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*Waarom geen einde maken aan de progressieve tarifiering voor water in Brussel?
Pourquoi ne pas en finir avec la tarification progressive de l'eau à Bruxelles ?*

Xavier May, Pauline Bacquaert, Jean-Michel Decroly, Léa de Guiran, Chloé Deligne, Pierre Lannoy and Valentina Marziali

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*Waarom geen einde maken aan de progressieve tarifiering voor water in Brussel?
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AUTHOR'S NOTE

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- 1 As underlined in a UN resolution adopted unanimously by the General Assembly in December 2013, the right to safe and clean drinking water is a fundamental right and a prerequisite for the realisation of all human rights. The issue of price and the fixing of a price scale for this commodity partly determines effective access to it for households.
- 2 In view of the precarious existence of the Brussels population (1/3 of the inhabitants of Brussels live on an income below the at-risk-of-poverty threshold¹) and the fundamental importance of water for everyone, the cost of water must be as low as possible, while guaranteeing the viability of the system and a fair and equitable pricing scheme. In this article, we look specifically at water pricing.
- 3 Before 2005, water pricing in the Brussels-Capital Region was linear: the price per additional cubic metre of water was the same regardless of the total volume consumed. On 1 January 2005, a tiered pricing scale known as “solidarity pricing” was introduced. It is based on the principle of an increase in the price of water according to the total volume consumed per person, in four bands (called vital, social, normal and comfort). In other words, the higher the water consumption per person in a household, the more expensive the cubic metre of water.

- 4 This tiered pricing system was introduced with two commendable intentions (art. 39/2 of the Order of 20 October 2006). On the one hand, it had to have a social impact by allowing the most disadvantaged people to access a quantity of water which would cover their vital needs at a reduced price. Furthermore, the legislator made the assumption that privileged households consume more water than disadvantaged households, and that the former would therefore contribute more towards the cost of the water supply and sanitation service. On the other hand, tiered pricing was supposed to have an ecological virtue by encouraging households to use less water by means of the price signal.
- 5 Although tiered pricing is based on essentially commendable intentions, it is nevertheless important to examine the validity of its underlying hypotheses and, above all, the effectiveness of the social and environmental impacts it strives towards. In this perspective, this article pursues four complementary objectives. Firstly, we seek to determine whether low-income households actually consume less water than other households. Secondly, we analyse the link between the price of water and water consumption. Thirdly, we identify a number of practical disadvantages related to tiered pricing. Finally, we present a review of tiered pricing in Brussels. To conclude, we propose some considerations for the implementation of a new pricing scheme by 1 January 2022.

