

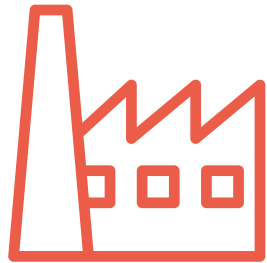
Annual Report 2018

BUILDING AND INVESTING

AVR.

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AVR in brief

AVR is specialised in the processing of various types of residual waste: wastewater, paper residuals, domestic and commercial waste, waste wood and hazardous residual waste. We continuously aim for maximum recovery of energy and materials from the said residual waste through effective, efficient and safe business operations. We ensure that metals are recycled and that minerals are used in (road) construction. We supply renewable steam, heat and electricity to our surroundings and thus prevent the use of fossil fuels. This way AVR makes an important contribution to the national and European climate and energy objectives. And all that with residual waste that is often qualified by others as worthless.

AVR has two locations where energy and resources are generated from residual waste: Duiven and Rozenburg. There are four transfer stations in The Hague, Utrecht and the centre of Rotterdam. The central position of the locations is very favourable for both waste suppliers and off-takers of energy and resources. Residual waste is supplied by water as much as possible and, where this is not possible, by road. At the end of 2018 AVR employed 449 people (433 FTE).



Our mission: create a clean world where nothing is wasted

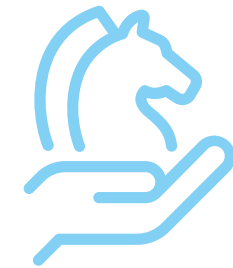
For many years AVR has contributed to clean streets and cities. We do this by giving worthless residual waste streams a useful purpose again in the form of resources and energy. The consideration is always 100%: restoring value to what is worthless by striving for a neutral carbon footprint in our activities. Today, we believe to have the best solution for this. That is the reason why we are here and that is also what motivates us: create a clean world where nothing is wasted. Together with our proud employees we work on positive change, day after day.



Our vision: too good to waste

Important resources become exhausted and the climate is changing due to CO₂ emissions. To keep our world liveable for future generations, radical changes are necessary, e.g. a circular economy and a 100% renewable energy supply. The way that we handle residual waste is an important factor in creating a sustainable living environment. The global population continues to grow steadily and the global waste heap is still increasing and in many countries, residual waste is still being dumped in a landfill.

AVR makes an important contribution to the reduction of difficult residual streams: as experts in the rest of the rest we provide for a new beginning. In a world that is subject to many changes, this requires a flexible approach of AVR. With our sights on the future, today, we offer the best solution for the remainder of the residual waste. Because that is what we aim for: offering the best solutions for the day-to-day challenges presented by society and simultaneously working on how it can be done even better, cleaner and more efficiently, without emissions. The one is not possible without the other: a natural balance of economy and ecology. In addition to offering a social solution for keeping the streets clean we have the capacity to realise large innovations. On our way to a circular and sustainable 2050, AVR is part of it.



Our strategy

To specifically put the mission and vision into effect AVR developed an appropriate strategy. The most important directions were summarised in three pillars that our organisation works on day-to-day:

long-term contracting of (residual) waste

continuing and expanding our operational excellence;

maximizing energy and resources efficiency and minimizing our CO₂ footprint.

Crucial in the implementation of our strategy is offering the correct preconditions and the best workplace. That is why we work on:

the enhancement of the potential of our employees;

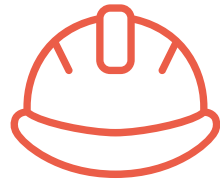
the promotion and securing of a safe workplace.

Number of employees
(in FTE)



433 ↑ 4
(2017: 429)

IF ratio



1.6 ↓ 1,8
(2017: 3.4)

Sickness leave



6.4% ↓ 0.6
(2017: 7.0%)

EBITDA



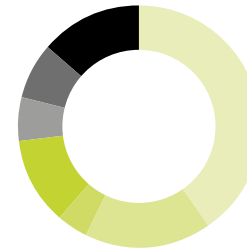
122.0 € mln ↑ 4.9
(2017: 117.1)

Net result



37.7 € mln ↑ 0.7
(2017: 37.0)

Amount of waste processed



2,298 kton
↓ 7
(2017: 2,305)

Domestic waste	929
Commercial waste	391
Hazardous waste	92
Import waste	269
Subtotal waste for Energy from Waste plant	1,681
Waste wood	136
Paper residual waste	169
Waste water	312
Total waste processed	2,298

Total energy output



8.2 PJ ↓ 0.3
(2017: 8.5)

Number of households supplied with our energy



157,000 ↓ 5,000
(2017: 162,000)

CO₂ emission



2,231 kton ↑ 13
(2017: 2,218)



“A year of building and investing”

Yves Luca and Rob de Fluiter Balledux

What AVR achieved in 2018? Read this annual report and we will show you. CEO Yves Luca and CFO Rob de Fluiter Balledux shed light on the most important developments, results and choices for the future.

How can we characterise the year 2018 for AVR?

Rob: “As a year of building and investing. Our biomass plant was converted in such way that apart from electricity it also supplies steam and heat. This way the energy efficiency increases considerably. Two other highlights are the start of the separation plant in Rozenburg and the construction of our CO₂ capture plant in Duiven.”

What can AVR do with the CO₂ capture plant?

Yves: “This plant will annually capture 60,000 to 90,000 tonnes of CO₂. In due course we want to capture and recover 50% of our total CO₂ emission,

hence the non-organic part. For instance, by supplying to greenhouse horticulture. The latter requires CO₂ during summer for the accelerated cultivation of plants and requires heat during winter. At present horticulturalists still require a gas-fired plant for both. When we supply CO₂ and heat, we kill two birds with one stone and we reduce our own emission and that of the horticulturalists.”

Why is a separation plant necessary?

Rob: “Through mechanical sorting only the material that can actually be recycled, is separated from the residual waste. There are less interferants and the quality of the sorted materials is therefore higher and

more stable. Recyclers want to receive a stable quality, fixed quantities and supply over a longer period of time. In case of alternating quality you will not be able to interest buyers.”

Yves: “Households do not all sort their waste with equal dedication and in city centres it is often impossible to sort. Mechanical sorting is the future. We are a technical company, and every evolution is the result of evolving knowledge and techniques. The sorting process is continuously improving as a result of which we can sort residual waste more efficiently and at lower costs. This is better for the industry and for the consumer. Scarcity of labour also plays a role of importance. Add to this that the source collection of separate streams require the use of different collection lorries that emit CO₂. The scales then tip in favour of the technique and that is what AVR aims at. We can also expand more easily with this and separate even more streams.”

How did the conversion of the biomass energy plant proceed?

Yves: “At the beginning of 2018 the biomass energy plant was linked to the heat and steam system in Rozenburg. All systems must mutually communicate with each other and the coordination therefore took a few months. A learning opportunity was that we underestimated the impact on our organisation. Steam was already supplied by our Energy from Waste plant and now that the biomass energy plant is also supplying steam and heat, the question is: what source is most sustainable, what is best for our customers, hence what prevails? In practice it appears to be pretty complex. This also applies to optimizing our mode of operation from a financial perspective. However, we master this ever better.”

How can AVR make such considerable investments?

Rob: “By concluding long-term agreements with our partners. We concluded a ten-year agreement with the Packaging Waste Fund and we found another third party that is responsible for the offtake and further recycling of the plastics from the separation plant. And for a period of ten years Air Liquide offtakes the CO₂ from the new capture plant. The term of these agreements offered us the certainty of making these investments. Also our financiers are very supportive. In 2018 we refinanced a part – € 150 million – of our loans. Of these € 150 million € 50 million was fixed for ten years and € 100 million for five to seven years. A part of the mentioned € 100 million is, for that matter, a green RCF, i.e. a revolving credit facility. That emphasises the sustainable nature of AVR and our investments. If we comply with certain KPIs then we receive an interest-rate discount: CO₂ capture, plastic separation and reduction of the sickness leave.”

The investments point to growth ambition, is that correct?

Rob: “Yes, that is the ambition. We need growth to continue investing in social and sustainable projects. This way we can offer people a new challenge, control costs and generate additional revenues. We could grow by acquiring other businesses, but we are very critical in this respect, it needs to fit. We have more influence on autonomous growth, which is what we now pursue through these investments.”

How important are the employees to AVR?

Yves: “Very important. Perhaps AVR does not employ a lot of people but they do manage a lot of capital. Then you must excel with the people you have on board. They must deal with a broad spectrum, with long-term

orientation. It is important that they can cooperate well cross-departmental and can speak with external knowledge partners. Our employees are also ambassadors. Many young employees who joined us were attracted by our social relevance and innovative projects.”

Rob: “Our people build a bridge between us and other stakeholders. They are curious and we give them room to explore things. And they are proud of AVR.”

What is the position of AVR on the international market?

Yves: “The import ban on plastics by China has had considerable impact, as a consequence the supply of plastics in Europe increased. We treat residual waste from the UK. On account of the uncertainty around Brexit we decided to halve these waste volumes, to process more Dutch residual waste, and to spread the import over more European countries, e.g. Belgium and Italy. This way our supply becomes more stable in the longer term.”

“The scales tip in favour of the technique and that is what AVR aims at”

Rob: “Where our industry used to have local links, this shifted from regional to international. This is beneficial to everyone because we can consequently process foreign residual waste in the Netherlands, it does not need to be landfilled in other countries, as a result of which the emissions of methane and CO₂ are avoided. And due to this sustainable processing, emissions during international transport pale into insignificance. We mainly use many trailers for this that left with export cargo and would otherwise return empty.”

How can AVR continue realising strong results?

Yves: “We provide customers a full-service solution with our plants and installations at the best price. We also continue developing the efficiency of energy and CO₂ further. We operate complex plants and we process all sorts of residual waste. However, every truck with residual waste is different. We must remain flexible, go with this flow. We also need to compete with other Energy from Waste plants. Import of waste remains necessary. Further mechanisation is of paramount importance to us. Our shareholders and investors support this.”

Rob: “From an operational perspective, 2018 was a challenging year. We had a long, warm summer as a result of which the waste was drier. This resulted in more unscheduled stops which had a negative effect on our results. We want to avoid unscheduled maintenance as much as possible by shifting from reactive to preventive maintenance. This renders maintenance more effective and thus shorter, with a higher availability of the installations. To realise this, we will start working with a computer system with which we can perform trend-related analyses and can predict maintenance. This is also an organisational change because people need to become familiar with this, more digital way of working. Because we will implement the application in both Duiven and Rozenburg, we will have one working method and we can exchange experiences and best practices. Since 2017 we have prepared this implementation and we will start with the system / application in March 2019.”

The year of AVR in a nutshell

Connection of biomass energy plant to heat and steam

– January and April 2018

Since January the biomass energy plant has, apart from electricity, also supplied heat to the city of Rotterdam. In April it is time for the next step. AVR and neighbouring company Tronox Pigments Holland BV have been cooperating for no less than fifteen years, inter alia to realise their environmental objectives. This cooperation receives a new impulse: Tronox purchases 100% renewable steam from the biomass energy plant of AVR. This leads to a considerable reduction of the carbon footprint of Tronox.



