



FROM BUILDING WASTE TO BUILDING GARDENS

Pop-up city gardens in Aarhus – created using PVC waste

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Why spend a fortune on fancy planter boxes made from terracotta, wood or galvanised steel, when you can grow your vegetables safely in free building waste made from plastic? The project "From Building Waste To Building Gardens" kills two birds with one stone. We extend the lifetime of worn out building products before they are sent to recycling, and they also acquire a whole new function as planter boxes. In this way, we support the development of city gardens, which means cheaper and fresher vegetables that have less environmental impact. The project follows the vision of the EU Waste Framework Directive, whose aim is the prevention and recycling of waste.



Introduction

To complete the green transformation in the use of plastic, it is important that each individual sector seeks creative solutions in how to prevent their products from becoming waste after they have served their purpose. PVC Information Council Denmark has examined the possibilities in exploiting the resources inherent in PVC building waste, by using the waste as the basic element in city gardens. Beneficially, this means that new products do not need to be manufactured to create such gardens, which in turn limits CO₂ emissions. In addition, green city gardens contribute to local food production and new communities.



In this booklet, we tell you about how, in collaboration with the Langenæsfestivalen (Langenæs Festival of Culture) in Aarhus, we made our project a reality. The 2019 festival's theme was **sustainability**. Using a series of photographs and quotes from the many different people who were involved in the festival, we show how PVC building waste was used to create 25 pop-up city gardens.

Though passersby who saw some of the 25 plant beds said that they were beautiful, it's certain that many people will feel that they are not as attractive as terracotta pots or planter boxes made from steel or shiny zinc. It is worth pointing out that a new aesthetic perception is needed, if reusing this kind of material in this way is to become prevalent. And as everyone knows, reuse is essential if we are going to succeed with the green transformation.

In connection with the project, we previously published a booklet "Urban agriculture with reused PVC". The booklet described in more detail why city gardens and urban agriculture are generally so important to the green transformation, and why using reusable materials is a sustainable solution. To learn more about our project, visit pvcreuse.farm.

