



Nudging consumers  
towards energy efficiency  
through behavioural science

## WATER

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## A LITTLE HISTORY

That clean water flows out of the tap every day is something we take for granted in Belgium.

Yet it has not always been so. In the 17th and 18th centuries there were epidemics such as typhoid and cholera in Belgium, easily spread by poor hygiene and polluted river and well water (due to increasing industrialisation).

In 1836, municipalities became responsible for drinking water supply by law. However, they did not have enough money and knowledge to effectively put this in order.

In 1858, Brussels was the first to get a water distribution network (underground pipes through which water was distributed to the various houses). Other industrialised cities followed in the decades that followed. In rural areas, water distribution was not centrally organised for a long time. There, residents had to fetch drinking water from a well with a pump. From 1907, municipalities could cooperate to provide drinking water. In 1913, the 'Nationale Maatschappij der Waterleidingen' was founded. Yet it took until after World War II before more than a million customers were connected to a national water distribution network.

With the state reform, drinking water supply became a competence of the regions in 1980. In 1985, the 'Flemish Water Supply Company' was born. In the last century, the focus was on water supply, but the need for an integrated water policy and water treatment became increasingly important.

From 2013, water companies (such as 'The Water Group', see table and figure 1) are not only responsible for water supply, but also for wastewater and industrial water treatment. [1]

So the water from our tap is the work of many hands in recent years.

# WATER CONSUMPTION AT HOME

## 1. Your current water consumption

Dozens of times a day a tap opens in our house for hot or cold water.

A bucket of water or a (small) sink holds about 10 litres. How many buckets of water run out of the tap at your house per year?

Make an estimate of your home's water consumption. How many litres of water do you think you (along with whoever lives in your home) consume? Show your calculations.

**Tip:** You can express water consumption in litres or in cubic metres, m<sup>3</sup> (1 m<sup>3</sup> = 1000 litres).

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Surf now to this website that helps you estimate water consumption in your home:

<https://www.swde.be/en/simulateur-consommation>

On this website, you will see a simulator, which makes an estimate based on some data. Answer the six questions to give the simulator information about your family.

According to the simulator, how many m<sup>3</sup> does your family consume? \_\_\_\_\_

Show how this website makes the estimate. Which parts are important?

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What was the difference between your estimate and the simulator's?

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How do you explain that difference?

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To know exactly what your family's water consumption is, you can look at a water bill. Ask for a water bill at home and look up your family's water consumption. The consumption on the bill is your real consumption.

My family's consumption is:

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Do you think your family consumes more or less than an average family with the same number of people? Explain why you think so.

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Go ahead and take a look at Table 2 on p.10 and find the average tap water consumption per year for a family with the same number of people (domiciled) as yours.

What is this average tap water consumption per year for your family size?

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Were your estimates and explanations correct? If not, can you explain the actual difference?

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## 2. The price of water

Water is everywhere on earth, but pure water is not free.

Do you know what 1 cubic metre of water (1 m<sup>3</sup>) costs approximately? Calculate this from the simulator or your water bill.

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We now look at the price of water in more detail.

The price you pay is not the same for every litre. Every family is entitled to a certain amount of water at basic rate. Those who consume a lot (more than the basic consumption) will pay more for that extra consumption.

Why do you think the price for extra water consumption is higher?

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Basic consumption is set at 30 m<sup>3</sup> per dwelling + 30 m<sup>3</sup> per occupant.

A family with 2 adults and 2 children is therefore entitled to 30 m<sup>3</sup> + (4 × 30) m<sup>3</sup> = 150 m<sup>3</sup> of basic rate. If this family consumes more than 150 m<sup>3</sup> per year, this additional consumption will be charged on the comfort tariff. The comfort tariff is double the basic tariff.

Moreover, the price (basic rate and comfort rate) of water is not the same throughout Flanders and therefore depends on where you live. Knokke is the only municipality to have its own water company. The rest of Flanders is served by six other water companies: Brabant Water, De Watergroep, Farys, IWVA, Pipda and Water-link. In table 1 you can see that prices differ greatly between different water companies.