Rotterdam also opts for plastic separation

– 9 March 2018

The decision to install a second separation line is definitive. Not only the residual waste of The Hague, Leiden and Utrecht is separated, but shortly also that of Rotterdam. The residual waste of this fourth large municipality will properly fill the separation plant. Continue reading under [Recycling](#).

Saying farewell and enhancing sustainability 'hand in hand'

In the spring AVR is informed that one of the customers of the liquid waste treatment plant will no longer rely on the services of AVR from 2021. The energy produced from the processing of the residual waste of this customer is now partly used for the supply of district heating and furthermore AVR recovers a precious metal - molybdenum - from the wastewater. For AVR this choice does indeed result in a lower energy output but at the same time in a considerable reduction of its CO₂ emission and consumption of natural gas.



Recovery of antimony

The flue gases that are released during the incineration process are cleaned in a flue gas cleaning installation. This process uses, inter alia, water that removes contamination from the flue gases. This water is in turn cleaned in our water purification plant. After long research AVR has discovered a method to recover antimony from this water. Antimony is a rare metal and does not belong in our surface water. Effective from 2018 we capture antimony at both our locations.



AVR decides to construct a CO₂ capture plant

– 29 May 2018

On 29 May, after years of pilot set-ups, testing and calculating, AVR and Air Liquide signed the agreement for the purchase of the CO₂ that the CO₂ plant will capture. AVR is the first Energy from Waste company in the Netherlands that deals radically with its emission of greenhouse gases with a large-scale CO₂ capture plant and thus contributes directly to the CO₂ reduction of the Netherlands. The CO₂ that is released at AVR after incineration of residual waste is recovered and serves as resource for the cultivation of crops. It offers an alternative for CO₂ from natural gas. In the summer of 2019 the installation will be put into use. Read more under [CO₂ emission](#).



Further cooperation Renewi and AVR

In the summer of 2018 Renewi and AVR reached an agreement on continuing and strengthening the long-term cooperation. In the long term AVR will process a large amount of commercial waste of Renewi. In turn Renewi supplies important services by processing specific residual streams and by being a partner in respect of the cleaning of our plants.



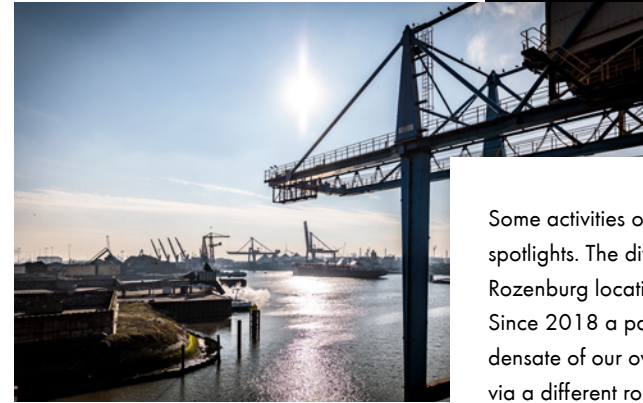
Perfect Days



A day when everything goes well. A day without accidents, emissions or transgressions, without unscheduled stops and also within budget. That is a Perfect Day. This occurs when we cooperate perfectly. Since 2011 every Perfect Day has resulted in € 100 that AVR donates to a charity. Employees suggest charities. Every month we support two charities with

Perfect Days. The person who suggested the selected charity can present the cheque. In 2018 many small charities were again made happy with the contribution of AVR. In June we consequently assist in, for instance, the cleaning of swans that were covered in oil after an oil leak in the port area of Rotterdam.

Sewerage tackled



Some activities of AVR are not often put in the spotlights. The diversion of our sewerage at the Rozenburg location is one of those projects. Since 2018 a part of the rainwater and the condensate of our own premises have been drained via a different route. With the new route we monitor the water and we work in a more controlled manner, and we are also more flexible in case of contingencies. A project like this is crucial to our surroundings.

Open day AVR Rozenburg

– 7 September 2018

Visitors are welcome at the AVR premises in Rozenburg. The theme of this open day is the conversion from 'worthless' bin bag into valuable source of energy. From residual waste to CO₂, pavement slab, heat, steam and electricity. No less than 750 visitors want to know how AVR does this. They find out during one of the 50 tours hosted by employees and during the trip with the two small trains around the premises. Various partners and suppliers also want to know more about domestic sorting, the grey bag, the logistical route, the incineration process, the energy recovery and the useful application of resources. Three coaches full of visitors of the World Port Days also join the tours.





Completion of 25 kV station

– 12 September 2018

By processing waste AVR supplies energy to the surroundings, including electricity. The transport of electricity over large distances in the Netherlands takes place via our high voltage and medium voltage grids. In 2017 AVR completed a new 25 kV station. On 12 September 2018 this is put into use and it will act as a distribution station. This infrastructure guarantees an optimal exchange with the public electricity grid.



Nuon Solar Team wins solar race

– 30 September 2018

Since 2017 AVR has been sponsor of the Nuon Solar Team, which wins a race for solar cars in South Africa. This year the race runs from Pretoria to Stellenbosch, where the students from Delft are once again the first to pass the finish. Next year AVR will also be pleased to assist the team, which has been renamed the Vattenfall Solar Team, in another victory.

Breaking ground ceremony CO₂ capture plant in Duiven

– 27 September 2018

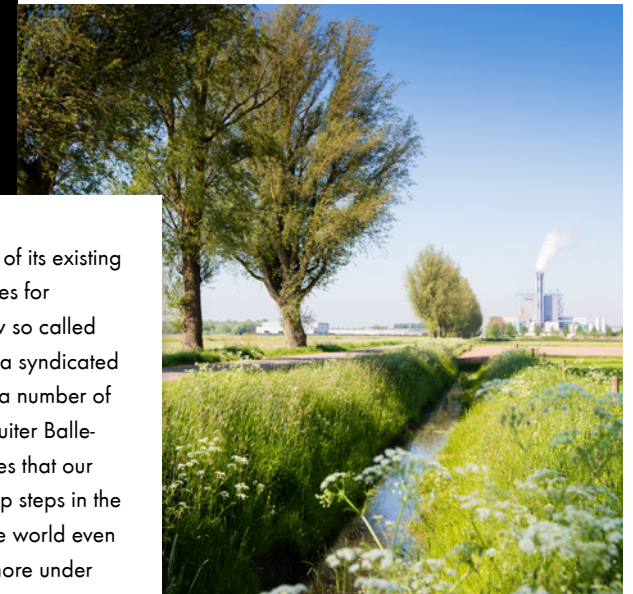
Following the agreement of 29 May the breaking ground ceremony for our new CO₂ capture plant takes place on 27 September. With the construction of this plant we again take a tremendous step towards the useful application of our residues. Last year AVR introduced a pavement slab of bottom ash, and in 2019 we can add a tomato that grows with the help of the CO₂ of AVR. Read more under [CO₂ emission](#).



Green refinancing

– October 2018

In October AVR finalises the refinancing of part of its existing debt. Amongst others, the new financing provides for greening of the investment scope through a new so called “green rcf” facility. With support of Rabobank a syndicated “green rcf” is put into the market. AVR imposes a number of sustainable targets on this loan. CFO Rob de Fluiter Balledux says: “This ‘green’ financing facility indicates that our banks acknowledge that we are taking follow-up steps in the circular area. This way we can show the outside world even better what these developments entail.” Read more under [Preface](#) and under [Financial stability](#).





Campaign: What actually happens with your bin bag?

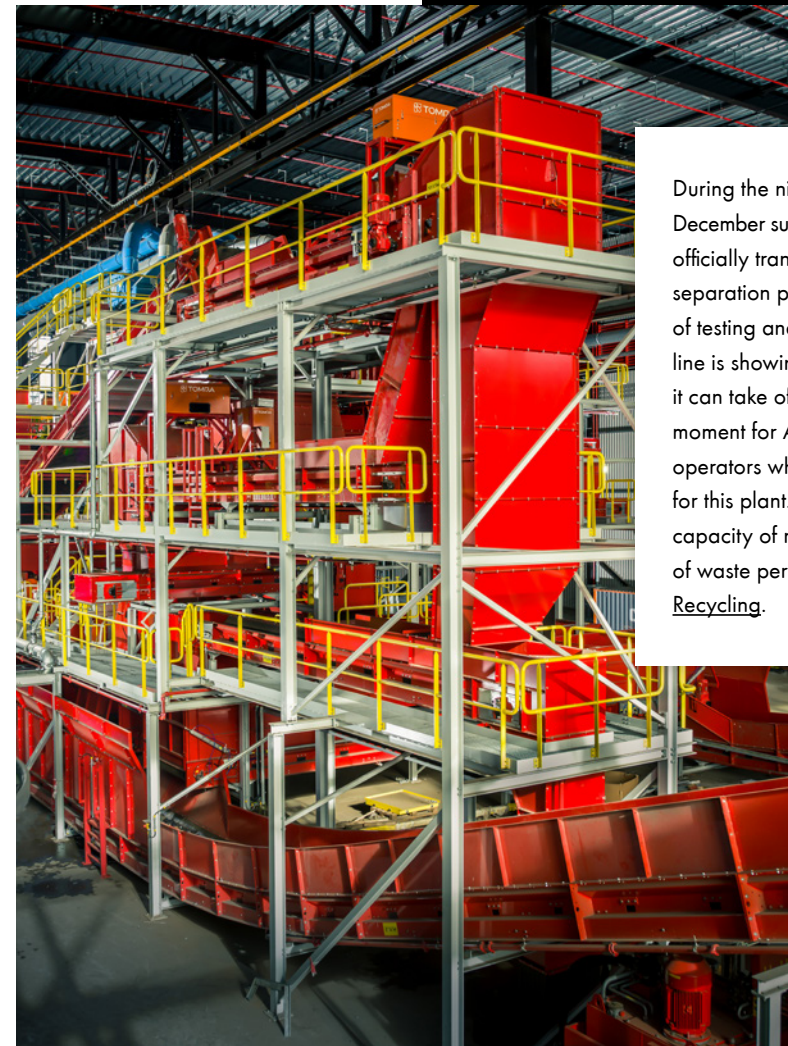
– October 2018

Still, a lot of people do not know what exactly happens with their grey bin bag. That is why we start a campaign on social media with sections that answer this question. On the street we ask people, for instance, how often they think you can take a shower with the energy released from one bin bag. Have a look at all the videos on [facebook.com/AVREnergyFromWaste/](https://www.facebook.com/AVREnergyFromWaste/).



Key transfer of separation installation

– 5 December 2018



During the night of Tuesday four December supplier Banzo in Rozenburg officially transfers the keys of the separation plant to AVR. After a period of testing and commissioning this first line is showing good initial results and it can take off officially. A beautiful moment for AVR and for the team of operators who were hired specifically for this plant. The first sorting line has a capacity of more than 200,000 tonnes of waste per year. Read more under [Recycling](#).



door Marlon Visser
MAASTRICHT – Afcherlich wurkamben plaatsen op wijkplein en andere plaatsen. Maar veel echt werkt, is dat nog niet bekend. Maar de gemeente van Maastricht, die heeft een strategie om de rookstop te versnellen. De rookstop is een van de belangrijkste doelstellingen van de gemeente. Het is een van de belangrijkste doelstellingen van de gemeente. Het is een van de belangrijkste doelstellingen van de gemeente.