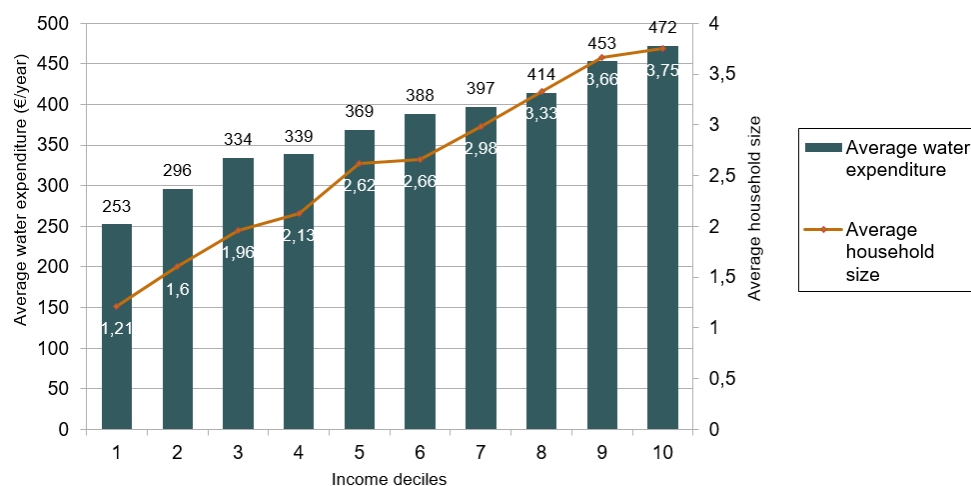
Data

- 6 The data on water expenditure and income are taken from the Belgian SILC (Statistics on Income and Living Conditions) survey.² In Belgium, it is conducted annually by Statbel, the Belgian statistical office. It only concerns private households included in the National Register: collective households such as residences, rest homes, prisons, religious communities, etc. are not taken into account. In 2017, 6054 households participated in the survey, including 1076 households in Brussels. These surveys are usually conducted face-to-face. The questions about water are related to expenditure and not to the volume consumed.
- 7 By water expenditure, we are referring to the amount paid periodically by a household for its water consumption. This may be an actual water bill payable to the water distributor, or a payment made to the person responsible for the water meter (e.g. the landlord, the property agent, etc.) in the case of a shared meter.
- 8 In the Brussels-Capital Region, almost two thirds of households are supplied by a shared meter³ and the amount paid is not always an accurate reflection of their actual consumption (for example, in the absence of a submeter or in the case of a flat-rate payment for water to the owner of the dwelling).
- 9 30 % of households in Brussels did not answer the question regarding the amount of their water expenses, whereas only 10 % of households in Belgium as a whole did not. This high non-response rate in Brussels is probably related to the predominance of shared meters, which implies that many households do not receive a water bill. The figures for Brussels are therefore less accurate.

No link between wealth and water expenditure

- 10 In order to show the assumed relationship between income and water expenditure, a graph similar to Figure 1 is often used, which shows average household water expenditure according to income decile. This figure refers to Belgium as a whole, as the Brussels sample is too small to allow a relevant calculation of the average water expenditure per income decile.

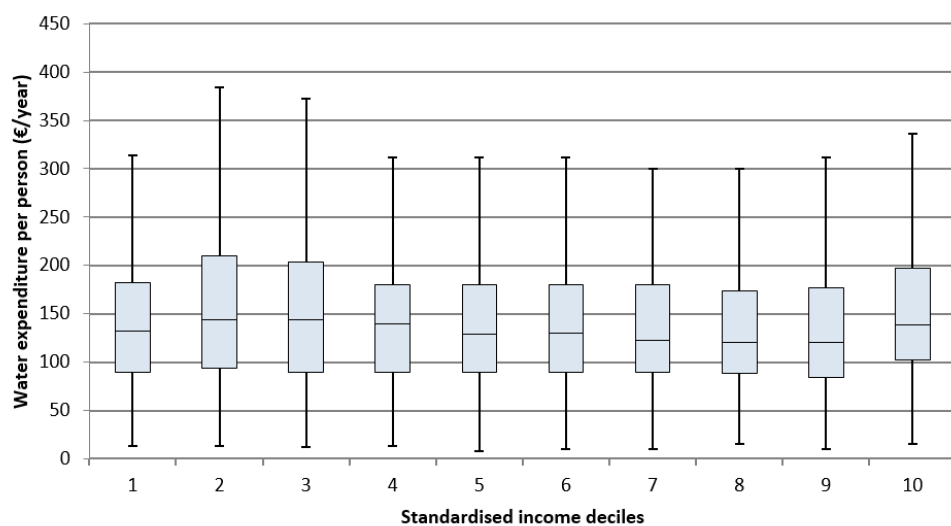
Figure 1. Average household water expenditure according to income decile (Belgium, 2017)



Source: SILC (2017)

- 11 Although water prices vary according to the region and the supplier, the graph shows that the average water expenditure increases with income. At the same time, it clearly shows that household size also increases with income: households in the first decile are comprised of 1,21 people on average, compared with 3,75 people for those in the tenth decile, i.e. a ratio of 1 to 3,1. This second relationship, which is often overlooked in the analysis of social inequalities, is nevertheless logical. Indeed, all other things being equal, the larger the household, the more adults who are likely to receive an income, and the more children who give the right to a family allowance. Finally, it is logical that larger households consume more water than smaller ones and therefore have higher water costs, as expenditure and consumption are closely linked.
- 12 In order to have a more accurate idea of the link between income and water expenditure, income which takes into account the household composition should be considered rather than the total household income. An income of €3 000 has very different implications depending on whether a household consists of a single person or a couple with three children. This is why the concept of standardised income is often used, which takes into account the number of people in the household and their respective age groups. Standardised income is the total household income divided by the number of household members converted into modified consumption units (or adult equivalents). Modified consumption units are 1 for the first adult, 0,5 for anyone aged 14 and over and 0,3 for children under 14 (modified OECD scale).