Table 1: Water tariffs 2023 [2]

Toegepast tarief variabele prijs 2023 (€ /m <sup>3</sup> )	Basis	Comfort
AGSO Knokke-Heist	€ 2,1031	€ 4,2062
Brabant Water	€ 0,8516	€ 1,7032
De Watergroep	€ 2,2597	€ 4,5194
Farys	€ 2,5322	€ 5,0644
Aquaduin	€ 2,1254	€ 4,2508
Pidpa	€ 1,6289	€ 3,2578
Water-link	€ 1,6289	€ 3,2578

In Knokke-Heist, water is supplied by AGSO Knokke-Heist. In the neighbouring municipality of Bruges, Farys is the supplier of water. If you were to move from Knokke to Bruges, what is the difference in price for 1 m<sup>3</sup> of water at base rate (variable price)?

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How much percent more will you have to pay in base rate if you move from Knokke to Bruges?

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Also calculate the percentage difference if you move back from Bruges to Knokke?

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Figure 1 shows which water company supplies water in various Belgian municipalities. You can also quickly look this up on the website of the Vlaamse MilieuMaatschappij (VMM): <https://www.vmm.be/waterloket/wvrsearch>

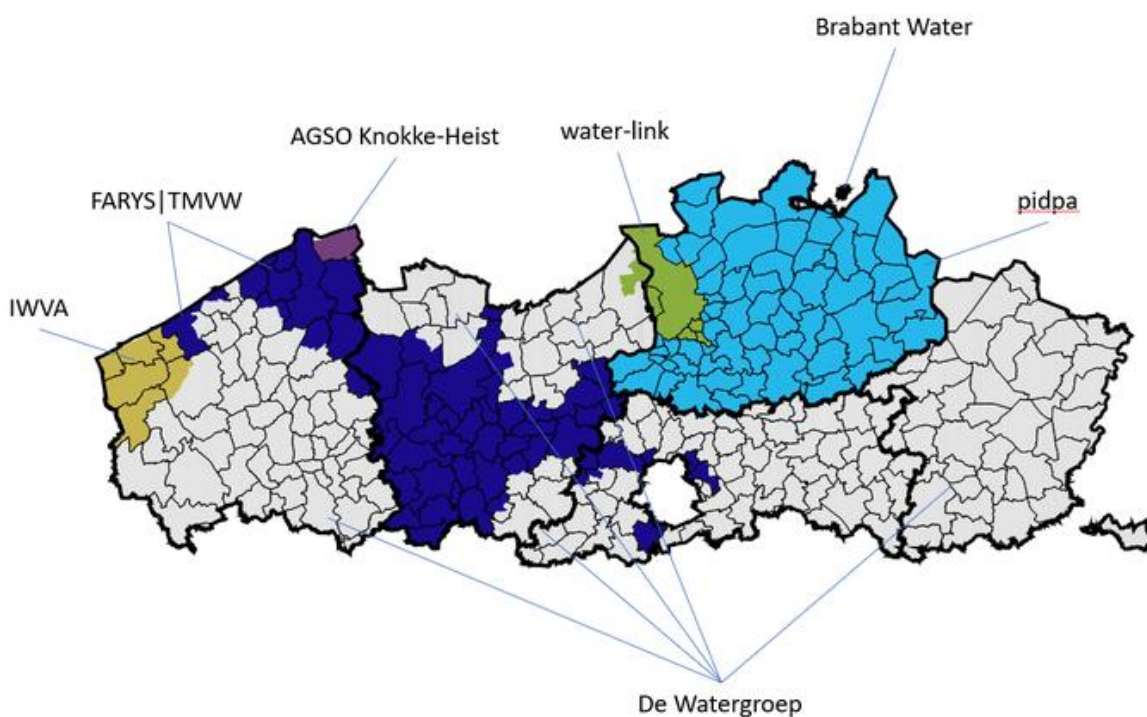


Figure 1: Map water companies Flanders [3]

Your water bill is not determined solely by your consumption. Everyone pays the standing charge, regardless of their consumption. Whether you consume much or little water, the standing charge for everyone is equal to 100 euros per home. This standing charge is a fee for consumption (50 euros), drainage (30 euros) and purification (20 euros) (see Figure 2).

Discounts do apply to this standing charge. Per domiciliary, a discount of 10 euros is given for consumption, a discount of 6 euros for drainage and 4 euros for purification. In total, the discount is therefore 20 euros per domiciliary (with a maximum of 5).