De rookstop is een van de belangrijkste doelstellingen van de gemeente. Het is een van de belangrijkste doelstellingen van de gemeente. Het is een van de belangrijkste doelstellingen van de gemeente.

We stop smoking

– 19 October 2018

In the quit smoking course that AVR offers in 2018 those who quit smoking receive gift vouchers, depending on how long they continue not smoking. This is a success: of the people who participate in the course in two years 80% are still not smoking. Researchers of the Maastricht University followed a group of people who quit smoking, inter alios AVR employees. This showed that small gifts of the employer have a stimulating effect. It also helps to quit together with colleagues. Read more under [Sustainable employability](#).

Governance

One-tier board structure

In June 2017 AVR implemented a one-tier board structure at the level of the top-holding Dutch Enviro Energy Holdings B.V. (DEEH) where the supervisory directors (non-executive directors) sit on one board together with executive directors. The executive directors are responsible for the day-to-day management of the business. The non-executive directors supervise the executive directors.

The one tier board usually meets six times a year. The board has three sub-committees: the remuneration committee, the audit & treasury committee and the commercial & operations committee.

CEO Yves Luca and CFO Rob de Fluiter Balledux sit on the one-tier board as executive directors together with shareholders appointed directors. At the end of 2017 a works council nominated non-executive director in the person of Ed Nijpels was appointed to the one-tier board.

May we introduce: Neil McGee

In 2013 DEEH was acquired by a consortium led by Cheung Kong Infrastructure (CKI) from Hong Kong. Neil McGee is chairman of the one-tier board of directors of Dutch Enviro Energy Holdings B.V., the holding company of AVR. He has a long track record within the CK Hutchinson Group (CKHG) of which CKI is also part. He has held various legal and financial positions with CKHG. Apart from chairman of the board of DEEH he is also an executive director of Power Assets Holdings, a listed utility company in Hong Kong, and managing director of Hutchison Whampoa Europe Investments S.à.r.l. in Luxembourg. He studied Arts and Law at the Australian National University.

The one-tier board of DEEH consists of:



Neil McGee,
chairman - non-executive director



Andrew Hunter
executive director



HL Kam
non-executive director



Charles Tsai
executive director



Duncan Macrae
non-executive director



Yves Luca
executive director



Ed Nijpels
non-executive director



Rob de Fluiter Balledux
executive director



Bram Witsenburg
General Counsel-Company Secretary

acts as secretary of the one-tier board.

One-tier board

The one-tier board of directors of DEEH consists of eight people and meets at least six times a year. During the meeting in March the annual report and accounts of the previous year are discussed in the presence of the external auditor. During the meeting of November the budget for the next year is discussed and approved. During the board meetings the strategy of DEEH, the safety policy, the financial and operational results and the performance of strategic projects are items on the agenda.

Working method

The chairman presides the meetings and monitors, in association with the secretary of the one-tier board, the preparation and decision-making process during the meetings. Moreover, he is the connecting link between the company and its shareholders. Outside the meetings the chairman has regular contact with the CEO and CFO of AVR. In the one-tier board the proposed strategic projects of DEEH are discussed and in case of sufficient support are approved. In approving strategic projects the financial impact plays a major role in the decision-making as well as whether the projects are in line with the business objectives of DEEH in contributing to the production of renewable energy.

Strategic prospects

At the beginning of 2018 the second line of the plastics sorting facility, which is reserved for waste volumes of the municipality of Rotterdam, was approved. At the end of 2017 the CO₂ capture facility in Duiven was approved and construction of the plant started in the course of 2018. The progress of the latter project was regularly on the agenda for the board meetings of 2018.

On behalf of the board,
Neil McGee, chairman

Our stakeholders and material themes

Reporting policy AVR

AVR is a strong and solid company with commercial value and an important contribution to society. We do not only process residual waste that should otherwise be landfilled but we generate energy that replaces the use of fossil fuels and recover resources for recycling. Hence we have social relevance.

It became clear in the development of AVR and in discussions with our stakeholders that our social contribution is important and that we must externally present ourselves structurally and professionally in this respect. That is why a motivated and varied team has been working on the professionalisation of our reporting about social results since the end of 2016. A first step was the digital annual report over 2017. We continue by preparing ourselves for the following step in this annual report over 2018: integrated reporting. The aim is to publish a fully integrated report within a number of years. Financially and socially, in a way that is in line with AVR and about subjects that are not only of crucial importance to us but actually also to our stakeholders.

Stakeholders

In the spring of 2018 AVR organised a stakeholder dialogue where internal representatives of stakeholder groups were interviewed. Objective hereof was an enrichment of the stakeholder perspective (what do stakeholders require of AVR exactly), the conversion of stakeholder interests into the present strategic objectives of AVR and the identification of material themes where AVR can, according to the stakeholders, make a difference.

In the stakeholder dialogue all stakeholders were first identified and classified. The five most important are:

employees

shareholders

waste customers

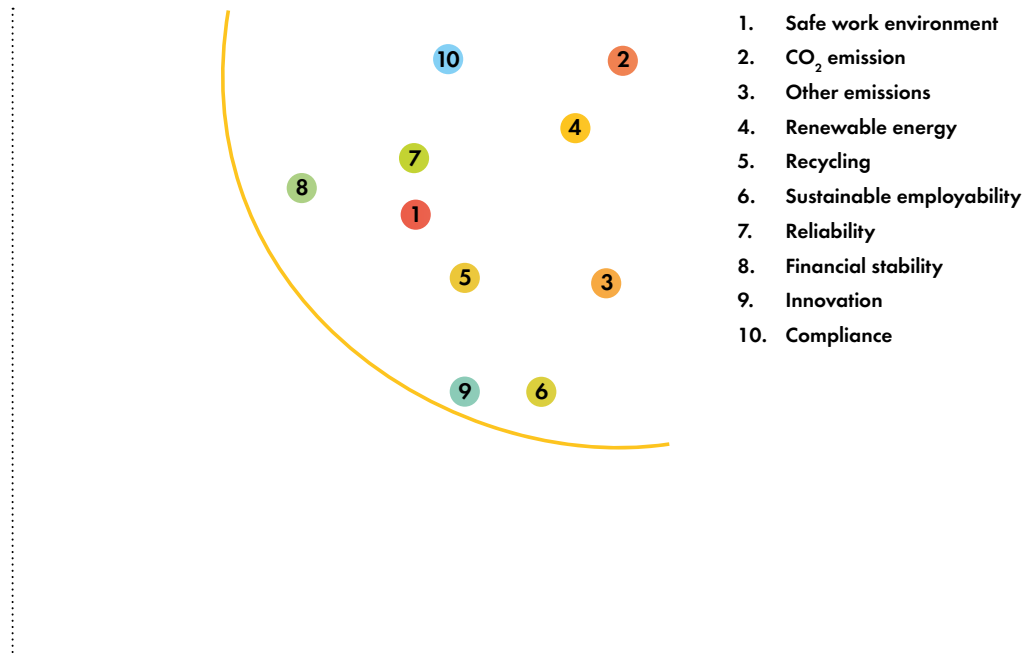
energy customers

policy developers

Materiality matrix

The outcome of the stakeholder dialogue expressed themes for AVR which were denominated and classified into the ten most important themes. These themes are relevant for the stakeholders, the society, the environment and/or the economy.

Materiality matrix



Themes, objectives and KPIs

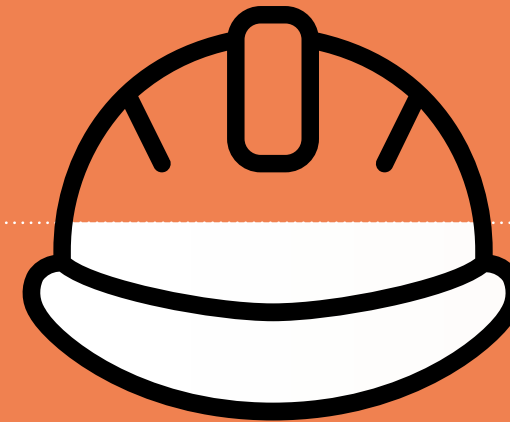
The ten most important themes of our stakeholders were linked to the strategic objectives of AVR. One or more KPIs were determined per theme. The KPIs make AVR's impact measurable. This resulted in the following matrix. Every year it is determined whether these KPIs reflect the effect to a sufficient degree or that an addition or adjustment is required.

Material themes	Strategic objectives	KPI
1. Safe work environment	<ul style="list-style-type: none"> continuation and expansion of our operational excellence the promotion and securing of a safe workplace 	<ul style="list-style-type: none"> Long Term Injury Frequency ratio Number of safety and observation rounds (SOR) performed
2. CO₂ emission	<ul style="list-style-type: none"> maximisation of energy and resources efficiency and minimisation of our CO₂ footprint 	<ul style="list-style-type: none"> CO₂ emission (direct and indirect) Avoided CO₂ emission Share of biogenic waste in CO₂ emission
3. Other emissions	<ul style="list-style-type: none"> continuation and expansion of our operational excellence 	<ul style="list-style-type: none"> AVR is still in the process of integrating KPIs in respect of this theme in the reporting process
4. Renewable energy	<ul style="list-style-type: none"> maximisation of energy and resources efficiency and minimisation of our CO₂ footprint 	<ul style="list-style-type: none"> Total volume of supplied energy (electricity, steam, heat) Percentage of biogenic waste of the energy supply
5. Recycling	<ul style="list-style-type: none"> maximisation of energy and resources efficiency and minimisation of our CO₂ footprint 	<ul style="list-style-type: none"> Amount / percentage of recovered or sorted resources
6. Sustainable employability	<ul style="list-style-type: none"> continuation and expansion of our operational excellence the enhancement of the potential of our employees 	<ul style="list-style-type: none"> Percentage of sickness leave
7. Reliability	<ul style="list-style-type: none"> long-term contracting of (residual) waste continuation and expansion of our operational excellence 	<ul style="list-style-type: none"> Percentage of availability of the plant Reliability in supply of steam and heat
8. Financial stability	<ul style="list-style-type: none"> long-term contracting of (residual) waste maximisation of energy and resources efficiency and minimisation of our CO₂ footprint continuation and expansion of our operational excellence Growth 	<ul style="list-style-type: none"> Turnover EBITDA EBIT Net result Cash flow Cash position
9. Innovation	<ul style="list-style-type: none"> long-term contracting of (residual) waste maximisation of energy and resources efficiency and minimisation of our CO₂ footprint continuation and expansion of our operational excellence Growth 	<ul style="list-style-type: none"> Investments in innovation
10. Compliance	<ul style="list-style-type: none"> continuation and expansion of our operational excellence 	<ul style="list-style-type: none"> AVR is still in the process of integrating KPIs in respect of this theme in the reporting process

Safe work environment

Safety as a condition

The safety of employees and (sub)contractors is of utmost importance considering the complex plants and the dynamic premises of AVR. We spend ample attention to the development of safety awareness with our employees and we work towards a culture where situations that bring about risks are discussed and evaluated openly. We thus want to reduce the number of accidents.



