

Report: Circular Public Procurement Case descriptions Norway



This is an English translation of short case descriptions that are part of a larger report on Circular Procurement and Strategies among Norwegian Municipalities, developed by Inventura AS on behalf of the Norwegian Agency for Public and Financial management. For enquiries about the contents, please contact Green Public Procurement Adviser Christian Tangene at Christian.tangene@dfo.no

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2. Reuse of furniture – Municipality of Asker.

Background and starting point

The Municipality of Asker aims to be an environmentally friendly municipality and to become a leader in the field of circular economy. A focus on the reuse of furniture is part of this strategy and was initiated following specific observations in which the municipality itself delivered large volumes of used furniture to the municipality waste centre. A long-planned relocation project in connection with the municipal merger with Røyken and Hurum became a natural opportunity to rethink reuse.

New solution

The reuse project aims to map out the existing range of furniture and, to the greatest extent possible, ensure that this furniture is reused internally within the municipality as needed, thereby minimising the purchase of new furniture. Initially, reuse of furniture will take place as part of the relocation project, but, over time, it will also be extended to cover the various units and line organisations. In cases where needs cannot be met through internal reuse of furniture, used furniture should primarily be purchased under existing framework agreements and then, as a third option, new furniture can be purchased.

Description of the process

A project team was established at the start of the project with participating managers from several municipal units. In spring 2019, architects were included to ensure a comprehensive furnishing plan, such as choosing furniture that would harmonise with the interior in general. During the same period, Asker was awarded NOK 325,000 in climate initiative funds to participate in the further development of the “Greenstock” tool developed by Zero Emission Development AS in Trondheim. The project has therefore contributed directly to business development. The platform has been used to gain an overview of the municipality’s furniture, connect used furniture to new needs and for measuring the impact on costs and the environment. Initially, two students were involved in the mapping, as well as one part-time internal resource. From and including January 2020, one person has had full-time responsibility for the project. Asker has also established a close collaboration with the Norwegian Labour and Welfare Administration (NAV) centres for work training, as well as the municipal centres for adapted work. They have been key resources in the relocation, but also for furniture repairs and upgrades. Today, several buildings in Asker have been furnished using used furniture and the hope is that 80% of the available used furniture will be in use by January 2021.



Figure 1: Office premises furnished using internally reused furniture

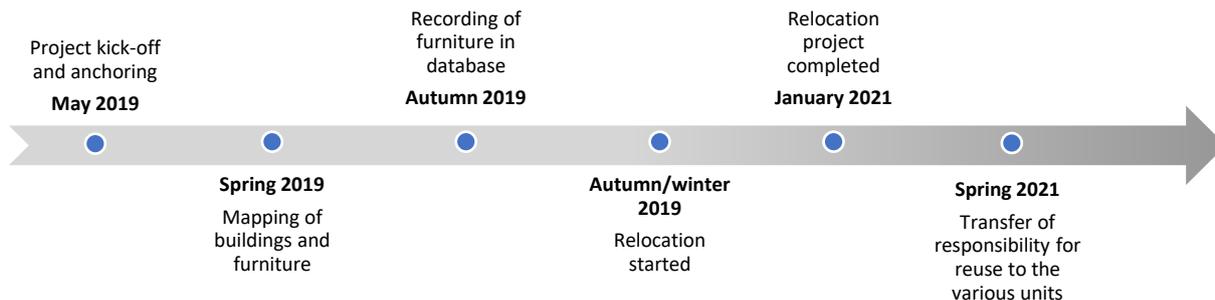


Figure 2: Timeline for reuse of furniture in the Municipality of Asker

Results

The reuse project is still in an early phase and only parts of the potential have been realised. Nevertheless, there is data available based on the furniture recorded in the database so far and the impact on costs and the environment below is based on this data. The final results will be available when the relocation project is completed in 2021.

Costs	Environment	Social
 <p data-bbox="209 1070 574 1160">NOK 10.7 million Savings</p> <p data-bbox="201 1200 582 1420">The reduction in costs comes in the form of the municipality avoiding having to buy new furniture. Figures are calculated based on a representative selection of furniture and the new purchase price for this furniture.</p>	 <p data-bbox="667 1070 927 1160">51.4 tonnes Reduced waste</p> <p data-bbox="608 1200 986 1453">This is a result of the extended service life for existing furniture and avoiding buying new furniture. 51.4 tonnes of waste is calculated based on recorded weight. Reuse will also reduce carbon emissions by 105 tonnes (based on EDPs and industry figures).</p>	 <p data-bbox="1043 1070 1358 1160">Contributes to Work training</p> <p data-bbox="1011 1200 1390 1420">Relocation of furniture has provided work training via NAV. Additionally, a pilot project with a work centre has engaged 4-6 people, one to two times per week, for repairs and upgrades to reused furniture.</p>

**The figures above are based on 80% of furniture being reused. 6724 pieces of furniture had been recorded as of January 2020.*

Success criteria

Based on the experiences in the project so far, the following criteria are highlighted as particularly important for succeeding with the reuse of furniture:



Anchoring – Anchoring across all levels within the municipality has been and will continue to be important. The project has been helped tremendously by a supportive mayor. It has also been important to gain the support of both internal unit managers and external architects by providing information and highlighting the positive impact. In order to achieve the necessary cultural change – in relation to reuse rather than buying new – Asker has placed emphasis on motivating employees. As an example, units that have excelled have been given extra recognition in the form of flowers.



