

#ZeroWasteCities



# The Story of Prelog

The first Croatian city to prove that, if there is the will, change is possible.



Within just 5 years, the city of Prelog in northern Croatia has tripled the percentage of its separately collected waste. The city has reduced the amount of the mixed waste local residents produce to below 100 kg per capita, becoming a zero waste best practice in Croatia and beyond.

How did this happen, in spite of much criticism saying the set goals were unattainable and 'utopian' for the Croatian context?

The answer lies in quality cooperation between the NGO Zelena akcija / Friends of the Earth Croatia / Zero Waste Croatia, the city of Prelog and 11 other neighbouring municipalities (of different political affiliations) operated by the public company PRE-KOM from Prelog.

## About PRE-KOM

PRE-KOM is a public company for waste management in the city of Prelog and 11 neighbouring municipalities, totaling 40,210 inhabitants. At the heart of their success lies their persistence in the implementation of their established measures, coupled with clear set goals that were established well in advance of the start date and implemented together with the local community's support.

In 2019, PRE-KOM managed to separately collect 57.25% of municipal waste in 12 municipalities (Prelog 66.69%), where only 70 kg of mixed municipal waste (1) is produced per capita per year. PRE-KOM is committed to the goal of reducing that amount to below 50 kg and increasing separately collected waste to above 70% in all municipalities in the next few years.

### KEY FACTS

- Number of municipalities: **12** (2019 - up from just 7 in 2007)
- Total residents (2019): **40,210**
- Separately collected waste in 2007: **11%**
- Separately collected waste in 2014: **22%**
- Separately collected waste in 2019: **57.25%** (157 kg per capita)
- Bulky waste going to the reuse center: **12.75%** (27 kg per capita)
- Mixed municipal waste (2019): **30%** (70 kg per capita)
- Total municipal waste (2019): **227 kg** per capita (National average in Croatia of total municipal waste: 444 kg per capita)
- CO2 Emissions saving: compared with the national average for 2018, for every tonne of municipal solid waste generated in a year, Pre-Kom saved **192 kgCO2eq** (Kgs of carbon dioxide equivalent) (2).  
*Per tonne, this is the equivalent amount of CO2 emitted by driving a car for 766 kms (3).*

1: Waste not suitable for recycling

2: Emissions calculated using [Zero Waste Scotland Carbon Metric tool](#).

3: [Equivalent calculated using the EPA conversion tool](#).