IF-rate*

1.6 ↓ 1.8

2018: 1.6
2017: 3.4
2016: 1.8

Safety Observation Round (SOR)

1,160 ↑ 153

2018: 1,160
2017: 1,007
2016: 994

*The injury frequency rate is the number of injuries per 1,000,000 employee-hours worked (measured for the calendar year)



Accidents

The accident index (IF, Injury Frequency) of AVR dropped down the line; hence the figure gives a positive picture, although two accidents were associated with serious bodily harm. In January 2018 an employee of a contractor suffered burns on his foot when he slipped whilst removing scaffolding and ended up in the slag removal plant with his foot. In December 2018 a serious accident occurred. An employee of a contractor lost a leg after he had been hit by a shovel.

Safety culture programme

In 2018 AVR started a programme to embed the safety culture further into the organisation. Within AVR we decided to develop and set up a programme together with our employees. The latter because working on safety is a continuous process. Safety is part of everyone.

The starting point of the programme was safety leadership. In 2018 we organised two sessions with the management of the production department. This resulted in learning points for the leadership, which we will pick up and develop further in the first quarter of 2019. In the second quarter we examine whether the safety leadership is strengthening and whether the step towards further development within the organisation can be taken with the programme.

We also paid attention to competence-oriented working for employees in the workplace. A good example of it is our commitment in Duiven. We relied on an actor who performed role-plays with employees whilst addressing each other on unsafe behaviour.

More rounds and more notifications

With 1,160 safety observation rounds in 2018 AVR arrives at almost 30% more than the objective of 900, and 13% more rounds took place than in 2017. In that year the number of observation rounds had already been increased to be more visible in the workplace and to incite the safety culture. In practice, this appears to work well because the safety subject has become more discussable during the rounds. It also stimulates employees to report incidents, near-incidents and dangerous situations. This is important because we consequently obtain insight into risks and because the commitment of employees to their own and each other's safety thus increases. We can see it in the figures: the number of notifications of near-incidents alone increased by 40%.

In 2018 AVR started working with the new notification system Ultimo. This also contributed, apart from the effect of the SOR, to the increase of the number of notifications. An incident or near-incident is easier to report and monitor with this system. The notifier receives feedback about what happened with his or her notification. Working with Ultimo assisted in creating good analyses of causes of events. This is an example of an area where automation can help to efficiently follow safety figures.



“The plants are in need of some love and attention”

Jos Boere, project leader

“I have been leading the PHS 31 project for six months. PGS stands for ‘publication series hazardous substances’, a directive for storage of chemicals in underground and aboveground tank installations. This includes everything from design and commissioning to inspection and maintenance. Many chemical facilities in Duiven must comply with this. These facilities dose chemicals in a process and they include many pumps and valves that people work with. This must all be very safe. Many plants in Duiven are over twenty years old and are in need of some love and attention and we can thus ensure that they comply with the latest state of the art and the rules. This way we give substance to our duty of care to work safely with them in the years to come.

In Duiven we are going to replace three old tank installations in their entirety. We must figure out how we temporarily compensate for this and ensure that the plant does not fail and that emissions remain within the thresholds. And of course we must make sure that everything proceeds safely. The challenge is for no one to notice that we are going to take these big steps in the business operations. It will be fulfilling if it is successful and it is very enjoyable to work on.

My background is hot mechanical engineering, so I know a lot about steam installations. But the nice thing about this project is actually that everything comes together: mechanical engineering but also civil engineering, automation and a tremendous amount of legislation and regulations. I feel like a duck to water with this project.”



CO₂ emission

Reduce CO₂ emission

If truly nothing can be recycled from the waste anymore then AVR uses the residues for the generation of energy. This takes place as efficiently as possible in order that the highest possible return with the lowest environmental impact is created. It is our ambition for 2030 to capture all CO₂ from residual waste that we then emit and to apply it usefully. This is 800,000 tonnes of CO₂.



CO₂ emission
(in kton)

2,231 ↑ 13

2018: **2,231 kton**
2017: **2,218 kton**
2016: **2,193 kton**

Avoided CO₂ emission

608 ↓ 20 kton

2018: **608 kton**
2017: **628 kton**
2016: **634 kton**

Share of biogenic CO₂ in emission

60% ↓ 3%

2018: **60 %**
2017: **63 %**
2016: **65 %**



CO₂ emission in 2018

AVR continuously measures its own CO₂ emission. The total CO₂ emission of AVR is for 99.9% determined by the primary process: the more residual waste we process, the higher our CO₂ emission. In 2018 this was a total of 2,231,000 tonnes. This implies that our CO₂ emission increased by 0.5% compared to 2017. The rise is related to an increase of the CO₂ emission of the liquid waste treatment plant. The Energy from Waste plants in Duiven and Rozenburg, the biomass energy plant and the paper residuals plant all emitted less CO₂ than in 2017.

CO₂ avoided by energy supply

By processing residual waste we generate steam, district heating and electricity for our surroundings. In the Netherlands this energy from residual waste replaces the consumption of energy from natural gas and coal and thus avoids CO₂ emission of these fossil fuels. We call this CO₂ avoided in the chain. In 2018 AVR thus avoided the emission of 608,000 tonnes of CO₂ of fossil origin.



Share of biogenic CO₂

A considerable part of the residual waste that we process originates from biomass, e.g. waste wood, paper residuals and organic material. During the incineration of 1 tonne of residual waste 1 tonne of CO₂ is emitted approximately. This is 'green', short-cycle or biogenic CO₂. The remaining part of the CO₂ originates from the incinerated residual waste of which fossil resources were used during the production phase, the 'grey' or long-cycle CO₂. The drop in the percentage of biogenic CO₂ compared to 2017 is particularly caused by the fact that our biomass energy plant processed less waste wood in 2018.

New plant will capture CO₂

Ultimately, the CO₂ emission of AVR is for 99% determined by the CO₂ that is inevitably released during the incineration of residual waste. To reduce our CO₂ footprint we must take a radical step. A highlight for AVR in 2018 was the decision to capture our CO₂ from the flue gases of our incineration plant in Duiven. We gave the starting shot with the signature of the agreement with the French company Air Liquide for the capture and commercial sale of CO₂, initially in greenhouse horticulture. The signatures were placed in May 2018 and the construction has been in full swing since the breaking ground ceremony on 27 September. AVR is the first in the industry that starts recovering and using CO₂ from waste incineration on a large scale. The plant is expected to be put in use in the third quarter of





2019 and will initially capture 60,000 tonnes of CO₂ per year. This quantity can grow to 90,000 tonnes of CO₂ per year.

Prior to the decision to construct this plant definitively, an extensive research and test phase was followed. AVR cooperated with several parties including scientific research agencies.

The CO₂ captured in Duiven will have a useful application: greenhouses use CO₂ for the accelerated cultivation of plants. Now they are still producing this with natural gas-fired plants. By supplying this CO₂ to greenhouse horticulture, AVR reduces both its own emission and that of the horticulturalists. And that is not all: if the horticulturalists also switch to (renewable) residual heat then they can become fully independent of natural gas with this external CO₂ supply. With a share of approximately 7.5% in the Dutch natural gas consumption the industry is one of the largest Dutch natural gas consumers, hence the impact is considerable.

AVR also has advanced plans at the location in Rozenburg to shortly start the construction of a CO₂ capture plant. The feasibility survey started in September 2018. This way we can serve greenhouses in other parts of the Netherlands, e.g. the WestLand. For the rollout of it we cooperate with, inter alia, LTO Glaskracht and OCAP. The plant in Rozenburg is a big step in our aim to find a useful application for all the CO₂ that we want to capture, e.g. in concrete and the base chemicals.

AVR and the Climate Agreement

AVR participated in the negotiations on the regional climate table for the industrial cluster of Rotterdam-Moerdijk. This resulted in proposals for the reduction of CO₂. At present the Energy from Waste plants in the Netherlands jointly emit about 8 million tonnes of CO₂ per year of which 5 million tonnes of biogenic waste (of organic origin). In the provisional climate agreement the waste industry received a reduction objective of 2 million tonnes of CO₂ from 2030. With our CO₂ capture plant in Duiven and the plans for a plant in Rozenburg we are taking a big step towards the realisation of this objective.



“Leading such a big CO₂ project means juggling a lot of balls”

Hugo Middelkamp, project leader

“As a project leader I organise everything regarding the construction of the CO₂ capture plant in Duiven. That is a complex matter, because you cannot, like with a car, go to the dealer and pick one. It is a specific plant that has all sorts of interactions with the existing plants. For instance, the flue gas from the waste incineration plant should go in but if CO₂ is recovered from it then it also needs to be returned. The same applies to steam, chemicals, electricity, and so on.

When I joined AVR to lead this, there was just a plan. I cut it in pieces and started working. I had knowledge of some parts but for other parts I talked with specialists and this resulted in a list of suppliers per component. I invited them because experience teaches

me that you need to enthuse them for a project like this. Eventually this led to six main contractors and several small ones.

Whilst for the one part the contract is already being performed, I am starting the call for tenders for other parts. I am basically a juggler who is keeping a lot of balls up in the air at the same time. This requires good structuring.

Physically there is already a lot. The concrete was poured, the pipes are being constructed, and part of the devices were installed. I can tick off ever more. It is nice to see it grow. At the end I still need to organise a few small things, like eye showers. These details are also important to make sure that the plant can operate well in the late summer.”



Other emissions

Minimise impact

Due to the important role that AVR plays in society, we have a positive impact on our surroundings but we are also responsible for minimisation of our negative impact. Our stakeholders in the direct surroundings, our licensing authorities and local authorities also challenge us in this respect.



'Other emissions' are understood as our emissions of pollutant substances in the air, water and soil. Compared to other countries in Europe, the Netherlands has the strictest standards for emissions that originate from Energy from Waste plants with energy recovery. In general, every company in the Netherlands is held not to waste natural resources and to limit the use of it in its own processes to a minimum. In addition, legislation and regulations apply to AVR in the area of quality, the environment and safety (see [Compliance](#)) and the applicable (environmental) permit in which obligations were established regarding our emissions. These statutory obligations for emissions are imposed and checked by the regional implementing agencies – competent authority – per plant and per incineration line. AVR measures and monitors its emissions every second and we periodically conduct measurements with certified bodies. In this respect we are held to operate within the applicable permit. In case of deviations, they are registered and reported to the competent authority. The cause and scope as well as potential measures are examined internally. AVR reports transparently and periodically about its environmental performances, including the emissions, in the environmental annual report.

AVR is still in the middle of the process of integrating KPIs in respect of this theme in the reporting process. We aim to report about this in the annual report over 2019.