Figure 2. Box plot of water expenditure per person according to standardised income deciles (Belgium, 2017)

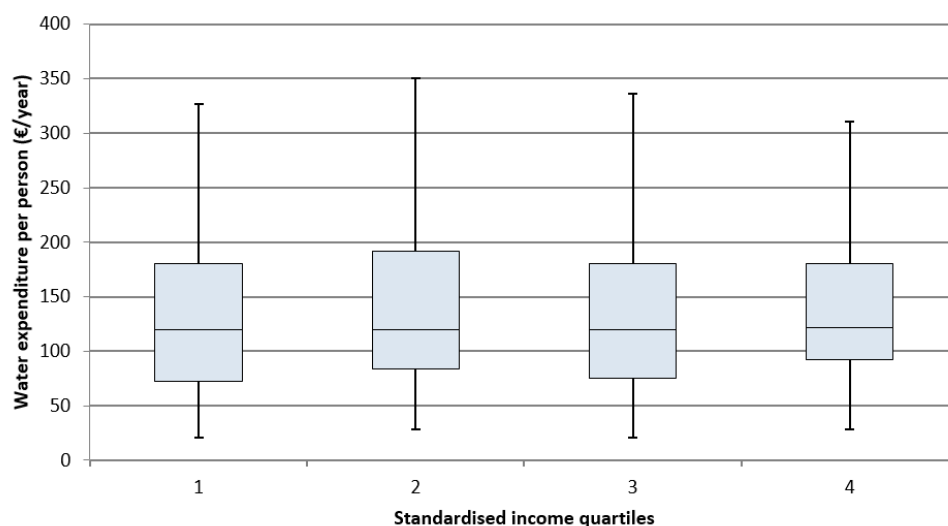


A box plot is a graphical representation which shows the first quartile (lower part of the box), the median (the line in the middle of the box) and the third quartile (upper part of the box). The ends of the lines show the minimum and maximum values (excluding any extreme values). The width of the box is of no significance.

Source: SILC (2017)

- 13 When we analyse the average household expenditure per person based on standardised income and not on income, the picture changes significantly. Figure 2 shows that water expenditure per person is stable from the 1st to the 10th decile of standardised income: in Belgium, the disadvantaged do not spend less on water than the privileged. The same is true for Flanders and Wallonia separately. Figure 1 is therefore misleading as regards the relationship between wealth and water expenditure.
- 14 For Brussels, the same exercise can be carried out but only according to standardised income quartiles due to the significantly smaller sample size (see Figure 3). Here too, water expenditure per person is stable from the 1st to the 4th standardised income quartile, which contradicts the frequently heard claim that disadvantaged households consume less water.⁴

Figure 3. Box plot of water expenditure per person according to standardised income quartiles (Brussels-Capital Region, 2017)



Source: SILC (2017)

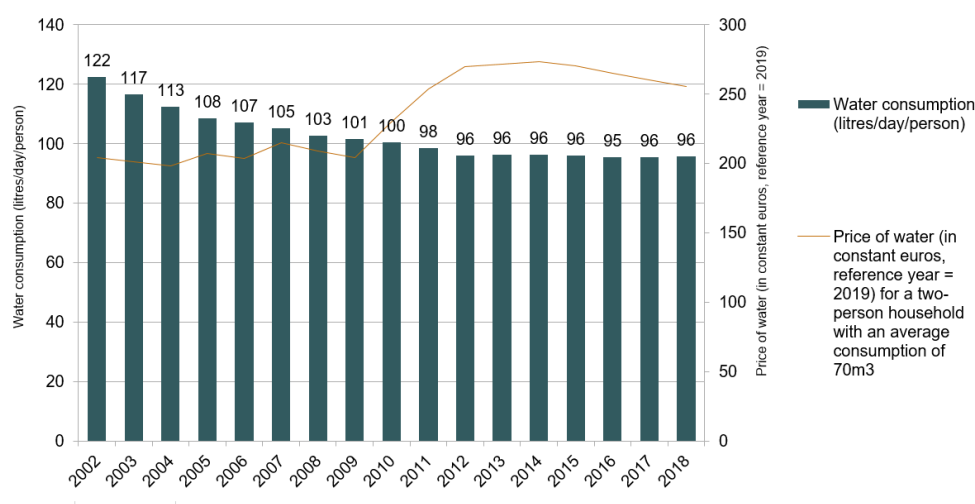
- 15 It is therefore wrong to assume that tiered pricing benefits low-income households. It benefits households which consume little water (per person), but these households are found in both the low- and high-income brackets. “Solidarity” pricing therefore shows no solidarity, and it is not social either, as it does not favour low incomes. There is therefore no evidence that privileged households contribute more than disadvantaged households to the financing of the water supply and sanitation service.

