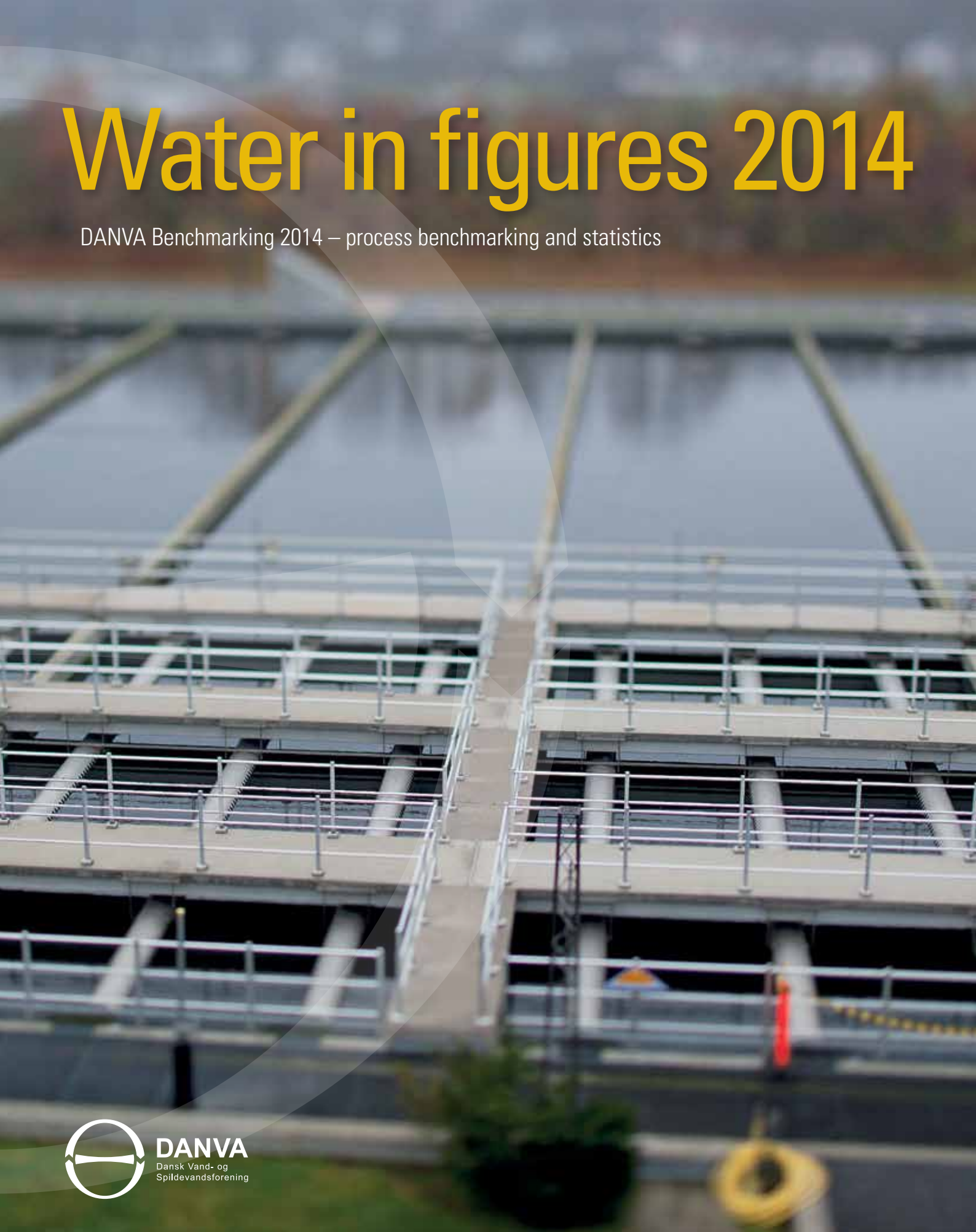
Water in figures 2014

DANVA Benchmarking 2014 – process benchmarking and statistics



DANVA
Dansk Vand- og Spildevandsforening

The water sector in figures
a new proficiency

Danish water companies are developing rapidly in today's world and the results they have achieved are reflected in DANVA's latest key figures and ratios for the water sector, 'Water in figures 2014'.

Operating costs for drinking water companies fell by 10.9%, whilst investments in the period rose by 32%. Over the 2010-2013 period, waste water companies' operating costs have fallen by 10.8%, whilst an increase in investment of 49% is attributable mainly to investments in climate adaptation solutions.

The water companies' efforts to streamline are a continuation of the mission of utilities in the 00s to operate with as few costs as possible, whilst also managing to create renewal, investment and development.

'Water in figures 2014' has a focus on the next generation of committed employees who are adapting to and indeed creating a new reality in the water sector.

The water sector is vital to society and industry alike, contributing billions of Danish crowns and employing thousands, including consultants, entrepreneurs, suppliers and others. At the same time it assumes responsibilities in the areas of health, the environment, climate adaptation, reliability of supply and technological development.

In 2010, the water companies underwent organisational separation from the municipalities. In 2014, we see decisive evidence of new organisations, structures and jobs as well as company action plans for operation, strategy and policy.

The Danish water companies have shown their worth since operating under a new set of conditions after 2010. They have been able to operate their companies more efficiently and have achieved an excellence that is reflected in the water sector's key figures. Annual streamlining of operations is one aspect of this: on average, efficiency is above the requirements set by the Danish Competition and Consumer Authority.

DANVA's members perform their tasks, developing and optimising solutions year after year. They supply clean drinking water and treat waste water. They also protect citizens from flooding caused by increasing rainfall and torrential downpours.

Operating costs incurred by the more than 59 drinking water companies translate to DKK 4.65 per m^3 sold, which is a decrease of 3.9% compared to the previous year. The 74 waste water companies' operating costs are DKK 10.70 per m^3 sold, a fall of 2.2% compared to the previous year.

The companies included in DANVA benchmarking together manage 1,784 water abstraction shafts, 239 water works, 533 treatment plants and nearly 100,000 km of supply and sewerage pipelines, enough to encircle the circumference of the earth twice.

Process benchmarking is one of the tools that help the water companies manage their affairs and deliver the most efficient service, with a business focus.

The water companies are one of the most important foundations of our society's structure. This responsibility has not lessened since the separation of authority and operation in 2010. The water companies participating in DANVA's benchmarking system show that with targeted and effective controls, they fully live up to the expectations of citizens, authorities and legislators.

DANVA's members take it upon themselves to utilise the opportunities that today's new reality has made available.

Carl-Emil Larsen
Managing Director, DANVA

Benchmarking for efficiency

Benchmarking is a tool for identifying performance and optimising working processes and methods by learning from 'best practice'. A total of 137 drinking water and waste water companies have taken part in DANVA's 2014 benchmarking work, using data from 2013. These companies supply approximately 55% of the Danish population with clean drinking water and treat waste water from approximately 73% of the population.

Key figures

- The average price of one litre of water is DKK 0.063.
- Average household water consumption is 107 litres per person per day.
- The drinking water companies' average operating costs were DKK 4.65 per m^3. Investments totalled DKK 5.43 per m^3.
- The waste water companies' average operating costs were DKK 10.70 per m^3. Investments totalled DKK 19.44 per m^3.
- The electricity consumed in respect of 1,000 litres of tap water supplied, treated and discharged to the receiving environment is 1.90 kWh. Of this, 0.44 kWh is used for the production and supply of drinking water, and 1.46 kWh is used for transporting and treating waste water. This electricity usage corresponds to approx. 0.9 kg CO_2.

(Data for 2013)

Information
on the price of water

What is the price of water?
This depends on the water company you use.

Contact your local water company to find out more about prices. On average, water costs DKK 0.063 per litre.

How do we arrive at this price?
In all, there are five components that make up the price:

- a fixed contribution for drinking water
- the drinking water price per cubic metre
- a fixed contribution for waste water processing
- the price of waste water treatment per cubic metre
- VAT and other taxes

Why does the cost of water vary?
There is a big difference between the lowest and the highest prices charged by water companies. The reason for the difference in prices water prices is due to a number of factors.

Structural differences:
- Supplying water-consuming industries can be relatively cheap when compared with the cost of supplying small customers, for example holiday cottages.
- Geological factors make it more expensive to pump water up in some places than in others.
- In some areas, investments have had to be made in new well-drilling areas, due to contamination.
- The intensity of waste water treatment depends on the receiving environment.
- Decentralised waste water treatment is more expensive than central waste water treatment.
- The older the plant, the more maintenance is required.
- Environmental circumstances may vary.

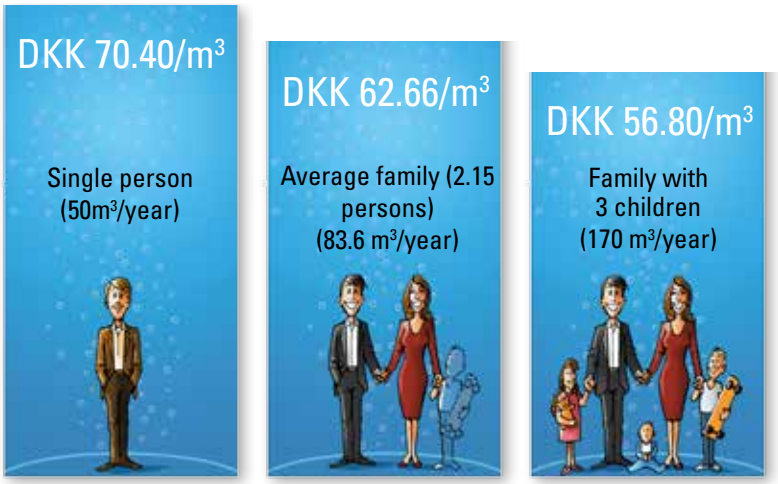
Politically determined differences:
- Different companies pursue different investment policies. At the moment, many companies are investing in new sewers in order to be able to address the consequences of climate change.
- Several drinking water companies are investing considerably in groundwater protection.
- Service levels may vary.
- There may be differing degrees of reliability supply.

What is **the price** of water?

The average price of water in Denmark is DKK 62.66 per m³. This corresponds to DKK 0.063 per litre. Average water usage in Danish households is 107 litres per person per day.

The price of water is not the same everywhere in Denmark, partly because of structural differences and partly because price components can vary from company to company. Some companies have choosen to charge a fixed annual contribution for water and/or waste water and a price per cubic meter for water consumed, whilst others charge only for the water used. The price of drinking water covers the costs of groundwater protection; water abstraction and treatment; and distribution from the waterworks to consumers. The price of waste water covers the costs of operation and maintenance, renovating and extending the sewer system, and operating and controlling the treatment plants to ensure compliance with legal standards for discharges to the receiving environment.

Average water price based on consumption, 2013, DKK/m³



Simple average for 215 water supply companies and 97 waste water companies.

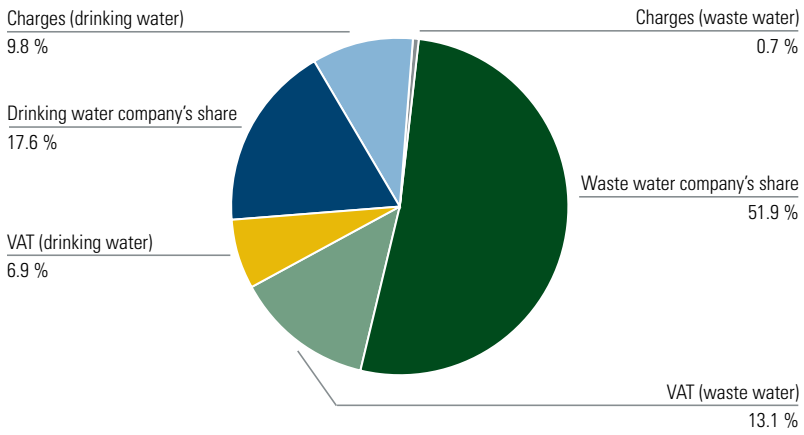
The price includes VAT and other taxes.

The average price **of water**

The price of water for an average family of 2.15 persons is DKK 62.66 per m³ calculated as a simple average based on the charges of 215 drinking water companies and 97 waste water companies. Quite apart from the fact that the water price varies from one company to the next, consumers may find water prices differ within the same supply area depending on whether the price is calculated for a single person or a large family, where the water company charges fixed contributions. If the company charges solely on the basis of usage, the price will be the same in all three examples. Last year, the average water price for an average family was DKK 60.62 per m³ – a price increase of 3.4%.

Make-up of water prices

Make-up of water prices, 2013



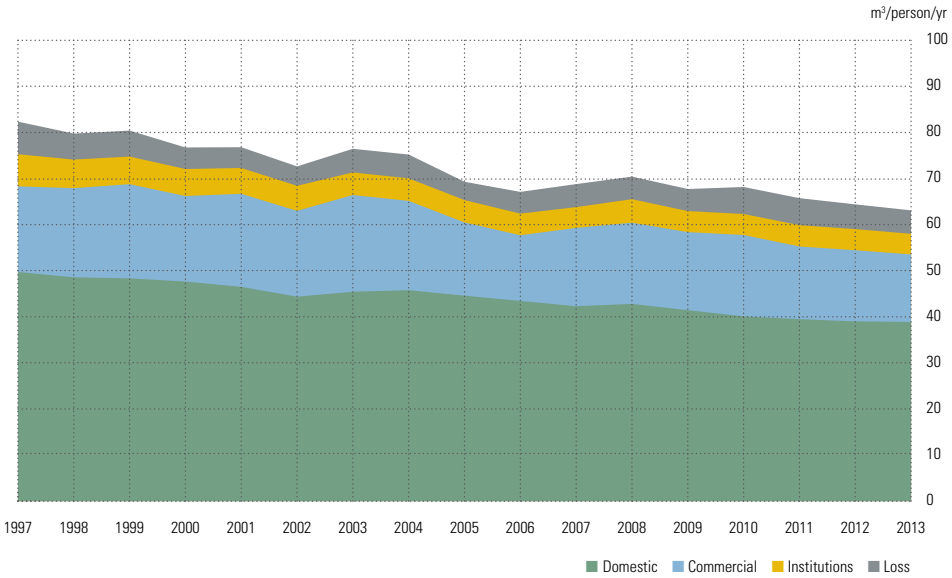
Of the total water price, 17.6% is paid to the drinking water company, 51.9% to the waste water company and 30.5% to the state in the form of VAT other taxes. The average water price can be split into the price of treating and supplying clean drinking water; and the price of collecting and treating waste water and returning it to the environment. Processing and the supply of clean drinking water comprises groundwater protection, pumping, processing and the supply of clean water which totals DKK 21.46, corresponding to 34.3% of the total price. Collecting water in sewers, treatment and discharge totals DKK 41.19, corresponding to 65.7% of the total price. The prices include VAT and other taxes. Income from water sales is made up of fixed contributions (33%) and variable usage (67%). For the waste water companies, 11% of their income stems from fixed contributions and 89% from variable contributions. On 1 October 2014, the government raised the waste water tax by 50%, which will have a slight effect on prices next year.

Water usage continues to fall

In 2013, the total average water consumption by households, businesses and institutions, including loss, was 63.10m³ per person per year. This corresponds to a decline in the total water usage of 2% compared to 2012.

Households account for 67% of total water volumes sold. Each person uses an average of 38.91m³ per year in the household, or 107 litres a day. Over the past 10 years, household water usage has fallen by 15%.

Development in water usage, 1997-2013



Name: Lars Bolander Mortensen
Age: 33
Title: Supervisor, Water distribution, Nordvand in Gentofte.
Education: County school
Joined April 2014.

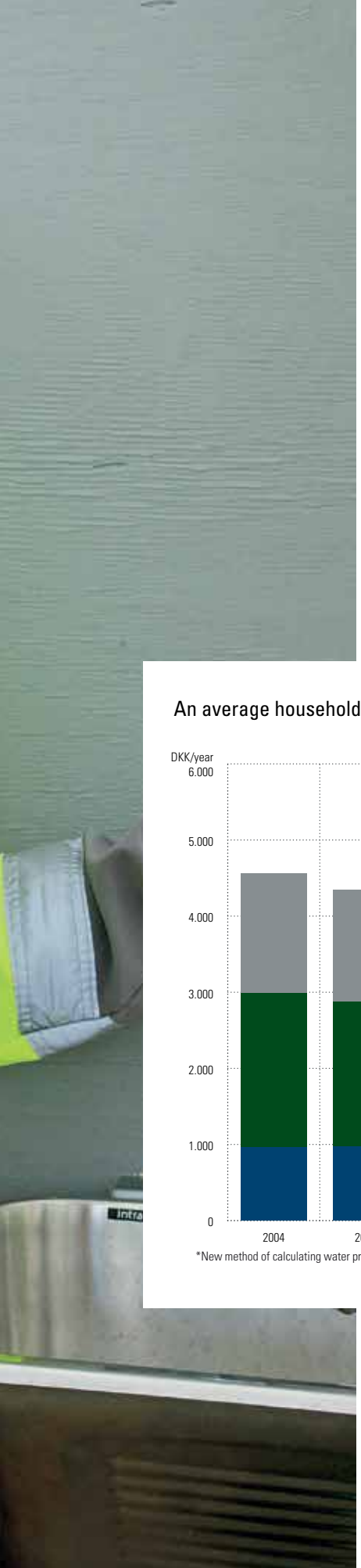
What made you decide to work for a water company?

There's always something happening. Sometimes, there's a lot to deal with. My department takes care of all minor projects, which include rehabilitation of pipelines and daily operational tasks such as leaks and the replacement of service pipes. I can be working in the field or in the office – you never really know what the day will bring. But I enjoy being busy and having a certain freedom, too.

Name: Helle Hovmand-Rasmussen
Age: 30
Title: Mediator: Varde Forsyning
Education: MA American Indian language and Cultures, University of Copenhagen.
Employed since April 2014.

What made you decide to work for a water company?