Ole Grøndahl Hansen
General Manager, PVC Information Council Denmark,
2020

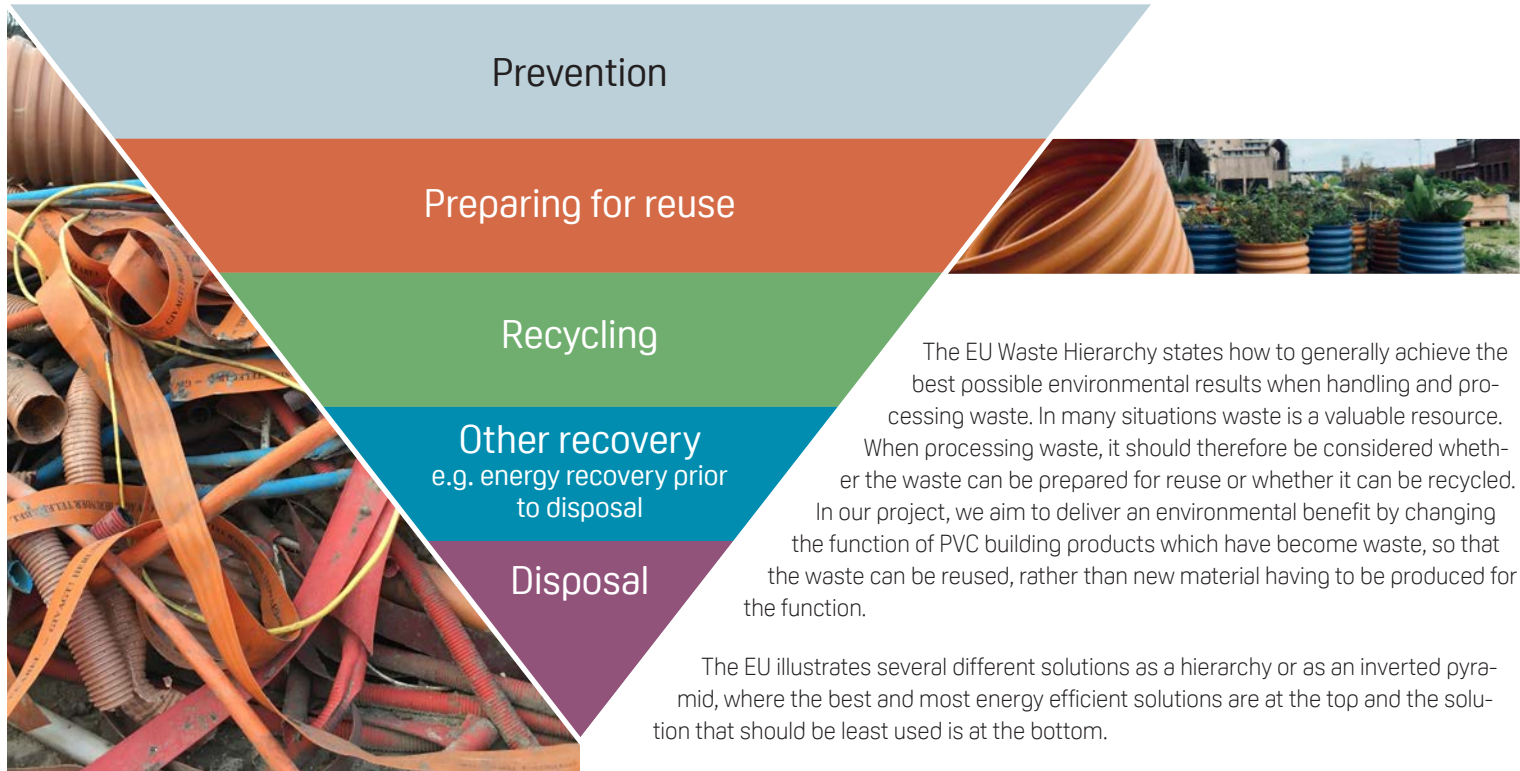
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From Building Waste To Building Gardens is a pilot project that has run for three years with architect Maja Sønderskov as the project manager and Marianne Mikkelsen as the project assistant. PVC Information Council Denmark, with General Manager Ole Grøndahl Hansen and communication consultant Tobias Johnsen, is also involved in the project. The project is financed by VinylPlus®, the Voluntary Commitment to sustainable development of the European PVC industry. But it is volunteers who plant and water the plants located at the different spots and ensure the whole project runs smoothly. Our partners include Langenæsfestivalen (Langenæs Culture Festival), Samskab Aarhus, Gallo Gartneriet, GroSelv and Skraldecafeen.

Maja Sønderskov (with baby Kira), Tobias Johnsen, Marianne Mikkelsen and Ole Grøndahl Hansen.

From PVC building waste to building gardens in the waste hierarchy





Prevention

The best solution is to avoid generating waste. By purchasing fewer products, maintaining the products you already own or by purchasing products that last for many years, waste is prevented. For example, in the building industry, it is important to purchase building products that will last for a long time. A PVC pipe can last for 100 years, and when it becomes waste, it can be recycled up to 10 times, without having to add new material.

Preparing for reuse

Preparing for reuse is when products can be used again when they undergo a few, simple actions, such as changing their function, cleaning, repair or renovation. In terms of the environment, this is a much better solution than recycling, when the products are first broken down in order to use the materials.

Recycling

Recycling is when the products are first broken down or dismantled and materials are then extracted from the broken down products. The extracted materials can then either be used to manufacture the same type of products as the original or for completely different products. In Denmark, we have a collection and recycling scheme for rigid PVC building products. The building products are crushed into reclaimed material, which is then used in the production of new products.

Recovery

Recovery of plastic waste involves its incineration to recover energy.

Disposal

Disposal or landfill is the lowest solution in the waste hierarchy, and covers first and foremost disposal but it also covers incineration without energy recovery.