“We must handle natural resources consciously”

Richard Kooijmans, SHEQ employee

“In the 25 years that I have been working at AVR, I initially performed water analyses as a laboratory technician. For the past ten years I have been head of the laboratory and I also started doing other things, apart from analyses, for instance environment-related improvement projects, and I became contact person of AVR for the Directorate-General Public Works and Water Management. Since 2017 I have still been doing these things, however now as environmental technician at the SHEQ Department. I also work on remedial investigation.

Our department ensures that with all activities AVR complies with the applicable permits. Because they keep being tightened, we must continuously assess whether we are still doing it well. Also when AVR taps

new waste streams or modifies plants, we must demonstrate that our emissions do not increase.

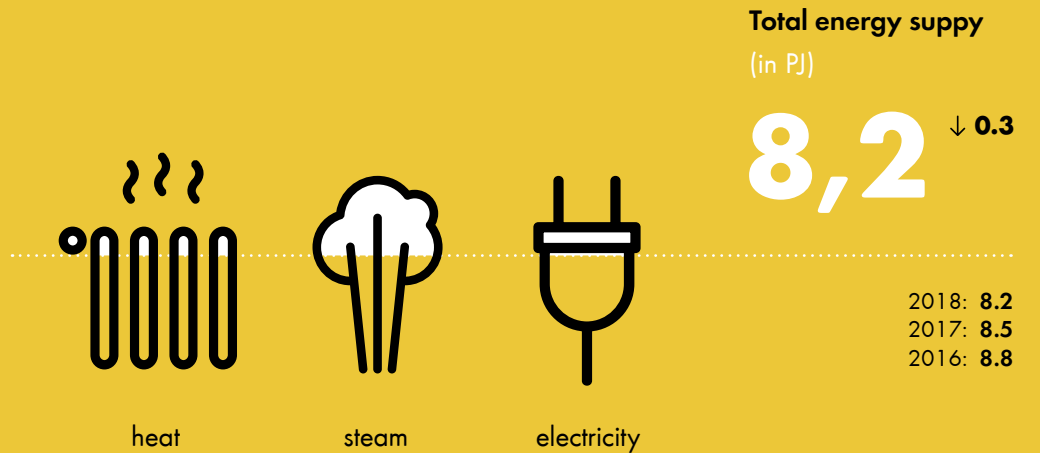
This now applies to, for instance, the CO₂ plant that we are building. We must operate it within the existing rules. That is a challenge because this plant will use a lot of water to cool the flue gases, but we cannot use additional river water. It is then a puzzle to solve it with the water that we already use, it is not a piece of cake. As a company you must handle the natural resources consciously, hence using water at random is not a good idea. This quest for how we can reuse the water is exciting to me because you immediately need to make the right choices during the construction of a new plant.”



Renewable energy

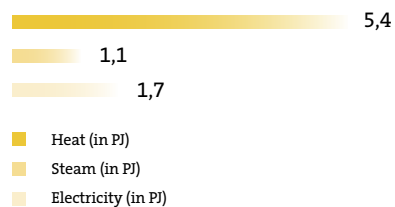
Renewable energy through incineration

From the residual waste that arrives at AVR the last materials are separated, e.g. plastics and metals. Once we have truly removed everything from it then the residual part – the rest of the rest – is still very useful: we turn it into energy. This is the most sustainable solution. We produce renewable electricity, steam and heat with our Energy from Waste plants and our biomass energy plants.





Division of heat, steam and electricity (in 2018)



AVR supplies heat to district heating grids in Rotterdam, Duiven, Westervoort and Arnhem. In 2018 we supplied a little less heat than in the previous year. This is related to the weather: the warmer it is, the less heat is purchased. Hence, we can distinguish the mild winter and warm summer in this figure. The heat transition of households (switch to different heat resources instead of natural gas) cannot be distinguished in our figures yet because this is a multiannual development that takes place home by home and district by district. In time we do expect to distinguish a trend in it.

The industrial buyers of our steam are our direct neighbours in Rozenburg who use steam to heat up installations and to operate (distillation) processes.

The purchase of steam is fairly constant. Due to a maintenance stop the supply to one of the buyers had been discontinued for a number of weeks and this slightly reduces the figures for 2018. This period was spent usefully to create a connection for a link to our biomass energy plant.

Heat and steam from the biomass energy plant

Up to the end of 2017 our biomass energy plant in Rozenburg only produced electricity. In 2018 heat and steam were added. Since January the district heating grid in Rotterdam has also been fed, barring by energy from residual waste, by heat from this biomass energy plant. From April one of our steam customers also receives, apart from steam from our Energy from Waste plant, steam from the biomass energy plant, which made the supply more reliable. An expansion of the steam supply to a second customer is expected in 2019 when we can create the link during a large maintenance stop. At the end of 2018 the first preparations had already been made for this.

Expand energy grids

AVR cooperates with several parties to expand the grids for heat and steam. We look for both new customers and new energy suppliers in order that in association we can provide more customers with energy. In 2018 we negotiated with several companies to examine whether we can extend the steam pipe in the port to other industries in the direct vicinity. Hence, in 2019, after adjustments in 2018, another plant that produces steam joins for the supply.

The expansion of the steam grid takes time because it requires strategic choices of partners, investments and adjustments to plants. A positive development is the possibility of custom made subsidies for long distance common steam pipes. They can reduce their CO₂

footprint because steam replaces the consumption of natural gas.

The Netherlands is facing the task of making heat sustainable. District heating is part of the solution and it is examined what cities and districts can be made sustainable via a central district heating grid. Our heat customers Eneco and Warmtebedrijf Rotterdam (WBR) want to expand their grid in this respect. WBR examines the connection of Leiden to the heating grid. There, the district heating grid is still running on a natural gas-fired power plant. This has reached the end of the lifecycle and no longer complies with the permit requirements, hence this is the time to change source. This equally applies to the heat power plant in The Hague, reason for Eneco to examine a branch from the north of Rotterdam. Like the expansion of the steam grid, this is also a long process due to investments and far-reaching infrastructural measures.



We notice growth in the number of households that is connected to the heating grid with customers of Nuon in Arnhem, where a residential district is being revamped and a new housing development is being built. In 2019 existing housing blocks will follow. The sustainabilisation of the developed environment is slowly taking off and we notice that social housing associations take initiatives in this respect. We expect to distinguish this trend in our figures in the longer term.

At the start of 2018 we opened a direct electricity connection in Duiven to the neighbouring 4PET, which recycles PET bottles. This saved the construction of a power cable to the nearest distribution station of the regional grid operator of several kilometres. An example of local synergy. We also examined the need for heat of 4PET and we will probably supply this from our biomass energy plant and Energy from Waste plant in 2019.



The energy supply of AVR prevents the use of fossil fuels in the Netherlands

Green versus grey

In 2018 we started a pilot in association with Nuon with guarantees of origin (GOO) for the renewable heat that we supply to Nuon. GOO are mostly issued for electricity, however we want to render transparent what part of the heat that AVR produces for Nuon originates from biogenic waste and is therefore of a

renewable origin. All heat produced by our biomass energy plant is. With this pilot Nuon intends to stimulate a market for heat GOO within the heating grid and thus give renewable heat a boost. The idea is that if customers are familiar with the origin of the heat then they can decide what they want to buy. We perform the pilot with swimming pool De Koppel in Arnhem.

“All energy finds its way to me for distribution”

Gijs Suringh, energy desk supervisor

“The control room is an area with six colleagues who all keep an eye on eight screens. One is behind those monitors to check the flue gas cleaner, someone else heats the boilers, and yet someone else manages the turbines and two others are busy with the biomass energy plant and the liquid waste treatment plant. I man the energy desk. This is basically the terminal where all energy that our plants produce comes together for distribution to the buyers.

In the morning we also have administrative duties. Our fixed buyers then communicate how much steam and district heating they expect to purchase the next day. We feed this into a calculation program in order to determine how much electricity we can still produce. This electricity is then sent to a

company that markets the said power on the stock exchange for AVR.

We work in shifts because AVR needs to remain operational 24/7, but that also applies to our buyers, the heat and steam customers. Shifts are easy to do, and it is nice that our rotas are already available up to 2024. You are not called out of the blue. We consequently work regularly irregularly.

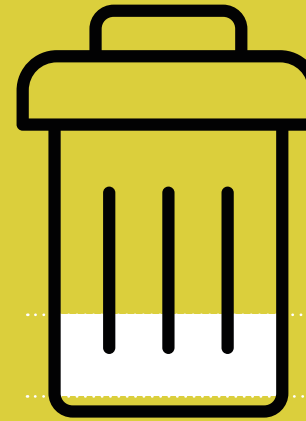
I went to nautical college, I hold a Bachelor's Degree in Operation Maritime Officer. More people with this background work at AVR. Switching from a vessel to this type of shore job is very easy because technically there are many similarities, you also work in shifts and the work mentality is the same. There is one big advantage: I now spend more time at home.”



Recycling

Recover and recycle resources

Residual waste that we process contains many valuable resources and materials that can be reused. We separate these from the waste streams or recover them. Our objective is to get the most out of the residual waste. We are successful in this with various materials and resources, e.g. (precious) metals, minerals and plastics. Our results increase: the products become ever more sophisticated and some have reached the end-of-waste status.



Quantity of recovered or separated resources

Minerals
(in % of amount of waste)

23.4 ↑ 1.1

2018: **23.4%**
2017: **22.3%**
2016: **22.4%**

Metals
(in % of amount of waste)

2.3 =

2018: **2.3%**
2017: **2.3%**
2016: **2.3%**

TopCrete

40 ↓ 1 kton

2018: **40 kton**
2017: **41 kton**
2016: **42 kton**

Plastics

688 = ton

2018: **688 ton**
2017: **N/A**
2016: **N/A**

Molybdenum

171 ↑ 1 ton

2018: **171 ton**
2017: **170 ton**
2016: **182 ton**

Plastic separation plant started

On 5 December 2018 we put our separation plant in use with which we sort plastics, foils and beverage cartons from domestic residual waste. The plant is valuable because source sorting is particularly difficult to realise in urban, densely populated areas or in districts with ample high-rise buildings and does often not lead to good quality of the sorted waste stream. The domestic residual waste from the municipalities of Leiden and The Hague and a part of the residual waste of the municipality of Utrecht is handled by the plant of AVR and in 2019 a second line will be added for the residual waste of Rotterdam. With the sorting of residual waste AVR contributes to the realisation of recycling objectives of the municipalities. The separation plant is the result of a partnership with the Packaging Waste Fund. The recovered materials are

now still forwarded to a sorting and recycling company for reprocessing, however in the future we want to reprocess them ourselves into more sophisticated resources. During the 26 days that the separation plant was operational in 2018, 688 tonnes of plastics were sorted from the residual waste.