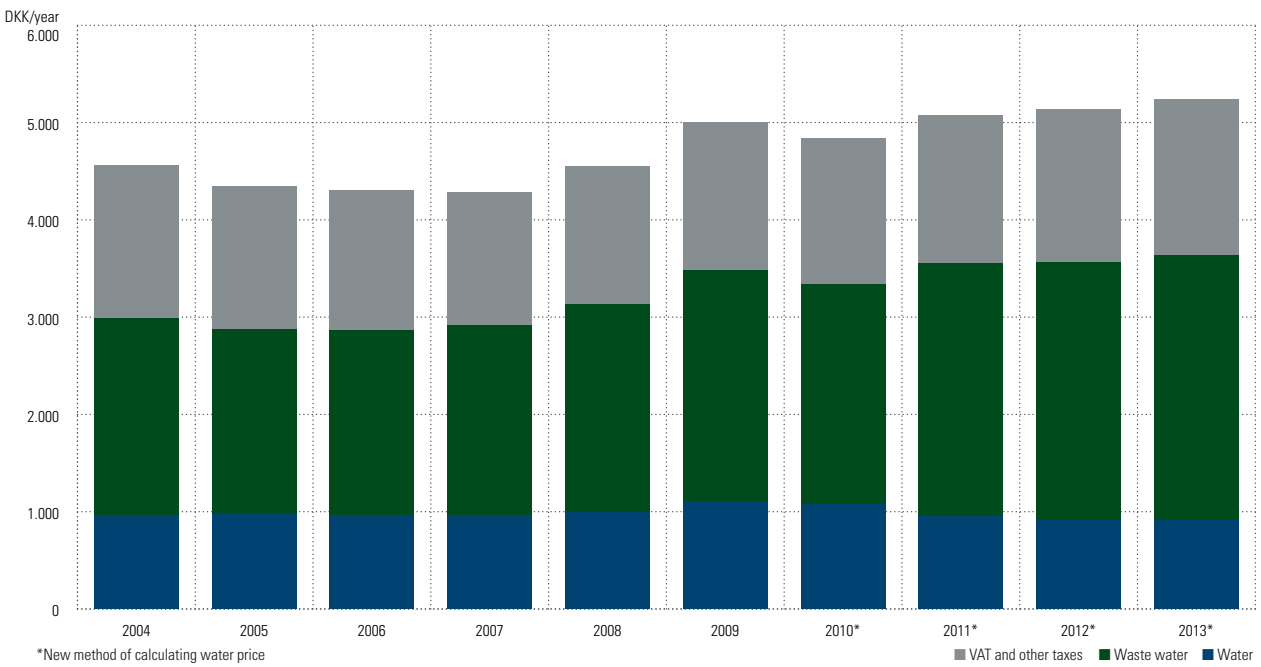
I am extremely interested in the environment and sustainability. I worked on information studies as a student, showing people round the National Museum of Denmark. Right now I am working on building our school services and this is where my experience in studying is useful – in terms of thinking outside the box. The best thing about my job is that when you have an idea, you can actually put it into practice. That is very satisfying.



Water costs
in the domestic budget

For a little more than DKK 5,000 a year, an average family of 2.15 persons can be supplied with fresh, clean and monitored drinking water from the tap whilst also having its waste water collected, treated and discharged responsibly to the environment. Some of these costs also go towards climate adaptation.

An average household's water outgoings, 2004-2013: (2013 prices)



Water prices in Europe

DANVA has compiled a comparison of water prices in several European countries. The map illustrates how prices vary.

Method:

The map of Europe is based on two data sources:
'International Statistics for Water Services', IWA, 2014
Eurostat table ILC_LVPH01: 'Average household size'

IWA provide data on household costs, water usage and tax composition for the countries highlighted in colour on the map. Eurostat provides information on the average household size of the countries concerned.

The map colours reflect how much water an average household uses in a year and what they pay for it. For countries that impose a fixed contribution as part of the payment for the collection of waste water, this is calculated on the basis of figures from IWA, since the material does not provide this specific information.

A given country's household costs are calculated as the average expenditure in the country's main cities.

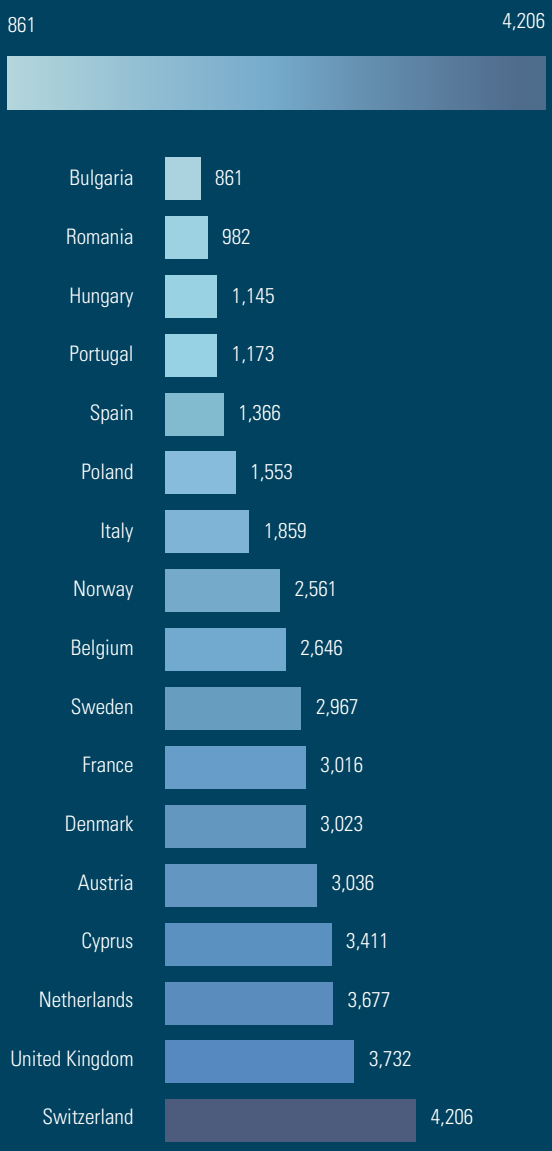
Would you like to know more?

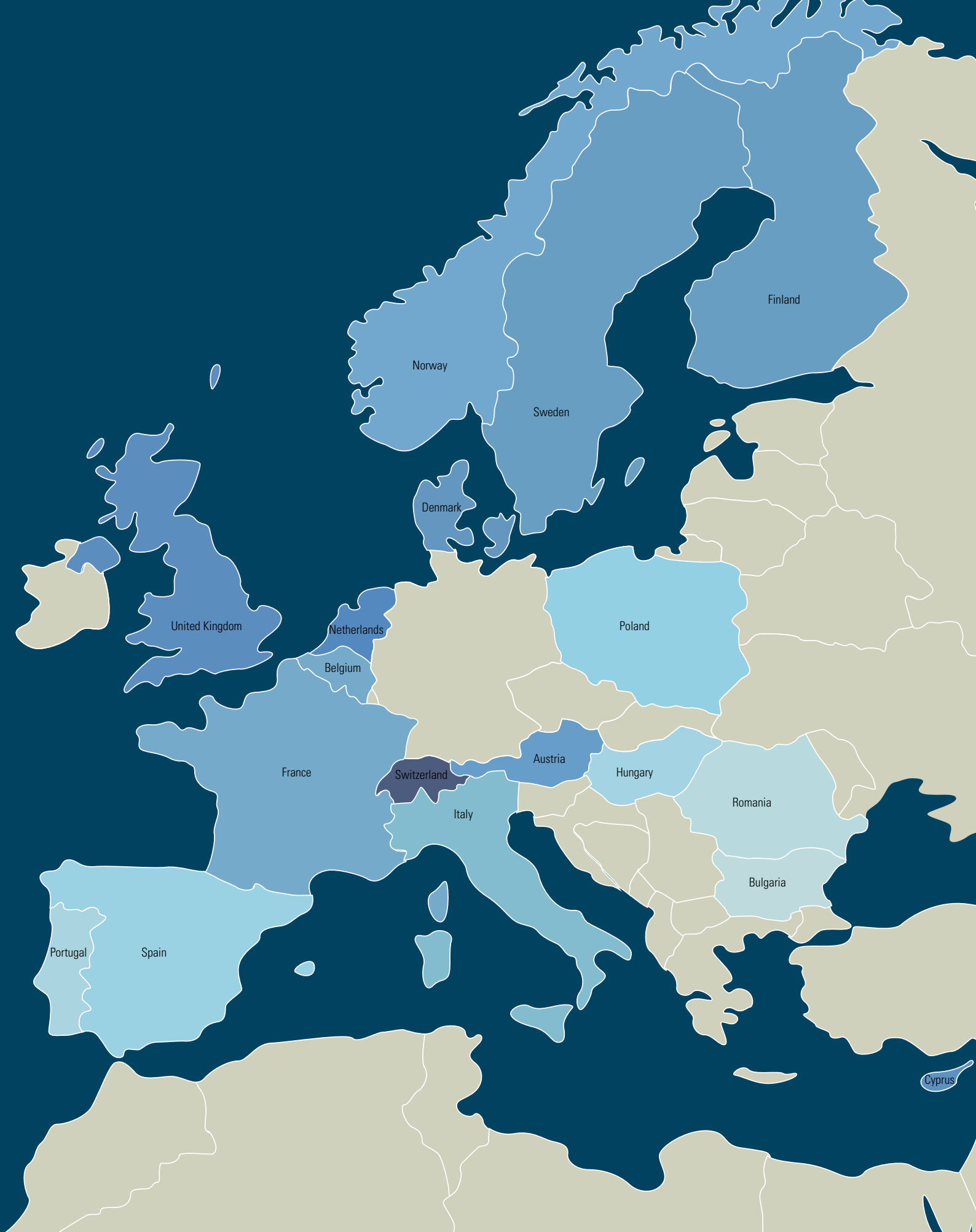
The electronic version of the map on DANVA's website gives you comprehensive data for the data for the countries shown.
http://www.danva.dk/vandpris_europa

Household expenditure in DKK

Household expenditure for drinking water and collection of waste water in DKK

= No data




Finland
Norway
Sweden
Denmark
United Kingdom
Netherlands
Belgium
Poland
France
Switzerland
Austria
Hungary
Romania
Italy
Bulgaria
Portugal
Spain
Cyprus

Drinking water companies
included in DANVA benchmarking

In 2014, 59 drinking water companies carried out DANVA benchmarking. The figures stated relate to the year 2013. Together, the companies manage 1,784 water abstraction shafts, 239 water works, approximately 27,800 km of supply pipelines and approximately 715,000 service pipes. Participating companies abstracted approximately 204 million m^3 and supplied at least 3.1 million people. Their total costs exclusive of taxes totalled approximately DKK 2.57 billion. (See an overview of the participants' key figures at the end of this publication).

Drinking water companies' operating costs continue to fall

Figures for 2013 relating to 59 waste-water companies' operating costs show expenditure of DKK 4.65 per m^3 sold, a fall of 3.9% compared to the previous year. The operating costs are subject to requirements under the Danish Water Sector Act (Vandsektorloven) for streamlining measures and form the basis for benchmarking the efficiency of the companies. Operating costs are exclusive of VAT and other taxes, 1:1 costs, environmental and service goals, associated activities and depreciation and amortisation. The operating figures show a fall of 10.9% between 2010 and 2013.

Investment continues to rise

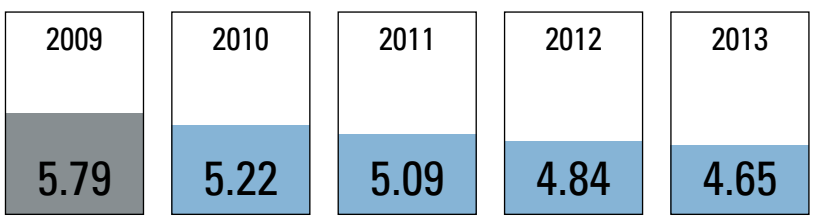
Figures for 59 drinking water companies' investments in 2013 show investment expenses of DKK 5.43 per m^3 sold, which is at the same level as last year. Investment rose by 32% between 2010 and 2013 and is expected to continue this trend in the coming year.

Breakdown of costs and investment

Drinking water companies spent 48% of operating costs on the production of clean water and 39% on distribution to customers. They allocate 13% of operating costs to customer account administration. Investment is divided between investment in and renewal of the distribution network (77%) and boreholes and production facilities (19%). The remaining 4% goes to other investments.

Operating costs, 2009-2013 (2013 prices)

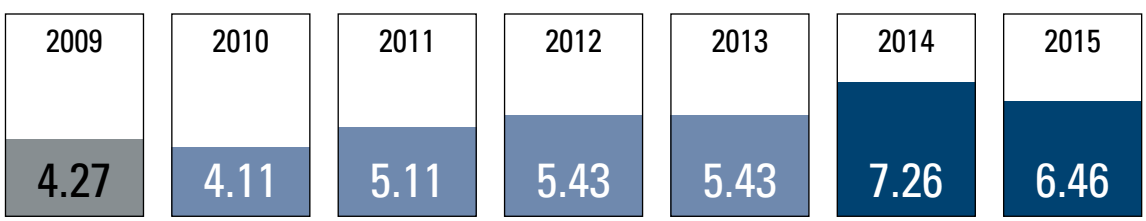
DKK/m^3 water sold



Operation and maintenance (28 companies - former BM calculation method)
Operating costs (57-61 companies)

Investments, 2009-2015 (2013 prices)

DKK/m^3 water sold

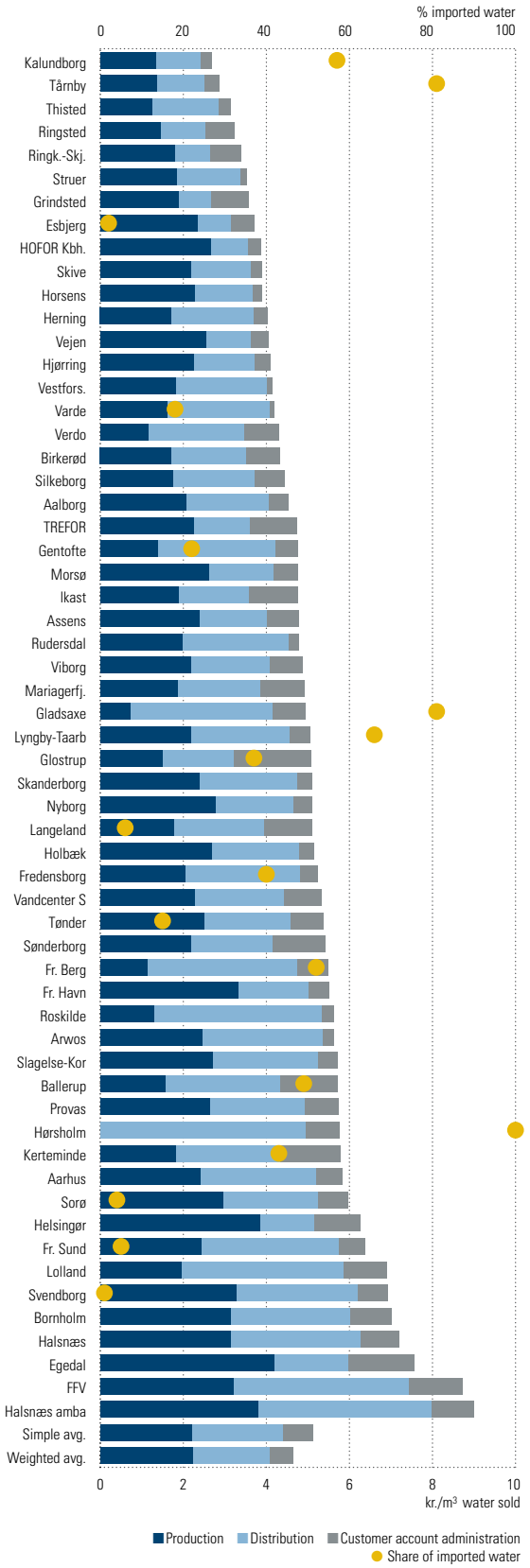


Reinvestment and new investment (28 companies - former BM calculation method)
Investment and renovation (54-61 companies)
Planned investment and renovation (59 companies)

Significant differences in costs

The weighted average of the costs of producing and distributing 1m³ of water is DKK 4.65. Variability between the statistical lowest and highest points is considerable; this is mainly due to the widely differing conditions under which the companies operate. Production costs are impacted, among other things, by geological conditions and access to groundwater, the extent of groundwater protection and the treatment steps required before the water is pumped to the distribution network. With respect to distribution, factors such as urban density and the extent, quality and age of the distribution network influence the costs.

Operating costs, 2013



Waste water companies
included in DANVA benchmarking

In 2014, 74 waste water companies carried out DANVA benchmarking. The figures stated are for 2013. These water companies together operate 533 treatment plants, which treat more than 561 million m^3 of waste water, a load corresponding to more than 7.0 million person equivalents (PE). They supply approximately 3.8 million people with water collection services via approximately 66,000 km of sewers which corresponds to an area served by sewers of more than 174,000 hectares. Total costs exclusive of charges totalled DKK 8.07 billion (see general key figures for the participating companies at the back of this brochure).

Waste water companies' operating costs continue to fall

A calculation of 74 waste water companies' operating costs in 2013 shows costs of DKK 10.70 per m^3 sold, a fall of 2.2% compared to the previous year. The operating costs are subject to requirements under the Danish Water Sector Act (Vandsektorloven) for streamlining measures and form the basis for benchmarking the efficiency of the companies. Operating costs are exclusive of VAT and other taxes, interest payments, 1:1 costs, environmental and service goals, associated activities, investments and depreciation and amortisation. The operating figures show a fall of 10.8% between 2010 and 2013.

Investment continues to rise

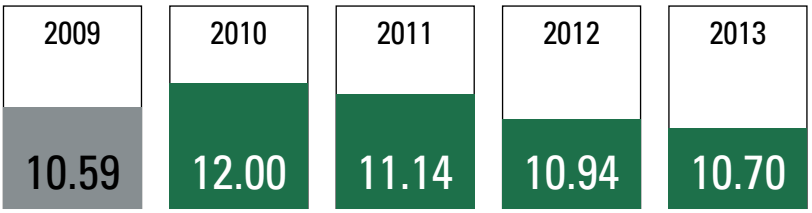
Figures for 74 drinking water companies' investments in 2013 show investment expenses of DKK 19.44 per m^3 sold in the catchment area of the treatment plant. This is at the same level as last year. Developments in investment show an increase between 2010 and 2013 of 49%, with further increases expected in future years.

Breakdown of costs

On average, waste water companies spend 36% of their operating costs on the transport network and 58% on operation of the treatment plants. They allocate 6 % of operating costs to customer administration. Figures for investments and renovation show that 83% of these are for the improvement and extension of the transport network, whilst 12% are spent on treatment plants. The remaining 5 % go to other investments.