PVC BUILDING WASTE IS EASILY ACCESSIBLE



PVC building waste made from rigid PVC is easy to collect and to grade for recycling. In Denmark, there is a legislation in place that requires this to happen. This means that PVC building waste is found in almost every municipal recycling station. The material is thus easily accessible to everyone and in principle is free. The idea is that the building materials shall be reused before they are recycled. Since it is the municipality that owns the waste, any reuse of PVC waste must obviously be done in collaboration with the municipality.

A close-up photograph of a blue PVC pipe. The pipe is oriented horizontally and has the text "PVC 8.5" printed in black on its side. Water is flowing out of the end of the pipe, creating a clear, aerated stream that falls into a metal grate below. The background is a soft-focus outdoor scene with green grass and trees. A teal-colored text box is overlaid on the left side of the image.

PVC IS MADE FOR WATER

PVC is the most used plastic material in the building and construction sector. Pipes, gutters, roofing panels, cable trays, windows and doors are made from rigid PVC, which is the material we suggested to use in city gardens. Specifically, we have trialled growing plants in sections of pipe found at recycling stations in Aarhus.



PVC building products are highly suitable for growing plants and vegetables in since they are designed to come into contact with water. If you compare rigid PVC with wood, PVC has a much longer service life. PVC does not rot and can last for more than 100 years. The material is also light, which means that if you want to build a city garden using PVC building waste, the material is very easy to transport from the recycling station. You can easily bring the material in a bicycle trailer.





From left: Daina Romero and professor Marianne Thomsen of the Aarhus University.


Academic assessment of the project's sustainability

In order to carry out an academic assessment of the sustainability potential of growing plants and vegetables in PVC building waste, From Building Waste To Building Gardens entered into a collaboration in 2017 with Professor Marianne Thomsen from Aarhus University's Department of Environmental Science. The aim of the study was to determine whether the basic idea could be a solution that could be characterised as sustainable.

Daina Romeo, a PhD student at Aarhus University, was given the task of finding out whether growing crops in PVC building waste

was environmentally and economically sustainable. The results were very positive. By growing crops in disposed PVC rather than new material, greenhouse gases were reduced by up to 70%, and the yield from growing plants and vegetables in PVC was also considered high. Daina Romeo writes in the report:

"Reusing PVC construction products for agricultural purposes is a promising way to "slow the flow", which is one of the critical steps in the direction of the circular economy. Normally, this resource is discarded before the end of its usable life, which is about 100 years. By reviving the products, the usefulness of the PVC material is maintained, whereby it can continue to benefit people."



Growing plants and vegetables in PVC building waste in cities does not present a risk to health

When you grow crops in a city, it is almost impossible to avoid the crops from absorbing undesired substances from the soil and from air pollution. However, the amounts are so small that they are not a hazard to health. "Compared to the risk of living in a city or town and breathing the air, the risk to health from vegetables is almost nothing," says Jakob Magid, associate professor at the University of Copenhagen's Department of Plant and Environmental Sciences. With regards to any hazards connected with growing plants and vegetables in worn out PVC pipes, toxicologist and PhD Lars Blom has stated that there are no related health risks. No unwanted substances migrate from the plastic and are thus not absorbed into the plants.

AARHUS MUNICIPALITY SEES GREEN PERSPECTIVES IN THE PROJECT

Aarhus Municipality is participating in the project From Building Waste To Building Gardens. “This project is a really fine example of how companies that generate waste are attempting to make the waste useful rather than letting it end up in an incineration plant. When waste benefits urban agriculture, it means that we consume less and we thus reduce our impact on the climate,” says Christian Brødsgaard Eschen from Aarhus Municipality.



“I believe that it would be ideal if there was a kind of ‘exchange centre’ where citizens could go to and pick up PVC waste, so that it could use it to build city gardens.”

Christian Brødsgaard Eschen



PRODUCTION THAT HAS AN IMPACT ON CLIMATE CAN BE AVOIDED THROUGH REUSE

"It is completely essential that we try to extend the lifetime of building materials after they have become waste. We do this by changing the function of the building product and reusing it as planter boxes. This extends the material's lifetime, thus benefiting the environment," says Maja Sønderkov, architect and project manager.