From bottom ash to building material

After the incineration of residual waste approximately 27% of bottom ash remains. This still contains many valuable substances. Think about minerals and metals like iron, copper, aluminium and precious metals, including gold and silver. Together with specialised partners AVR recovers the metals from this bottom ash with advanced technology for recycling. The granules that remain consist of inert residues, including stone, sand, porcelain and glass. They form minerals that can

be used as building material and therefore replace primary resources. In the Green Deal for bottom ash from Energy from Waste plants it was agreed that the use of granules where measures must be taken to prevent the 'logging out' or leaking of hazardous substances (IMC measures: isolate, manage and control) must be phased out in an accelerated manner. In 2020 it must be possible to use the granules freely for 100%. In association with partners Mineralz and Heros AVR is improving: from the bottom ashes from 2017 63.4% of the minerals were used cleanly and freely, without IMC. Thus the recycling percentage of our customers increased considerably. The figures of 2018 are available from June 2019 due to the long turnaround time of the reprocessing process.

TopCrete

Paper is recycled seven to eight times. After that the paper fibres have become so short that recycling is no longer possible. However, the woody material is still in it, it is biomass. AVR has a plant for the incineration of these paper residuals in Duiven. When the maximum amount of renewable electricity and heat has been generated with it, a calcareous product remains that can serve as alternative to cement: TopCrete. In 2017 this material received the end-of-waste status. This means that this substance can be used as a product without the waste qualification. Apart from alternative to cement, the residual can be used as material that bonds with substances from flue gases.

Molybdenum

In Rozenburg AVR processes caustic waste water streams from the chemical industry that cannot be sent one-on-one to a biological water purification plant where bacteria 'eat' the hazardous substances. One



of these waste waters that AVR processes contains molybdenum, which occurs as a residual stream during a catalyst process in the production process of our customer. AVR recovers molybdenum (as rare heavy metal) from this waste water to be reused in the (steel) industry. The process is special. Because the water contains organic material we can incinerate that part with the help of waste fuels to use as little natural gas as possible. The water that remains, evaporates and is clean. We use the residual heat that is released during this process for the supply of district heating.



“It is special to be part of such an amazing, new project”

Vincent Matthijsse, head operator separation plant:

“On 5 December the separation plant here in Rozenburg becomes operational. That is a complete plant that is in a large factory building and that sorts plastics, foils and beverage cartons from domestic residual waste. We now process 28 tonnes of waste per hour and when we shortly have another line for the waste from Rotterdam it will be about 60 tonnes per hour.

A crane first removes large pieces, e.g. mattresses, and then the waste goes through a shredder. A vibrating sieve sorts it on size. Then it passes pedals that sort flat pieces and 3D pieces with cycling movements. Then everything passes infrared twice with which, for instance, types of plastics are sorted. The final products go to a reprocessing company in bales.

Since the start it has been going surprisingly well, it was properly thought out. Sometimes a piece of cloth or something else slips through that cannot be processed by the plant. Then the waste piles up and we need to intervene. But that is everything really.

As head operator I steer the team that operates and maintains the plant. My work is nice because it is very diverse because apart from with my team members I also speak with many different people. The communication between the team and my supervisor is also fascinating. I have been involved in the plant since before the construction and I thought along about things like safety. It is special to be part of such an amazing, new project.”





Sustainable employability

Work on less absenteeism

We did much to reduce the sickness leave ratio. This was partly successful but in some areas of our organisation the sickness leave is still too high and that is cause for concern to us. That is why we continue our ample attention for vitality, health and professionalism. Our measures jointly form the three pillars of our programme 'Become your best', with which we work on the sustainable employability of our employees.



Sickness leave ratio

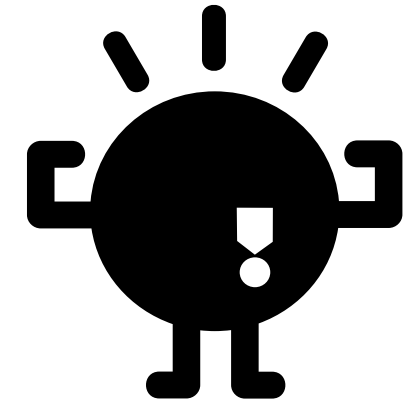
6.4 ↓ 0.6%

2018: 6.4%
2017: 7.0%
2016: 6.0%



Become your best

The policy for sustainable employability of AVR is known in full as: 'Become your best (because you are too good to waste)'. It is based on three pillars: vitality, health and professionalism. Important in 'Become your best' are the employability interviews. They replace the assessment interviews and are more about the development. By entering into the dialogue, we can ensure that employees are at the right place and receive what they need in order that, like at our plants, 'their fire keeps burning'.



We want our employees to keep 'their fire burning'

Vitality

AVR supports a healthy lifestyle of the employees. For instance, we improved the offer in the canteen and twice a year we organise workshops about energy and lifestyle. We hold employability interviews about resilience, motivation and work climate to sound out whether employees are still fit at work. Attention is then also paid to the balance between work and private life. For new employees who start working in shifts, 'Healthy in shifts' is a mandatory course to limit the adverse effects of shifts.

Effective from 1 September 2018 AVR concluded the Generation Pact for employees aged 62 and over. They can start working 80% and preserve 90% of their income and accrue 100% of their pension. The first employees are relying on this from 1 January 2019.

In 2018, as a first in the industry, the WENB - the employers' organisation for the energy, cable and telecom, waste and environment industry - implemented that partners receive four weeks of leave after the birth of their child. In 2019 we will start a pilot with flexible rotas in Duiven where shift employees can mutually exchange shifts so that work is better in line with their personal life.



Health

Because many employees work in shifts and perform heavy work, AVR cares for their health through several facilities. We do more than imposed on us by the occupational health and safety rules. We have an extensive company health insurance package for our staff that we use when more support is required. Where psychological care may take months before someone can expect treatment, an employee of AVR receives an intake within two weeks. This prevents employees from being absent for a long period of time.

The average age of our staff is over 50 and the absenteeism is relatively high. That is why we have deployed all HR Advisers as case managers in absenteeism management, who trained the manager on the job. This means that they, where required, enter into the dialogue with team members together with the manager. This helps to pick up on signals of employees and to make the employees feel that they are taken into account. In 2018 we facilitated a quit smoking pilot in association with the Maastricht University. Thirty employees participated in it of whom most successfully. Also see Stop smoking.



If an employee can no longer handle the work then we hold career interviews. We then find out if someone is still at the right place. We anticipate what someone can still do. Since we have implemented this working method and have made everything discussable in a safe work environment, there has been more internal mobility than ever, in terms of positions at both a higher and a lower level and horizontally.

In 2017 AVR prepared the mandatory position of prevention employee and this started in 2018 with a critical examination of workplaces. Following on from this sit-stand desks were purchased and other ergonomic adjustments were made. The prevention employee also examines if physical complaints are caused by stress. In addition, the confidential counsellor was made better visible for potentially difficult meetings. And apart from the company doctor, there is the senior case manager who offers support in a confidential manner.

Professionalism

By paying attention to knowledge and expertise AVR aims for its employees to be 'fit for the job' and to expand and deepen their position. In 2018 we spent € 567,000 on training and development. We lowered the threshold for employees to inquire after training and courses. Managers will also mention it to employees. We offer possibilities at all levels, from MBA to 'driving claim-free'.

With the AVR Academy we deploy in-house knowledge on a broader scale by bringing people of different departments and with different positions into contact with each other. Since the implementation of it at the start of 2018 knowledge bearers have been

speaking about their profession for an hour per week on a rotating basis. This way knowledge is transferred in an accessible manner, colleagues can find each other more easily and it stimulates the internal mobility. This is a mandatory part of the induction programme for new employees.

We also deploy coaching on a broader scale for personal development. Never before did we perform so many assessments to check what is in line with employees. By giving them control over their career, we can bind them and continue stimulating them.

Recruitment

AVR actively started presenting itself as an employer. The vacancies underwent a makeover. They explain how they experience their job at AVR and show their work environment. This campaign is very successful. In 2018 AVR could welcome a record number of new people: 48 vacancies were filled, inter alia because of the start of the separation plant. Apart from new fixed employees we also assisted 22 people in 2018 in the block or day release (BBL) and the pre-vocational learning pathway (BOL). We also made a work experience place available and two students participated in a traineeship.

“Your body can deal with a lot, as long as you do it correctly”

Jarno Hoogendoorn, mechanical engineering technician

“We work daily on the plant with eight mechanics. We solve first line failures and we perform the inspection of the plant. We work in a dayshift. Five of the eight mechanics work a breakdown service. This means that once every five weeks you are on call for a week. You must then also be available after working hours and at night if something needs to be solved. This does have an impact on your social life, because you cannot spend the day in Amsterdam on a Sunday or have a beer in the evening. It can also be hard physically because if you have already completed a working day and you also need to work hours at night then this requires a lot of your body. Nonetheless, I just keep doing my thing, like DIY or working in the garden.

I am 21 and I do a lot of sports. I play korfbal three times a week and I also go to the gym twice a week. I enjoy that. An advantage of doing sports is that I am less tired during my work. Before I started working I was only used to my school rhythm. The first couple of months at AVR I consequently did not have a lot of energy left after working hours. It requires a lot of walking and lifting heavy things. But your body can deal with a lot, as long as you do it correctly.

I have been working at AVR for two years now. My last traineeship was here and I could stay after my certification. Now I look after all mechanical parts with much pleasure.”



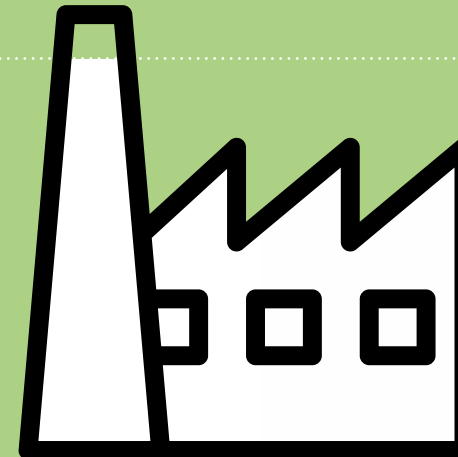
Reliability

Availability and continuity

The red threat in the satisfaction of our customers with the services of AVR is particularly related to reliability. AVR must be a reliable partner to its customers. Supply security, the quality of the services and the continuity of the waste processing play a role in this. Because AVR serves several customers reliability has been divided into two parts: availability of our factories and continuity of the supply of steam and heat.