Operating costs, 2009-2013 (2013 prices)

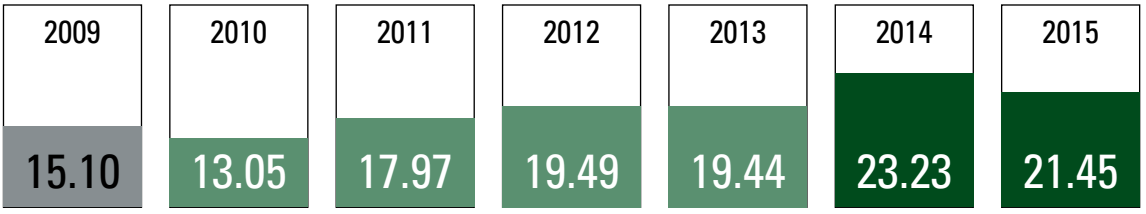
DKK/m^3 water sold



Operation and maintenance (16-22 companies - former BM calculation method)
Operating costs (62-74 companies)

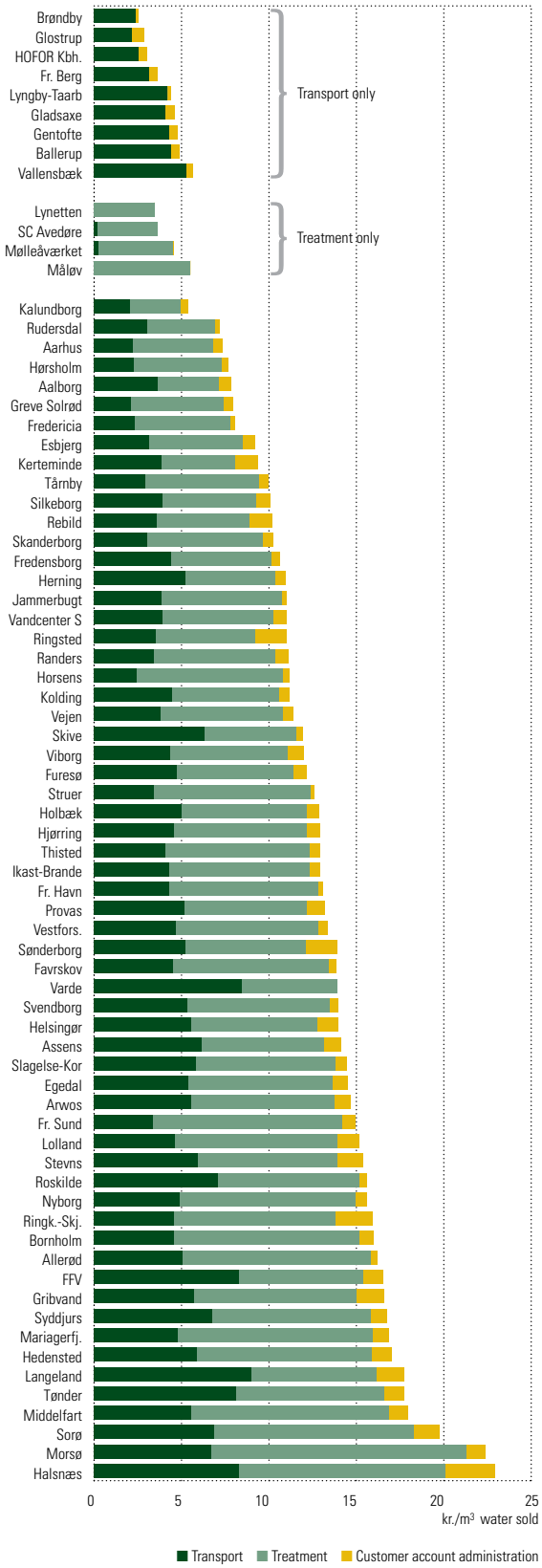
Investments, 2009-2015 (2013 prices)

DKK/m^3 water sold



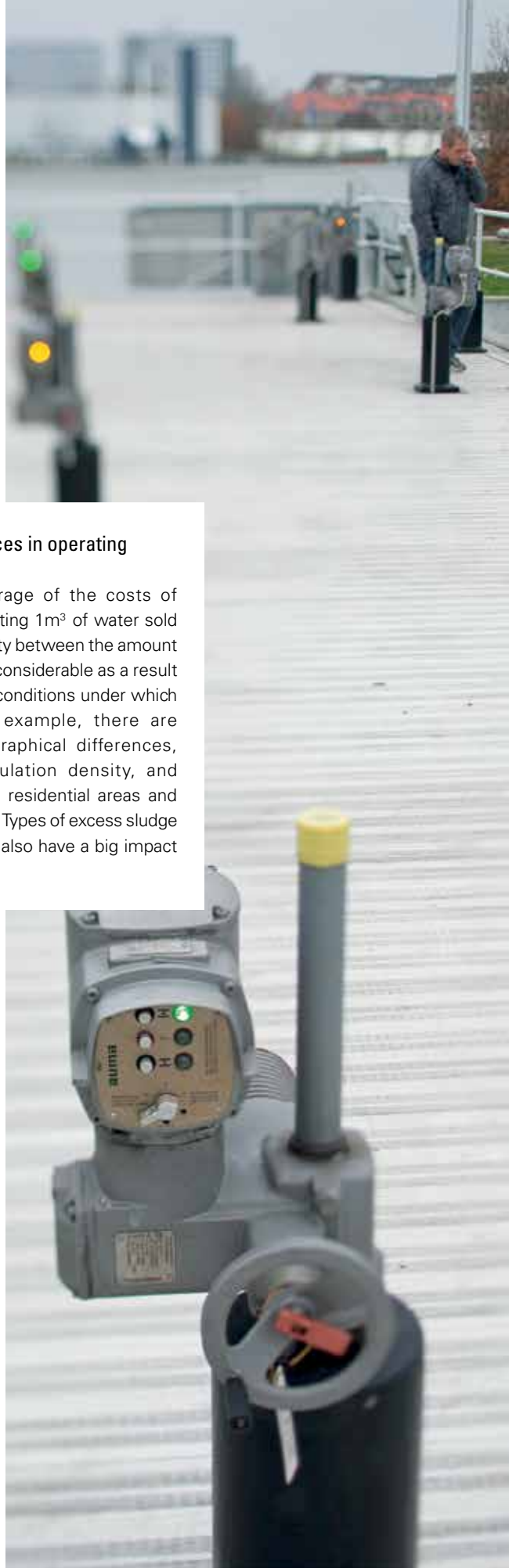
Reinvestment and new investment (16-22 companies - former BM calculation method)
Investment and renovation (66-70 companies – investment and renovation)
Planned investment and renovation (70 companies) – investment and renovation

Operating costs, 2013



Significant differences in operating expenses

The calculated average of the costs of transporting and treating 1m³ of water sold is DKK 10.70. Variability between the amount of company costs is considerable as a result of the very different conditions under which they operate. For example, there are considerable topographical differences, differences in population density, and differences between residential areas and major industrial areas. Types of excess sludge and disposal options also have a big impact on treatment costs.



One sector - many opportunities

The water sector should not be seen as a workplace for workers in blue overalls and ageing engineers, but an attractive sector for many people with widely differing backgrounds. Meet two young employees and hear their reasons for working for a water company

The engineer:
"I've worked here for less than two years and I'm already in charge of projects worth more than 50 million krone".

Name: Freja Bendixen Nielsen
Age: 27
Title: Project manager, Nord Vand.
Education: Civil engineering, DTU
Service: nearly two years.

What made you decide to work for a water company?

"In fact, it was by chance. I wanted to work as a project manager within my field. My tasks on a daily basis are quite demanding and there is a broad range of work. You need to be able to work with people who perform different roles such as consultants, lawyers and of course the public. At the same time I feel that my work is very relevant, in particular with respect to climate adaptation, which comes into it a lot.

What is the best thing about your job?

"That I have a certain amount of autonomy. I am free to decide about the execution of tasks and can put my own mark on them. I've been here less than two years and I'm already in charge of projects worth more than DKK 50 million. There aren't many other employers where this would happen.

"What do you think should be done to attract more young people to the sector?"

"We should be more visible as a branch. When I was a student I had no idea that work within the water sector was an option for me. But there is room for all sorts of professionals in utilities. Especially as a project manager. As long as you have a feel for it, the technical side of things soon comes naturally.

What are you doing at Nordvand to attract new employees?

"Among other things, there are student fairs: this is when we get a lot of questions from interested students.

I am a member of the network Young Water Professionals. It's really interesting. It is useful to hear about others' experience – no matter their area, from climate adaptation to groundwater protection. It's nice to know people from round about and exciting to get a glimpse of their work.

Name: Hans-Christian Damm Obel
Age: 31
Title: Communication officer, Varde Forsyning
Education: MA in International MA in International Commercial Communications, Odense University
Service: four years

The communications officer: "The best thing about my job is its many-sidedness".

What made you decide to work for a water company?

"My work is really varied and I come into contact with all kinds of colleagues, customers, business partners and companies on a daily basis. It is also important to me that my work is something that is vital to people's lives. For many, drinking water and waste disposal are services that are just so natural that they simply don´t think about them. So as a sector we share the challenge of telling people about our work. I think it's exciting to talk about something that people relate to.

What is the best thing about your job?

"Its many-sidedness. I am allowed to run an entire campaign and be responsible for updating the website. I am also in charge of communication with the media. I really enjoy finding and sharing good stories with my colleagues."

"What do you think should be done to attract more young people to the sector?"

"First and foremost, there should be jobs and we should be open to input from other specialist groups besides the usual ones. The important thing is that people should be really enthusiastic about working here. Above all, we should go out and show what we can do. I took part in training fairs around the country, together with colleagues from other water companies. It was a great initiative. I've also visited universities to talk about my job.

What are you doing at Varde Forsyning to attract new employees?

"We have a partnership with the innovation team at Varde Business College, which takes us out to classes several times during the pupil's school life to talk about various topics within our sector.

Students write projects using us as a case study. The same thing is certainly happening with other utilities. Why not invite a team of mechanics to a treatment plant and talk about drives, monitoring and control?

This all helps to make people aware of the opportunities in our sector – they may not choose to join us straight after college, but they might think about it later in their careers.

If the sector made more use of educational institutions, it could be a means of showing others the exciting areas in which we work and challenges that we face.

Business clients
are keen to enter into a dialogue with their water company

What does a business expect of its water company? DANVA asked four very different enterprises and found they had one wish in common: more proactive guidance.

Is it better quality, cheaper prices or more flexible billing that tops the wish list of the many companies who are clients of Danish water companies? Perhaps not surprisingly, the answer depends on who you ask. DANVA interviewed four business clients, asking what they would like to see their water companies offer.

At Dykon, a producer of duvets and pillows with non-synthetic fillings, there is no doubt that price is the most important factor when it comes to water services.

"The charge for water collection is particularly high because we produce a lot of waste water. I don't understand why one should pay a fortune when the water being discharged is incredibly clean. Our waste water contains only soap and fat residues that are highly protective of the environment", says Dykon director Peter Bøgh Petersen.

Because of the considerable cost of water collection, the company is keen to process waste water themselves.

"But we are afraid that we might invest millions in order to recycle waste water, and then be hit by more charges in the end, so it would not really make economic sense", says Mr Petersen.

New payment model

There has been a political drive to introduce a more transparent payment structure, one that better reflects the relation between prices and the costs of waste water treatment. On January 1 this year, a ladder model was introduced which meant that companies that fulfil certain requirements can have their water collection charge reduced. Mr Petersen is however not impressed by the new payment model. He thinks that the result is too small a saving.

The ladder model

Since 1 January 2014, waste water companies serving properties from which businesses operate at market conditions must apply a new payment structure (a ladder model) to the variable component of the water collection contribution.

The ladder model involves a reduction in the cubic metre charge of the variable component of the water collection contribution in proportion to increased water usage. The variable water collection contribution is composed of three rates, or steps. Step 1 is for water usage of up to and including 500m³ per year. Step 2 is for water usage from 500 m³/year up to and including 20,000 m³/year. Step 3 is for water usage of over 20,000m³ /year. When the ladder model is fully implemented in 2018, it will mean that the cubic metre charge for Step 2 will be 20% lower than Step 1 and the charge for Step 3 will be 60% lower than for Step 1.

"The ladder model is like a snowball in hell. It doesn't really make much of a difference when it comes to it, at least not in our case", he declares.

At Odense Marcipan, factory manager Johnny Engberg has a more positive attitude to the ladder model.

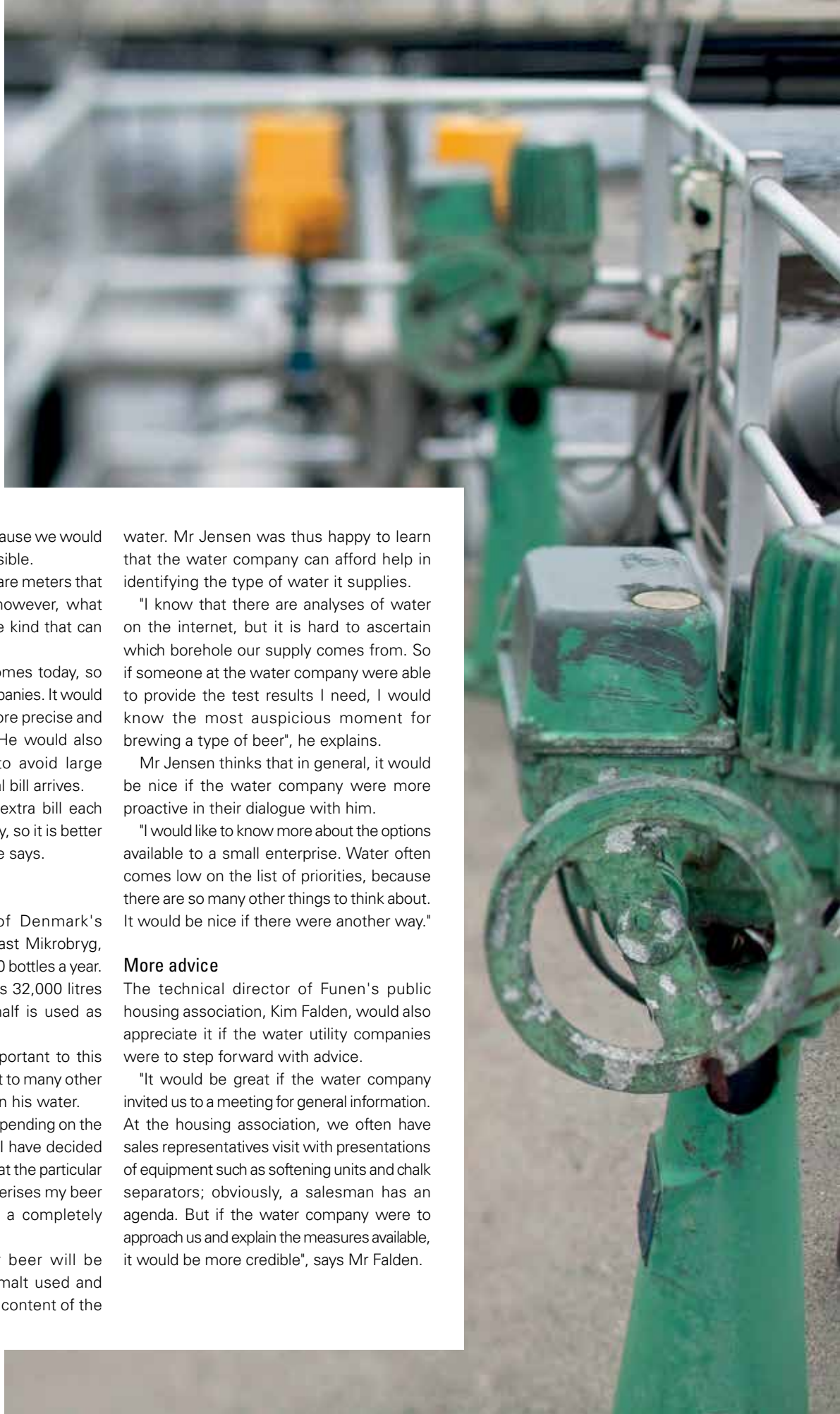
"We use more than 100,000m³ water in a year, so it is a good thing for business that charges are reduced. One might question the benefits to the environment, but for our finances and ability to compete, it's great".

The factory manager is thus very happy with communications with the water company.

"I think the dialogue with the water company is very good. It has improved considerably over recent years. The company is good at inviting us to meetings. For instance, we produce a lot of waste water which derives from cooling water and which is not contaminated, since the system is closed. Formerly, this was discharged to a treatment plant: this costs money and imposes an extra load on the treatment facilities. The water company took the initiative to suggest that this water could be discharged directly into Odense harbour. This meant we could save on water collection charges – and the treatment plant is also better off", he explains.

Mr Engberg would however like an improvement in one area, and that is billing.

"A couple of years ago our water company had problems with billing and meter reading. They have since got things under control. But one year it was August before we got our



annual bill, which was bad because we would rather have it as early as possible.

At Odense Marcipan there are meters that have to be read manually; however, what they would rather have is the kind that can be read remotely.

"This is done for private homes today, so it ought to be possible for companies. It would make meter reading much more precise and faster", Mr Engberg thinks. He would also like to see quarterly bills to avoid large adjustments when the annual bill arrives.

"For some companies an extra bill each year can involve a lot of money, so it is better to have ongoing invoicing", he says.

Water quality

Mads Jensen owns one of Denmark's smallest micro-breweries, Ikast Mikrobryg, which produces around 15,000 bottles a year. The brewery's water usage is 32,000 litres per year, of which roughly half is used as cooling water.

The quality of water is important to this passionate brewer: in contrast to many other breweries, he does not soften his water.

"The water quality differs depending on the borehole it comes from. But I have decided to go with the quality of water at the particular moment. This is what characterises my beer varieties. My beer must be a completely natural product", he says.

The taste of a particular beer will be strongly dependent on the malt used and its interplay with the mineral content of the water. Mr Jensen was thus happy to learn that the water company can afford help in identifying the type of water it supplies.

"I know that there are analyses of water on the internet, but it is hard to ascertain which borehole our supply comes from. So if someone at the water company were able to provide the test results I need, I would know the most auspicious moment for brewing a type of beer", he explains.

Mr Jensen thinks that in general, it would be nice if the water company were more proactive in their dialogue with him.

"I would like to know more about the options available to a small enterprise. Water often comes low on the list of priorities, because there are so many other things to think about. It would be nice if there were another way."