Domestic (excl. 6% VAT)	2019 2020 2021 2022 2023		
	Drinking water consumption	Waste water disposal	Waste water treatment
<b>Standing charge (= annual fixed fee)</b>	€ 50 (incl. € 53)	€ 30 (incl. € 31,8)	€ 20 (incl. € 21,2)
<b>Discount per domiciliary person on standing charge (max. 5 persons)</b>	- € 10 (incl. - € 10,60)	- € 6 (incl. - € 6,36)	- € 4 (incl. - € 4,24)
	€ 2,2597 (incl. € 2,3953)	€ 1,6407 (incl. € 1,7391)	€ 1,1719 (incl. € 1,2422)
<b>Basic rate per m<sup>3</sup></b>	€ 0,00225 (incl. € 0,00239)	€ 0,0016 (incl. € 0,0017)	€ 0,00117 (incl. € 0,00124)
<b>Basic rate per litre</b>			
<b>Comfort rate per m<sup>3</sup></b>	€ 4,5194 (incl. € 4,7906)	€ 3,2814 (incl. € 3,4783)	€ 2,3438 (incl. € 2,4844)
<b>Comfort rate per litre</b>	€ 0,00451 (incl. € 0,00479)	€ 0,0033 (incl. € 0,0035)	€ 0,00234 (incl. € 0,00248)

Figure 2: Water tariffs (with tariffs for drinking water consumption of De Watergroep) [4]

A single person in Flanders consumes an average of 108 litres of tap water per day.

On your water bill you will see the price per m<sup>3</sup>. Show that a consumption of 108 litres corresponds to 39 m<sup>3</sup> of water per year.

Table 2 shows average tap water consumption by family size. An average family of 2.3 people uses 89 litres per person per day.

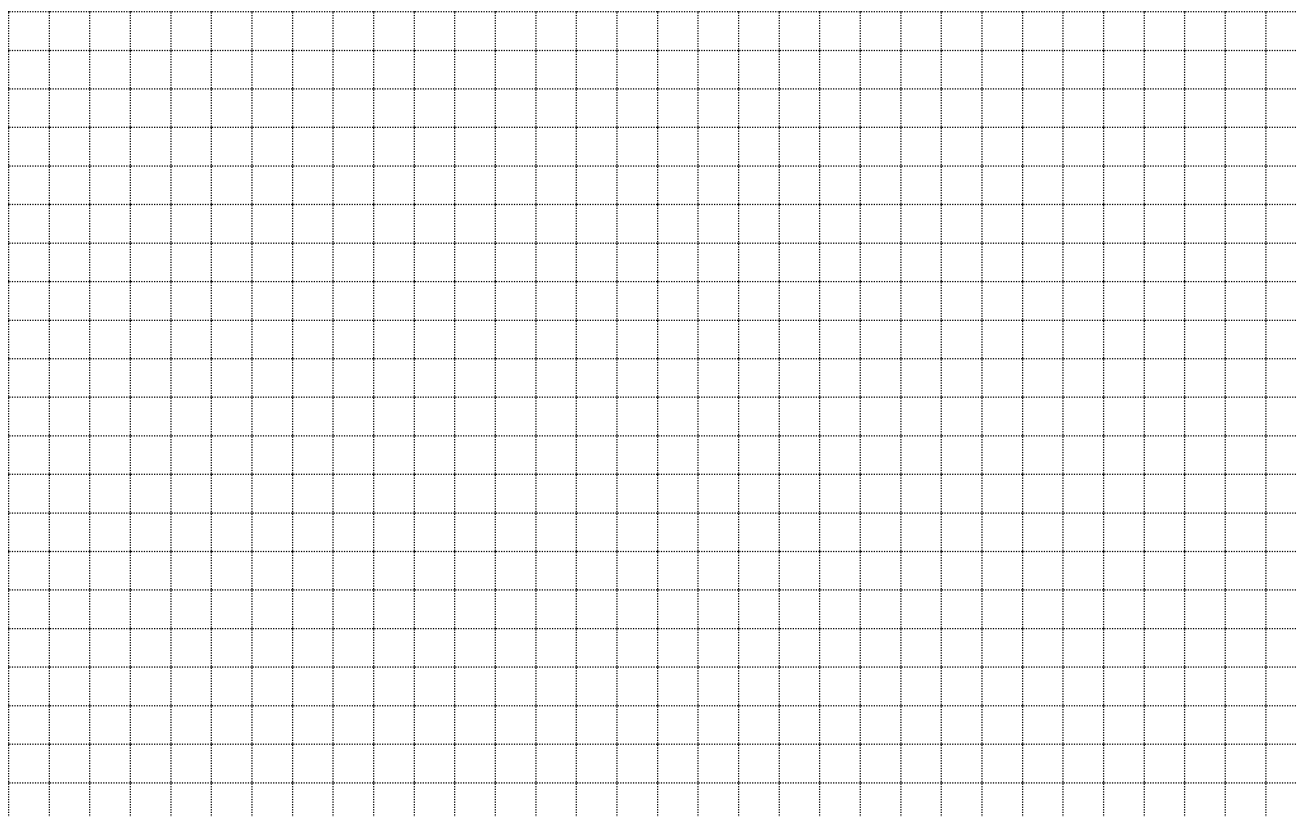
Tap water consumption varies greatly from region to region in Belgium. Average water consumption is also very different in other countries (see 'Water consumption in Europe' p.17).