Availability of the factories
(AVR wide)

92.3% ↑ **0.2%**



2018: **92.3%**
2017: **92.1%**
2016: **92.4%**

Reliability of heat and steam

97.2% ↓ **0.9%**

2018: **97.2%**
2017: **98.1%**
2016: **98.1%**

Availability of our factories

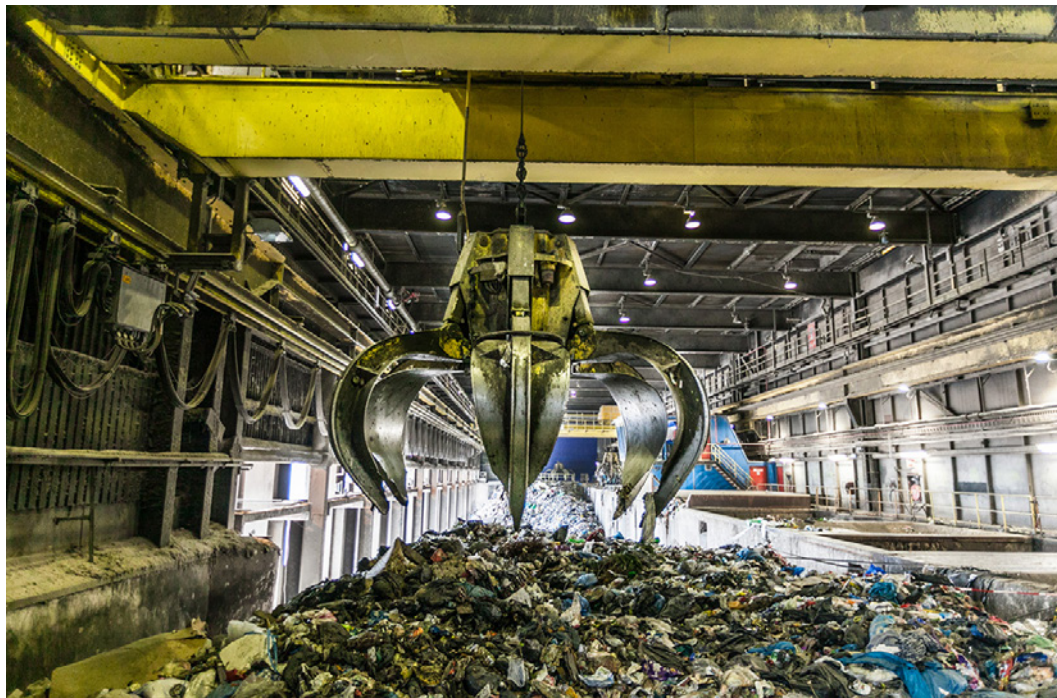
It is important to residual waste customers that they receive supply security with AVR. That they can supply their residual waste throughout the year, summer and winter, and the entire week. An important condition is therefore that AVR disposes of sufficient storage capacity and that the factory is and remains available to process the contracted residual waste.

The year 2018 was characterised by a long and warm summer period. As a consequence the residual waste was drier and this affected the amount of residual waste that we processed. Hence, in 2018 there was a slight drop in the amount of residual waste that we processed in Rozenburg. Due to some

unscheduled stops and failures the availability was lower. The biomass energy plant also had a lower availability in 2018 in connection with the connections of the energy system. The availability of the waste plant in Duiven was actually higher than scheduled. Another positive result is that of the plant in Duiven where we process paper residuals: it reached the highest availability in recent years.

Continuity in supply of steam and heat

Reliability of the supply is the most important to the energy customers of AVR. A changing reliability in the supply of energy from AVR directly affects the process at our customers. Our industrial steam customers do not immediately have a backup



available and are therefore partly or fully dependent on steam of AVR. The natural gas-fired plants are an alternative to our district heating customers but represent a less sustainable alternative. They must always ensure that households receive heating when required.

The reliability of AVR in the supply of energy to our heat and steam customers indicates in a percentage in time how long the energy supply from AVR complied with the correct temperature and/or pressure and/or volume (as stipulated in the agreement).

In 2018 the reliability of the heat and steam was slightly lower than in 2017 due to a large maintenance stop of an important boiler / incinerator line in Rozenburg. It consequently supplied less 40-Bar steam than in previous years. In 2018 AVR produced more heat from the location in Rozenburg. As a consequence we were able to comply well with the demand of our district

heat customers. Reason for this was the additional heat that became available due to the connection of the biomass energy plant to the district heating grid. As a consequence more capacity is available and AVR has become more flexible. For instance, if a boiler now fails then we can still comply with the demand for heat and we noticed this in 2018. At the AVR location in Duiven we were able to comply with the customer demand throughout the year.

Thanks to the connection of our biomass energy plant to the district heating and steam grid AVR will be better able to anticipate the changing demand for energy more flexibly in the coming years. It is also easier to absorb failures in our own system more easily. More factories that supply energy – hence more sources – provide for a higher reliability.

“It is important that we can trust each other in the team”

Roy Taal, supervisor shift four, Rozenburg

“With five teams we make sure that the incinerators, the biomass energy plant and the liquid waste treatment plant are operational 24/7. I am a supervisor, so I steer one of these teams. We are in at least sixteen during a shift. A group of six operates the plants inside behind the panel. Outside there are five who follow the instructions from the people inside. They check the plants. Then there are three others on the crane who put the residual waste in the incinerators.

It is important to the reliability and the availability of the plants that we go through everything properly when the shifts change. What did you work on? What do we need to take over? Were there any incidents? Also

when maintenance is required, we make sure that it is safe to work on the plants. That everything is free of tension, that everything is clean and that the lists and procedures are correct. We also form the company emergency response organisation, so if something happens with an employee then we are the first on the scene.

To us reliability means that we can trust each other in the team. That we are certain that colleagues open and close the right valves, for example. The plants are complex, certainly now that they are linked together for the heat production. Then you must be able to cooperate well.’



Financial stability

Basis for growth

The financial stability of AVR is important for the shareholders, financiers, employees, customers and contractors. A stable financial situation contributes to the continuity of AVR and the realisation of strategic objectives. With this condition AVR can do investments to keep the plant maintained and start new sustainable projects.

EBITDA
(in millions €)

122.0 ↑ 4.9

2018: € 122.0 mln
2017: € 117.1 mln
2016: € 124.8 mln



Net result
(in millions €)

37.7 ↑ 0.7

2018: € 37.7 mln
2017: € 37.0 mln
2016: € 36.9 mln



Turnover

245.3 ↑ 1.3

2018: € 245.3 mln
2017: € 244.0 mln
2016: € 248.6 mln

EBIT

80.0 ↑ 3.2

2018: € 80.0 mln
2017: € 76.8 mln
2016: € 83.9 mln

Investments

64.3 ↑ 14.2

2018: € 64.3 mln
2017: € 50.1 mln
2016: € 39.0 mln

Cash flow

- 49.4 ↓ 58.5

2018: € -49.4 mln
2017: € 9.1 mln
2016: € 28.1 mln

Cash position

28.7 ↓ 49.4

2018: € 28.7 mln
2017: € 78.1 mln
2016: € 69.0 mln

AVR has a prudent financing structure and we are able to budget and forecast our performance accurately in advance. Also the company has a stable financial result over the past years. As a consequence we can, as an organisation, continue our existence and continue performing and expanding our activities.

KPI's

The KPIs of this theme, financial stability, are derived from the annual accounts of 2018, which are based on IFRS principles.

Developments in 2018

Result

Financially, 2018 was a positive year for AVR. Both the turnover, the operational result and the net result have risen compared to 2017.

The volume of residual waste processed decreased slightly, in particular as a result of more standstill for maintenance and the effects of the warm summer. The high temperatures also contributed to the drop of the amount of energy supplied. In addition, there was question of lower energy and subsidy income. The cause of this is the commissioning of the connection of our biomass plant in Rozenburg to the district heating and steam grid in connection with the start-up effects in 2018. On the other hand, both the waste and the energy prices developed slightly positively. Since December 2018 the new separation plant has been contributing to the result.

The operational result of 2018 arrives at € 80 million and is thus no less than € 3 million higher than in 2017. A part of this higher result is cancelled by higher tax expenses (compared to 2017) as a result of which the net result arrives, on balance, at € 37.7 million, compared to € 37.0 million in 2017.

Cash flows

Despite the positive operational result, AVR realised a negative cash flow over the 2018 financial year of € 49 million. The cash flows consist of operational activities of approximately € 114 million, investment activities of approximately minus € 64 million and financing activities of approximately minus € 99 million.

In 2018 AVR invested € 64 million. These are investments in innovative projects and investments in the plants: per annum AVR invests at least € 30 million to guarantee that existing plants continue complying with the highest standards and will therefore also be profitable in the future. The cash flow from financing activities predominantly consists of interest charges on loans and credit facilities (€ 30 million), a dividend distribution (€ 40 million) and a (temporary) repayment on an existing financing (€ 30 million).

As a result of the cash flow, the cash position of AVR in 2018 dropped from € 78 million to € 29 million. This is a scheduled drop: the resources of the company were used to invest in strategic projects with which the company intends to further expand its contribution to the circular economy and the energy transition. A part of the cash position (€ 30 million) was used to phase out debts.

Refinancing

AVR has € 450 million of outstanding loans and credit facilities with banks and investors. A part of these loans expired in 2018. This regarded € 150 million and these loans were refinanced in 2018. As part of this refinancing a credit facility of € 80 million was made 'green'. AVR agreed on three sustainable objectives and targets:

- amount of CO₂ captured and applied usefully;
- number of tonnes of plastics sorted;
- percentage of sickness leave.

Interest must be paid on every loan and the realisation of these objectives affects the level of the interest rate that AVR must pay. This is a green financing and that means that, apart from an environmental result, we also obtain a financial advantage when we realise these targets. We aim to also turn other parts of our financing green in order to thus show our role in the sustainable society.

The refinancing resulted in a combination of more flexibility (e.g. early repayment or additional borrowing) and long-term certainty (ten-year fixed interest rate on the new loans to investors) for AVR.

Fitch credit rating

AVR has had an investment grade credit rating with Fitch for quite some time. AVR has a rating of Triple B+ (BBB+) on its external financing. This means that AVR is a reliable company to invest in, not just in the short but actually also in the long term. We consciously opted for a financing in combination with a rating. This makes it visible that we pursue a strategy that aims at focus and stability in the long term. Due to the credit rating AVR is able to attract financing with a longer term at a favourable interest rate. In December 2018 our rating was, after the annual evaluation, again confirmed with a stable prospect: Triple B+.





“Living up to your promises provides certainty for the future”

Leen van Welie, controller

“I have been working at AVR since 1998. I consequently experienced from close by how our company grew from a waste processor into a supplier of renewable energy. Our social function increased significantly. I am proud to be part of that.

When shaping your social role it is important that you live up to your promises. This provides certainty for the future. Financial stability is important in this respect. Our stakeholders want to know whether AVR can offer this stability. Customers want to know if residual waste is processed and energy will be supplied. We must also be able to pay the invoices of the suppliers in the longer term, just like the salaries of our employees. AVR must also meet the requirements for emissions and safety. In turn, AVR provides

for sufficient profitability to provide for this in the long term, through investments in maintenance in the existing plant and in strategic expansions to anticipate new developments. As a controller I assist in steering this in the right direction.

With integrated reporting AVR reports transparently to stakeholders to what degree we realise our objectives. Because in the end they are decisive for our future. In this respect we are proud of our successes but we also mention when things can go slightly better. For instance, we show that, if the realisation of objectives was not entirely successful, not to be a rudderless ship but that we are still underway to a clearly formulated result.”