More advice

The technical director of Funen's public housing association, Kim Falden, would also appreciate it if the water utility companies were to step forward with advice.

"It would be great if the water company invited us to a meeting for general information. At the housing association, we often have sales representatives visit with presentations of equipment such as softening units and chalk separators; obviously, a salesman has an agenda. But if the water company were to approach us and explain the measures available, it would be more credible", says Mr Falden.

Water loss (non-registered use)

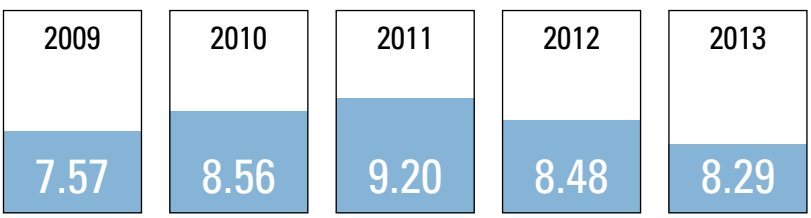
Water companies compute 'non-registered use' or 'water loss' as the difference between the water volume pumped out to the pipeline network and the water volume registered as used by customers. 'Non-registered use' includes direct loss through leaks in the distribution network, loss during repairs and bursts, flushing out after repairs, water used to extinguish fires, unauthorised use and metering faults.

Note:
The measurement does not include any adjustments of water loss made due to approved volumes used to flush out contamination, etc. This means that there can be a small discrepancy in the water loss on the graph and the water loss reported by companies.

Water loss is falling slightly

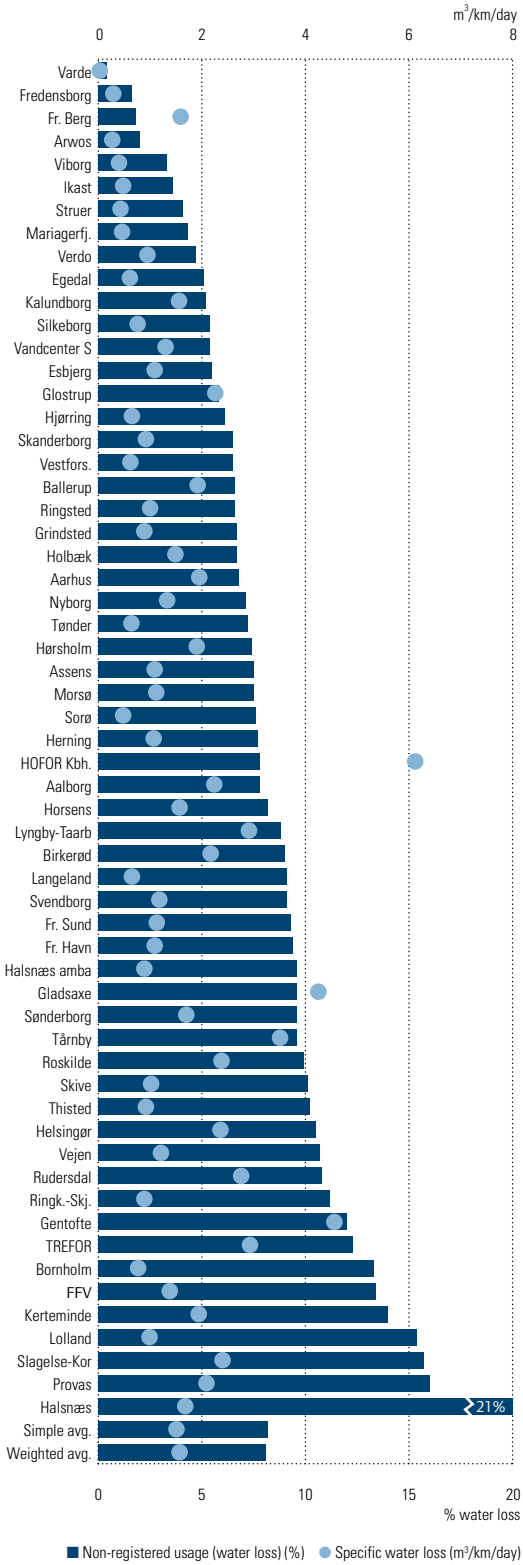
For the 39 water companies included in DANVA benchmarking over the last five years, it looks as if water loss is becoming less severe. Fewer resources are devoted to investigations of leakage loss, which involves inspecting pipelines for 'holes'. Despite improvements in the distribution network, water loss in percentage terms has not improved significantly however, due to the continued decline in water usage.

Non-registered use (water loss) 2009-2013



Average of 39 companies participating in DANVA benchmarking over the last 5 years.

Non-registered use (water loss) 2013

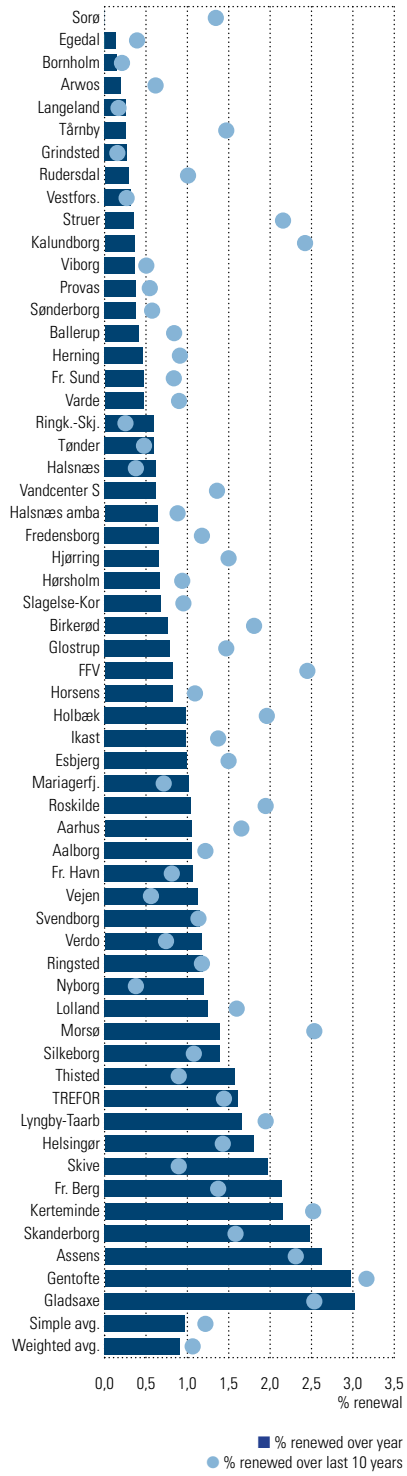


Name: Martin Andersen
Age: 31
Title: Project manager,
Nordvand in Gentofte.
Education: Civil Engineering, DTU
Service: four years

What made you decide to work for a water company?

"It was not exactly planned. I wrote my thesis on energy optimisation in buildings and discovered it was exciting enough to pursue. And working here, you can be part of a project from start to finish. This is something you don't find in a consultancy firm or with a company. It's fun to be able to be involved both generally and on a more detailed level.

Supply network renewal 2013



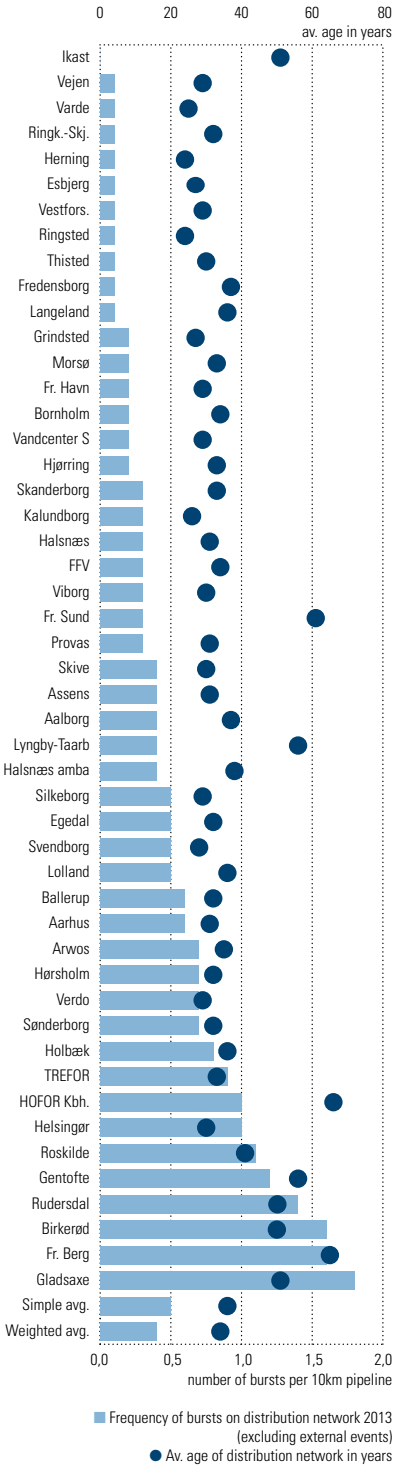
Renewal of distribution network

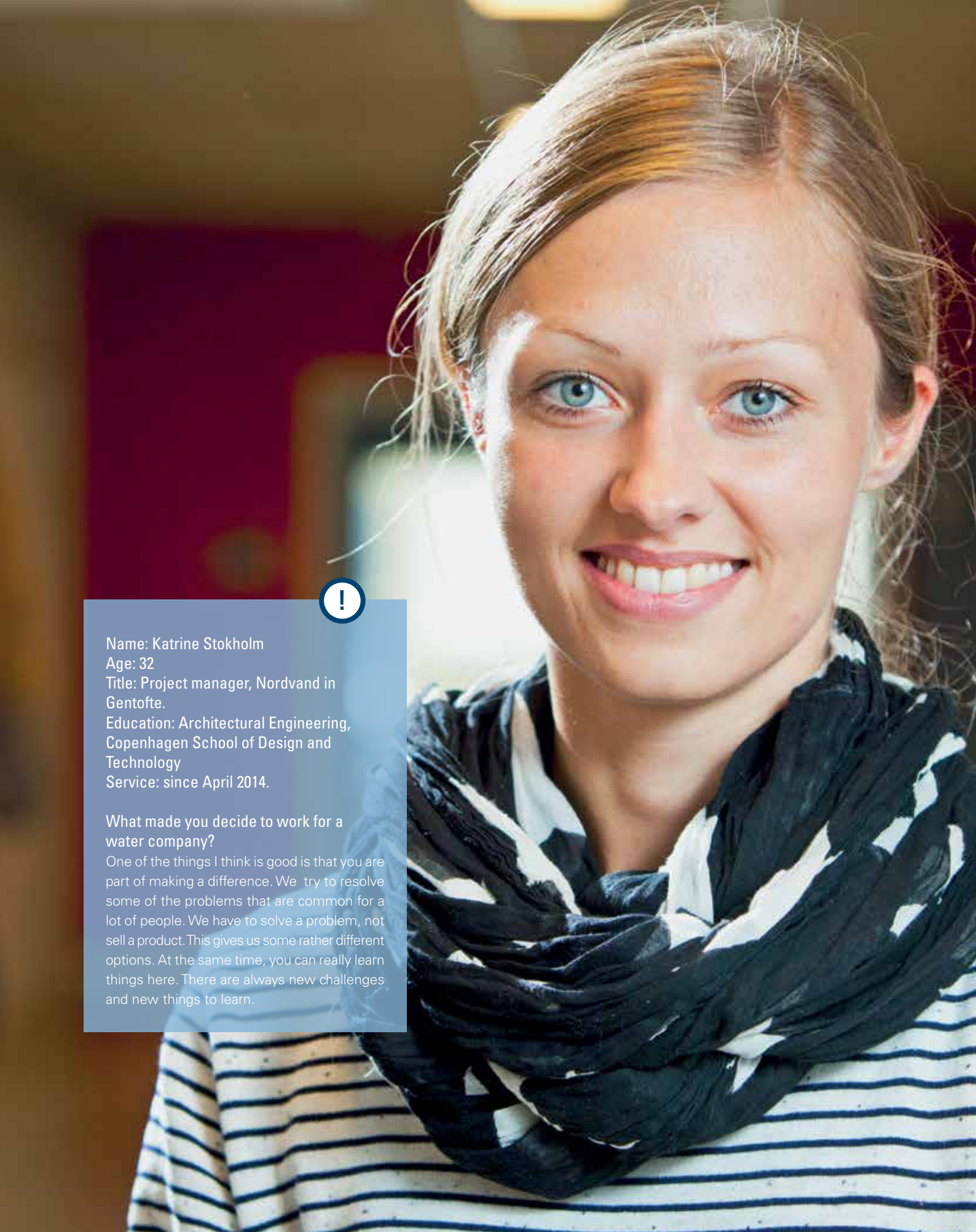
The distribution network is constantly being renewed in order to maintain high standards, with low water loss and excellent reliability of supply. Network renewal shows the percentage of the distribution network that is replaced each year, compared with the annual average over the last 10 years. The participating companies' distribution networks are 36 years old on average. Many factors such as materials, geological conditions and age influence the timing of replacement.

Wide differences in frequency of ruptures

Frequency of ruptures, measured as bursts per 10 km of pipeline, differs widely amongst participating companies. Pipeline ruptures are recorded excluding any caused by external circumstances. Similarly, ruptures in service pipes are not included. External causes can include excavation damage caused by construction firms. The causes of burst pipes can be age, pipe materials, mains tapping clips, local geology and the quality of work done.

Frequency of bursts on distribution network 2013 (excluding external events)





Name: Katrine Stokholm
Age: 32
Title: Project manager, Nordvand in Gentofte.
Education: Architectural Engineering, Copenhagen School of Design and Technology
Service: since April 2014.

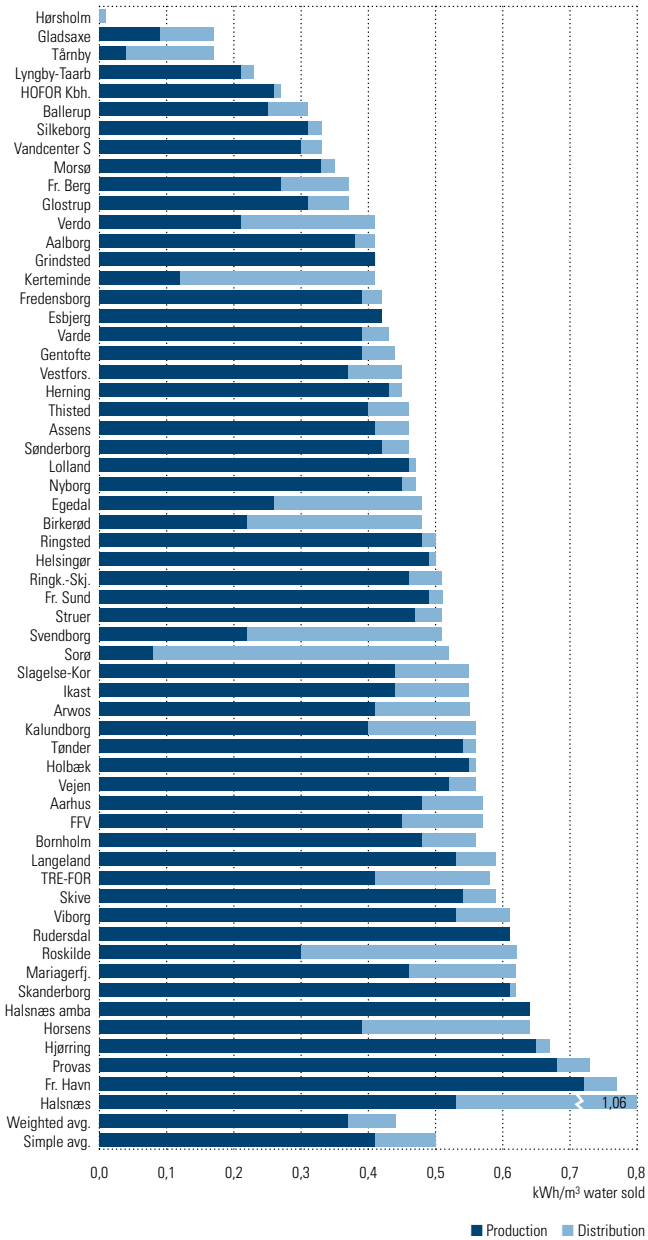
What made you decide to work for a water company?

One of the things I think is good is that you are part of making a difference. We try to resolve some of the problems that are common for a lot of people. We have to solve a problem, not sell a product. This gives us some rather different options. At the same time, you can really learn things here. There are always new challenges and new things to learn.

Electricity usage by drinking water companies

There are large differences in electricity used for the production and distribution to customers of 1m³ pure water. These can be partly explained by the existence of boreholes that are particularly energy-intensive, topographic effects on the distribution network, the import of water or a distribution network that consumes a particularly large amount of energy. At the same time, the positioning of pump-out pumps is crucial. In recent years, there has been an intensive focus on energy savings using for instance new pumping technology and water boosting equipment as well as optimised pumping control of boreholes. These measures should bring about a decrease in energy consumption. Weighted average electricity usage for the production of drinking water is 0.44kW/m³ sold.