Collaboration – The collaboration with one of the NAV centres for work training, as well as the municipal work centres for people with disabilities, has been crucial to the implementation of the project. People participating in work training have resolved a lot of the logistical challenges, such as collecting furniture. The work centres have carried out simple repairs and cleaning of furniture and the intention is to extend the collaboration through additional repair tasks as the centre users gain more experience and expertise.



Resources – Going forward, there will be a dedicated person working full-time on the project. This recognises the fact that the project has required a lot more resources and time than the municipality initially anticipated. This is especially true in relation to the mapping phase, which was time-consuming, but also because it would have been beneficial to have had more and better internal and external communication about the project in order to anchor it with a broader group and to improve ownership for both employees and residents.

Links

The Asker project website: <https://www.nyeasker.no/nye-asker-kommune/aktuelt-nye-asker-kommune/asker-satser-pa-ombruk/>

The Asker website on reuse: <https://www.asker.kommune.no/klima-og-miljo/ombruk/>

The Norwegian Digitalisation Agency's website on circular procurements: <https://www.anskaffelser.no/samfunnsansvar/sirkulaere-anskaffelser>

The Norwegian Ministry of Climate and Environment's pages on climate initiatives: <https://www.miljodirektoratet.no/klimasats>

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3. Mobility Procurement – Municipality of Bergen.

Background

The Mobility project at the Municipality of Bergen is linked to the Norwegian Ministry of Transport project “Smarter Transport in Norway”, the purpose of which was to promote and test new types of transport solutions. Hordaland County Council was awarded funds from the ministry and initiated a regional project called MUST in June 2018, in which the Municipality of Bergen was one of many participants. The aim was to create a local platform for collaboration on the transport solutions of the future. For Bergen, the procurement of vehicles was designated a natural part of the municipal testing of new solutions. Additionally, mobility procurement must also be viewed in the context of Bergen's overall plans within the environmental field and how procurements can contribute to the realisation of these plans.

Starting point

The municipality currently has around 900 vehicles (including fire trucks and lorries). With the exception of specialist vehicles, the need has been met by leasing vehicles. The fleet of passenger cars consists of 50% electric cars.

New solution

The Municipality of Bergen essentially desires a solution that can fulfil its entire transport requirements, excluding specialist vehicles such as fire trucks, etc. The solution is also intended to

replace the transport currently performed through the use of private vehicles with reimbursement of mileage. In order for a mobility solution to fulfil the entire requirements, it is necessary to have a data tool that provides an overview, as well as sharing and coordination of resources.

Description of the process

The intention is for the municipality’s service transport requirements to be met through three different procurement types: Renewal of vehicle leasing agreements, a vehicle sharing agreement and a platform to coordinate various vehicle sharing services. As of now, a preliminary announcement has been made and a consultation has been held. In connection with this, it has been extremely important to identify the municipal transport requirements, as well as current vehicle use. Data retrieved from electronic log books and information from the municipal mobility office has accounted for the bulk of the figures used in the analysis. Other methods, such as user interviews, will be considered at a later date. The consultation took place in October 2019 and brought together a wide range of parties within transport and mobility. If further consultations with the supplier market become relevant at a later date, the intention is to do this through one-on-one meetings.



Figure 1: Photographs from the consultation

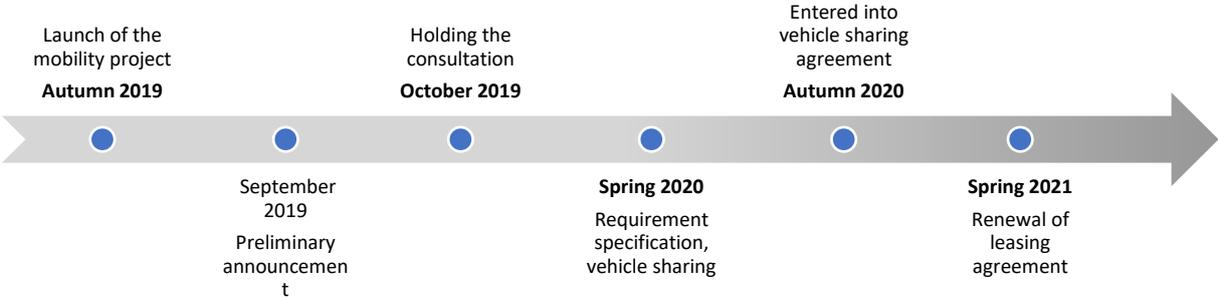


Figure 2: Timeline for the mobility project

Results

The Municipality of Bergen project remains in an early phase in which neither the requirement specification nor the mobility solution type have been established. Nevertheless, the municipality does have some hypotheses as to the impact a new mobility solution will have on costs and the environment. Actual impact will be calculated when a supplier has been selected and the new solution has been put into use.

 <p>Costs</p>	 <p>Environment</p>	 <p>Quality</p>
<p>The changes associated with the new solution are expected to be implemented in a cost-neutral manner. A smaller vehicle fleet and reduced use of private vehicles in the service are expected to reduce costs, while increased costs are expected for the administration of the solution.</p>	<p>The owned vehicle fleet consists of 50% electric vehicles. Since vehicle sharing solutions currently largely offer fossil vehicles (this could change), this would have a negative impact on the environment even though this would be partially compensated through higher vehicle resource utilisation. Positive environmental impact is expected in connection with the phasing out of private vehicles for service use and employees using public transport to get to and from work to a greater extent.</p>	<p>The assumption is that the solution will meet the transport needs at least as well as was previously the case. The same will apply to employees' user experience, even though it is expected that it will take some time to get used to new means of transport and the use of these.</p>

Success criteria

Based on the experiences in the process so far, the following criteria are highlighted as particularly important for succeeding in this type of procurement:



Cultural Change – Bergen has found that this type of innovative procurement is as much about a change of culture as it is about the procurement of the right technical solution. The new means of transport and employees getting used to this will create a need for change but this is also the case in relation to the new solutions providing different ways in which to solve tasks. The municipality has systematically worked to anchor the project at a management level and, going forward, will also collaborate with the staff working on information management at the various units. The work requires continuous efforts throughout all phases of the project.