Table 2: Average tap water consumption [5]

Family size/number of inhabitants	Average tap water consumption per year	Average tap water consumption per domicile per year	Average tap water consumption per domicile per day
1	39 m <sup>3</sup> /jaar	39 m <sup>3</sup> /jaar	108 liter/dag
2	66 m <sup>3</sup> /jaar	33 m <sup>3</sup> /jaar	90 liter/dag
3	94 m <sup>3</sup> /jaar	31 m <sup>3</sup> /jaar	86 liter/dag
4	115 m <sup>3</sup> /jaar	29 m <sup>3</sup> /jaar	78 liter/dag
5	137 m <sup>3</sup> /jaar	27 m <sup>3</sup> /jaar	75 liter/dag
Gemiddeld gezin: 2,3	74 m <sup>3</sup> /jaar	32 m <sup>3</sup> /jaar	89 liter/dag

Graph the water consumption per domicile per day from Table 2.



How would you explain that water consumption per domicile decreases with an increase in the number of domiciles in a household? In your explanation, refer to your graph.

You now have all the information you need to calculate how much you pay for water at home. Someone living alone pays 295 euros a year for tap water in Limburg, or on average 0.81 euros a day.

Complete table 3 for families living in Limburg and then calculate it for your family.

You can find all the info on the website of the Vlaamse Milieumaatschappij

<https://www.vmm.be/water/waterfactuur/prijzen-en-tarieven-gezinnen> or in figure 2 p.9.

You can also use proportions.

The VAT (tax) on water is 6% on the total amount (you may round off this amount).

*Table 3: Distribution of water costs by family size*

Family	Standing charge	Consumption	Drain	Treatment	VAT (6%)
1 person	80 euro	88 euro	64 euro	46 euro	17 euro
2 persons					
3 persons					
4 persons					
5 persons					
My home					

Present this data clearly in one or more graphs. You can make these graphs on (graph paper) or in Excel. Add the graphs on a separate page.

Formulate two conclusions from these graph(s).

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### 3. Save water

Saving water is a good idea both for our wallets and the environment.

By now, you know where a lot of water is consumed AND you know the price of water.

On average, we use about 110 litres of water a day. We use more than 70 litres of this for flushing the toilet and bath/shower.

Table 4 shows how much water each consumer item in the house consumes (on average).

If we want to save water, it's best to look at the biggest consumers.

*Table 4: Water consumption (in litres per day per person) per consumption item [6]*

Item	Litres per day per person
Bath / Douche	44
Toilet	30
Laundry	17
Dishwasher	8
Cooking	3
Cleaning	4
Garden	4

Suppose a single-person household that has only a shower, not a bath.

Table 4 shows that this shower consumes an average of 44 litres per day.

This person is considering replacing the regular shower head with a water-saving shower head to save water and money. How much such a water-saving shower head effectively saves depends very much on the type.

Let's assume that the water-saving shower head uses 20% less water. How many litres of water can you save with this on an annual basis?

Show your calculations.

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How many m<sup>3</sup> of water is this? Show your calculations.