Drinking water companies' electricity usage, 2013



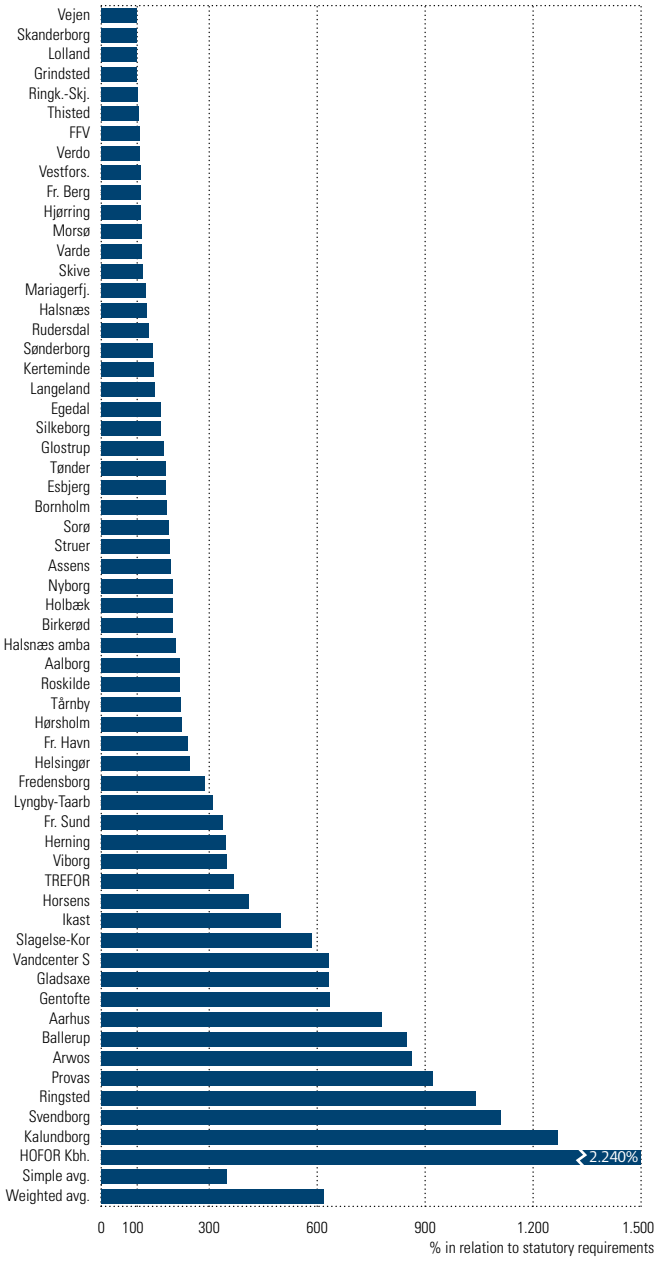
Statutory microbiological tests, 2013

All drinking water companies carry out tests on water before it is delivered to customers. These are performed both at the water works and on the distribution network. Around half of the 59 drinking water companies taking part in DANVA benchmarking take twice as many tests to check for microbiological contamination as are required by the authorities.

It is up to the drinking water company to decide on the number of tests they perform over and above the statutory requirement.

The result of analyses shows that 97% of the microbiological control tests taken conform with all the quality requirements. If a single analysis parameter for a water test fails to meet quality requirements, the sample will be registered as 'failed'. This does not necessarily mean that the water is harmful to health; usually it simply means that conditions must be investigated further. In 2013, two companies were obliged to issue a public notice to boil water that encompassed a total of 561 meters, due to a failure to meet microbiological parameters.

Statutory microbiological tests, 2013



A broad spectrum

of tools ensures reliability of supply

Access to pure drinking water at any time of day, all the year round, is something we take for granted in Denmark. For this we have to thank the country's water works whose concerted and sustained efforts ensure reliability of supply. It is rare that consumers find themselves without water.

One of the ways in which water companies try to ensure that no consumer is ever without water is to run production facilities with excess capacity. This is one policy pursued by VandCenter Syd, one of Denmark's largest and oldest water companies, as process consultant Erling Nissen explains.

"With excess capacity it is always possible to close a water works without affecting customers. We also have a reserve supply for smaller water works in the area, so if anything happens they will not run dry.

"VandCenter Syd's pipeline network is constructed in sections so that it is easier to locate water loss and to find any contamination.

"The way the network is built means that it will not be so vulnerable to contamination. This is particularly important when contamination originates not from a water works but from a customer who has inadvertently pumped water backwards into the network. We have a network model which allows us to identify the source of contamination if we discover a problem near a customer", Mr Nissen explains.

VandCenter Syd has also installed anti-terrorism security measures: all its water works are for instance locked and equipped with video surveillance and alarms. Similarly, boreholes are secured and have sensors that activate an alarm if there is any interference.

Opponents

Ensuring a reliable supply is a complicated matter and water quality can at times be vying with security issues, according to civil engineer Michaela Bloch Eiris of Forsyning Ballerup.

"Ensuring a reliable supply can also mean – at any rate with respect to the pipeline network – that one has to consider water quality and give some slack in this area. If you build large reservoirs such as water towers and containers where water will stand for some time, you will often find that quality deteriorates. Right now, we use water towers to ensure a highly reliable supply, but it is one of the practices we need to consider.

"The same problem occurs with ring attachments; they enhance reliability in that they allow water to come from two sides so that in the event of a burst the second side is still available for use. But they can also give rise to stagnation points in the distribution network. Water can stand, or simply travel in a ring without being used, which has a detrimental effect on quality.

"So we are also prioritising the use of ring attachments on very large pipes with high flow: this means that we avoid problems with stagnation points. We will not be using ring attachments on smaller pipelines in future - they result in fewer down times but give poor quality", says Ms Eiris.

Strategy for valves and emergency electricity

At Forsyning Ballerup, the issue of reliability is served by setting objectives. One such objective is setting targets for the number of consumers that have to be cut off in the event of a burst. In this respect, the number of valves and their location on the pipeline network has a significant effect on the number of consumers who are cut off. A strategy for the future placement of valves is therefore being worked out.

"There really is a lot of money to be saved by establishing targets. Previously, valves would be inserted when pipes were laid, at the most suitable points from the construction point of view. In future, we would like to have far more forethought when planning the location of valves", says Ms Eiris.

In 2003 a power outage occurred that left the whole of Zealand without electricity. Forsyning Ballerup could not supply consumers with water because the pumps were not working. Today, one of the water works has a small emergency generator: but if there were to be another outage across Zealand, this would not suffice. The establishment of an emergency power supply on one of the two large pumping stations receiving water from HOFOR will address this issue.

Risk assessments

At Aarhus Vand, 'technical design objectives' have been put in place.

"This means that we establish guidelines for guaranteeing supply depending on the situation. For instance, we may need to determine how many residents must be in an area to warrant more than one connection to them", explains department manager at Aarhus Vand, Kurt Brinkman Kristensen.

One of the tools used on a daily basis when working on projects and operations at Aarhus Vand is Documented Drinking Water Security (DDS). DDS focuses on the main risks associated with the four main areas of water supply: abstraction, treatment, distribution and consumers' installations. Every link in the water supply system is evaluated with a view to what could go wrong, how critical it would be for consumers and how problems can be prevented.

"These risk assessments are part of our efforts to define some value parameters in our technical design objectives", says Mr Kristensen.

"By using DDS, we can avoid water quality problems, which in a worst case scenario could mean shutting off some customers' water supply. We have actually noticed that placing greater emphasis on security of the drinking water gives us more up time in our facilities".

At Truelsbjerg Nord in Aarhus, two separate production lines have been established in a newly inaugurated water works. It is the only installation in Aarhus Vand in which the production lines are completely separated.

"The advantage of having several production lines is that, if something happens during the course of the water's journey from source to pumping out, the entire production will not be affected but perhaps only half", says Mr Kristensen.

Aarhus Vand has plans to divide more of the existing facilities into several production lines.

Customer satisfaction survey

As part of DANVA benchmarking, a water customer satisfaction survey was carried out this year.

The survey results reveal a generally high level of satisfaction with both drinking water and waste water companies. An external telemarketing survey conducted a telephone survey of 3,400 customers of 32 drinking water companies and 4,300 customers of 41 waste water companies.

The customers were asked for their opinion on the companies' core services as well as about their knowledge of their own water usage and the prices they pay.

There is generally a high degree of satisfaction with the companies' core services. The average evaluation of the companies is between 'satisfied' and 'very satisfied'. Customers' appraisal of the information and invoices they receive from water companies is 'satisfied'. In general, dissatisfaction is greatest in the area of water prices.

Customers were also asked if they knew their own annual water consumption. Approximately two out of three of those asked knew their water usage; however more than 80 % of customers could not state the price of one cubic metre of water.

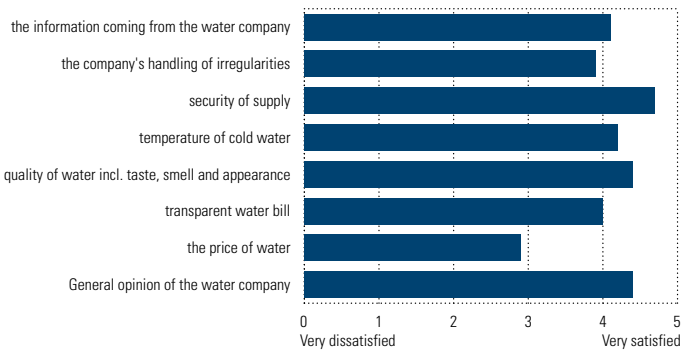
Individual reports and how the results are used

Individual reports with the results were sent to every participating company. They had been allowed to add specific questions to the survey, thus to some extent tailoring the research to the companies' needs.

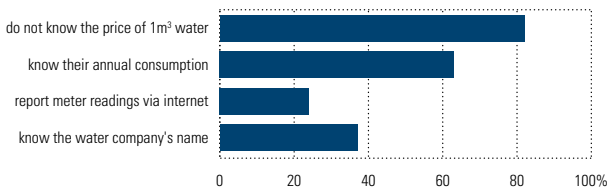
The individual reports can provide an indication of whether a company's services are at the required level – and whether certain areas could be improved.

Drinking water

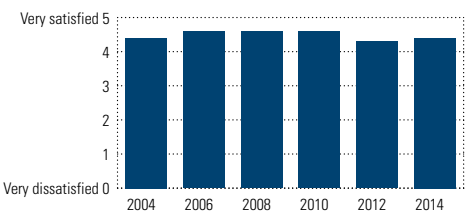
Degree of satisfaction with:



Share of respondents who:

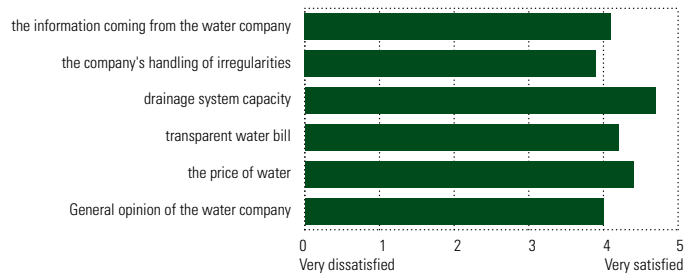


Development in general evaluation of the company

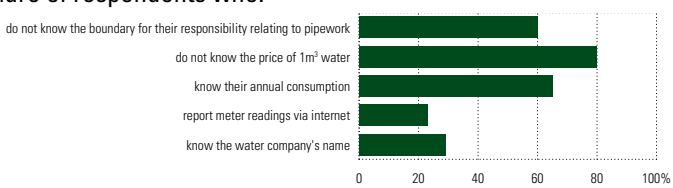


Waste water

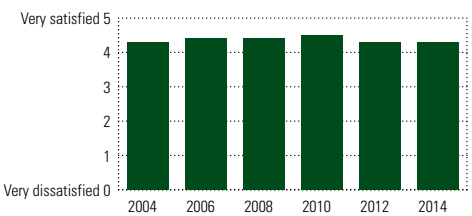
Degree of satisfaction with:



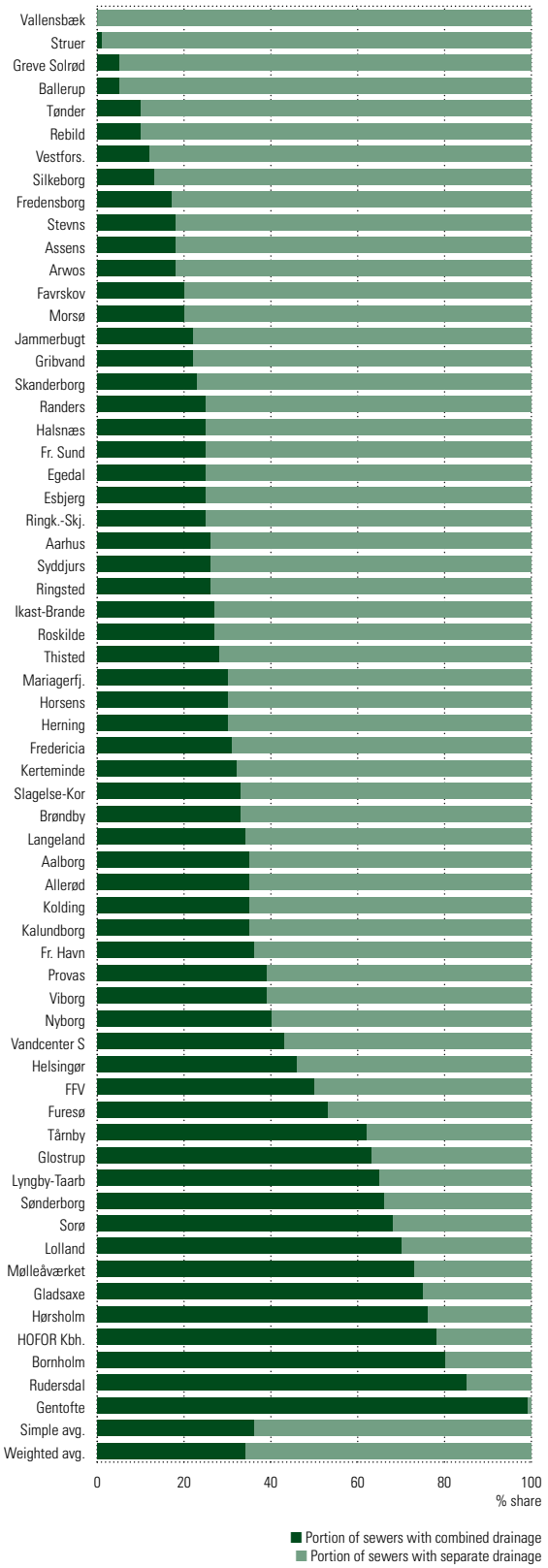
Share of respondents who:



Development in general evaluation of the company



Area breakdown showing combined and separate drainage, 2013



Combined and separate drainage

There is considerable divergence on the question of separate drainage systems amongst the benchmarked waste water companies. Some companies use combined waste water systems almost exclusively, whilst for others there is a predominance of separate systems for effluent and surface water. The reason for this is the significant investment required in replacing combined systems with separate systems, since the former are often found in town and city centres.

Separate drainage

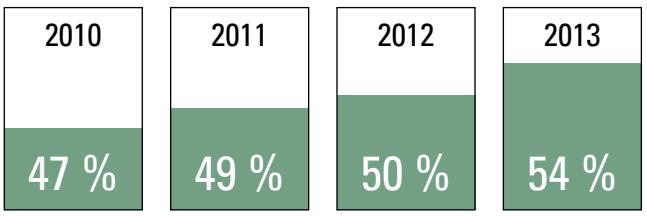
In recent years, the Danish population has experienced several instances of very heavy downpours which have caused flooding on roads and railways, and in cellars and shops. Besides the fact that it is very expensive for society to clean up after a flood, there is of course an effect on the people whose homes have had untreated waste water in their cellars.

There are two main methods for tackling these issues. Enlargement of existing sewers and waste water basins so that they can manage heavy rainfall; or the separation of rainwater and waste water. The first method is usually far more expensive than the second, unless the siting of sewers is in closely built up town centres, where it is technically difficult to separate surface water and effluent.

The two main methods for separating run-off and waste water are: 'Local collection of rainwater run-off' whereby rainwater is collected in dry wells, fascines in gardens, or larger retention basins; and separate drains which collect all rainwater in a buried pipe that is separate from the sewer system and which is not sent to a treatment plant.

The figure illustrates the increasing proportion of separate sewers. The rise in separate drainage systems is a direct consequence of several heavy rainstorms; it is also one of the reasons why waste water collection has become more expensive in recent years for Danish consumers. Separate drainage systems are a relatively costly investment.

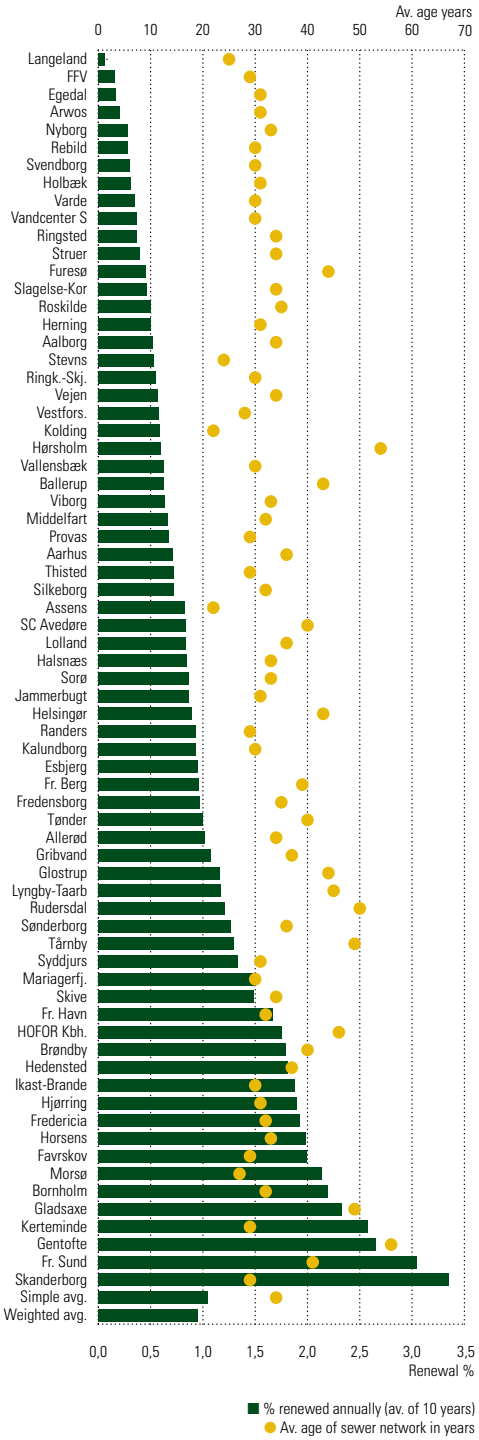
Development in separate drainage systems, 2010-2013



22 waste water companies included over all four years.