Expertise – The procurement differs from ordinary procurements in so far that it covers many municipal units at once, as well as the fact that the solution has not been used before. It has therefore been crucial to include people from various units and with different expertise in the project team, e.g. people who are skilled when it comes to data analysis and mobility as well as procurements.



External Collaborations – Participation in the MUST forum was crucial to the actual initiation of the project, but it was also important when it came to the municipality obtaining useful input from various professional communities and private-sector parties. For Bergen, it has been especially useful to benefit from experience and knowledge transfer in relation to how existing data on service execution can be used and how to design comprehensive solutions covering all units and tasks.

Links

- Doffin announcement: [Preliminary announcement – 09/07/2019](#)
- Regulations on energy and environmental requirements relating to the procurement of vehicles; [Lovdata](#)
- The Norwegian Agency for Public Management and eGovernment's website on transport procurements; [www.anskaffelser.no](#)
- The Norwegian Agency for Public Management and eGovernment's website on innovative procurements; [Innovative procurements](#) and [Competitive dialogue](#)

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4. Preventing food waste – Municipality of Bærum

Background and starting point

Through its Climate Strategy for 2030, the Municipality of Bærum has initiated a number of projects that, together, will ensure that the municipality contributes towards national and international climate targets. Particular focus areas are mobility, buildings and better resource utilisation. The municipality's project on the prevention and reduction of food waste is part of the focus on resource utilisation. Bærum is participating in the national initiative to cut food waste ("KuttMatsvinn2020"), as part of which both private and public sector parties have committed to reduce their own food waste by 20 percent by 2020.

New solution

The project comprises four assisted living and treatment centres with a total of 820 employees and is the first major project in the municipality with a specific focus on the reduction of food waste*. Each participating institution has followed a three-part process. They first identified the extent of food waste, then they analysed what could be possible causes of food waste and finally they initiated appropriate measures based on the findings. The aim was to achieve an overall reduction in food waste of 20 percent among participating institutions during the project period.

Description of the process

The municipal Climate Secretariat submitted an application and was awarded NOK 300,000 in climate initiative funding in 2018. The municipality subsequently established a project team consisting of e.g. service managers, environmental advisors and employee representatives and also allocated a 40 percent position to manage and coordinate the project. A lot of time went into the necessary preparatory work. The municipality ensured that it had the right expertise through collaborations with Matvett, the Norwegian Institute for Sustainability Research and The Future in Our Hands. In order to obtain an overview of the current situation, reasons for food waste were identified and good procedures were established for measuring and weighing, so that progress could be monitored.

A total of 40 weighing stations were established. Reasons for food waste were subsequently surveyed through interviews and questionnaires, as well as by reviewing procedures. Measures were initiated based on the findings. Among other things, portion sizes have been reduced and procedures have been put in place to order fewer portions per department. The project is scheduled to run for two years, until the end of 2021. If successful, the project will be expanded to include all assisted living and treatment centres in the municipality. Additionally, during 2020, the initiative will also look at the actual procurement of food, with the intention to further reduce food waste through e.g. improved shelf life and food quality, as well as more appropriate packaging.



Figure 1: The picture illustrates that 30% of all food produced in Norway is thrown away. Photo: Matvett/KuttMatsvinn 2020

*Food waste is all usable parts of food produced for human consumption that is thrown away or removed from the food chain for purposes other than human food (e.g. animal feed).

Results

The Municipality of Bærum project is still in an early phase and the results of the measures are not yet clear. The final impact will be calculated when the project is completed at the end of 2021. The results below are based on an assumption of an achieved reduction in food waste of 20 percent from the initial measurement.

Food waste	Greenhouse gas emissions
	
<p>7.8 tonnes Reduced food waste</p>	<p>24.2 tonnes Reduced carbon emissions</p>
<p>The figure is based on the first weighing performed, in which 1.5 tonnes was thrown away over a two week period for all four units combined. This will correspond to 39 tonnes over 52 weeks. A 20 percent reduction will result in 7.8 tonnes less food being thrown away.</p>	<p>One outcome of reduced food waste is that less food needs to be produced. The production of one tonne of food is calculated to amount to approximately 3.1 tonnes* of carbon equivalents. A reduction of 20 percent, or 7.8 tonnes, would then amount to 24.2 tonnes of CO²</p>

*The figures are based on a report from the Norwegian Institute for Sustainability Research in 2016 and include production, packaging and transport.

Success criteria

Based on the experiences in the project so far, the following criteria are highlighted as particularly important for succeeding in reducing food waste:



Measuring Procedures – The establishment of good procedures for weighing, measuring and recording of food waste have been important. The four assisted living and treatment centres make up a total of 21 departments that in turn are divided into 40 units. A weighing station has been established at each unit. Weighing is done after each meal and is divided by meal type and category: e.g. breakfast and dinner and waste from plates and after cleaning out the refrigerator. Targeted measures can be designed on the basis of the above.