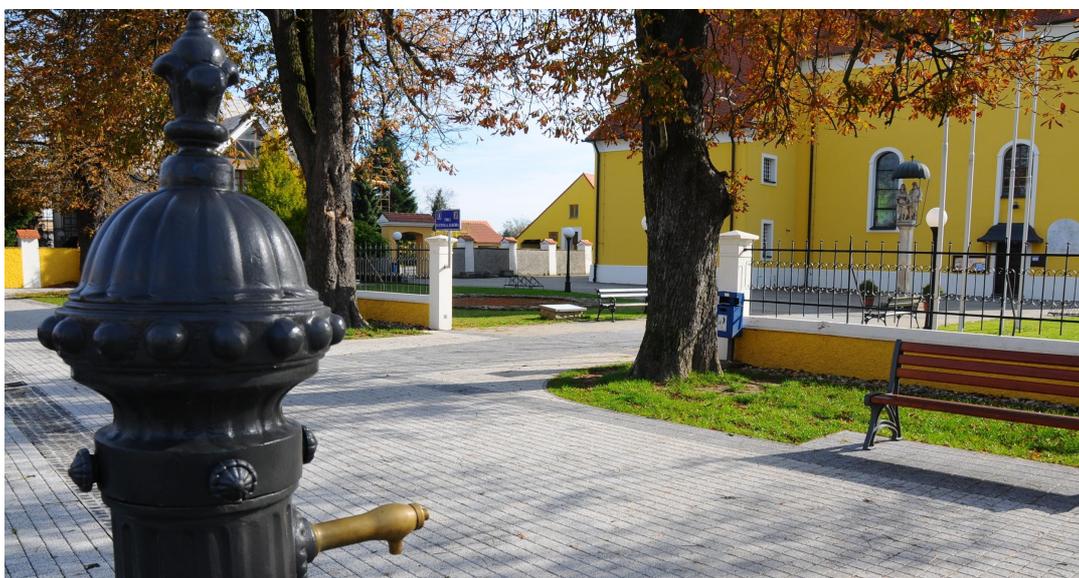
## National context

For the majority of Croatian municipalities, the current waste management system is largely based on the collection and disposal of mixed residual waste (70% on average), while separate collection systems often remain insufficient to meet European Union requirements. **The City of Prelog has been steadily improving their separate collection system for more than 10 years now, but it is only in the last 5 years that the city has become the leader for separate collection in Croatia.**

The national government has introduced further fees for municipalities who generate the highest volumes of waste. However, through the effective system developed by PRE-KOM, the municipality does not have to pay these fees.

Thanks to the excellent results in the separate collection system, supplemented by the construction of local waste management infrastructure, the city of Prelog has become a leading example showcasing that large regional centres for processing and incinerating mixed waste, imposed by the Ministry of Environmental Protection in Croatia, are not aligned with or support the achievement of the goals of a circular economy.

Therefore, together with local NGOs, the City of Prelog continues to slowly begin to change the national concept of waste management within Croatia, despite the strong resistance of certain interest groups and lobbies, insisting on continuing with the status quo of waste incineration.



Picture 1: Square in the city of Prelog. Medimurje, [www.medimurje.hr](http://www.medimurje.hr)

## Key factors of success

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### DOOR-TO-DOOR SEPARATE WASTE COLLECTION

In 2007, PRE-KOM started to introduce separate waste collection in 7 municipalities. The system of separate collection was based upon containers being located in public areas. In the following years, containers were removed from public areas and the old system was replaced **with door-to-door collection.**

Until 2014, mixed municipal waste was collected from citizens in 120-liter bins every 14 days and then sent to a regional landfill site. Dry recyclables (paper, glass, tetra pack, PET / plastic and metal packaging) were collected separately in bags once a month. Citizens had to call the local waste management company if they wanted bulky waste to be collected. This system was already quite advanced for Croatia since 5 dry fractions of waste were collected separately with a separate collection rate of 22%.

In January 2015, PRE-KOM supplemented its waste collection service and started separately collecting biodegradable waste from households using brown bins.

The collection was characterized by alternating a two-week collection of residual waste and biodegradable waste, with the collection of dry recyclables still once a month. This system proved its success very quickly, with PRE-KOM **jumping from 22% separate collection in 2014 to 49.5% in its 7 municipalities by the end of 2015.** Prelog had practically reached the recycling target set for Croatia by the EU 5 years before the deadline (2020), unlike the vast majority of other municipalities in Croatia which are still far from reaching this goal.

This system has been further improved in the following years. Currently, both paper and plastic waste are collected in blue and yellow bins in most households, and the plan is to replace bags with bins in all households during 2021 for all dry recyclables. In addition, 5 more surrounding municipalities have recognised PRE-KOM's efficiency in waste management and joined the PRE-KOM's system. **The number of municipalities managed by PRE-KOM has therefore risen from 7 to 12 municipalities.**

In all PRE-KOM municipalities, waste is collected at the doorstep of residents and businesses. This method of collection, in combination with a quality education programme, led to excellent results **in 2019 when the city of Prelog separately collected 66.69% of waste.** Whilst the average was 57.25% in all 12 municipalities operated by PRE-KOM. The success of PRE-KOM's system is highlighted by the fact that **10 out of these 12 municipalities are the most successful in the separate collection of waste in the whole Croatia.**

However, the company and its municipalities wish to go further and continually improve the system. For example, in 2019 PRE-KOM was the first company in Croatia which started a pilot project of separate door-to-door collection of waste oils, with the aim of converting this type of waste into new products, such as scented candles.