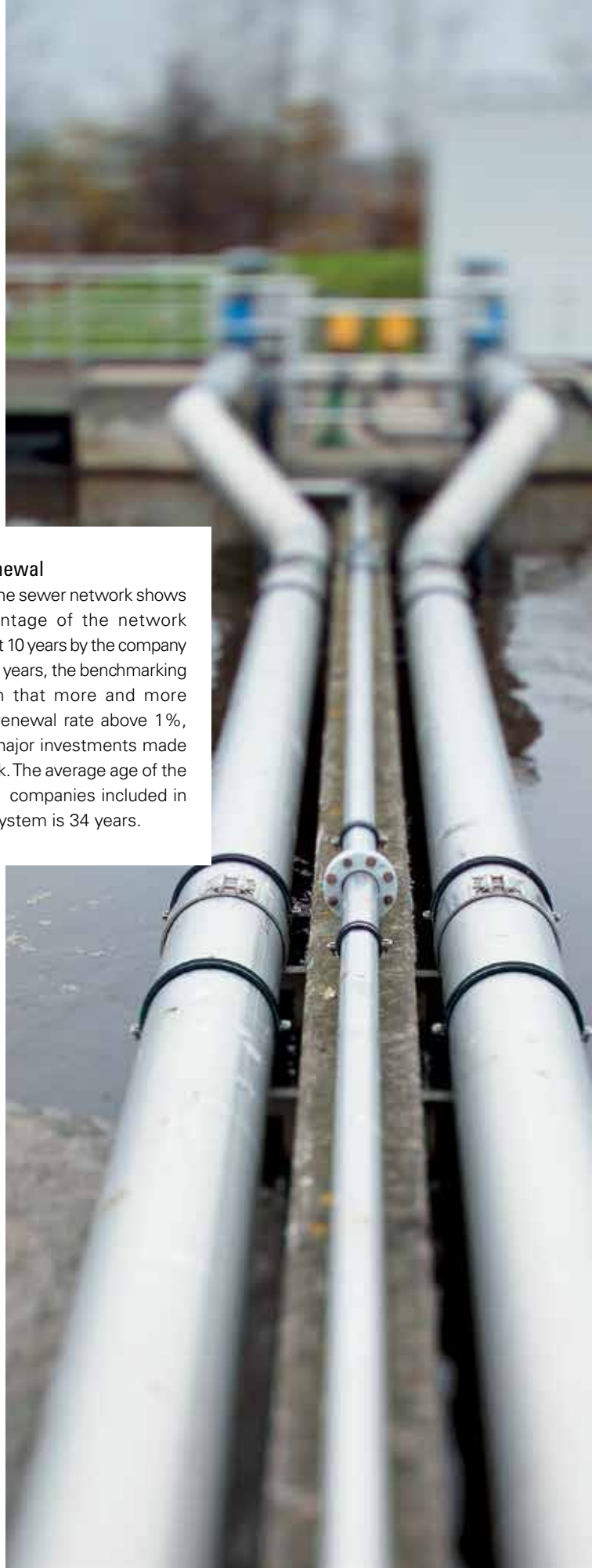
Calculated in km of separate drainage system in relation to total km of waste water pipeline, excl. intercepting sewers

Waste water network renewal 2013



Sewer network renewal

The renewal rate of the sewer network shows the average percentage of the network replaced over the past 10 years by the company in question. In recent years, the benchmarking system has shown that more and more companies have a renewal rate above 1%, which reflects the major investments made in the sewer network. The average age of the sewer networks for companies included in the benchmarking system is 34 years.



Name: Henriette Jakobsen
Age: 32
Title: Process engineer, Varde Forsyning.
Education: Biology and Conservation Technology
Service: four years

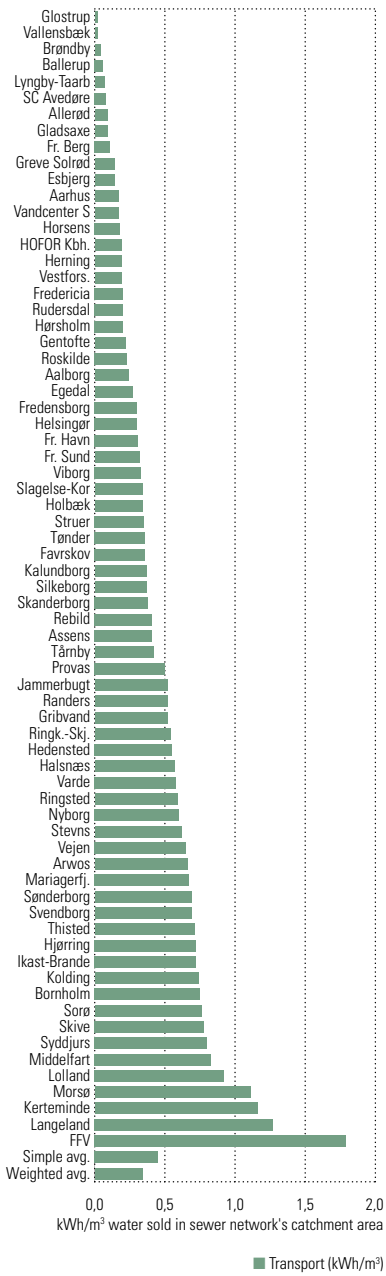
What made you decide to work for a water company?

I enjoy the freedom we have in day-to-day work and the fact that if you have a good idea, you are encouraged to act on it. This is the way to progress, both as an individual and through other people around you who accept the idea. When I started it was this that spoke to me: the openness. My colleagues were friendly and ready to share their experience. They were also open to my ideas.

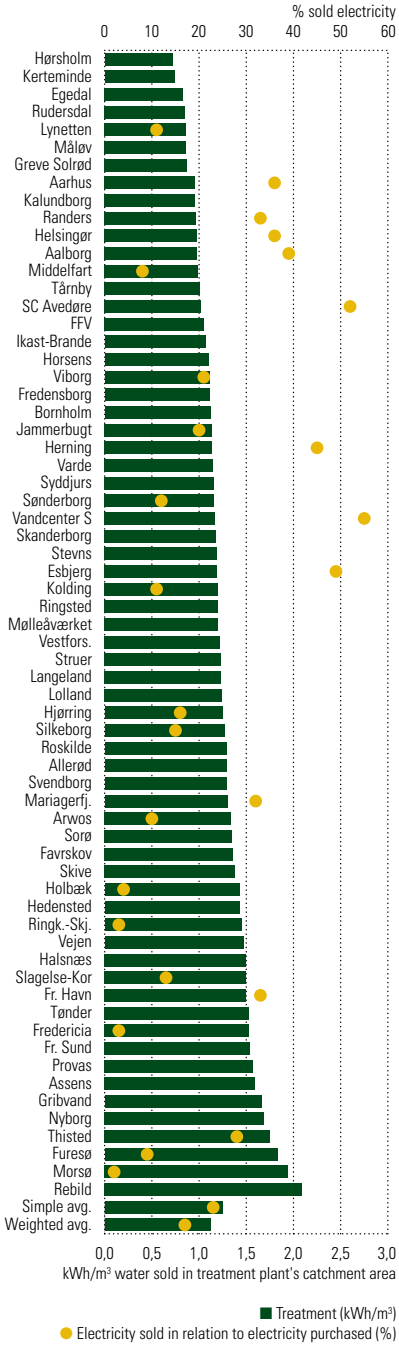
Electricity usage by waste water companies

There is still wide divergence in the waste water companies' electricity usage per m^3 treated water. One reason for this is the different make-up of waste water, which means that electricity usage for oxidation differs for each treatment plant. Another important parameter is the amount of water being pumped. A large transport network needing pumping will be more expensive to run than a network where waste water can largely drain off by itself. For some time, work has concentrated on process optimisation and in particular with respect to aeration systems: this helps to reduce electricity consumption. Weighted average electricity consumption per treated m^3 is 1.46kWh per sold m^3.

Waste water companies' electricity consumption for transport, 2013



Waste water companies' electricity consumption for treatment, 2013



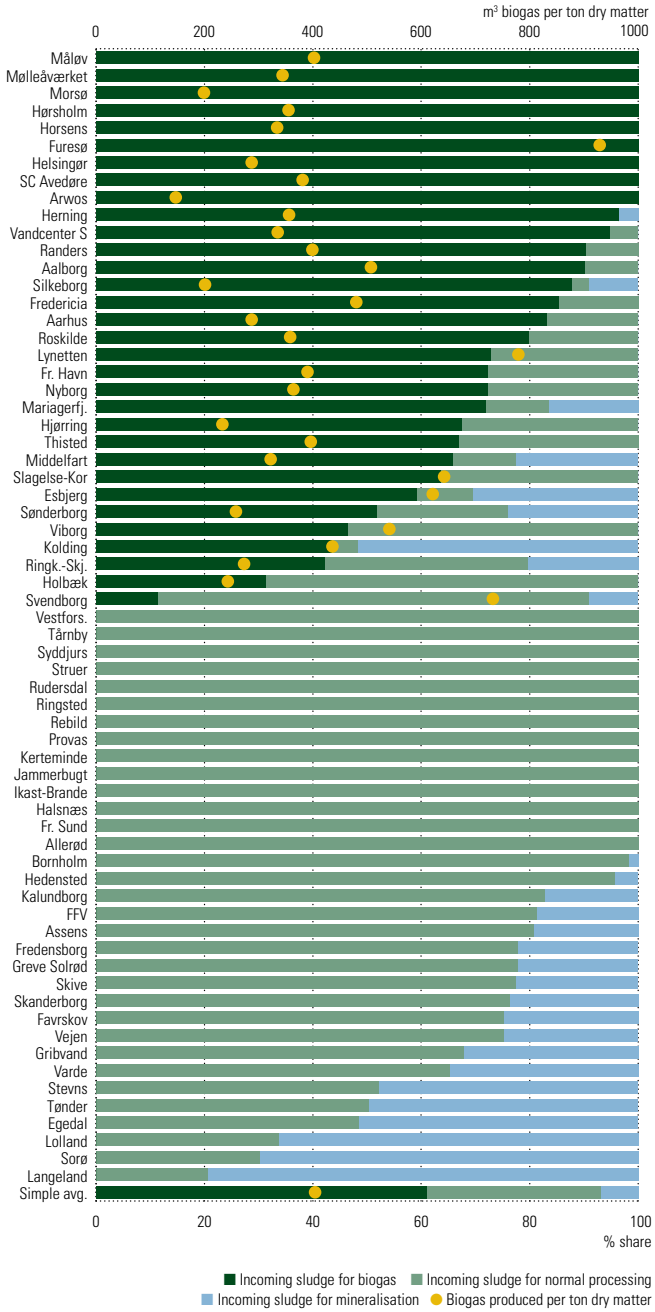
Sludge processing by waste water companies

When Denmark's waste water arrives at a treatment plant, it goes through a process to cleanse it of impurities. Once this process is complete, the clean water is piped to a receiving environment, whether a river, lake or the sea. But the treatment plant now has to deal with the residual product: sludge. Before disposal, sludge may need further processing and dehydration. Final disposal may be through recycling in agricultural applications, composting, incineration or dumping. The method of final disposal depends on the sludge's content of heavy metals and/or substances that are harmful to the environment; the waste water company may also have certain principles regulating final disposal.

The figure illustrates how various companies process their excess sludge. Excess sludge is processed in one of three ways: conversion to biogas, mineralisation in beds and other processing such as dehydration (known as normal processing in connection with regulations).

The figure also shows how much biogas is produced per ton of dry excess sludge, for companies that convert part of their excess sludge to biogas. There is a relatively wide difference in the volume of biogas various companies can produce from excess sludge. This is partly dependent on the suitability of the waste water sludge to biogas production; and partly on whether other matter is added to the waste water sludge, such as agricultural waste.

Sludge processing by waste water companies, 2013



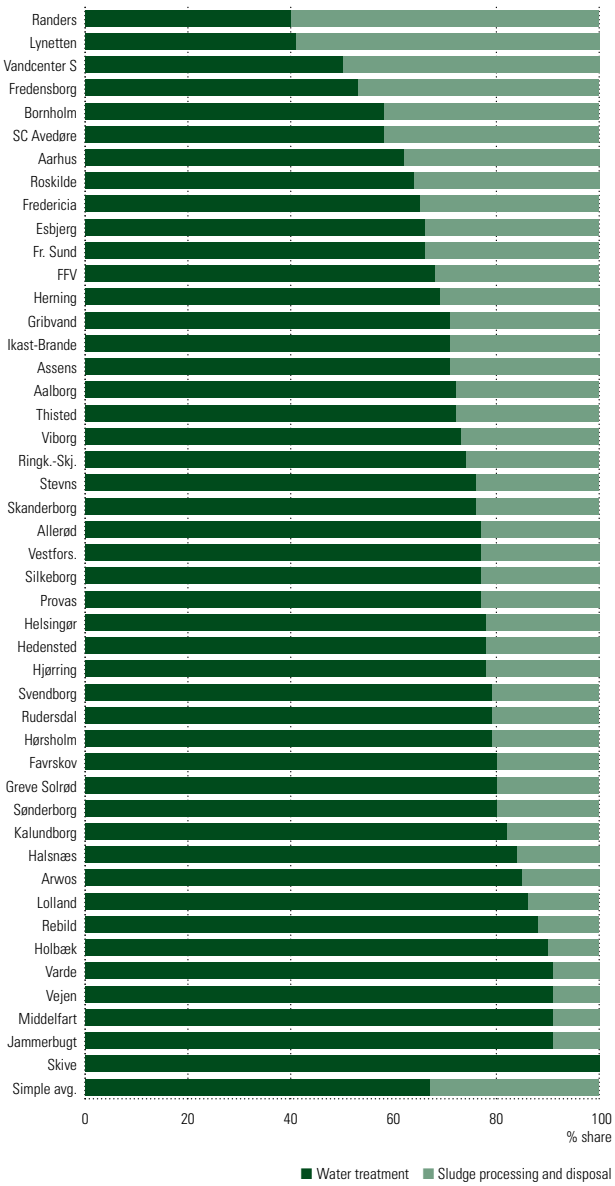
Operational costs for treatment and sludge processing and disposal

Waste water companies' operational costs can be broken down in three main categories: Transport of waste water from consumers to the treatment plant or rainwater basins; treatment; and customer account administration.

Operating costs for waste water treatment can be further broken down into two categories: treatment of waste water, and processing and disposal of sludge.

The figure shows how waste water companies' operating costs for treatment of waste water is divided between treatment and sludge processing, including disposal. Companies that have high costs for sludge processing are typically those with biogas facilities. These generate income in the form of gas sales, heat and/or electricity.

Distribution of operating costs for waste water treatment and sludge processing, 2013



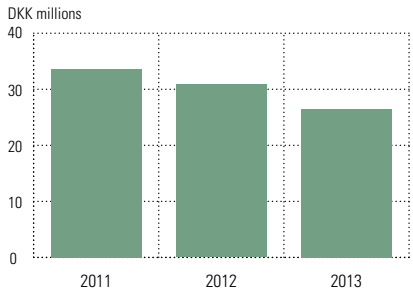
Arrears transferred to Danish Customs and Tax Administration

A DANVA benchmarking analysis in 2011 shed light on the collection of arrears. An estimated DKK 92 million in arrears was attributed to the water sector in 2010. The analysis also showed considerable disparity in the volumes of arrears transferred to the Danish Customs and Tax Administration by water companies. The analysis considered only companies that transferred arrears throughout 2010; a separate quality assurance exercise was carried out with respect to the data. It was discovered that companies that turned off water had fewer arrears than companies that did not employ this method. The analysis recommended that water companies focus on the issue. This might for instance take the form of a specific policy. Subsequently, sharing of information showed that it is very important to have a fixed procedure for the collection of arrears, to contact customers quickly, to act quickly in cases of payment default and to visit the customer relatively early in the process. A less comprehensive procedure may be implemented for repeat offenders.

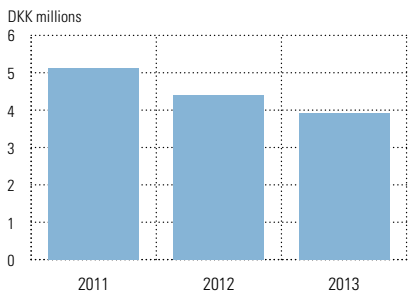
The figures to the left illustrate the development in arrears transferred to the Danish Customs and Tax Administration between 2011 and 2013 by drinking water and waste water companies respectively. The figures are based on data from 20 drinking water companies and 27 waste water companies. Only companies that have reported arrears throughout the period are included in the analysis. The figures show a fall of 23% for drinking water companies and 21% for waste water companies in the analysis.

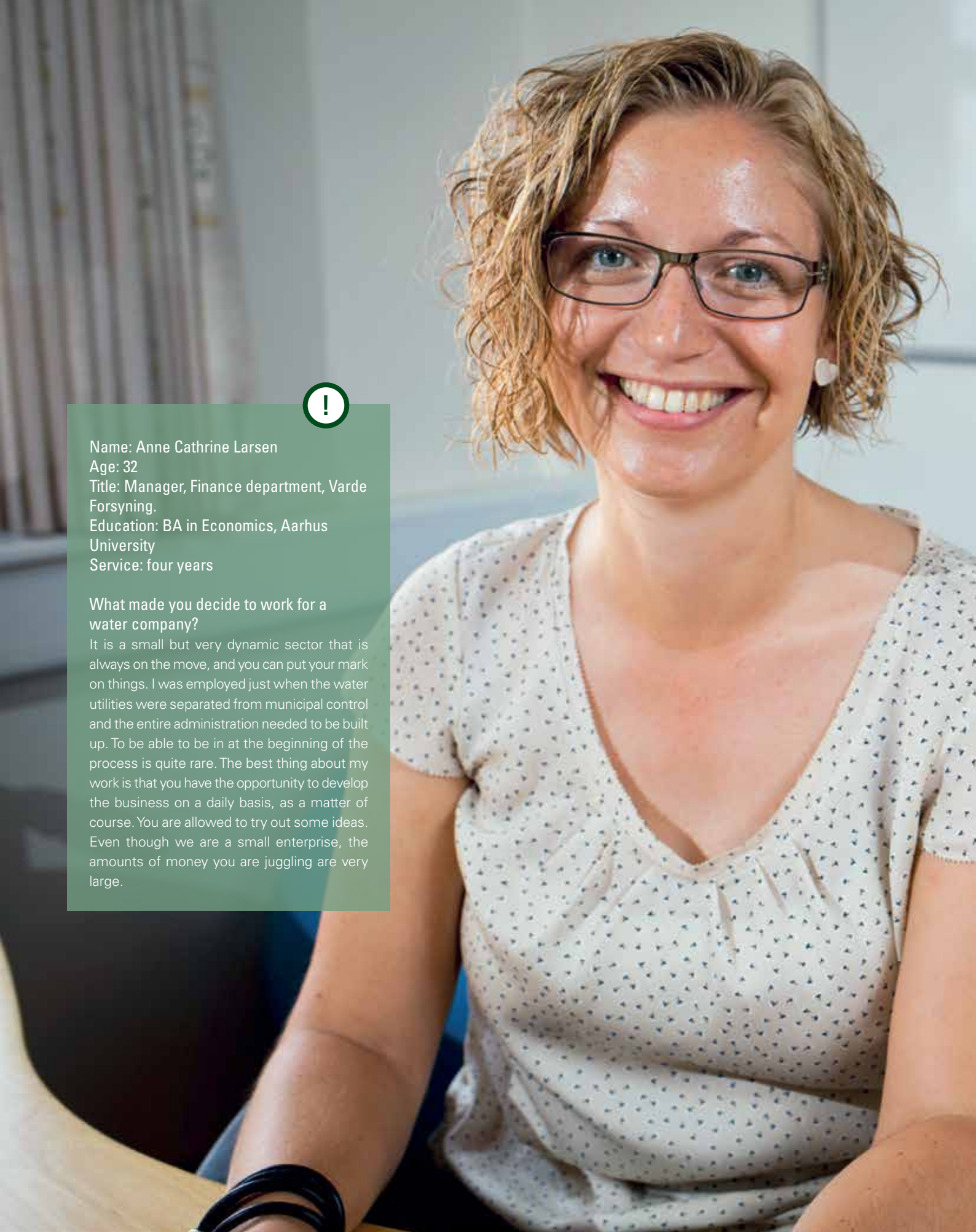
The underlying data for these figures show that many water companies transferred considerably fewer arrears to the Danish Customs and Tax Administration in 2013 than in 2011. This shows that many water companies have become better at collecting receivables. Data also shows that some companies are transferring stable or rising volumes of arrears to the Danish Customs and Tax Administration. This points towards a continued potential for further streamlining if all companies implement'best practice' in this area.