Information Flow – With more than 800 employees involved in the project, it has been challenging to ensure adequate information and good coordination. The municipality found that clear information about what should be done and how, as well as good information flow between the units and the catering kitchen are crucial to success. For this reason, the municipality has established “food contacts”, who play a key role in the contact with the catering kitchen and ordering, as well as being a driving force when it comes to employees and implementation of the measures.



Expertise – The project has required intimate knowledge of food waste in general and the healthcare sector in particular. The municipality’s collaboration with the Norwegian Institute for Sustainability Research and Matvett added expertise and also provided the opportunity to exchange experiences with other parties. Bærum has also found that there were several advantages of having a project manager with extensive experience from the healthcare sector. Because the project manager had insight into procedures and was familiar with key people, it was easier to understand relevant issues and more effectively coordinate the project.

Links

The Norwegian Digitalisation Agency’s guide on the prevention and reduction of food waste: [DigDir - Food Waste Guide](#)

Criteria for the environment and social responsibility in connection with food procurement: <https://kriterieveiviseren.difi.no/>

The Norwegian Digitalisation Agency’s website on circular procurements: <https://www.anskaffelser.no/samfunnsansvar/sirkulaere-anskaffelser>

The Norwegian Ministry of Climate and Environment’s pages with information about climate initiatives:

<https://www.miljodirektoratet.no/klimasats>

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5. Mobility Procurement – Municipality of Lørenskog

Background

The background to the project was that two individual vehicle procurement types – procurement of new vehicles and leasing of vehicles – were put into a broader context in which the entire transport requirements of the municipality were looked at as a whole. Even though mobility has not been part of the municipal procurement strategy, the project must still be viewed in the context of the environmental plans adopted by the municipality. The outcome was a comprehensive mobility project intended to meet the overall transport requirements of employees.

Starting point

Lørenskog currently has eight leased and 109 owned vehicles and the intention is for these to be replaced through the solution. This includes both passenger cars and vans. 30 percent of owned

vehicles are electric. The largest users are the home help service with 33 vehicles, municipal engineering with 21, school/childhood with 20, culture with 20 and others with 20.

New solution

The new solution is intended to replace the current ordinary use of vans and passenger cars and to provide a comprehensive “package solution” for mobility. Specialist vehicles, such as specially equipped vans, are not included in the procurement. The reason for this is that this vehicle type is customised to solve a specific task and it is therefore not appropriate or practical to share the use of such vehicles.

Description of the process

Given that the procurement was innovative and that the solution was not known, competitive dialogue was chosen as the procurement procedure. This meant extensive dialogue with the supplier market in order to obtain input on how the transport requirements could be solved and any impact this could have on costs and the environment. A number of meetings were held with a wide range of parties, followed by preliminary meetings with relevant suppliers. A key aspect of the procurement process has been to identify the requirements and the current situation: the municipality’s requirements, use of vehicles and the total costs associated with the vehicle fleet. The surveying included interviews with managers and users at various units to obtain an understanding of the requirements: observation of how tasks are solved and mapping of the current vehicle fleet through analysis of internal data and insurance information.

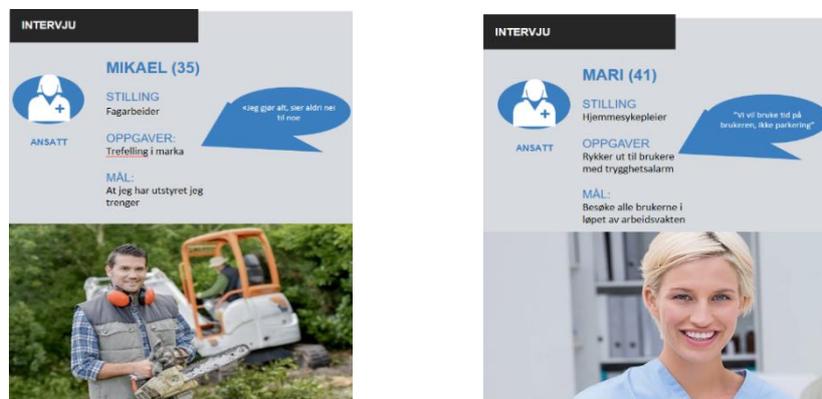


Figure 1: The use of profiles when identifying employee requirements.

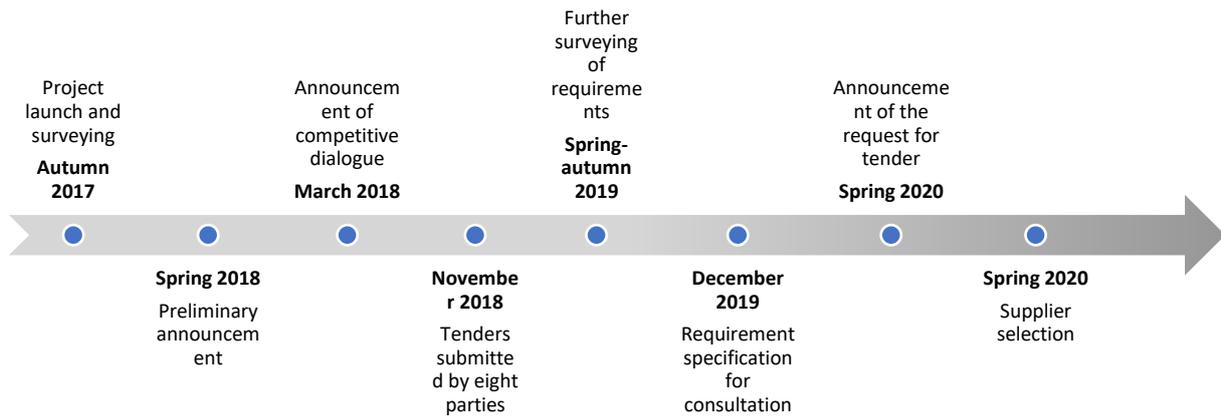


Figure 2: Timeline of the procurement process

Results

The project in the Municipality of Lørenskog is still in an early phase and the final solution is not ready. However, some preliminary calculations have been made on the impact the procurement will have on costs and the environment. The calculations are based on estimated returns. The actual impact will be measured at a later stage.