Picture 2: Containers for door-to-door separate waste collection in Prelog. - PRE-KOM, [www.pre-kom.hr](http://www.pre-kom.hr)

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## LOCAL INFRASTRUCTURE

Instead of waiting for the regional center for waste management to be built, which for many Croatian municipalities has and continues to take years, the city of Prelog and PRE-KOM decided to build their own local facilities to efficiently treat waste collected in the 12 local municipalities.

As part of a unique waste management system, PRE-KOM built a recycling yard of approximately 2000 m<sup>2</sup> size in the city of Prelog. The yard consists of boxes and containers where it can accommodate about 750m<sup>3</sup> of recyclable materials, as well as hosting a sorting plant for such materials and a reuse centre, RE-USE.

Furthermore, a “mobile recycling centre” was also developed to support those within these municipalities who could not travel to the recycling yard. In 2015, the sorting plant was improved by upgrading the technology it used. This improvement in capacity and efficiency led to a corresponding higher demand with more citizens recycling more.

Building on this success, PRE-KOM has just started a new project in September 2020 to build a recycling centre for construction waste, identifying this waste stream as a key priority to tackle as part of their zero waste strategy.

Considering the implementation of separate biowaste collection, there was an obvious need for a composting plant to be built in order to process the collected biowaste. Therefore, in April 2015 PRE-KOM opened a composting plant. In July 2020, PRE-KOM started a new project of equipping and modernising the composting plant, which will increase the capacity to 7,200 tons per year in order to process biowaste from other municipalities that didn't have a composting plant. This expansion shows the success and impact such composting plants can have, when an effective biowaste collection system is established, reducing the volume of residual waste significantly and saving carbon emissions from the landfilling or burning of such recyclable material.

Since January 2016, households with a brown bin have been receiving a coupon each year. The coupon is enabling them to receive two bags of compost from the composting plant free of charge, as a reward for their efforts to separate biowaste.

Another innovation in terms of waste management system was the opening of the first reuse centre in Croatia in May 2017, in order to efficiently manage bulky waste.

The most attractive part of the centre for customers, and key to its sustainable business model, is that all the products that are repaired are then sold at a price which covers the repair costs and labor.

Furthermore, for those who cannot travel to the centre itself, there is a the possibility to check available products online using the web app on the [website](#).



*For example, we have a lot of mattresses, and in each of them there are 7 to 15 kilograms of iron that we extract and reuse. The textile can also be reused and sent for processing. A lot of replaced carpentry ends up in the waste - in the processing, we cleaned the iron, aluminum, glass that went for recycling, and we crushed the wood and handed it over for recovery and plywood production. This way, we manage to save around 70 percent of bulky waste.*

Siniša Radiković, Director of PRE-KOM

Before the construction of the RE-USE centre, PRE-KOM first did some market researches and analysis to explore the demand for such products. One part of this research was an online auction of products taken from the bulky waste to test the interest in such items.

During the auction, all the repaired products were quickly sold, showing the high demand for buying refurbished and recovered products from local

citizens and therefore the ability for such a centre to be established within Prelog and the neighbouring area.

Finally, it must also be highlighted that PRE-KOM continues to invest each year in its fleet of vehicles for collecting waste. The purpose of this continued modernisation is to constantly increase the quality and volume of waste that is collected for recycling.

## KEY INFRASTRUCTURES NUMBERS

- The total value of the recycling yard project was 3,673,882.81 HRK, approximately 500,000 EUR.
  - The annual capacity of the sorting plant is 1500 tonnes per year in one shift, employing 15 workers working on two sorting lines at the time.
  - The total value of the project to build a recycling yard for construction waste is 4,177,315.84 HRK, around 550,000 EUR.
  - Construction and expert supervision of the Prelog Composting Plant was worth 3,018,361.69 HRK, around 400,000 EUR.
  - The capacity of the composting plant is 2000 tons of biodegradable waste per year, with an output of about 1500 tons of compost per year. .
  - The size of the RE-USE center is 440 m<sup>2</sup> and it consists of two parts: sales (220 m<sup>2</sup>) and the storage and workshop part (220 m<sup>2</sup>).
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## CREATE A FAIR BUT PROFITABLE PAY SYSTEM

In order to motivate citizens to properly handle and manage their waste, PRE-KOM has created a payment system that motivates citizens to reduce their amount of mixed waste and increase separation of recyclable materials.