An uncertain link between water prices and water consumption

- 16 A second important question is whether tiered pricing actually encourages households to use less water. In other words, is the ecological argument valid? Does paying more for water when using more water really encourage households to reduce their consumption?
- 17 The relationship between the price of water and the quantities consumed by households is an issue which has been widely debated in the literature. A recent study coordinated by the European Environment Agency [Dige *et al.*, 2017] covering eight European countries⁵ concludes that, in five of the eight countries studied, a change in the price of water does not appear to have a significant impact on the quantity of water consumed by households. The study concludes that “*the evidence on the real incentiviveness of existing tariffs for a more efficient water use is scarce, if available at all. And the relation between pricing mechanisms and their effects on water demand is often unclear [sic]*” [Dige *et al.*, 2017: 68].
- 18 In the Brussels-Capital Region, there has been a drop in domestic water consumption per person since at least 2002, when a methodological change was made in the estimation of consumption (see Figure 4). Significant decreases in domestic water consumption took place before 2005 – the year in which tiered pricing was introduced – while prices remained stable. The decrease in average consumption then continued

until 2012, when consumption stabilised at 96 litres/day/person. Yet between 2009 and 2012, the first significant increase in the price of water was recorded. One would therefore have expected a decrease in household water consumption after 2012 if the price had had an impact on water consumption, but this was not the case. Therefore, at the aggregate level, there is no apparent link between household water consumption and price changes.

Figure 4. Evolution of average domestic water consumption per person in Brussels and prices for the standard consumption of 70m³ for 2 people (2002-2018, in constant euros)



- 19 Moreover, the observed decrease in water consumption by Brussels households is not an isolated phenomenon. This has been documented for Flanders [Vlaamse Milieumaatschappij, 2020] and for several European countries [Prevedello, 2014] since the early 1990s. Yet all of these countries or regions have followed different pricing policies. This would indicate that the decrease in consumption is likely to be due to factors other than the price of water, such as the availability of increasingly water-efficient fittings. Low-flush toilets in particular have contributed to the reduction in household water consumption [Vlaamse Milieumaatschappij, 2018]; [Grafton *et al.*, 2011]. There have also been improvements in the performance of washing machines, dishwashers and water-saving shower heads, as well as changes in habits (showering rather than bathing), water-saving campaigns and the use of rainwater tanks.
- 20 Compared with the other two regions of the country, Brussels has a uniquely urban and dense habitat with more blocks of flats and fewer single-family houses. As a result, almost two thirds of households are supplied via a shared water meter and therefore do not receive a bill from the intermunicipal water distributor. In this case, payment is made on the basis of a deposit or a flat rate established by the person responsible for the water meter (often the landlord or the property agent). For practical reasons, it is very often impossible for this person to apply tiered pricing (absence or lack of precision of submeters, lack of knowledge of the number of people living in the building, removals, complexity of the calculations, etc.), and he or she must therefore decide on a formula to divide the bill between the various occupants. Therefore, in practice, tiered pricing does not exist for the majority of households.
- 21 Furthermore, according to the SILC survey (2017), 30 % of Brussels households are not able to provide an estimate of what they spend on water. For these households, it is

unlikely that tiered pricing or, more generally, the price of water would have an incentive effect on their water consumption.