 <p>Costs</p>	 <p>Environment</p>	 <p>Quality</p>
<p>The project is expected to lead to cost reductions in connection with reduced internal resource use for administration, higher utilisation rates for vehicles and reduced costs in connection with the reimbursement of mileage.</p>	<p>The assumed environmental impact will be a result of the higher utilisation rates for vehicles and the fact that vehicles are shared externally with residents. This will reduce the municipality's share of carbon emissions linked to transport.</p>	<p>Calculations or estimations have not yet been made in relation to the quality of the solution. But the assumption is that the new solution will fulfil the requirements at least as well as the current solution.</p>

Success criteria

Based on the experiences in the process so far, the following criteria are highlighted as particularly important for succeeding in this type of procurement:



Anchoring - It has been essential for the project to be anchored broadly – both among the municipal management and among the users of the future solutions. This has been done,

among other things, through repeated meetings with the management team and by providing information to and interviewing unit managers and future users of the solution. This has resulted in well anchored support, a proper process and broad participation from relevant parties in the project.



Dialogue - Lørenskog has found that it has been essential to enter into extensive dialogue with the supplier market in connection with this type of innovative procurement. This has allowed suppliers to provide input at an early stage of the procurement process, resulting in a large amount of useful input regarding the available solutions and how these could be used to fulfil the municipal requirements.



Preparations - The procurement differs from an ordinary procurement, as it seeks to fulfil requirements in a new way and because the buyer has limited knowledge of how the final solution will look. This can present challenges in terms of the procurement regulations and making adjustments to the requirement specification along the way. Thorough preparations are therefore particularly important to clarify the current situation and the requirements when using competitive dialogue.

Links

Doffin announcement; [Preliminary announcement, 3 March 2018](#) and [Announcement of the request for tender, September 2018](#)
Regulations on energy and environmental requirements relating to the procurement of vehicles; [Lovdata](#)
The Norwegian Digitalisation Agency's website on transport procurements; www.anskaffelser.no
The Norwegian Digitalisation Agency's website on innovative procurements; [Innovative procurements](#) and [Competitive dialogue](#)

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6. Reuse of buildings – Store Norske Spitsbergen Kullkompani

Background and starting point

Store Norske Spitsbergen Kullkompani (SNSK) owns a number of industrial and residential properties in connection with its operations in Svea and Longyearbyen. In 2017, when the Norwegian parliament decided that mining would be shut down in Svea, this resulted in a major clean-up task and restoration of the area with minimal damage to landscape and the environment. For SNSK, it also involved selling off machinery and equipment and demolishing and managing waste from buildings. When it came to the removal of residential and industrial properties, cost-effective remediation was initially emphasised. Over time, it became clear that it was possible to realise major gains from the sale of equipment and the focus on reuse intensified in connection with this work, including for building stock.

New solution

Despite the fact that demolition and waste management were considered most affordable in the majority of cases, there was growing recognition that the building stock in Svea could be a resource for Svalbard as a whole. The reduction in greenhouse gas emissions associated with avoiding shipping

and construction of new buildings was potentially significant. The building stock was therefore viewed from a wider societal and environmental perspective, in which not only costs were assessed. This has resulted in SNSK attempting to reuse as much as possible of the building stock internally on Svalbard. The buildings predominantly consist of air halls, steel sandwich halls, portacabin modules and wooden cabins.

Description of the process

The decommissioning and clean-up work is split into three phases: clean-up of the Lunckefjell mine, which commenced in March 2019, clean-up of the Svea mine, which commenced in spring 2020 and clean-up of the local community linked to the Svea mine in 2021. In 2019, SNSK initiated the sale and remediation of property process and one person was appointed to manage the work. Emphasis had been placed on cost-effective work when funds were allocated by the state. It became clear that a lot of the property stock could be reused internally on Svalbard and that this would have major environmental advantages compared to remediation followed by production, shipping and newbuilds. In order to highlight the benefits, an external consultant was hired to calculate the impact reuse would have on costs and the environment. This was important in order to situate the project in a wider context and to gain internal support. So far, two types of buildings have been reused: a storage hall has been dismantled and is intended to be used by Avinor at the airport on Svalbard and several portacabin modules have been reused by SNSK itself in connection with the clean-up project. Plans are currently in place to reuse a further two or three buildings.



Figure 1: Picture showing some of the buildings in the Svea community for which reuse is planned.



Figure 2: Project timeline

Results

Reuse of the building stock in connection with the shutdown of Svea is still in an early phase. Only a small proportion of the potential has been realised. The final impacts* will depend on which of the buildings will be reused and where.