Waste water companies' arrears transferred to the Danish Customs and Tax Administration



Drinking water companies' arrears transferred to Danish Customs and Tax Administration

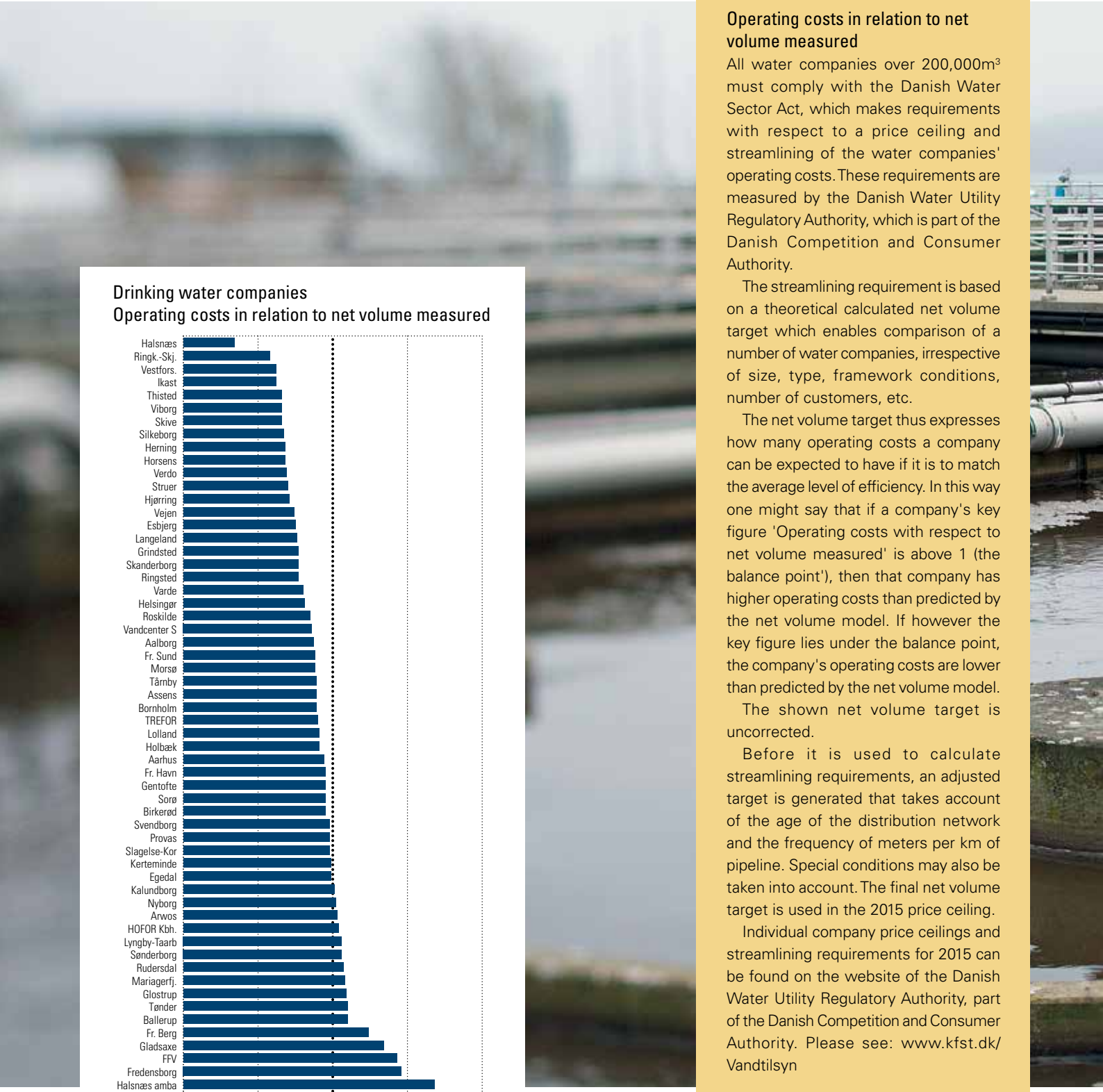




Name: Anne Cathrine Larsen
Age: 32
Title: Manager, Finance department, Varde Forsyning.
Education: BA in Economics, Aarhus University
Service: four years

What made you decide to work for a water company?

It is a small but very dynamic sector that is always on the move, and you can put your mark on things. I was employed just when the water utilities were separated from municipal control and the entire administration needed to be built up. To be able to be in at the beginning of the process is quite rare. The best thing about my work is that you have the opportunity to develop the business on a daily basis, as a matter of course. You are allowed to try out some ideas. Even though we are a small enterprise, the amounts of money you are juggling are very large.



Drinking water companies
Operating costs in relation to net volume measured

Operating costs in relation to net volume measured

All water companies over 200,000m³ must comply with the Danish Water Sector Act, which makes requirements with respect to a price ceiling and streamlining of the water companies' operating costs. These requirements are measured by the Danish Water Utility Regulatory Authority, which is part of the Danish Competition and Consumer Authority.

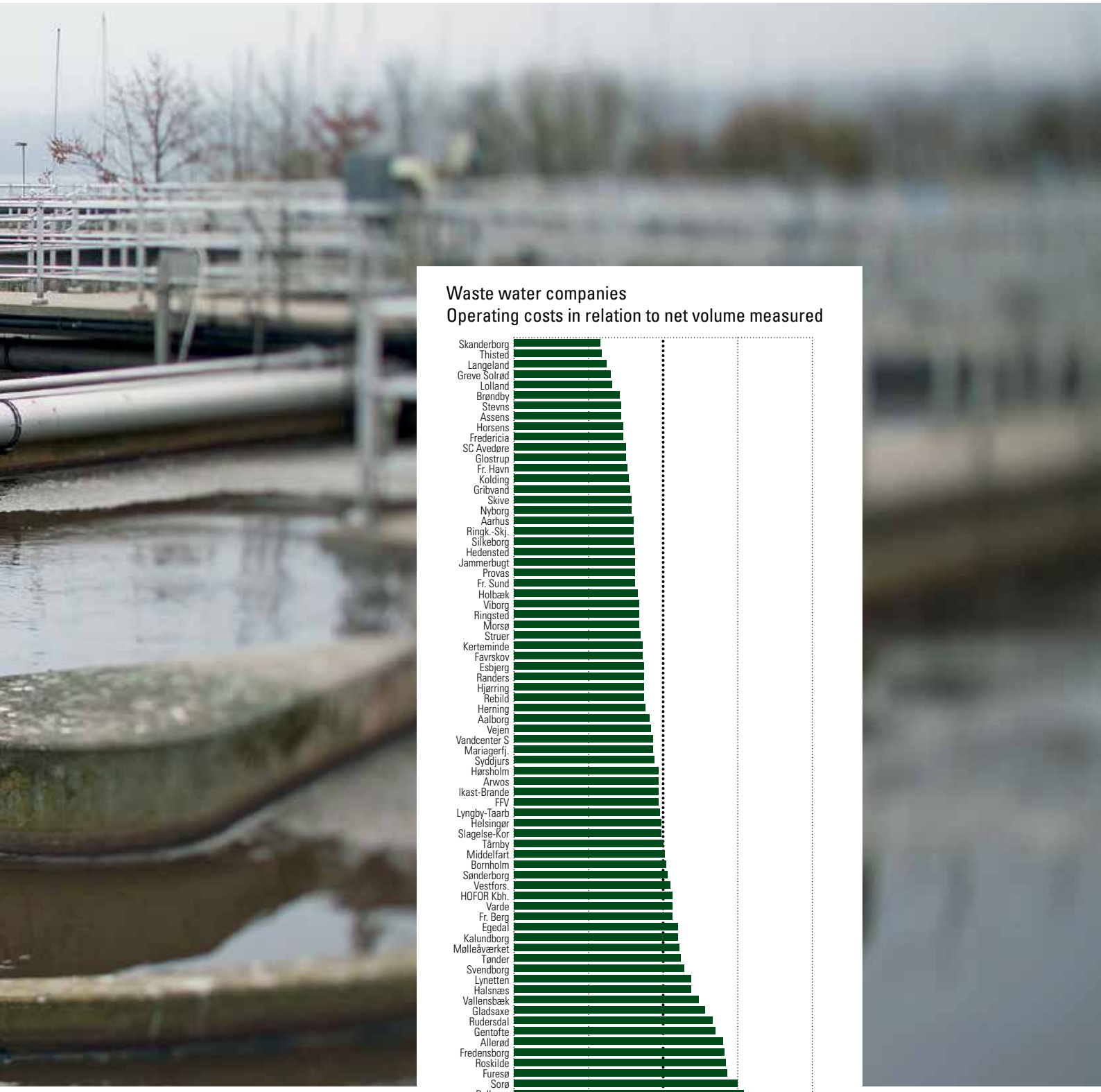
The streamlining requirement is based on a theoretical calculated net volume target which enables comparison of a number of water companies, irrespective of size, type, framework conditions, number of customers, etc.

The net volume target thus expresses how many operating costs a company can be expected to have if it is to match the average level of efficiency. In this way one might say that if a company's key figure 'Operating costs with respect to net volume measured' is above 1 (the balance point'), then that company has higher operating costs than predicted by the net volume model. If however the key figure lies under the balance point, the company's operating costs are lower than predicted by the net volume model.

The shown net volume target is uncorrected.

Before it is used to calculate streamlining requirements, an adjusted target is generated that takes account of the age of the distribution network and the frequency of meters per km of pipeline. Special conditions may also be taken into account. The final net volume target is used in the 2015 price ceiling.

Individual company price ceilings and streamlining requirements for 2015 can be found on the website of the Danish Water Utility Regulatory Authority, part of the Danish Competition and Consumer Authority. Please see: www.kfst.dk/Vandtilsyn



Waste water companies
Operating costs in relation to net volume measured

Drinking water companies included in DANVA benchmarking 2014 (Data for 2013)	BASIS DATA				
	Inhabitants in the supply area	Total water volume sold	Boreholes (water abstraction)	Water works	Supply pipelines
Company unit:	Persons	m^3/year	Quantity	Quantity	km
Arwos Vand A/S	22,000	1,255,507	16	3	258
Assens Vandværk a/s	8,360	634,584	8	2	130
Birkerød Vandforsyning a.m.b.a.	22,000	1,159,282	9	1	144
Bornholms Forsyning A/S	20,000	1,198,447	27	5	678
Egedal Vandforsyning A/S	16,400	623,068	9	1	152
Energi Viborg Vand A/S	51,994	2,306,114	11	4	552
Esbjerg Vand A/S	92,000	6,798,867	45	6	993
FFV Vand A/S	9,308	712,485	7	2	201
Forsyning Ballerup A/S	54,000	3,187,327	11	5	320
Forsyning Helsingør Vand A/S	58,000	2,780,956	23	4	376
Fredensborg Vand A/S	38,150	1,730,930	13	2	274
Frederiksberg Vand A/S	102,989	5,262,960	5	1	168
Frederikshavn Vand A/S	58,000	4,374,278	104	6	1,136
Frederikssund Vand A/S	27,700	1,312,110	19	5	325
Glostrup Vand A/S	21,869	1,274,214	10	3	95
Grindsted Vandværk A.m.b.a.	12,049	1,149,247	11	2	255
Halsnæs Vand A/S	14,700	561,424	17	3	243
Halsnæs Vandforsyning a.m.b.a.	8,579	459,469	16	1	150
Herning Vand A/S	50,299	3,215,749	21	3	678
Hjørring Vandselskab A/S	34,000	3,281,968	51	5	890
HOFOR Vand København A/S	563,460	48,535,025	473	7	1,130
Holbæk Vand A/S	23,756	1,639,087	14	2	215
Horsens Vand A/S	49,450	3,839,139	20	4	614
Hørsholm Vand ApS	24,537	1,282,827			149
Ikast Vandforsyning A.m.b.A	16,000	934,640	13	2	204
Kalundborg Vandforsyning A/S	13,439	2,872,010	16	1	278
Kerteminde Forsyning - Vand A/S	17,000	914,180	9	2	197
Langeland Vand ApS	9,300	823,991	25	4	337
Lolland Vand A/S	38,300	1,673,529	29	4	839
Lyngby-Taarbæk Vand A/S	54,237	2,785,710	8	2	253
Mariagerfjord Vand a/s	15,100	1,281,456	16	8	295

PROCESS BENCHMARKING (GENERAL KEY FIGURES AND RATIOS)					CHARGES 2013		
Operating costs for production, distribution and customer account administration	Operating costs for production	Operating costs for distribution	Operating costs for customer account administration	Investments made and renovation expenditure	Fixed annual contribution incl. VAT	Variable water contribution incl. VAT and other taxes	Expenditure for usage of (100m3/year)
DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK	DKK/m³	DKK
5.62	2.45	2.91	0.27	6.49	563	15.35	2,098
4.78	2.38	1.63	0.77	9.44	595	16.67	2,262
4.34	1.71	1.79	0.83	3.18	425	14.29	1,854
7.01	3.13	2.89	0.99	9.54	1,221	17.15	2,936
7.56	4.19	1.78	1.59	6.85	420	16.57	2,077
4.86	2.17	1.91	0.78	5.60	565	16.42	2,207
3.71	2.33	0.80	0.58	3.45	876	13.98	2,274
8.74	3.20	4.22	1.32	2.37	875	17.67	2,642
5.73	1.57	2.75	1.41	2.53	0	20.41	2,041
6.26	3.84	1.31	1.11	9.11	569	20.78	2,647
5.25	2.05	2.74	0.45	3.61	254	22.12	2,466
5.50	1.13	3.60	0.77	2.83	370	23.54	2,724
5.52	3.31	1.69	0.52	9.77	1,313	15.18	2,831
6.38	2.42	3.32	0.64	9.72	825	17.67	2,592
5.08	1.50	1.70	1.88	4.28	218	20.00	2,218
3.58	1.89	0.76	0.93	1.53	693	10.46	1,739
7.19	3.14	3.12	0.93	15.51	838	21.33	2,971
9.01	3.79	4.18	1.04	15.31	740	22.65	3,005
4.04	1.71	1.98	0.34	2.44	630	13.85	2,015
4.09	2.25	1.47	0.37	4.39	1,293	15.04	2,797
3.86	2.65	0.91	0.30	1.54	480	16.31	2,111
5.15	2.67	2.10	0.38	7.40	0	17.10	1,710
3.90	2.27	1.41	0.22	3.30	959	12.98	2,257
5.06		4.93	0.84	5.90	0	25.31	2,531
4.76	1.88	1.69	1.19	2.68	469	12.38	1,707
2.68	1.34	1.07	0.27	9.49	0	19.92	1,992
5.79	1.82	2.51	1.46	4.21	500	17.44	2,244
5.11	1.77	2.18	1.15	10.83	300	11.16	1,416
6.91	1.94	3.91	1.06	18.63	786	29.35	3,721
5.06	2.17	2.39	0.50	8.10	0	23.60	2,360
4.92	1.86	1.99	1.07	5.78	613	12.66	1,879

Drinking water companies included in DANVA benchmarking 2014 (Data for 2013)	BASIS DATA				
	Inhabitants in the supply area	Total water volume sold	Boreholes (water abstraction)	Water works	Supply pipelines
Company unit:	Persons	m^3/year	Quantity	Quantity	km
Morsø Vand A/S	9,220	566,014	9	2	115
NFS A/S	16,000	1,168,356	18	2	183
Nordvand (Gentofte Vand A/S)	73,821	3,680,709	23	1	303
Nordvand (Gladsaxe Vand A/S)	66,338	3,363,923	5	2	231
Provas	33,000	1,614,041	13	3	403
Ringkøbing - Skjern Vand A/S	43,939	3,247,319	34	8	1,170
Ringsted Vand A/S	33,413	1,920,279	13	3	370
Roskilde Vand A/S	54,416	3,014,691	20	3	371
Rudersdal Forsyning	33,000	1,701,977	13	3	204
Silkeborg Vand A/S	45,600	2,414,949	7	2	502
SK Vand A/S	69,000	3,485,639	49	6	731
Skanderborg Forsyningsvirksomhed A/S	17,500	1,010,398	19	5	210
Skive Vandforsyning A/S	33,560	2,325,912	30	10	700
Sorø Vand A/S	10,000	515,168	8	1	245
Struer Forsyning Vand A/S	16,000	967,239	11	3	265
Svendborg Vand A/S	37,500	1,946,316	27	6	451
Sønderborg Vandforsyning A/S	40,325	2,114,529	21	6	364
Thisted Vand	32,022	3,114,923	38	9	1,058
TREFOR Vand A/S	147,000	10,894,918	88	10	1,424
Tønder Vand A/S	24,370	1,650,174	12	5	549
TÅRNBYFORSYNING Vand A/S	41,992	2,537,439	10	1	191
Vandcenter Syd as	164,000	8,660,878	46	7	995
Varde Vandforsyning A/S	18,238	1,716,326	15	3	510
Vejen Forsyning A/S	18,065	655,658	5	3	177
Verdo Vand A/S	49,194	2,370,932	20	4	340
Vestforsyning Vand A/S	42,956	3,564,054	29	7	1,090
Aalborg Forsyning, Vand A/S	113,506	6,501,864	57	15	688
Aarhus Vand A/S	272,125	13,865,417	88	9	1,460

