

Analysis of the Introduction of Deposit Refund System in Slovakia

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What is the real price of deposit? This is the question that we were asked. Maybe this is how our presentation differs from the others today that talked mostly about why we need deposit systems, whereas our presentation looks at the costs and benefits of implementing such a system for our country.

So why and how are these topics relevant in our country? This is a photo from April 2018 of a river in the western part of our country, which, as you can see, is full of plastics, mainly, bottles. This picture kind of raised the public's awareness about the littering problem and also drove our Minister of Environment to conduct a study to look at the costs and benefits of implementing the deposit refund system in our country.

When we started to look at deposit refund systems, we went through the list of advantages of implementing such a system. DRS is a policy measure that is mainly used to reduce littering, to provide an incentive for higher recycling rates, and to achieve higher material quality. If the system is correctly designed, as is in the Scandinavian countries as well as Lithuania, and Estonia, then another advantage is that this system applies the producer pays principle. There are also some indirect advantages of this system which are mainly the benefits of saved energy, material conservation, and reduced CO₂ emissions from avoiding the conventional production of plastics and aluminum. And then there are the jobs created as a result, which was already mentioned today.

As for some of the disadvantages of DRS that are raised in public discussion, one is cost. It's well-known that DRS is much more expensive in comparison to current EPR schemes. Another disadvantage, according to the opponents, is reduced consumer convenience, since more effort is required. It is also said that DRS increases the cost of other collection schemes, because it removes valuable material such as PET and aluminum. It also places a limitation on the free international market because of the added security features and labeling that must be put on the containers. It's also worth noting that the deposit system is not a solution for municipal waste as a whole. These points give an idea of some of the opposition we are currently facing from the public. They say that it's not going to solve our problems, that it's not going to bring up our overall recycling rates since beverage containers only make up 2% of the municipal waste stream.

For the study, we looked at countries that already had deposit refund systems in place. We didn't want to re-invent the wheel, but rather learn from best practices in European countries like Norway, Sweden, Finland, and also Lithuania and Estonia. Since we already had a deposit refund system for refillable glass bottles in Slovakia, we decided, based on the practices of other countries, that we didn't want to change this system, and that we would focus our aim on one-way beverage containers (PET bottles and aluminum cans) only.

When we started the study, the main issues we encountered were data availability and quality. First of all, when you are trying to conduct such a study, you want to know how many PET bottles and cans are currently being placed on the market. This is something for which there is no evidence in our country, and so I had to estimate the number of these containers placed on the market each year using municipal solid waste data. The other important thing to know when conducting such a study is the number of shops or retailers selling the units, and we were provided with various numbers for this. There was also

the issue of determining separate recycling rates. In the current EPR system, they are only reporting the overall recycling rate for plastic and metal packaging, so we do not know exactly what the recycling rates are for PET bottles or for aluminum cans, so we had to estimate them. We estimate that it's currently around 62% for PET and maybe around 77% for aluminum cans, but this is just our estimate, it's not the exact number. There is also a lack of data on nationwide littering. A comprehensive estimate on nationwide littering pre-DRS is important, because you want to be able to assess how effective the system is at reducing litter, but we didn't have that.

This slide talks about some of the key features and characteristics of the DRS model we created, which was inspired by the Scandinavian model. As I've already said, the DRS would include only one-way PET bottles and aluminum cans. It would also include a central system operator responsible for coordinating all the activities and acting as a clearinghouse for all stakeholders, including retailers and producers. This central system would compensate retailers for their costs through handling fees. The system is financed by producers (the ones putting the containers on the market), so the polluter-pays principle is applied in this kind of model. There were also some features that differ from country to country. For the purposes of our modeling, we decided that the system would be voluntary for producers, with an environmental tax for those who don't join, similar to how it works in Norway or Finland. We also decided that it would be mandatory for retailers, but with an exemption for shops below 400m². Another decision we made was that the deposit rate should be determined by the central system and not by the government.

This next slide shows how the money and material flows in a deposit system. This is just to illustrate the fact that in this kind of system, the central system is the clearinghouse for the flow of deposits, so the deposits are in a kind of closed-loop. The central system also owns the material that's been recovered, so he is the one who is selling it to the recycling.

This slide shows the story of a bottle from a financial perspective. The system's revenues come from the sales of recovered materials and from unredeemed deposits. The costs of the system include the handling fees paid to retailers, transportation costs, costs of the sorting plant and counting centres, and also some administration costs. The difference between the costs and the revenues is covered by a so-called administrative fee paid by producers.

Here are the key parameters/assumptions we used for modeling purposes. First off, we assumed a 90% return rate, which is in line with the target rate proposed by the European Commission in their Directive. Looking at the data from other countries, we discovered that there is a strong relationship between the deposit amount and the return rate. So, based on this, we determined that if we want to achieve a 90% return rate, we should apply a deposit of approximately 12 cents per PET bottle and 10 cents per aluminum can. Based on data on the capacity of reverse vending machines and also sales data from different kinds of shops, we estimated that we would need approximately 2,000 reverse vending machines, which works out to around 1 machine for every 2,500 inhabitants. This seems to be in line with the experiences of other countries that we looked at. In Slovakia, we are currently placing on the market approximately 1 billion PET bottles and around 300,000,000 aluminum cans. In our modeling, we estimated that around 73% of all shops would participate in the system and collect empty container and that 90% of collection would be automated (meaning that the 90% of bottles would be returned via reverse vending machine), which is also the case in European countries with existing deposit systems. Another assumption we used in our modeling was that there would be an environmental tax of 24 cents per bottle/can (double the rate of the deposit) for producers who choose not to join the system, or for producers who do not achieve the target return rate. Regarding transportation, we calculated that in

Slovakia we would need 34 interim storage facilities and 1 counting centre and sorting plant where all these empty containers would be taken. So those are all the assumptions and parameters we used in our modeling.