 Costs	Greenhouse gas emissions
<p data-bbox="236 555 767 584">Portacabin modules: 93% cost reduction</p> <p data-bbox="288 629 715 658">Storage hall: 50% cost reduction</p> <p data-bbox="201 703 802 808">The construction of a new portacabin module gives a total cost of NOK 30,000/m², while reuse costs NOK 2000/m². This constitutes a difference of NOK 28,000/m² or a reduction of 93%.</p> <p data-bbox="201 846 802 952">The installation of a new storage hall (air hall) gives a total cost of NOK 2000/m², while reuse gives a cost of NOK 1000/m². This constitutes a difference of NOK 1000/m², a reduction of 50%.</p>	<p data-bbox="1066 432 1150 533">  </p> <p data-bbox="863 555 1353 618">Portacabin modules: 82% less carbon emissions</p> <p data-bbox="847 629 1369 658">Storage hall: 94% less carbon emissions</p> <p data-bbox="828 703 1393 808">The construction of a portacabin module** is estimated to produce carbon emissions of 170 kg/m², while reuse gives carbon emissions of 30 kg/m². This constitutes a difference of 140 kg/m² or a reduction of 82%.</p> <p data-bbox="828 846 1393 952">The installation of a new storage hall is estimated to produce carbon emissions of 130 kg/m², while reuse is estimated to give carbon emissions of 8 kg/m². This constitutes a difference of 122 kg/m², a reduction of 94%.</p>

*The above figures are based on calculations performed by LPO prior to the project. SNSK has subsequently found that this deviates from the actual situation in certain areas. For example, the erection of halls is much more expensive than assumed, possibly due to high levels of uncertainty or limited competition.

** Newbuilds: remediation, production and transport from the mainland have been included. Reuse: internal transport on Svalbard is included.

Success criteria

Based on the experiences in the project so far, the following criteria are highlighted as particularly important for succeeding in reuse of buildings in this project:

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Commitment – The original plan and the allocated state funding only covered the remediation of buildings. Personal commitment has been crucial to expand the project from relating only to demolition and remediation to also including the reuse of fully functional buildings. Personal commitment has also been crucial for ensuring progress and overcoming barriers.
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Visualisation – As part of the work to generate awareness and to gain support for reuse, it has been crucial to visualise the potential positive impact. The project manager received external assistance to calculate the impact of potential reuse – with regard to both costs and an LCA-based environmental study. This type of impact assessment helped situate the project in a wider context, while also clarifying the potential impact on costs and the environment.
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Preparations – A good deal of resources were used to survey the building stock, as well as clarifying the practical and legal aspects associated with reuse. It has been a complicated process to understand these aspects but it has shown that projects concerning reuse of buildings and building materials require substantial preparatory work and clarifications prior to implementation.

Links

About SNSK and its operations: <https://www.snsk.no/>

SNSK's project website on reuse: <https://snskmachinesales.com/gjenbruk-av-svea-bygg/>

The Norwegian Building Authority's report on the reuse of building materials: <https://bit.ly/2HFs2gz>

The Norwegian Digitalisation Agency's website on circular procurements: <https://www.anskaffelser.no/samfunnsansvar/sirkulaere-anskaffelser>

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7. Reuse of building materials – Statsbygg and Entra

Background and starting point

This case describes the participation and pioneering work of two players in the reuse of load-bearing structures from Regjeringskvartalet in Entra's project "Kristian Augusts gate 13 (KA13)", which is scheduled for completion during autumn 2020. This project is part of Statsbygg's focus on circular economy and is the first project in which the reuse of load-bearing structures has been attempted. On the part of ENTRA, the project is part of an ambitious environmental strategy, as part of which ENTRA seeks to be one of several leading players. ENTRA already participates in collaborations on the development and construction of energy-plus houses and a natural next step has been to look at the possibilities for reusing building materials.

New solution

The solution described here involves retaining the hollow structural floor elements when demolishing building R4 in Regjeringskvartalet and reusing these in Entra's Kristian Augusts gate 13 project. The building project involves renovation of the existing building and a new extension being built - the total project will constitute 4300 square metres of business premises. The original building dates back to the 1950s. The newbuild will be nine storeys high. The concrete hollow structural floor elements from Regjeringskvartalet will be reused for three of the storeys in the newbuild.

Description of the process

When the decision to demolish building R4 in Regjeringskvartalet was made, Statsbygg created a list of materials suitable for reuse and the hollow structural floor elements were one of 45 products on the list. During the same period from autumn 2018 to spring 2019, FUTURE BUILT held four seminars, in which Statsbygg, SINTEF, ENTRA and others participated to discuss the legal and practical aspects of reuse. ENTRA subsequently mapped out the requirements for its KA 13 project, as well as the available materials – input from suppliers was key here. It was determined that the hollow structural floor elements from R4 could be used. The hollow structural floor elements were cut out and lifted from R4 in November 2019 and subsequently transported to a location outside of Oslo for processing. This work involved cutting to the correct dimensions and installing new attachments in accordance with the preferred lifting method. In order to obtain the necessary certification, compression tests and core sampling were performed by SINTEF. Calculations of whether the quality of the hollow structural floor elements was appropriate for use in a new building were performed by ENTRA itself. Four out of nine building plans have now been completed. The hollow structural floor elements are scheduled for installation during spring 2020. The KA13 project will be complete and ready for use during autumn 2020.