PROCESS BENCHMARKING (GENERAL KEY FIGURES AND RATIOS)					CHARGES 2013		
Operating costs for production, distribution and customer account administration	Operating costs for production	Operating costs for distribution	Operating costs for customer account administration	Investments made and renovation expenditure	Fixed annual contribution incl. VAT	Variable water contribution incl. VAT and taxes	Expenditure for usage of (100m3/year)
DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK	DKK/m³	DKK
4.76	2.62	1.54	0.60	7.49	680	15.57	2,237
5.10	2.76	1.88	0.47	3.82	500	17.66	2,266
4.76	1.38	2.84	0.54	9.73	0	22.00	2,200
4.93	0.72	3.43	0.78	9.89	0	23.90	2,390
5.73	2.63	2.30	0.80	6.44	851	18.10	2,661
3.40	1.80	0.83	0.77	19.20	1,075	14.86	2,561
3.23	1.45	1.09	0.69	4.80	186	18.63	2,049
5.62	1.29	4.05	0.29	4.62	376	22.15	2,591
4.79	1.98	2.55	0.26	3.06	438	17.00	2,138
4.43	1.75	1.97	0.71	5.06	788	13.55	2,143
5.72	2.71	2.52	0.48	10.73	1,237	14.36	2,673
5.09	2.38	2.35	0.37	11.70	1,106	17.66	2,872
3.89	2.18	1.45	0.26	5.23	688	14.23	2,111
5.98	2.95	2.28	0.75	1.78	520	19.40	2,460
3.52	1.83	1.54	0.16	2.44	555	12.86	1,841
6.93	3.27	2.92	0.74	7.15	600	19.70	2,570
5.41	2.18	1.97	1.26	5.80	555	15.65	2,120
3.13	1.24	1.61	0.28	8.36	714	16.22	2,336
4.74	2.25	1.35	1.13	7.70	1,250	15.16	2,766
5.39	2.49	2.08	0.82	23.07	1,032	14.78	2,510
2.87	1.35	1.15	0.37	3.39	256	18.38	2,094
5.33	2.27	2.15	0.91	4.09	600	17.35	2,335
4.20	1.60	2.48	0.11	11.35	951	12.00	2,151
4.06	2.54	1.08	0.43	27.91	750	14.54	2,204
4.31	1.15	2.31	0.85	3.24	694	16.00	2,294
4.13	1.81	2.20	0.12	4.38	683	14.04	2,087
4.52	2.06	2.00	0.47	4.50	1,250	13.35	2,585
5.83	2.40	2.79	0.64	6.21	688	21.18	2,806

Waste water companies included in DANVA benchmarking 2014 (Data for 2013)	BASIS DATA					
	Inhabitants in the supply area	Sewage pipelines (effluent and run-off)	Debited water volume sold	Treatment plant over 30 PE	Additional water volume to treatment plant	Total organic load
Company unit:	Persons	km	m³/year	Quantity	m³/year	PE, person equivalents
Afløb Ballerup A/S	48,211	378	2,733,547	0		
Allerød Spildevand A/S	23,900	277	1,118,051	3	1,964,367	34,500
Arwos Spildevand A/S	23,368	1,201	2,499,826	8	6,984,953	77,519
Assens Spildevand A/S	35,872	958	1,807,064	9	5,851,836	68,795
BIOFOS Lynettefællesskabet A/S			44,456,000	2	80,300,000	1,199,315
BIOFOS Spildevandscenter Avedøre A/S	211,670	55	13,159,204	0	22,279,347	210,000
Bornholms Forsyning A/S	30,000	800	1,797,424	8	6,886,657	66,151
Brøndby Kloakforsyning A/S	34,700	290	1,856,361	0		
Egedal Spildevand A/S	40,230	589	1,601,501	4	2,262,367	25,900
Energi Viborg Spildevand A/S	42,113	1,669	3,913,092	22	10,483,808	99,994
Esbjerg Spildevand A/S	119,000	1,274	6,211,979	10	16,914,936	232,306
Favrskov Forsyning	41,452	838	1,745,100	9	3,990,269	47,248
FFV Spildevand A/S	25,000	1,276	2,382,980	8	8,690,046	43,108
Forsyning Helsingør Spildevand A/S	61,000	585	2,846,186	3	6,272,392	63,669
Fredensborg Spildevand A/S	39,462	431	1,711,688	3	2,528,583	34,314
Fredericia Spildevand og Energi A/S	50,100	831	4,709,093	1	9,323,117	286,115
Frederiksberg Kloak A/S	102,989	146	5,134,656	0		
Frederikshavn Spildevand A/S	51,480	861	3,905,151	9	10,262,760	218,344
Frederikssund Spildevand A/S	39,000	655	1,974,774	6	4,363,195	44,804
Furesø Spildevand A/S	37,881	322	1,666,390	1	1,419,218	13,410
Glostrup Spildevand A/S	21,869	156	1,340,577	0		
Greve Solrød Forsyning A/S	68,577	820	3,065,051	2	6,154,810	74,553
Gribvand Spildevand A/S	38,500	740	1,788,657	9	5,454,985	34,918
Halsnæs Spildevand A/S	19,800	492	1,253,995	4	3,198,989	36,360
Hedensted Spildevand A/S	32,568	877	1,782,974	6	5,252,829	57,594
Herning Vand A/S	70,000	1,300	4,164,166	14	12,644,305	194,799
Hjørring Vandselskab A/S	52,000	1,054	3,221,113	10	9,214,328	195,918
HOFOR Spildevand København A/S	564,499	1,070	29,554,588	0		
Holbæk Spildevand A/S	33,921	991	2,879,040	15	6,877,002	82,668
Horsens Vand A/S	71,500	1,284	4,523,037	4	9,557,176	346,800
Hørsholm Vand ApS	24,372	203	1,749,879	1	3,394,690	25,152

PROCESS BENCHMARKING (GENERAL KEY FIGURES AND RATIOS)					CHARGES 2013		
Operating costs for transport, treatment and customer account administration	Operating costs for transport	Operating costs for treatment	Operating costs for customer account administration	Investments made and renovation expenditure	Fixed annual contribution incl. VAT	Variable contribution including VAT and other taxes	Expenditure for usage of (100m³/year)
DKK/m³ sold	DKK/m³ sold	DKK/m³sold	DKK/m³ sold	DKK/m³ sold	DKK	DKK/m³	DKK
4.87	4.38		0.50	11.25	0	33.25	3,325
16.20	5.07	10.77	0.36	30.50	0	45.37	4,537
14.68	5.54	8.19	0.95	46.04	313	38.75	4,188
14.10	6.13	7.01	0.96	38.41	685	45.50	5,235
3.45		3.45	0.00	8.94			
3.61	0.17	3.44	0.00	4.61			
15.97	4.55	10.61	0.82	16.36	644	33.45	3,989
2.54	2.38		0.16	14.55	0	29.50	2,950
14.48	5.38	8.27	0.82	13.69	0	48.90	4,890
12.00	4.37	6.71	0.92	6.58	0	38.03	3,803
9.22	3.14	5.32	0.76	11.99	708	25.20	3,228
13.89	4.49	8.91	0.48	29.70	625	42.50	4,875
16.53	8.27	7.11	1.15	43.42	708	34.58	4,166
13.98	5.55	7.18	1.25	20.67	656	39.00	4,556
10.61	4.38	5.77	0.46	19.72	0	42.59	4,259
8.08	2.34	5.42	0.32	15.91	250	23.50	2,600
3.60	3.15		0.44	4.75	0	12.14	1,214
13.09	4.30	8.49	0.30	14.04	834	38.21	4,655
14.95	3.35	10.82	0.78	29.36	718	42.50	4,968
12.17	4.75	6.67	0.76	9.52	0	44.50	4,450
2.84	2.17		0.66	8.03	0	28.00	2,800
7.93	2.13	5.28	0.51	17.83	0	33.60	3,360
16.60	5.74	9.24	1.63	20.94	686	50.31	5,717
22.93	8.28	11.78	2.86	29.80	625	51.00	5,725
17.03	5.88	9.98	1.16	32.06	708	31.25	3,833
10.95	5.21	5.15	0.59	9.62	0	26.88	2,688
12.91	4.55	7.63	0.73	34.35	844	37.50	4,594
3.00	2.55		0.45	2.36	0	22.80	2,280
12.83	4.99	7.17	0.67	46.57	0	32.52	3,252
11.15	2.43	8.36	0.35	9.28	709	26.21	3,330
7.66	2.28	4.98	0.39	21.95	0	33.79	3,379

Waste water companies included in DANVA benchmarking 2014 (Data for 2013)	BASIS DATA					
	Inhabitants in the supply area	Sewage pipelines (effluent and run-off)	Debited water volume sold	Treatment plant over 30 PE	Additional water volume to treatment plant	Total organic load
Company unit:	Persons	km	m^3/year	Quantity	m^3/year	PE, person equivalents
Ikast-Brande Spildevand A/S	35,600	626	1,773,991	3	5,607,364	57,247
Jammerbugt Forsyning A/S	45,600	804	1,957,464	5	4,840,750	42,037
Kalundborg Spildevandsanlæg A/S	38,600	778	6,884,136	12	8,318,958	89,312
Kerteminde Forsyning - Vand A/S	20,787	450	1,085,546	4	2,157,143	14,333
Kolding Spildevand a/s	83,318	1,508	4,176,756	7	12,506,485	114,003
Langeland Spildevand ApS	8,906	445	631,320	7	2,499,233	13,305
Lolland Spildevand A/S	23,500	897	1,744,809	57	7,100,000	93,500
Lyngby-Taarbæk Spildevand A/S	54,223	341	2,747,787	0	0	0
Mariagerfjord Spildevand A/S	30,000	798	1,909,422	8	6,600,166	62,227
Middelfart Spildevand A/S	37,685	774	1,518,256	6	6,939,248	42,618
Morsø Spildevand A/S	14,674	481	883,140	5	3,174,709	34,414
Mølleåværket Renseanlæg Lundtofte			4,895,516	1	9,164,915	114,520
Måløv Rens A/S			2,074,099	1	4,262,620	68,912
NFS A/S	35,463	668	1,517,180	5	5,249,147	45,810
Nordvand (Gentofte Spildevand A/S)	73,821	377	3,651,433	0		
Nordvand (Gladsaxe Spildevand A/S)	66,338	275	3,266,369	0		
Provas	49,610	955	2,335,303	15	9,180,855	112,230
Randers Spildevand A/S	90,766	1,478	4,126,707	8	9,092,649	103,115
Rebild Vand & Spildevand A/S	21,500	541	1,137,079	14	846,536	14,525
Ringkøbing - Skjern Spildevand A/S	47,500	989	2,257,988	18	7,595,971	71,882
Ringsted Spildevand A/S	29,556	579	2,000,046	3	3,899,000	71,005
Roskilde Spildevand A/S	67,521	866	3,992,626	5	7,997,717	112,842
Rudersdal Forsyning	55,034	456	2,861,223	4	3,776,300	22,403
Silkeborg Spildevand A/S	79,950	1,389	3,716,643	16	7,361,779	94,453
SK Vand A/S	53,701	1,257	3,401,694	19	8,244,863	106,780
Skanderborg Forsyningsvirksomhed A/S	58,094	510	2,359,931	8	4,970,445	65,533
Skive Spildevand A/S	15,177	985	1,859,167	5	6,831,427	40,467
Sorø Spildevand A/S	21,000	392	1,030,766	12	2,983,136	21,426
Stevns Spildevand A/S	18,723	439	828,819	6	2,184,739	20,385
Struer Forsyning Spildevand A/S	18,014	385	948,609	3	2,123,044	34,839
Svendborg Spildevand A/S	22,000	817	2,651,380	8	8,320,482	67,624

PROCESS BENCHMARKING (GENERAL KEY FIGURES AND RATIOS)					CHARGES 2013		
Operating costs for transport, treatment and customer account administration	Operating costs for transport	Operating costs for treatment	Operating costs for customer account administration	Investments made and renovation expenditure	Fixed annual contribution incl. VAT	Variable contribution including VAT and other taxes	Expenditure for usage of (100m³/year)
DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK	DKK/m³	DKK
12.94	4.27	8.04	0.64	32.23	625	34.38	4,063
11.00	3.84	6.89	0.27	20.02	706	23.55	3,061
5.34	2.04	2.91	0.39	8.64	0	48.57	4,857
9.35	3.86	4.16	1.33	14.84	500	30.00	3,500
11.19	4.47	6.07	0.64	23.64	584	36.25	4,209
17.74	9.02	7.12	1.60	27.45	688	31.25	3,813
15.18	4.64	9.25	1.29	77.35	723	56.35	6,358
4.38	4.20	0.00	0.19	36.17	0	26.76	2,676
16.88	4.77	11.14	0.98	134.14	643	32.19	3,862
17.90	5.53	11.34	1.04	22.63	0	50.75	5,075
22.41	6.72	14.56	1.12	48.96	619	42.38	4,857
4.54	0.26	4.25	0.04	3.69			
5.90		5.52	0.00	2.43			
15.61	4.89	10.04	0.68	35.50	500	40.00	4,500
4.75	4.31		0.44	16.71	0	28.20	2,820
4.64	4.10		0.53	23.38	0	28.80	2,880
13.20	5.18	6.97	1.05	27.50	708	45.08	5,216
11.10	3.43	6.94	0.74	20.09	0	38.50	3,850
10.21	3.57	5.28	1.36	20.96	0	41.25	4,125
15.93	4.55	9.24	2.14	23.69	813	37.00	4,513
11.04	3.50	5.74	1.80	25.73	0	37.87	3,787
15.59	7.08	8.06	0.44	10.22	0	36.00	3,600
7.19	3.03	3.86	0.30	5.59	0	29.08	2,908
10.05	3.91	5.32	0.82	20.46	656	30.00	3,656
14.47	5.83	7.94	0.70	27.18	709	53.13	6,022
10.29	3.03	6.58	0.64	33.80	389	30.00	3,389
11.94	6.30	5.27	0.38	18.10	656	31.88	3,844
19.78	6.87	11.41	1.49	15.07	563	51.55	5,718
15.36	5.93	7.98	1.45	58.82	740	60.00	6,740
12.61	3.42	8.95	0.24	16.45	0	23.75	2,375
13.94	5.34	8.13	0.48	16.59	0	35.51	3,551

Waste water companies included in DANVA benchmarking 2014 (Data for 2013)	BASIS DATA					
	Inhabitants in the supply area	Sewage pipelines (effluent and run-off)	Debited water volume sold	Treatment plant over 30 PE	Additional water volume to treatment plant	Total organic load
Company unit:	Persons	km	m^3/year	Quantity	m^3/year	PE, person equivalents
Syddjurs Spildevand A/S	36,800	780	1,600,186	12	2,845,132	38,117
Sønderborg Vandforsyning A/S	32,800	1,458	3,302,618	6	9,219,306	85,408
Thisted Vand	39,655	801	2,444,872	5	7,163,214	174,574
Tønder Spildevand A/S	28,572	750	1,845,276	19	5,715,368	51,739
TÅRNBYFORSYNING Spildevand A/S	41,607	186	2,225,637	1	5,108,347	54,582
Vallensbæk Kloakforsyning A/S	14,045	133	666,125	0		
Vandcenter Syd as	215,000	2,230	10,761,592	14	31,771,211	300,170
Varde Kloak & Spildevand A/S	34,804	814	2,219,474	9	6,759,846	71,785
Vejen Forsyning A/S	19,228	859	1,873,905	12	6,129,778	45,128
Vestforsyning Spildevand A/S	51,090	941	3,340,657	6	7,365,649	164,039
Aalborg Forsyning, Kloak A/S	196,747	1,968	10,171,517	3	24,010,330	300,000
Aarhus Vand A/S	315,795	2,601	14,901,462	10	29,193,484	388,534

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DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK/m³ sold	DKK	DKK/m³	DKK
16.76	6.75	9.05	0.96	29.17	783	41.20	4,903
13.87	5.20	6.92	1.75	31.17	0	43.63	4,363
12.92	4.10	8.25	0.57	20.41	708	31.76	3,884
17.74	8.14	8.43	1.17	33.26	585	36.13	4,198
9.96	2.94	6.50	0.52	16.09	0	29.36	2,936
5.63	5.29		0.34	15.07	0	33.46	3,346
11.00	3.92	6.31	0.77	14.93	625	32.38	3,863
13.93	8.46	5.42	0.05	23.18	600	29.00	3,500
11.40	3.79	7.01	0.60	17.57	700	31.75	3,875
13.35	4.68	8.12	0.54	20.16	700	24.83	3,183
7.85	3.65	3.46	0.75	16.57	688	28.13	3,501
7.30	2.20	4.60	0.51	14.88	0	28.86	2,886

Key figures and ratios

- The average price of one litre of water is DKK 0.063.
- Average household water usage is 107 litres per person per day.
- The drinking water companies' average operating costs were DKK 4.65 per m^3. Investments totalled DKK 5.43 per m^3.
- The waste water companies' average operating costs were DKK 10.70 per m^3. Investments totalled DKK 19.44 per m^3.
- The electricity consumed to treat and discharge 1,000 litres of tap water to the receiving environment is 1.90 kWh. Of this, 0.44kWh is used for the production and supply of drinking water, and 1.46kWh is used for transporting and treating waste water. This electricity usage corresponds to approx. 0.9 kg CO_2.

(Data for 2013)

Map of Danish water prices

On the DANVA website there is a map of Denmark showing water prices for companies that are subject to the Water Sector Act.

Water in figures graphs on interactive user interface

All benchmarking graphs in this publication can be found on an interactive user interface on the DANVA website under www.danva.dk/benchmarking

What is DANVA?

DANVA, the Danish Water and Waste Water Association, is the sector and interest organisation for Denmark's more than 120 top water companies. The association also has corporate and private members. DANVA water companies supply drinking water and handle waste water for more than 5 million Danes. Read more at www.danva.dk

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