- 22 Consequently, in view of the above, it is doubtful that tiered pricing has played a significant role in reducing the water consumption of Brussels households, which is already very low compared to other European cities.⁶

The disadvantages of tiered pricing

- 23 In the Brussels–Capital Region, tiered pricing takes into account the number of people registered in the household; this makes sense, otherwise large households would pay a higher price for water as they consume more of it. This pricing scheme therefore requires knowledge of the number of people living in a dwelling. To estimate this number, the intermunicipal company Vivaqua (which produces and distributes water) uses the information contained in the National Register.
- 24 In its practical application, tiered pricing raises at least five issues.
- Almost two thirds of Brussels households are currently supplied via a shared water meter. A bill is therefore established for each household by the person responsible for the meter. In practice, the shared bill is often divided either on a flat-rate basis or on the basis of submeters. Pricing is therefore not tiered but arbitrary, as households using a shared meter pay for water according to the consumption of the other households: the higher the group's consumption, the higher the average price per cubic metre of water for all occupants. This is all the more true in the case of a leak or defective fittings in one of the dwellings using the shared meter;
 - Tiered pricing takes into account the number of people listed in the National Register and not the actual number of people living in a dwelling. However, there may be a substantial difference between the number of people listed in the National Register and the number of occupants. Examples of this include the temporary accommodation of additional people, students living elsewhere than at their home address, children living with the other parent in the event of separation, foreigners not listed in the National Register, people moving, etc. In many cases, tiered pricing is a strong disadvantage (advantage) to households as they pay a higher (lower) average price for water than they should do. This is especially true when residents are not registered as living in the building they live in and there is a shared meter: all households pay a higher average price per cubic metre of water;
 - In the case of leaks or faulty installations, this type of pricing structure leads to an even higher bill. In 2020, the fourth price band was almost four times more expensive than the first and almost 2,5 times more expensive than the price of water for the average consumption. Yet the most disadvantaged households – which live in rented dwellings in the vast majority of cases – have poorer quality housing and fixtures and have fewer opportunities to carry out works allowing them to save water;
 - It is well documented that small households, and in particular people who live alone, have a higher water consumption per person than larger households. According to the Vlaamse Milieumaatschappij [2018], this is due to the fact that it is less common for them to have a low-flush toilet, they are at home more and they use more water for washing (less frequent availability of a shower and longer duration of showers when there is one). Furthermore, fittings are replaced at a higher rate as the size of the household increases.⁷ This phenomenon is also observed in the Brussels Region, where people who live alone spend more on water than other households do.

Figure 5. Median water expenditure per person per year according to household size (Brussels, 2017)

Size of household	Median water expenditure per person (in €)	Sample size / 6 or more
1	204	240
2	150	205
3	120	107
4	90	135
5	89	48
6 or more	82	39

Source: SILC (2017)

In 2019, 46 % of Brussels households were made up of one person, and 23 %, of two people.⁸ These small households are paying more for water and contribute more to the financing of the water service in Brussels.

- Tiered pricing creates billing problems where a building has a shared boiler. If the boiler is supplied via a separate meter (possibly at a linear rate), households are supplied via two different meters, which artificially reduces their consumption and the price they pay for water.

Tiered pricing thus has many disadvantages with obvious implications in terms of equity.

What conclusions can be drawn from tiered pricing?

- 25 For the consumer, tiered pricing does not appear to have any of the virtues cited at the time of its implementation: it is neither social nor ecological. In contrast, it has many disadvantages, all the more so in the Brussels context where there are fewer single-family houses and where almost two-thirds of households are supplied via a shared meter.
- 26 Ultimately, tiered pricing favours larger households (which consume less water per person on average) to the detriment of smaller ones. Furthermore, with the fixed service fee per dwelling, small households are penalised a second time, as the same fee is paid regardless of the number of inhabitants (and therefore the number of income sources).
- 27 From the point of view of the intermunicipal water company Vivaqua, the tiered pricing system entails more management costs, as the number of inhabitants must be determined for each meter based on the National Register. In particular, in the case of shared meters, each meter must be linked to the households and registered residents it supplies. This operation can be tricky in some buildings: Brugel (the Brussels water and energy regulator) and Vivaqua do not count the same number of housing equivalents in the Brussels-Capital Region.⁹ It is therefore easy to imagine that mistakes can be made.