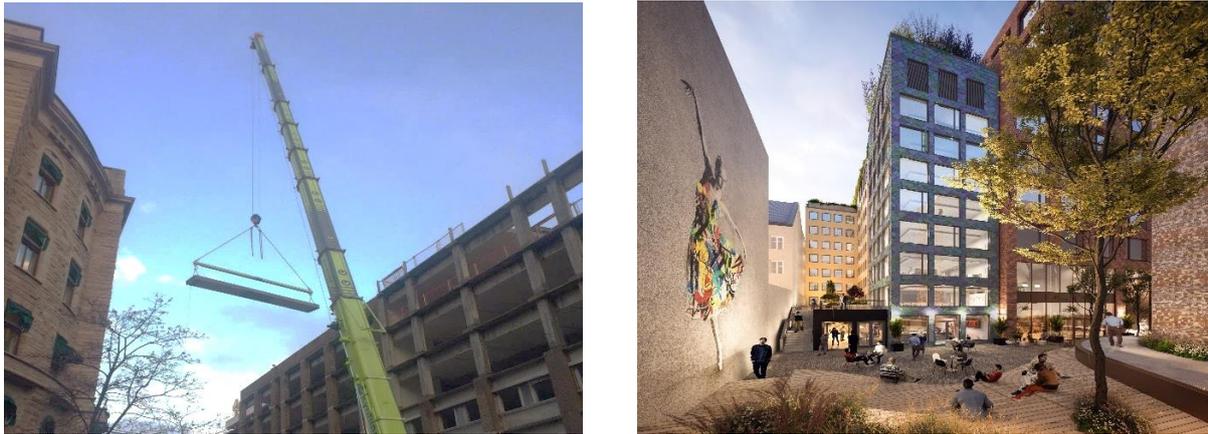


Figure 1: The photograph shows the dismantling of hollow structural floor elements from R4 in November 2019 and an illustration of Entra's KA13 project.

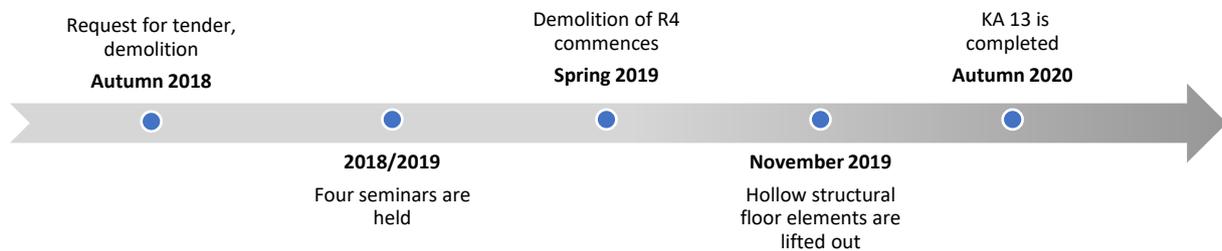


Figure 2: Project timeline

Results

The hollow structural floor elements were installed during spring 2020 in accordance with the plan, but the project KA13 is not yet complete. When the project is completed during autumn 2020, ENTRA will conduct a larger analysis of the environmental impact of reusing hollow structural floor elements and other materials.

The Norwegian construction and civil engineering sector is responsible for around 13 million* tonnes of carbon equivalents per year, which is around the same scale as the industrial and petroleum sector. Half of the emissions originate from building materials. The use of concrete in e.g. columns, wall elements and hollow structural floor elements accounts for a substantial proportion of these emissions. By reusing rather than recycling, the materials are used for the same purpose and not at a lower level in the waste hierarchy. This avoids using energy and resources to break down and recycle concrete, while also not using energy and resources to extract raw materials and produce new materials. In addition to the hollow structural floor elements, a number of other materials have been reused in the building, including windows, doors and load-bearing steel components. Of this, steel undoubtedly had the greatest positive environmental impact. New steel is calculated as producing emissions of 2.8 kg of carbon equivalents per kg of steel, while reuse gives emissions of only 0.24 kg of carbon equivalents. This constitutes a reduction in the emissions per kg of steel of 91 percent.

**The above figures are based on the Norwegian Building Authority's report "Safe reuse of building materials" (Norwegian title: Forsvarlig ombruk av byggevarer) from 2019.*

Success criteria

Based on the experiences in the project so far, the following criteria are highlighted as particularly important for succeeding in the reuse of building materials.



Planning – Reuse of building materials requires thorough planning. It is important to map your own project with regard to the materials you require and what it would be practically possible to reuse. There is limited access to relevant materials in the market. For this reason, it may be appropriate to consult suppliers about possible buildings that are due to be demolished and which materials may become available.



Regulations – Current regulations are not well designed with regard to reuse. It is therefore essential to familiarise yourself with applicable laws and regulations. When it comes to the procurement or taking over of materials from others, the starting point is that the materials must be documented and certified in the same way as new materials. If there are no suitable materials or if the necessary documentation is missing, it may also be worth checking the supplier's surplus stock. Surplus stock means unused materials with complete documentation that would otherwise have been destroyed or used for other purposes.



Partnerships – It has been crucial for ENTRA to connect with talented partners and suppliers. The future tenant has been extremely positive towards the project, has helped drive it forward and considers a strong environmental focus to provide added value for them when selecting premises. In relation to contractors and suppliers, the project has included a number of elements that have not previously been done. This has resulted in a need for many different capacities and has placed major requirements on flexibility on the part of suppliers throughout.

Relevant links:

Information from Statsbygg about the demolition and reuse of materials from Regjeringskvartalet: <https://bit.ly/329Po7o>

ENTRA's project website: <https://www.entra.no/projects/kristian-augusts-gate-13/195>

The Norwegian Building Authority's report from 2019 on the reuse of building materials: <https://bit.ly/2HFs2gz>

The Norwegian Digitalisation Agency's website on circular procurements: <https://www.anskaffelser.no/samfunnsansvar/sirkulaere-anskaffelser>

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8. Procurement of used IT equipment – Municipality of Sør-Varanger

Background

Like many other municipalities, Sør-Varanger has long had a pressurised municipal financial situation, with limited IT budgets. However, with a decentralised municipal structure, distributed across a large geographical area, the IT budgets have also had to cover necessary investments in network infrastructure. Against this background, Sør-Varanger made its initial small-scale procurements of used IT equipment as early as 2002. After this, the scheme has been expanded significantly in line with

gaining expertise and positive experiences. In 2017, the municipality adopted a major financial restructuring, in which one of the initiatives was that all units should strive to use or repair existing IT equipment and buy used equipment where possible.