The bill price is based on the 'polluter pays' principle: households producing less mixed municipal waste also have lower monthly bills.

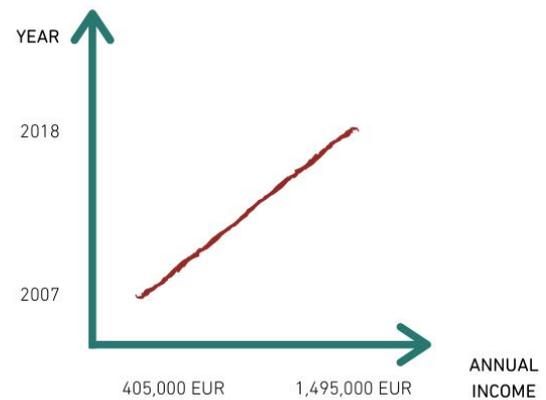
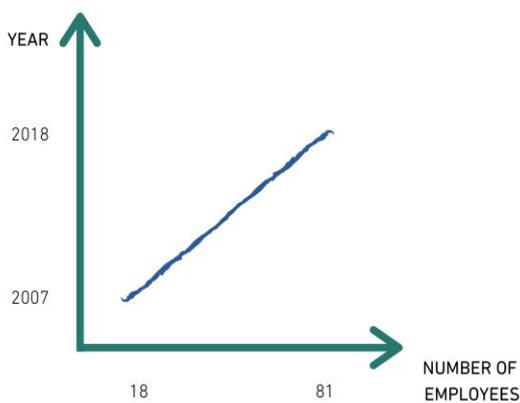
The price list was created according to the number of household members and the number of times the bin for mixed municipal waste has been emptied per month, taking into account the different categories of users who receive a discount on the service. For example, the service is 30% cheaper for users who don't use a brown bin but have their own compost systems for biowaste.

In addition, families with small children are offered 600 HRK (around 80 EUR) gift vouchers that can be used for the purchase of reusable diapers.

**The total price of the waste management service ranges between 4 and 11 EUR per month, and the average price of the service in 2019 was around 8 EUR per household.** This price is much lower than in many cities and municipalities in Croatia, with the price range up to 15 EUR, whilst offering a much better service to residents.

Furthermore, PRE-KOM as a business remains profitable if the target goals were reached for that year, with all the extra profit directed back into a reduction in costs for citizens. For example, in 2017 PRE-KOM could have provided households with one monthly bill of the amount of 0.00 HRK, as a reward to citizens for their efforts in separating waste. When speaking about rewards, it's worth repeating again that local citizens also get coupons for free bags of compost, as a reward for separating the biowaste.

## ECONOMIC GROWTH of PRE-KOM



Charts 1 and 2: The economic growth of PRE-KOM (number of employees & annual income).

The economic and business model of PRE-KOM is based upon a variation of factors that have fluctuated in recent years. For example, in recent years the market value of selling the plastic and paper recycling it collects has decreased, yet the company has saved costs by having to pay lower landfilling fees, given the decrease in mixed residual waste being generated. Furthermore, PRE-KOM generates income by composting biowaste from other municipalities who don't have composting plants.

In 2018, electronic identification of waste collection was introduced in order to further contribute to better regulation of collection and to provide electronic invoicing for users. Electronic identification monitors the time and locates the household where each bin is emptied, providing data that is up-to-date and accessible for residents, PRE-KOM and the municipality. Furthermore, from 2020, citizens can choose if they want their bills to be delivered to them by email in

order to avoid unnecessary paper waste.