Based on the assumptions and input settings outlined on the previous slide, we estimate that setting up a DRS in Slovakia would require 80 million euros in investments. This would include the cost of purchasing reverse vending machines, the establishment of the central system, as well as the costs for the sorting plant and counting centre. And then there would be the ongoing operating costs that would consist mainly of transportation costs (costs of transporting containers from the shops to the interim storage facility, and then from the interim storage facility to the sorting plant); retailer costs (costs associated with the additional labour required to collect and sort containers and for operating the RVMs; costs of buying the bags and stickers for collecting the bottles, etc.); and administration and other costs. Regarding the reverse vending machines, we calculated the costs using two price options, one from RVM Systems Company (in Norway), and one from Tomra. Based on our calculations of the costs using these two options, we chose RVM Systems Company, and this is the why we also propose that in the legislation, this company be the administrator of this system, because they will be providing the RVM machines and know the market best.

This slide shows the direct financial revenues of the DRS, which come from unclaimed deposits (15m euros, from bottles that were not returned by the consumer) and from the sales of recovered materials (PET [9m euros] and aluminum [4m euros]). For PET, we used the prices from our recycling facility and for aluminum we used international prices, so it is possible that these numbers are overestimated. As you can see, there is an annual loss to the system of 5m EUR; this amount is covered by producers or importers through administrative fees.

Apart from the direct costs and benefits just described, we have also tried to calculate the indirect costs and benefits of the deposit refund system. Regarding the impact on litter removal costs, we have estimated that it should result in a savings of litter removal costs of about 0.6 to 2.7 million euro. As I mentioned earlier, there is a lack of nationwide data on the rate of littering, so the data we used to come up with these numbers is from regional studies. We also calculated the estimated savings from reduced landfill disposal of residual municipal waste, which contains 0.5 to 1.5 percent PET bottles, and came up with 53k to 690k euro in savings. Another indirect benefit is increased employment (3.3mil to 4.8mil EUR), as well as energy, material and emission savings of 3mil to 11.6mil EUR. There are also indirect benefits that are difficult to quantify, for example improved aesthetics, lower load on ecosystems, and benefits to human health. While all three of these are benefits of DRS, there are currently no studies or supporting literature that we could use to somehow quantify these.

As for indirect costs of the system, there is the cost to the current EPR system. While it is true that the current EPR system would experience decreased collection costs (as a result of less material to collect), it would also see higher costs because it would receive less administration fees from the producers of those materials. The current EPR system would also lose the revenue of this valuable material. This means that they would have to raise the fees for other plastic materials, which I think makes sense because currently all plastic packaging—even non-recyclable plastic—in Slovakia carries the same producer fee, which is unfair for producers of PET packaging. The other indirect cost is the cost to consumers. Compared to the current EPR system, consumers will need to make more effort to recycle their empty containers. They will also need to make space in their homes to store empty containers in between their trips to the shop.

Here is where we are at now. We published our analyses in November. The legislation for the deposit refund system in Slovakia is also being prepared. We, as an institute, are participating in the working group; we are providing the comments and some of the results from our study but we are not telling them to do it “this way” or “that way”. There are ongoing meetings between the Ministry and different stakeholders such as the Association of Retailers, Association of Beverage Producers, and so on. And there is also ongoing public discussion.

This public discussion has raised a number of arguments against the deposit refund system, some of which were already mentioned today, but also some others. The first one is that the separation of other plastics will decrease as a result of the DRS. This was already mentioned, and is not the case according to Lithuanian research. Another argument that has been raised by the public is that EPR costs will increase. This is something that we acknowledge, and agree that probably, yes, this is the case. Regarding the third point, that the use of PET bottles and cans will decrease, I have spoken to several system operators about this, including Infinitum and Palpa, and they have all told me that refillable bottles are not replacing one-way beverage containers. So I don't think this has been an issue in countries with existing deposit systems. Some people are also saying that we should focus on the promotion of glass or refillable bottles instead of a deposit refund system. But I think these people are forgetting about the fact that the transport costs are much higher for returning glass bottles, and so on. Another argument raised by the public was related to frauds with empty PET bottles. Apparently, in Estonia, producers were placing empty PET bottles on the market and putting them into the machine just to collect the deposit. But I cannot imagine someone that would take a thousand bottles, go to the machine, and take the deposits back. The last argument is that “DRS is for rich countries,” but I don't think this is a very relevant argument because we have already seen this system function well in countries which are at the same economic level as Slovakia.

Thank you for your attention. You can find us on Facebook and LinkedIn. Also, the study and technical analysis I mentioned are available in English on the Ministry's website. Thank you very much.