Starting point

Before the municipality started to procure used IT equipment on a larger scale, the majority of Sør-Varanger's needs for laptops, desktop PCs and tablets were met through the procurement of new equipment. There was a framework agreement in place for such procurement.

New solution

Around 90 percent of the municipality's IT equipment is used. This primarily relates to PCs for the municipality's administrative staff and schools. The remaining 10 percent is equipment that has yet to be phased out and specialist PCs such as touchscreen and ultraportable devices, for which there are limited options in the second-hand market. The framework agreement entered into for the procurement of new equipment includes a clause stipulating that the municipality may buy used equipment if available from the suppliers.

The process

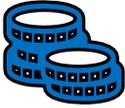
The IT department will typically approach three providers with requests for the supply of IT equipment that meets the requirements concerning quality and functionality, including specifications linked to memory and storage capacity, as well as processor speeds. The existing framework agreement is used for the around ten percent of the needs that are covered through the procurement of new equipment.



Figure 1: The photographs illustrate the preparation of used laptops for resale.

Results

The procurement of used IT equipment results in significant savings in terms of both costs and the environment. The calculations below are based on the figures in Figure 2 and figures obtained from the Municipality of Sør-Varanger.

 <p>Costs</p>	 <p>Environment</p>	 <p>Quality</p>
<p>NOK 680,000 Annual savings</p> <p>The figure is based on an annual procurement of 145 used laptops. The cost per device has been compared to the price of new PCs that would otherwise have been procured. The price per used device is estimated at around NOK 2300 and the price of a new unit has been estimated at around NOK 7000. There is a saving of around 67% per device when buying used.</p>	<p>75% Reduction in emissions</p> <p>The figures are based on Figure 2, in which a new laptop contributes 300 kg of carbon emissions and a used laptop contributes 75 kg of carbon emissions. The procurement of 145 used devices constitutes an annual saving of 32.6 tonnes of carbon emissions or 75% lower emissions than buying new. The environmental savings can be found in extending the service life of each device and avoiding new production.</p>	<p>Improved Quality and user satisfaction</p> <p>Sør-Varanger has managed to obtain favourable prices for used high-specification devices, so the equipment, overall, has been of substantially better quality and performance than if it had been bought new with the same budget. Users have simply received better equipment than they otherwise would have done. This has predominantly resulted in extremely high levels of user satisfaction.</p>

Bruksfase 1			Bruksfase 2	
Produksjon 225kg CO2eq	Transport 25kg CO2eq	Bruk 50kg CO2eq	Transport 25kg CO2eq	Bruk 50kg CO2eq
Totalt 300kg CO2eq			Totalt 75kg CO2eq	

Figure 2: The figure above illustrates the reduced emissions when buying used compared to buying new. The figures are based on an EY study from 2018. Transport is estimated to have the same emissions in both phases: the transport distance is shorter in phase 2 (bruksfase 2) than in phase 1 (bruksfase 1), but phase 2 also includes any emissions in connection with necessary repairs and service following the initial usage phase.

Success criteria

Based on the experiences so far, the following criteria are highlighted as particularly important when procuring used IT equipment:



Market knowledge – In connection with the selection of models and specification of memory cards, storage and processor speeds, it is useful to gain some experience as to what satisfies the needs the best, what has the highest level of reliability, allows for repairs and more. In terms of laptops, Sør-Varanger has found that the top models with higher performance and a solid build often have a longer service life and require fewer repairs. Additionally, it is worth noting that some models are adapted better for simple repairs in that they have removable casings.



Standardisation – When you have experience of the types of components and specifications that work well, it can be both profitable and practical for components and machines to have a high degree of compatibility. This can result in advantages such as e.g. that chargers can be used across the entire machine fleet, that fewer types of spare parts are needed in stock and that repairs and service can be performed more efficiently, as you will be more familiar with each component.

Wear - Suppliers grade used equipment with regard to wear, but, because suppliers use different degrees of wear, it may be a good idea to set out specific requirements concerning the appearance of used PCs (e.g. no screen scratches) rather than requiring a given grade (A may constitute different levels of wear for different suppliers).



Own resources – Service and repairs to equipment can be outsourced to external parties. But in the case of Sør-Varanger, with major geographical distances involved and few actual suppliers, it was necessary to have the resources to perform such work internally. Despite low failure rates in used PCs, it is often necessary to make upgrades, e.g. new batteries. Developing internal expertise has been essential for offering rapid repairs and fast response times.

Relevant links:

- Sør-Varanger's website on the financial restructuring: <https://bit.ly/37Vwena>
- Criteria for the environment and social responsibility in IT procurements: <https://bit.ly/2PnJ8Uq>
- The Norwegian Digitalisation Agency's website on circular procurements: <https://www.anskaffelser.no/samfunnsansvar/sirkulaere-anskaffelser>
- ICT Norway's page on providers of used ICT equipment: <https://www.ikt-norge.no/oversikt-over-tilbydere-av-brukt-it-utstyr/>
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