When it comes to the supervision and control of enforcing proper separation of waste, PRE-KOM uses a warning system that gives yellow and red cards. The aim of the system is to warn users who have incorrectly separated their waste, letting them know of their mistake and the correct bin for each material. The system of penalties is only used in cases of multiple intentional mistakes.

Therefore, this proves that adopting a zero waste strategy is not only beneficial for the environment, but also for the local economy and business-model of waste management companies. The story of Prelog and PRE-KOM showcase how, with the right management system in place, waste can be reduced whilst saving costs, a win-win situation.

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## COMPREHENSIVE EDUCATION AND EFFECTIVE COMMUNICATION

PRE-KOM has been putting a lot of effort into communication activities within its 12 municipalities, with the aim of raising awareness about the importance and impact of sustainable waste management. Since the beginning of the separate collection system in 2007, citizen and business education was focused on the importance of proper waste separation, while in recent years it has progressed up the waste hierarchy to focus on waste prevention, encouraging citizens to reduce their waste by teaching them how to reuse certain products and how to effectively compost at home.

PRE-KOM provides comprehensive education for different generations. In addition to advertising materials, radio jingles and online discussions, it often holds in-person lectures and workshops for children.

There is a famous educational quiz for children named *"Do not hesitate, but separate waste"* (*"Ne dvoji, otpad odvoji"*) in which children can win valuable prizes by motivating them further to properly handle and reduce their waste.



Picture 3: Educational activities in Prelog's schools - PRE-KOM, [www.pre-kom.hr](http://www.pre-kom.hr)

The quiz has been successful in having a consequential impact on the wider families of these children. This success is visible not only through the increase of waste separation but also through the increase in goods purchased at the reuse centre.

Building on this, PRE-KOM is continuously educating and informing citizens also via their website and social media. In addition to that, in 2019 they developed a mobile app in which users

can see relative news about waste management issues and their waste collection calendars. App users can also report bulky waste, rather than having to call, and they can view available goods at the reuse center. Local media has also been used by PRE-KOM in order to amplify their message further to reach as many citizens as possible.



*PRE-KOM have shown that in a relatively short period of time, it is possible to create a good quality waste management system and become a good example for others. I am proud that Zelena akcija contributed to this success with its analysis. This shows that NGOs have relevant knowledge and that when the authorities are ready to listen to well-argued recommendations, significant results can be achieved. The success of PRE-KOM has been bad news for many groups that have been blocking improvements to the waste management system due to their interests in the trash business. It took courage to step in the direction opposite to the one taken by most municipalities and the Croatian Government.*

Marko Kosak, Coordinator of Zero Waste Croatia.

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## COOPERATION BETWEEN PRE-KOM AND ZELENA AKCIJA (ZERO WASTE CROATIA)

One of the key ingredients of the success of Prelog and its surrounding municipalities is the cooperation with Zelena akcija / Zero Waste Croatia. Zero Waste Croatia analysed PRE-KOM's system of waste management and gave recommendations and goals, which formed the basis of their zero waste strategy. Although PRE-KOM was initially a bit sceptical at the beginning, they decided follow Zero Waste Croatia's recommendations and very soon they were able to witness the excellent results that came as a result of this successful cooperation.

The cooperation started in 2015 when Zero Waste Croatia conducted a research analysis of the current waste management system and gave recommendations for future development to optimise the system. These recommendations were based upon the principles of zero waste, with the aim for PRE-KOM of achieving zero waste goals in reducing waste generation, as well as in prevention via key reuse, recycling and composting methods.

Research showed that by implementing the proposed measures by Zero Waste



Picture 4: Municipalities officials signed Zero Waste Strategy in Prelog - PRE-KOM, [www.pre-kom.hr](http://www.pre-kom.hr)

Croatia, municipalities operated by PRE-KOM would achieve a cumulative result of 70% of separate collection by 2020 and reduce the amount of disposed mixed waste below 100 kg per capita.

Following these recommendations, PRE-KOM is today close in achieving the set goals, which are the goals that Croatian municipalities have for 2030, so 10 years ahead of the deadline.