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How much money can you save per year with this water-saving shower head?

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Knowing that this new water-saving shower head costs 50 euros, how long will it take you to recoup this investment?

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Would this investment be recouped faster or less quickly in a family with 5 people? Explain.

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Would you install a water-saving shower head at home?

Why or why not? Please justify your answer.

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Of course, you can save water in many other ways.

One of Greenpeace's tips is to put a stone in the sink of your toilet to reduce the number of litres of water you use per flush. This modification costs nothing, of course. Many toilets today are equipped with a economy button (small button). This one has a similar function.

How many litres of water could you save per year this way? Show your calculations.

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How much will you save on your water bill?

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Read Greenpeace's other tips for saving water on the following website:

<https://www.greenpeace.org/belgium/nl/story/9694/tips-hoe-kan-je-thuis-water-besparen/> /  
<https://www.greenpeace.org/belgium/fr/blog/9650/comment-economiser-leau-au-quotidien-7-astuces-a-appliquer-chez-vous/> / <https://www.nudgeproject.eu/7547/>

**ASSIGNMENT:**

Together we find a common target. Discuss with your classmates what behaviours you see together you could change to reduce your water consumption. What is achievable for everyone? How will you measure and track this? How can you convince each other? Write down here your joint target and how you will try to achieve it. Note, formulate this SMART (specific, measurable, acceptable, realistic and time-bound).

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Personal target: In addition, write down three personal goals (SMART) that you can achieve at home to reduce water consumption and note how you can motivate your housemates to join in.

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# WATER CONSUMPTION IN BELGIUM

## 1. Water consumption in Flanders

When we add up the water consumption of all Flemings, we are talking about a huge consumption. In 2019, we collectively consumed about 350 million m<sup>3</sup> of tap water!

Fortunately, there is clearly a decreasing trend when we look at the consumption of tap water over the last 20 years (see figure 3).

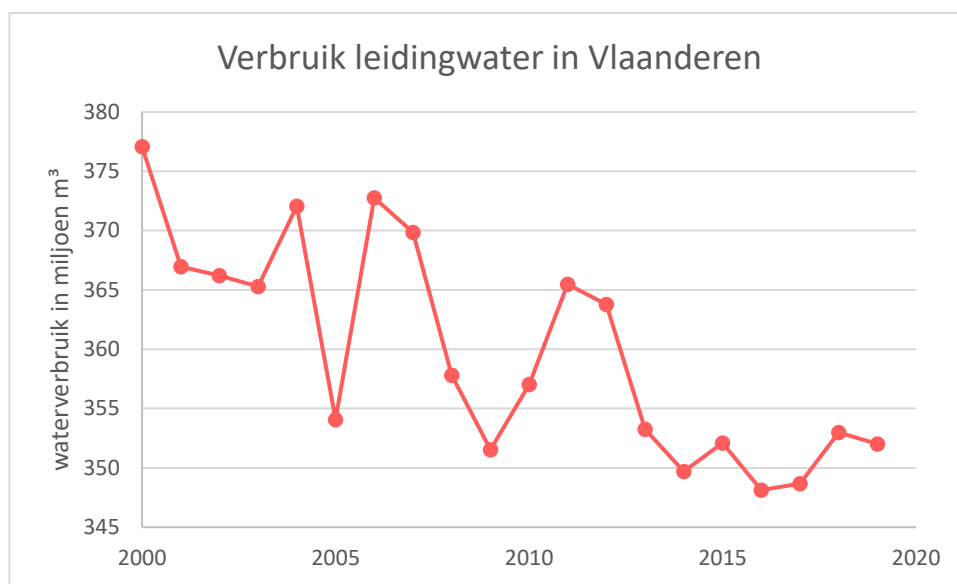


Figure 3: Tap water consumption in Flanders [7]

One of the factors that can explain the decrease in tap water consumption is the mandatory installation of a rainwater cistern since 2004.

On the graph in Figure 4, you can clearly see that since 2004, rainwater consumption has been increasing. More and more people use rainwater for flushing the toilet, watering plants, etc.

