**	**1,034,687**

CONSOLIDATED STATEMENT OF FINANCIAL POSITION AS OF 31 DECEMBER 2022 (x € 1,000)

	31 December 2022	31 December 2021
EQUITY AND LIABILITIES		
Capital and reserves		
Issued capital	100	100
Share premium	260,364	260,364
Cash flow hedge reserve	(50,624)	(37,063)
Retained earnings	(23,089)	(24,174)
Unappropriated result	46,298	42,617
Equity attributable to the parent	**233,048**	**241,845**
Non-current liabilities		
Borrowings	538,096	538,957
Lease liabilities	16,449	16,340
Derivative financial instruments	14,827	14,255
Deferred tax liabilities	36,828	36,828
Provision for jubilees	1,046	1,286
Other provisions	18,403	13,606
Total non-current liabilities	**625,649**	**621,271**
Current liabilities		
Trade and other payables	36,874	39,812
Borrowings	(610)	-
Lease liabilities	2,222	2,256
Current tax liabilities	14,149	15,835
Derivative financial instruments	43,309	47,117
Amounts payable to shareholders	3,520	3,520
Other provisions	9,640	10,018
Other liabilities	56,553	53,013
Total current liabilities	**165,658**	**171,571**
Total liabilities	**791,307**	**792,842**
Total equity and liabilities	**1,024,355**	**1,034,687**

CONSOLIDATED INCOME STATEMENT AND OTHER COMPREHENSIVE INCOME FOR THE YEAR 2022 (x € 1,000)

	2022	2021
Revenue	352,654	300,845
Other income	(208)	16,605
Raw materials, supplies and energy	(59,408)	(30,861)
Third-party processing	(24,777)	(23,679)
Third-party maintenance	(25,288)	(21,419)
Employee benefit expenses	(47,970)	(47,613)
Depreciation, amortization and impairment	(57,541)	(58,712)
Impairment loss on financial assets	-	(19,211)
Other operating expenses	(44,207)	(36,010)
Operating result	**93,254**	**79,945**
Financial income and expenses	(30,024)	(29,989)
Result before tax	**63,231**	**49,956**
Taxes on result	(16,933)	(7,338)
Profit / (loss) for the year	**46,298**	**42,617**
Attributable to: Owners of the Company	**46,298**	**42,617**
Other comprehensive income:		
Gain/(loss) on cash flow hedges taken to equity	(18,276)	(45,472)
Income tax direct through equity	4,715	11,368
Total attributable to the Owners of the Company	**32,737**	**8,513**

CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR 2022 (x € 1,000)

	2022	2021
Result before tax	**63,231**	**49,956**
Adjustments for:		
– Depreciation, amortization and impairment	57,541	58,712
– Change in provision for jubilees	(240)	(69)
– Change in other provisions	4,005	898
– Financial expenses	30,024	29,989
– Change in other financial assets	-	16,834
– Changes in working capital	(21,652)	26,493
Cash flow from operating activities	**132,908**	**182,813**
Investments in:		
– Property, Plant & Equipment	(67,366)	(57,707)
Cash flow from investment activities	**(67,366)**	**(57,707)**
Payment of current lease liabilities	(2,755)	(2,744)
Interest paid	(28,006)	(29,159)
Capitalized financing costs	(1,128)	-
Repayment of borrowings	-	(50,411)
Dividend paid	(41,533)	(42,533)
Cash flow from financing activities	**(73,422)**	**(124,847)**
Net increase in cash and cash equivalents	**(7,881)**	**259**
Cash and cash equivalents at 1 January	30,075	29,815
Cash and cash equivalents at 31 december	**22,194**	**30,075**

In conclusion

Looking forward to 2023

At the end of 2022, the turbulence on the global stage was not yet over and it is expected to remain for the time being. This demands a flexible attitude and quick response to the current situation. We will continue our sustainability unabated, starting with the construction of new CO_2 capture installations. We hope to be able to ratify the acquisition of AEB in 2023.

War in Ukraine

As the year progressed, it became clear that the war in Ukraine will not be ending any time soon. That means that energy prices will remain volatile and AVR may once more be able to sell its energy at higher prices in 2023. On the other hand, scarcity of supplies for our processes and inflation are still causing difficulties for us.

Acquisition of AEB

At the end of 2022, we were still waiting for the approval of the Authority for Consumers & Markets (ACM) for the acquisition of AEB. This acquisition will allow us to achieve our growth targets. We are already prepared for the integration and hope for a quick decision, so that we all know where we stand, not only at AVR but also at AEB.

CO_2 capture

In 2023, we will continue with preparations for the construction of our new installations in Rozenburg and Duiven that capture CO_2 from flue gas cleaning. Now that the SDE++ subsidy has been granted, we can invest in the large-scale capture of CO_2 for use and storage. The final investment decision for Duiven is expected to be taken by late 2023 and for Rozenburg by early 2024.

Read more about our future policy on CO_2 -in the relevant chapter in this annual report.

Overcapacity

Waste incineration creates more overcapacity. In view of that, AVR should get ready for the future. When the waste supply decreases, the company with the best quality and the lowest cost price will continue to exist. There is enough waste supply in Europe for the next 15 to 20 years and at the same time we are working on new techniques for other solutions.

European collaboration

For the long term, we advocate European cooperation in the light of the Paris Agreement. We can make great strides internationally. A huge environmental benefit can be realised in Europe by having residual waste that is still being deposited, and therefore causes a lot of CO_2 and methane emissions, processed in countries that have overcapacity. Unfortunately, the Dutch government seems to have a different view and is maintaining the tax on the import of waste. Since we find this approach illogical, we continue to advocate the removal of that tax.

Developments in recycling

Much will be possible in the future, in the world of recycling. The next step is recycling from product to product, in other words: making a new plastic bottle from the same used plastic. Chemical recycling may also work. We are actively looking into that. We are also constantly applying new techniques to fly ashes. We have a pilot running, to investigate whether we can recover heavy metals from the fly ashes in an easier way. And we will be starting a pilot for bottom ash, focused on mineral components. After regaining valuable metals from bottom ash there is still a fraction from which we can extract a mineral fraction that can be used as a building material. This is an important discovery now that sand and soil are so scarce.

Published by
AVR.
Postbus 1120
3180 AC Rozenburg (ZH)

Text and translation
Ellen Segeren (Segeren Tekst)

Photography
Annemiek Boontjes
Frank Osinga
Maureen van Noorloos
Marie-Claire van der Schoor
Miranda Koopman (Studio CAPAZ)
Thijmen Kielen

Design
Studio CAPAZ, strategisch design

Print
Zwaan Lenoir

For additional information
Marie-Claire van der Schoor, press officer AVR
T: +31 6 10534105
E: communicatie@avr.nl

AVR. ANNUAL REPORT 2022