Municipalities operated by PRE-KOM subsequently joined the Zero Waste Cities programme, operated by Zero Waste Europe, when they accepted the proposed goals by Zero Waste Croatia and began implementing the proposed measures. They became part of the network in February 2016 and since then the region is used as a successful model for the organisation of waste management systems in most parts of the Republic of Croatia. In 2016, a zero waste conference was organised in Prelog, gathering 7 leaders of municipalities in which PRE-KOM has signed the international Zero Waste 2020 strategy.

Through the years, PRE-KOM's excellent system has been recognised by other neighboring municipalities who have decided to become part of PRE-KOM's system, resulting in the number of municipalities managed by PRE-KOM increasing from 7 to 12.

In order to monitor the implementation of their zero waste strategy, a local Waste Management Council was formed on the recommendation of Zero Waste Croatia. The Council consists of all the municipalities operated by PRE-KOM, as well as representatives from PRE-KOM itself and from Zero Waste Croatia. The Council meets every few months and unanimously makes all the decisions related to any changes in the waste management system, serving as an excellent example of cooperation with non-governmental organisations. This cooperation continues also through the joint presentation between members of the Council of their successful system at various global conferences and in different media outlets.



*How did we do it? We copied from the better ones and adapted. We are constantly following modern trends in Europe. We constantly research what is happening in the world of waste management, we join study trips, and look at new solutions and ideas.*

Siniša Radiković, Director of PRE-KOM.

## Conclusion

The story of Prelog and their waste management company PRE-KOM showcases the diversity of zero waste. **When done successfully - through background research, effective communication and education programmes for citizens, the building of proper infrastructure and flexibility within the system to adapt and improve, zero waste is a strategy that can be successfully implemented in a wide range of contexts seen across Europe.**

In the case of PRE-KOM, since the adoption of its zero waste strategy, the company not only boasts 10 of highest-performing municipalities for separate collection in Croatia, but it also has one of the least expensive systems for local residents. Yet, the story of Prelog is not yet over, as they continue to identify new policies and ideas to prevent waste from being generated, such as plastic free campaigns in local institution and more effective food donation systems, further embedding their status as a zero waste champion.

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## SOURCES

### Zelena akcija:

- [zelena-akcija.hr/en/programmes/waste/foe\\_croatia\\_got\\_zero\\_waste\\_in\\_croatia\\_moving\\_7\\_municipalities\\_adopted\\_zero\\_waste\\_strategy](https://zelena-akcija.hr/en/programmes/waste/foe_croatia_got_zero_waste_in_croatia_moving_7_municipalities_adopted_zero_waste_strategy)
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- [zelena-akcija.hr/en/programmes/waste/first\\_re\\_use\\_center\\_in\\_croatia\\_and\\_2\\_new\\_zero\\_waste\\_municipalities](https://zelena-akcija.hr/en/programmes/waste/first_re_use_center_in_croatia_and_2_new_zero_waste_municipalities)

**PRE-KOM:** [www.pre-kom.hr](http://www.pre-kom.hr)

### MINISTRY OF THE ENVIRONMENT:

- 2019 data: [www.haop.hr/hr/tematska-podrucja](http://www.haop.hr/hr/tematska-podrucja)

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Zelena akcija (Green action) / Zero Waste Croatia is an association of citizens in Croatia for the protection of the environment and the promotion of sustainable development at the local, national and global level. Within our Sustainable Waste Management Program, we are working on many fields such as zero waste cities, single-use plastics, food waste, separate collection, DRS, reuse, repair, home composting etc. We lead a network of NGOs and civic initiatives as part of the Zero Waste Croatia Network, and we coordinate a network of Croatian zero waste municipalities. At global level, we are part of many networks: Zero Waste Europe, Break Free From Plastic, Friends of the Earth, EEB, IPEN, Justice & Environment etc.

Zero Waste Europe is the European network of communities, local leaders, experts and change agents working towards the elimination of waste in our society. We empower communities to redesign their relationship with resources, and to adopt smarter lifestyles and sustainable consumption patterns in line with a circular economy.

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