In addition to the benefits to the climate, there are other obvious advantages from using waste to create city gardens. The city garden is very inexpensive to create. The social and nutritional benefits are also important.

This project allows to extend the lifetime of the material by changing the function of building products – turning them into planter boxes for city gardens. If you no longer wish to cultivate your city garden, the building waste used can be returned to your local recycling station, where it will be sent on for further reuse and recycling. So after it has been used in a city garden, the building waste once again gets a new life, in the form of a new pipe, a new gutter, etc. This is circular economy in practice.





In the project From Building Waste To Building Gardens, we also tested whether we could use waste from the production of vinyl records. We received some production waste from Nordsø Records and used the records to make garden chairs. The production of vinyl records has undergone a revival. After a 30 year hiatus vinyl records are once again being manufactured in Denmark.

PVC BUILDING WASTE
BECOMES

CITY GARDENS IN AARHUS





FRA BYGGEAFFALD TIL BYHAVER

Den bæredygtige udvikling kræver kreative løsninger. Vi forlænger materials levetid ved at ændre typiske byggeprodukters funktion. På genbrugspladser i Århus finder vi PVC-byggeaffald, som vi forvandler til plantekasser. Vi genbruger byggematerialerne, inden vi afleverer dem til genanvendelse.

Fordelene ved projektet er mange. Når affald nyttiggøres spares klimaet for belastning, og du sparer penge. De sociale og ernæringsmæssige fordele ved at etablere byhaver er også vigtige.

Vores projekt er støttet finansielt af PVC-industriens miljøprogram VinylPlus. Du kan læse mere om Fra Byggeaffald til Byhaver på urbantlandbrug.dk, Facebook og Instagram.

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PVC BUILDING WASTE BECOMES CITY GARDENS IN AARHUS

When Aarhus district Langenæs held its annual culture festival in 2019, the theme was **sustainability**. The festival organisers had decided to promote the theme by placing 25 city gardens around Aarhus. Originally, they decided to purchase new plant pots, in which different flowers and useful plants could grow. But when they heard about the project 'From Building Waste To Building Gardens', they liked the idea of growing plants in PVC building waste instead. It would not only give the festival a feature that focused on reuse, it would also be much less expensive to implement. So the decision was made to use PVC building waste. A landscape architect was asked to identify 25 strategic spots where the city flowerbeds could be placed. The result was, that during the festival period, local people could see the plant beds made from PVC building waste situated in many different spots – in the church garden, at the hospital, next to schools, the care home, kindergartens, bus stops, housing blocks and supermarkets.



"I had my work cut out for me because Langenæs wanted 25 planter spots and I had to get all of the pipes. But the collaboration with the recycling centre Eskelund was faultless, so of course it succeeded. In the project group, Hanne was amazing at combining the pipes in good ways, controlling where they should be set up and making a map of their locations."

Project assistant Marianne Mikkelsen



Church cultural professional,
Jenny Thaysen Kjær

"I've been stopped in the street several times by people who wanted to say thank you for the plants and flowers. Local people whom I have never seen before or spoke with."

"The flowerbed spots have helped create happiness and sustainable communities across generations."



Hanne Knudsen is a member of the joint council and an active Langenæs resident. Among other things, she helped to plan the placement of the many flowerbed spots, making the connections across and along the district more visible for pedestrians.

Hanne is also helping with co-ownership and involving people in their own district.

"We did it! And it succeeded because everything fell into place with the festival, resources, a small but active group of people who were engaged and willing to give their time. And above all, because we got the young people from the youth club involved. It was a big deal and it was fun."

"There can be many obstacles to 'doing something': What can you do? How do you find out what you can do and what you are allowed to do? Who do you need to talk with? For example, we contacted the municipality and were visited by municipal employees who could give us temporary permission to set up the planter spots on public ground. It's taking longer to get more permanent projects up and running – but the temporary flowerbeds idea can be tested in practice."

"The joint council for the district helped to create a network and clear the way for several direct resident activities and greater citizenship. The planter spots were located close where residents live and precisely because of this closeness, we received good feedback."