- 28 In view of the above, one may wonder why the tiered pricing system has been continued in Brussels. In reality, it is being continued only partially, as in the end, the Brussels legislator has decided to abolish tiered pricing in 2022 for households which depend on a shared meter.¹⁰ From this date onwards, pricing should therefore still follow a tiered system for individual meters and become linear for shared meters, which at first sight might seem to be a step in the right direction, but which in fact leads to unfair treatment. What is the rationale behind paying a different price for the same quantity of water, depending on whether a shared meter or an individual meter is used?
- 29 Moreover, in its methodology note setting out the future price methodology (initially planned for the 2021-2026 period), Brugel, which controls the price of water, mentions that *“the linear domestic price will correspond to the average price increased by an amount in order to finance part of the ‘vital’ band”*,¹¹ the “vital” band being the first band of the tiered pricing intended for individual meters. In other words, the tiered pricing for individual meters is to be financed by the linear pricing for shared meters. This seems difficult to understand, especially as lower quality housing is more likely to have a shared meter. The most disadvantaged households (which live in lower quality housing) will therefore pay more for water in order to finance the water bills of households with individual meters.

Which pricing scheme should be prioritised?

- 30 We believe that it is preferable to adopt a water pricing scheme which does not depend on the number of people living in a dwelling. In a city like Brussels, there are many reasons why the number of people listed in the National Register may not be in line with reality (frequency of moves, presence of non-registered foreign populations, students not living at their home address, alternating custody of children, accommodation of additional people, etc.). For this reason, linear pricing is an interesting solution and has the following advantages with respect to tiered pricing:
- Linear pricing reduces the problems of shared meters. If there is a functional submeter, water expenditure no longer depends on the volume of water consumed by the whole building: one pays for what one consumes. If there is no submeter and the person responsible for the meter uses a formula to divide the water bill, households are penalised less in the event of a leak or excessive consumption by a neighbour;
 - In the event of a water leak, a household is forced to pay large sums to the distributor but is not subject to a rate which is as high as the last band of the tiered pricing. The problem of leaks is more common in poor quality housing. Vivaqua does have a leakage price, but it is only available under certain conditions which are not always easy to meet, requiring administrative procedures which can be an obstacle for people in precarious situations;
 - Smaller households, especially people who live alone, consume more water per person on average and have lower water costs under linear pricing than under tiered pricing. There is, in our view, no reason to make small households contribute more to the financing of the water service;
 - Linear pricing solves the problem of households being supplied with water via two different meters (e.g. in the case of a building with an individual cold-water meter and a shared boiler for hot water). In such a case, if the individual meter is subject to tiered pricing, the household will have a lower consumption and will benefit unfairly from a lower water price;

- Linear pricing reduces management costs for the intermunicipal water company, which in principle allows it to reduce prices for consumers.
- 31 Given that disadvantaged and privileged people consume the same amount of water, linear pricing does not show less solidarity than tiered pricing: on the contrary, many disadvantaged households are impacted negatively by tiered pricing (lower quality housing, older fixtures which consume more water, more frequent leaks, problems with legal address, moving house frequently, etc.). Similarly, there is no evidence that households would behave less ecologically with linear pricing, as price does not seem to have a significant impact on water consumption.
- 32 As pricing will become linear for shared meters from 2022 onwards, this seems to us to be an opportunity to implement this type of pricing for all households in Brussels, regardless of the type of water meter used in a dwelling.
- 33 In conclusion, we also believe that it is preferable to avoid offering households free cubic metres of water, as recommended by a recent French bill¹² and by certain associations,¹³ for two reasons. Firstly, even with a linear pricing system applied after a free volume of water offered to households, the result is a tiered pricing system (the first few cubic metres have a very low average price, and as the consumption increases, the average price gradually reaches the price per additional cubic metre). On the other hand, in order to be fair, such a system would have to take into account the number of people in a household (it would be illogical to offer the same number of free cubic metres to a household of one person and to a household of five people) and the issues raised by the use of the National Register would be encountered once again.
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NOTES