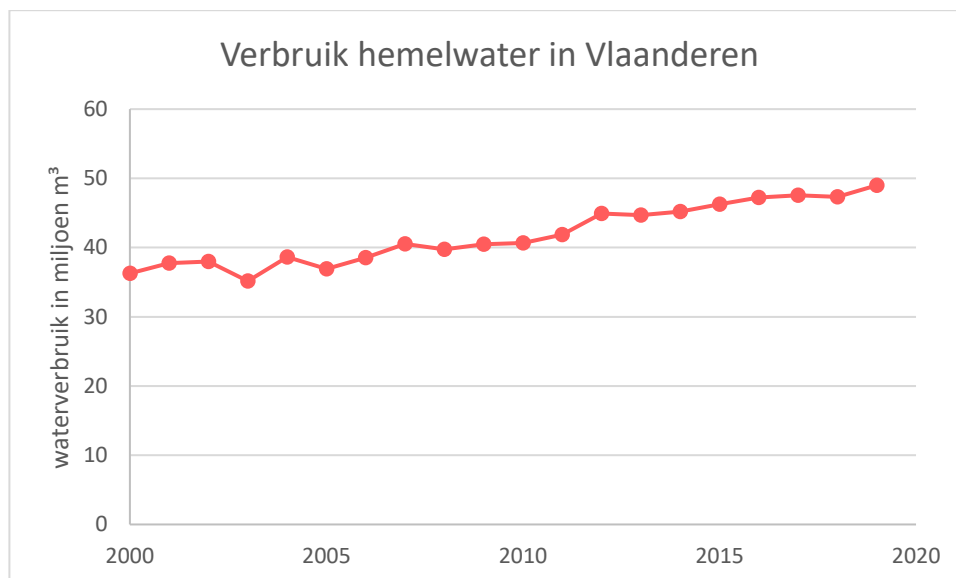


Figure 4: Rainwater consumption in Flanders [7]

Can you think of another reason why tap water consumption has been falling in recent years?

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## 2. Water consumption in Wallonia

We have seen that this price depends on where you live in Flanders. Drinking water supply is a municipal competence. Often municipalities work together. Water management has been a regional competence since 1980. The water bill in Wallonia therefore looks different from that in Flanders.

### Challenge: Water-l'eau – French

Do households in Wallonia consume as much, more or less water than in Flanders?

How is the price of water determined in Wallonia?

Explain in French how water bills differ in Wallonia and Flanders.

You can find lots of information at: <https://www.swde.be/fr>

## WATER CONSUMPTION IN EUROPE

Water consumption not only varies by region in our country, there are also large differences in household water consumption between European countries.

The overview map in Figure 5 clearly shows that water consumption is lower in Eastern Europe than in Western Europe. The differences are very large. From about 60 litres per person per day in Slovakia to more than 200 litres per person per day in Italy and Portugal.

In Belgium, we clearly consume less water than in our neighbouring countries.

### WATER CONSUMPTION HOUSEHOLD

Litres per person  
and day



Data: EurEau, 2020  
Infographic: Hidrología Sostenible



Figure 5: Household water consumption in Europe [8]

Can you explain these big differences in water consumption?

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The price of water also varies greatly from country to country. If we take into account the price of other goods (average price to live), we see that water is more expensive in northern Europe than in southern Europe.

## AVERAGE WATER PRICE

Modified according to the cost of living adjusted to UK



Figuur 6: Prijs water in Europa [8]

Can you explain these big differences in price?

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### Challenge:

Suppose you are the boss of our country. (Yay!)

How would you make people use water more carefully?

Make a plan and present it to your class!

## HOME ASSIGNMENT

- Write down the state of your water counter after this lesson (in EnergyID or your water counter).
- Try to use water as economically as possible for one month according to your formulated goals. Discuss your goals with your family members.
- After this month, record your water counter reading again (in EnergyID).
- Compare your consumption this month with your average monthly consumption in previous years.

Do you see a difference?

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Write down a quiz question on water consumption with four answer options and hand it in the next lesson.

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## REFERENCES

- [1] <https://www.dewatergroep.be/nl-be/over-de-watergroep/wat-doen-we/historiek>
- [2] <https://www.vmm.be/water/waterfactuur/prijzen-en-tarieven-gezinnen>
- [3] <https://www.vmm.be/water/drinkwater/kaart-waterbedrijven-vlaanderen.png/view>
- [4] <https://www.dewatergroep.be/nl-be/drinkwater/tarieven>
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