"The best was involving the 11–14-year-olds from the youth club at Læssøesgades School. They are holding the plants up to their faces in the picture, not because they are shy but because of personal data regulations! When we go around and plant together, we talk about the plants they know from their parents or grandparents allotments. We found some mallows, which one of the girls knew was edible – and they were easier to pluck than wild brambles."

Project assistant Marianne Mikkelsen

FROM SCEPTICISM TO EXCITEMENT

Project coordinator Jenny Thaysen Kjær explains that, at the beginning, there was a certain degree of scepticism about choosing worn out PVC pipe instead of attractive terracotta plant pots. The idea was considered not aesthetic, but, when it became a reality, there was a completely different perception. "There have only been positive responses. Everyone is pleased about the flowerbeds because they are so beautiful. It's as if the whole area is revitalised. As if the area has been touched by a loving hand," says Jenny Kjær and adds that the flowerbeds become a talking point among local residents. "You could meet people who when going past, would stop to talk about the pipes."



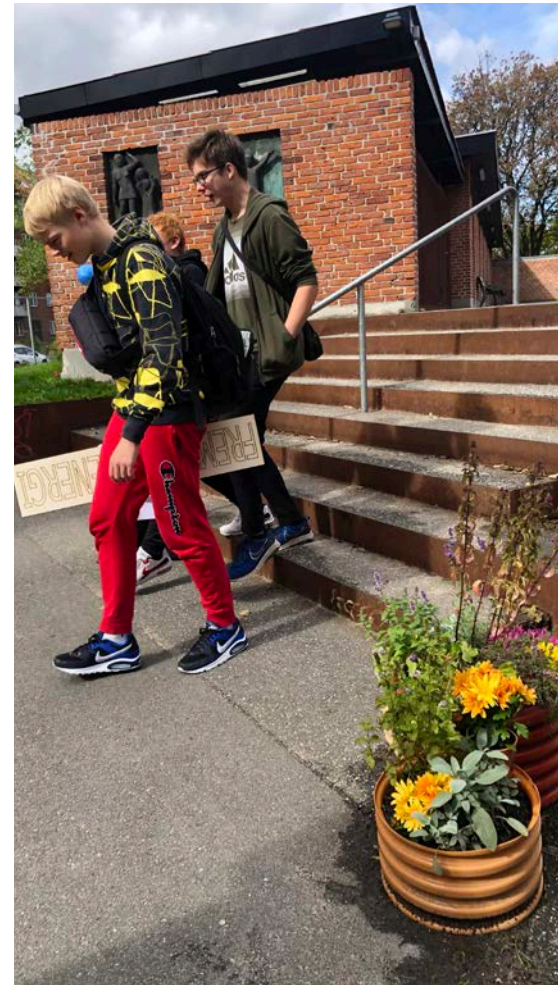
SCHOOLCHILDREN INVOLVED IN THE PROJECT



Langenæsfestivalen (Langenæs Culture Festival) succeeded in involving schoolchildren in the project. To give children an insight into growing plants and vegetables in the city, three afternoon workshops were held in the church garden, where children from the third and fourth grade were invited to come along and build their own flowerbed. They chose their own herbs or flowers that they wanted to plant in the flowerbed and afterwards they wrote their name on the pipes, so they had a kind of ownership of the flowerbed. Thanks to the lightness of the pipes, it was easy for the children to move them around on their own. According to Jenny Kjær, taking part in the project was something completely new for the children. "Many of the children had never planted anything before and experienced positive fellowship by planting. We also saw that they experienced success, because several of the people who saw them, praised them for their work, so the children were happy that they had made the flower beds. So they grew by finding joy in planting and bringing joy to others."

"Many of the children had never tried to plant things before – and they were really good at it. For example, they quickly realised that roots need soil lovingly packed around them when you are planting. And I taught them the old gardening song 'Plante smil og plante solskin' (Plant smiles and plant sunshine). It was absolutely delightful spending some hours with beautiful young people!"