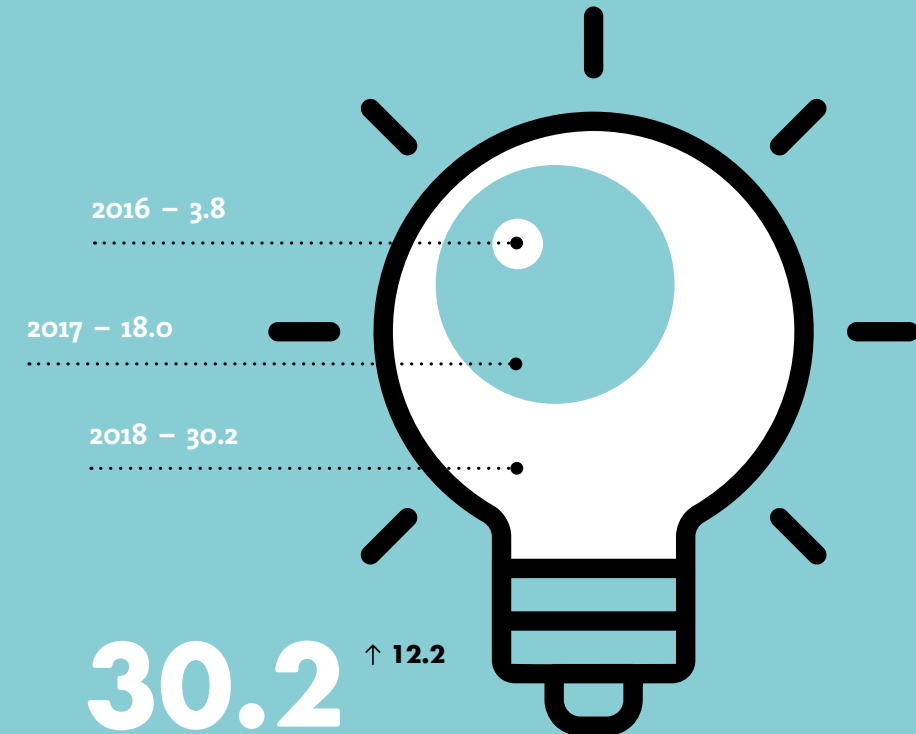
Innovation

Constantly developing

To make the processing of residual waste even more sustainable and efficient, AVR continues innovating and investing in large and smaller projects. These investments make a contribution towards our strategic objectives, and at the same time they lead to an environmental return: less CO₂ emissions, more recycling, more energy supplied.

Investing in innovation

(in millions €)



Realised innovative projects

In 2018 AVR completed several sustainable investment projects:

- Plastic separation plant
- Biomass energy plant

Investing in innovation

In the 1970s and 1980s AVR was predominantly a waste incinerator and the emphasis was put on reduction of waste volumes in order to reduce landfilling. Since then we have made considerable investments in our installations and related infrastructure, which resulted in a reduction of waste and increase of energy recovery. The production of steam and heat apart from electricity was a big change and immediately led to a reduction of the CO₂ emission of our partners and the regions of Rotterdam and Arnhem. After this innovation AVR has continued investing in new and innovative projects. We propose solutions for the daily challenges that our world offers and we simultaneously have clout to accomplish large innovations. The CO₂ capture plant is a good example of this.

KPI: realised innovative projects

In 2018 AVR completed several sustainable investment projects.

Plastic separation plant

In 2018 AVR commissioned a plastic separation plant with a first sorting line on the basis of an input capacity of 215 kilo-tonnes per year of domestic residual waste. AVR invested a total of approximately € 23 million in this plant. This investment was made possible thanks to a unique partnership with the Packaging Waste Fund, with which AVR concluded a long-term cooperation agreement for the separation and further sorting and recycling of plastics. In addition, we jointly agreed on an innovation agenda that includes expansion and extension of the plant.

The plastics and beverage cartons that are separated by AVR are further sorted in several streams by a reliable partner, the German company Augustin, and processed by several recyclers into new resources.

We have the strenght to innovate with impact

Biomass energy plant

The biomass energy plant in Rozenburg was connected to the heat grid on 1 January 2018 and from 1 April 2018 also to the steam grid. This increased the energy efficiency considerably because the plant is consequently suitable for – apart from the production of electricity – the direct supply of steam to surrounding industrial customers of AVR in the Botlek area and district heating to Rotterdam.



Projects in progress

In 2018 various large projects started.

CO₂ capture plant

In May 2018 AVR decided to invest in a CO₂ capture plant in Duiven. The plant will capture CO₂ from the flue gases of the Energy from Waste plant, which is supplied to greenhouse horticulture for the accelerated cultivation of plants. We concluded an agreement with Air Liquide for the purchase of the CO₂. The plant is expected to be ready for delivery and commissioning mid-2019. This way we contribute to the objective for the reduction of CO₂ emissions.

Second line with separation installation

The separation installation, which has been in use for the sorting of domestic residual waste from Utrecht, Leiden and The Hague since 5 December 2018, is expanded with a second line. The second line is destined for the domestic residual waste of the municipality of Rotterdam. The second line has the same capacity as the first with which the separation installation will have a total input capacity of approximately 430 kilo-tonnes per year in 2019. It is expected that the second line will be commissioned before the summer of 2019.

Combustible residual stream instead of natural gas

At the moment AVR is testing the processing of a combustible residual stream that originates from the production process of one of our steam customers.

This residual stream can be used in our liquid waste treatment plant as an alternative to natural gas. Due to the processing of this residual stream at AVR, the processing at our customer can be discontinued and the steam supply can be made more sustainable. Hence, two birds are killed with one stone: AVR saves on natural gas usage and our customer can make its steam purchase more sustainable. In the second half of 2018 we hope to know more about the success of these tests.

Buffer for district heating

Together with Nuon AVR is working on the realisation of additional buffer capacity in the district heating grid of Arnhem / Duiven / Westervoort with which the supply of renewable heat is optimised further.

Projects under development

To apply even more residual waste usefully, AVR continues developing new projects.

Second CO₂ capture plant

Apart from the construction of the capture plant in Duiven, AVR is working on a feasibility study with various partners (including Linde Benelux) in Rozenburg for the capture and supply of CO₂ to greenhouse horticulture for reuse. AVR received a subsidy from the Ministry of Economic Affairs and Climate Policy for this extensive feasibility study.

Expansion of steam and heat grid

The commercial and technical feasibility of an expansion of the present 40-Bar steam pipe between AVR and one of our customers is examined with various surrounding industrial companies in the Rotterdam-Botlek area. In addition, we are examining the possibility of making residual heat of nearby companies in Rotterdam-Botlek available for use in the district heating grid of Rotterdam.

AVR is also working on a feasibility study for the availability of residual heat from the flue gases of its own biomass energy plant in Rozenburg.

Reprocessing of plastics

Together with the Packaging Waste Fund, with which AVR concluded a long-term cooperation agreement, AVR is examining the possibility of realising further reprocessing capacity for separated plastics on-site. Our objective is to create a more sophisticated product with broader sales possibilities. We also aim to set up the chain activities more efficiently and thus reduce costs.

Configuration of turbine park

AVR is examining the optimal configuration of the turbine park in Rozenburg. The latter with the intention of optimising the energy efficiency, the reliability and the energy output of the processes.

Expansion

AVR examines whether a capacity expansion is possible for the thermal processing of waste biomass and sewage sludge at the location in Duiven.



“People thought: that CO₂ plant, it is just hot air”

Simon Frans de Vries, Energy & Residuals project manager

“More varied work than this does almost not exist. I have many external contacts with universities, start-ups, multinationals and knowledge institutions like TNO, and also internally with colleagues from commerce to production, plant performance and logistics. All to examine if ideas are technically and commercially feasible, like we did for the CO₂ capture plant that we are building now. We react to questions from the market and examine, for instance, whether we can develop a new product for a partner and the other way around we seek partners who see value in something we present.

When the business case for a new plan has been finalised then the investment decision follows. When that moment arrived for the CO₂ capture plant, which we had already been working on since 2016, we were very

pleased with the team! Yet another step of a worthless residual stream to a valuable product.

With the plan for this CO₂ plant we did have to overcome some scepticism. People could not imagine it, they thought: it is just hot air. Well, it is, literally, but still. You need to overcome obstacles, dare, evidence ever again that it is possible. Now that we are ready with CO₂, there is actually enthusiasm all around. And that is also nice. Shortly I will receive a group from England who conducted tests with our fly ash and fine bottom ash. Difficult streams that they convert into useful materials with CO₂. Hence, a local market can be developed with it. Another new challenge. I like challenges, because otherwise I would not be working here.”



Compliance

Compliance with legislation and regulations

The board and shareholders of AVR attach ample importance to compliance with the applicable legislation and regulations. To safeguard this, the organisation implemented internal policies and procedures for its business processes.

Compliance required continuous improvement, certainly in consideration of the increasing regulatory burden in combination with its complexity. In the course of 2019, just as in 2018, new control measures will be defined and followed to structure compliance with legislation and regulations and to embed it in the organisation better.



Key performance indicators

Several spearheads in the area of compliance are applicable to AVR: compliance with environmental and planning law (permits), procurement law, accounting law, energy law, consumer law, financial law and privacy law. After all, compliance with these areas of the law directly affects the 'licence to operate' of AVR. In addition, the prevention of fines and other enforcement measures is essential for maintaining our good reputation. The SHEQ, IT and HR Departments and the General Counsel support the organisation with solicited and unsolicited advice and offer, where required, the necessary knowledge to support the operation.

Certificates

AVR disposes of modern, certified management systems that are updated and maintained frequently. All (work) procedures and rules are based on this. This regards ISO 9000 and ISO 9001 for quality, ISO 14001 for environmental matters and the OHSAS 18001 for working safely.

GDPR

In 2018 compliance with the General Data Protection Regulation (GDPR) was an important indicator for AVR in connection with the entry into force of the said legislation on 25 May 2018. As a public company AVR attaches ample importance to compliance with the GDPR. From the end of 2017 a working group of internal IT, HR and Legal professionals, supported by the law firm CMS and IT consultant Cegeka, worked hard on making the company compliant with the GDPR. The working group completed its activities successfully prior to the implementation of the GDPR.





In conclusion

Confidence in 2019

In 2018 we started a number of special projects that we will reap the fruits of in the coming years. And meanwhile we will continue working on innovations that help us enhance the energy efficiency of our incineration plants and reduce, and even use, the emissions. We also continue contributing to the circular economy by sorting waste streams that can be recycled. AVR is confidently looking forward to 2019.

We look forward to the supply of the first CO₂ from the CO₂ capture plant in Duiven. The construction is progressing well and it is expected that the plant can be operational from the summer of 2019. We also hope to start the construction of a much bigger version of this plant in Rozenburg in the upcoming years.

The initial experiences with the separation plant in Rozenburg, which sorts plastics from residual waste of municipalities, are positive. The expansion of the plant with a second line in 2019 will result in even more sorted waste streams of a higher quality to provide a full-service solution to even more people. We follow our conviction that expansion of mechanisation in waste sorting is the correct choice to obtain usable resources for recycling.

In Rozenburg all plants will be decommissioned for a brief period of time in September 2019 for the performance of maintenance of parts of the process that are usually operational 24 hours a day and are never decommissioned. As a consequence we expect to process less residual waste in 2019 than in 2018.

Otherwise, we continue our current course towards integrated reporting. We have taken a first step with this report. We will refine the monitoring of our input, output and impact on society and will show our progress next year.



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