1. See for example [Observatoire de la Santé et du Social de Bruxelles-Capitale, 2019: 17]
2. [Goedemé *et al.*, 2018] provides a description of the data contained in the Belgian SILC survey on water expenditure.
3. The 2015 activity report for Hydrobru (which later merged with Vivaqua) mentions that “Currently, only some 200 000 dwellings or occupancy units have individual meters. The remaining two thirds of the Brussels housing stock are supplied via shared meters” [Hydrobru, 2016: 9].
4. It is true that 30 % of Brussels households did not answer the question regarding water expenditure in the survey and that they are over-represented in the first two standardised income quartiles, but the income quartiles are defined without taking into account the (non-)response to the water question. In order for water expenditure to be biased upwards or downwards in these first two quartiles, households which did not answer the question would therefore always have to consume more or less than other households in the same quartile. To our knowledge, there is nothing to suggest this.
5. Germany, Denmark, Spain, France, Italy, Romania, Sweden and Cyprus.
6. International Water Association (IWA), Specific Water Consumption For Households For The Capital Cities, [Accessed 18/11/2020]. Available at: <http://www.waterstatistics.org/graph/19>.
7. See [Prevedello, 2015: 62, 111]
8. On 1 January 2020, Statbel counted 225,223 single-person households in the Brussels-Capital Region out of a total of 556,631 households.
9. In 2018, Brugel [2020b: 101] estimated the number of housing equivalents at 591 127 units, while Vivaqua counted 575 157 units.
10. See art.19 of the Order of 16 May 2019 amending the Order of 20 October 2006 establishing a water policy framework.
11. [Brugel, 2020a: 38]
12. Draft law No 3451 aimed at effectively guaranteeing the right to water by establishing free access to the first volumes of drinking water and access for all to

water for the needs required for life and dignity; registered at the office of the President of the National Assembly on 20 October 2020.

13. For example, the *Association des Usagers de l'Eau des Pyrénées-Orientales*.

ABSTRACTS

In 2005, the Brussels-Capital Region switched from linear pricing to progressive pricing per person because the latter was supposed to be social and ecological. We show that poor households do not consume less water per person than rich households in Belgium and Brussels. Tiered pricing therefore does not benefit poor households and is not social. We also point out that there is no evidence that progressive pricing has encouraged Brussels residents to reduce their already low water consumption. It would therefore not be environmentally friendly either. On the other hand, progressive pricing has a number of disadvantages and leads to serious problems of equity. We therefore advocate a return to linear water pricing for all in Brussels.

In 2005 is het Brussels Hoofdstedelijk Gewest overgeschakeld van een lineaire tarifiering voor water naar een progressieve tarifiering per persoon, omdat zo'n progressief tariefbeleid sociaal en ecologisch zou zijn. Wij tonen aan dat arme huishoudens niet minder water per persoon verbruiken dan rijke huishoudens in België en in Brussel. Een progressieve tarifiering is bijgevolg niet in het voordeel van arme huishoudens en is dus niet sociaal. Ook benadrukken we dat niets erop wijst dat het progressieve tarief de Brusselaars heeft gestimuleerd om hun reeds lage waterverbruik verder te verminderen. Milieuvriendelijker is het dus evenmin. De progressieve tarifiering heeft echter een aantal nadelen, met ernstige problemen op het gebied van rechtvaardigheid als gevolg. Wij pleiten er dan ook voor dat er voor alle Brusselaars opnieuw een lineair watertarief wordt gehanteerd.

En 2005, la Région de Bruxelles-Capitale est passée d'une tarification linéaire de l'eau à une tarification progressive par personne, car cette dernière était supposée être sociale et écologique. Nous montrons que les ménages pauvres ne consomment pas moins d'eau par personne que les ménages riches en Belgique et à Bruxelles. La tarification progressive n'avantage donc pas les ménages pauvres et n'est pas sociale. Nous mettons également en évidence que rien n'indique que la tarification progressive ait incité les Bruxelloises à réduire leur consommation d'eau, qui est déjà basse. Elle ne serait dès lors pas non plus écologique. Par contre, la tarification progressive comporte une série d'inconvénients et entraîne de sérieux problèmes d'équité. Nous préconisons dès lors le retour à une tarification linéaire de l'eau pour toutes à Bruxelles.

INDEX

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