Project assistant Marianne Mikkelsen







“I hope that all children’s parents and grandparents have visited the flowerbeds and found their child or grandchild’s flowerbed with the child’s name on it.”

Project assistant Marianne Mikkelsen



Langenæsfestivalen (Langenæs Culture Festival) lasted for two weeks, while the flowerbeds decorated the city for over two months. They were then adopted by local institutions, who looked after them or the project group moved the flowerbeds to new locations.

A couple of kindergartens agreed to keep their own flowerbeds, and have decided to move them into the playground, where the children can better examine and smell the herbs. And the local men, who regularly sit on their favourite bench, decided that they would plant fresh flowers next spring.

Most of the flowerbeds have been moved to Marselisborg Centret, a Danish disability, development and rehabilitation research centre. The centre has a number of separate buildings situated in a large and beautiful park. In addition to the municipal and regional bodies, many of the buildings at that location are used by a large number of organisations involved in rehabilitation.

“Jenny from the church ensured that everyone got a chance to speak and EVERYONE was involved: The youth club, school, kindergartens, care home, housing associations – everyone! Luise, the church’s communications officer, created the finest signs made from recycled wood, which of course was tied to the flower beds using pieces of old rope from the church’s flagpole. And Verner, the verger, drove the car and trailer, moved the soil, and swept and tidied up. Ole, from Marselisborg Centret, had the honour of being the first contact, and helping to ensure that after the festival, the flowerbeds continue to be used at the partners addresses in the park. It’s just been a wonderful experience creating the PVC pipe flowerbeds with such great partners at and with Langenæs,”

Project assistant Marianne Mikkelsen







“It’s as if the whole area has been touched by a loving hand,” says the Langenæsfestivalen (Langenæs Culture Festival) coordinator. And many local residents feel the same way. Older people really value that “they are also remembered” – because there is little flowerbed at the entrance to where they live. Local men who regularly sit on their favourite bench next to the supermarket to share a beer feel the same. Of all the local residents, they are probably the ones who spent the most time in the company of the flowerbeds. One of them, a former seaman, has by his own hand decorated the flowerbed with ropes – another reusable material. “So you think less about the pipes having been drainpipes, and notice more the beautiful plants,” he explains.



Marselisborg Centret project manager Ole Mygind has helped to set up the flowerbeds for the district's sustainability themed culture festival and afterwards to find organisations who would adopt the flowerbeds once the festival was over.

"I was just so happy on behalf of Marselisborg Centret, to act as the carer for the pop-up gardens during the festival. The whole idea about reuse and sustainability fits perfectly with SPARK, the world's first climate-adapted city park, for people undergoing rehabilitation at Marselisborg Centret. And the pipes' flexibility is completely optimal for us during the building phase – because they can be moved to areas where work is not underway.



One of the organisations who has adopted many of the PVC flowerbeds is 'Midtpunktet', a municipal day centre for citizens with dementia and cognitive challenges. *"We would not have come up with the idea of using PVC pipe as plant pots ourselves,"* says Ann Dorte Gammelgård who works for the organisation.

"The day centre may have to move location again, so it is nice that we can take the flowerbeds with us."

"Many of the citizens who come to Midtpunktet have owned a garden or balcony, and often miss having plants and vegetables. The small flowerbeds are manageable and easy to work with."

"Plants and flowers provide sensory experiences and the work with plants and flowerbeds makes our citizens stay active. They train daily in order to retain their skills."











About VinylPlus®

VinylPlus® is the Voluntary Commitment to sustainable development by the European PVC industry. The programme was developed through open dialogue with stakeholders, including industry, NGOs, regulators, civil society representatives and PVC users. The regional scope is the EU-28 plus Norway and Switzerland. For more information: vinylplus.eu



About PVC Information Council Denmark

PVC Information Council Denmark is part of the European-wide PVC network, which communicates about PVC-related issues. The Council was established in 1995. Besides being funded by the European PVC resin manufacturers, the Council has Danish PVC converting companies as paying members. For more information: pvc.dk



Turn off the news and build a garden

Lukas Nelson