

# Project Genbyg in Skive municipality in Denmark

*This is a freely translated summary from the Danish language of "Afslutningsrapport Projekt Genbyg Skive". A project supported by Region Midtjylland's project Rethink Business.*

## Background to Project Rebuild

Skive is a city in Region Midtjylland by Limfjorden in Jutland, Denmark with about 21,000 inhabitants where the municipality have worked with environmental issues and have adopted a strategy to become CO<sub>2</sub> - neutral by 2029. Already in 2008, the town of Skive was appointed as an Energiby (Energy town) by the current Minister of Climate and Energy Connie Hedegaard, an award that is something of a quality stamp for having an active work in the field.

Skive municipality has for several years worked purposefully on energy and climate issues in a pilot project for circular economy with the project name Genbyg Skive. The project aims to demonstrate methods for working with circular economy at the demolition of buildings and thus recycle materials for new construction and renovation of other buildings. By setting requirements for recycling of building materials, new business opportunities can develop and new jobs created.

The project where divided into six different work packages:

- Develop a new strategy for using recycled building materials in municipal construction.
- A new purchasing policy with new purchasing routines to promote the use of recycled building materials and products in municipal buildings.
- New procurement procedures requiring recycling of suitable building materials for demolition of municipal buildings.
- Create awareness and demand from recycled building materials and products.
- Create new business models for the use of building materials and demolition products.
- Open up for new business creation.

Some of the demolition products that are of particular interest are various stone products, building tiles, roof tiles, building timber, windows and doors, etc. By creating a web-based database for recycled materials, with careful product and quality description, the availability of materials would be simplified.

Skive Municipality has developed a management plan for 2015-2024 which describe how to work with the attitudes, visions and demands on the management of waste from the demolition of buildings on the basis of a model of circular economy. This by, among other things, with stricter requirements for demolition of buildings. All with the intention of thus obtaining a better overview of the materials and substances that are included in construction waste, and of imposing requirements on demolition companies' qualifications.

Through these requirements and a circular thinking, one wants to get a better quality of construction waste for recycling and thus a higher recycling rate of this. It goal is that at least 70% of the total amount of construction waste will be used for new purposes. Today, old bricks and windows are used to some extent for renovation, while plaster and asphalt is used in production of new materials. It is particularly important that hazardous substances and hazardous materials are separated from the construction waste. The handling of these materials must be in a safe and

environmentally friendly manner. They see a need to develop new rules for the procurement of demolition companies and routines for gentle demolition of buildings in order to be able to recover as much material as possible.

### **The implementation and expected result of the project**

In the project, they decided to demolish two similar one family houses with different demolition methods. Both houses had a brick façade. One house was demolished in the traditional way with the help of machines, without special consideration for re-use and recycling. The other house was mainly dismantled by hand before the machines were used. Both houses were demolished by the same demolition company. Economically speaking, it was more expensive to demolish by hand, even if the hourly cost for human working hours is lower than the cost of machine hours. For both demolition methods, the processes were studied and all materials were documented for its suitability for sale and re-use. This resulted in new ideas for projects and business models in order to increase reuse and recycling, some of them mentioned here.

- Education for social economy projects / business models.
  - By increasing knowledge and awareness of the importance of the interaction between entrepreneurs, the municipality and society in general, when it comes to environment and recycling. The purpose is to build a system that can ensure the quality of recycling material from demolition of buildings so that it can be included in a circular system.
- Recycling Material
  - Wood from demolition of houses was classified into four categories depending on its recyclability. (a) wood for landfill (e.g. pressure-impregnated wood); (b) combustion; (c) recycling for the production of chipboards etc. and (d) better-quality wood suitable for local craftsmen, designers, etc.
- Recycling Database
  - By sorting and classifying different building components and recycling materials from demolitions and add this into a national on-line database, accessibility would increase and one would reach a higher recycling rate.
- Mobile facility for cleaning bricks etc.
  - A mobile facility for cleaning bricks, roof tiles and other stone-based products that is moved to each demolition site. This should reduce the transport of these demolition products to central cleaning stations. With this, it would be possible to reach new users directly on site and its nearby surrounding areas.
- A new demolition tool
  - The demand for bricks, roof tiles and other stone-based products is great, but the approach to demolition is not entirely straightforward to keep a good quality of these products. By developing a new machine tool for demolition machines that enable a gentle dismantling of bricks etc., the quality of these would increase.

## Results and suggestions

Already in the year 1996, Skive began to follow an agreement with an environmental control system for the demolition industry, NMK96, which required selective demolition methods to maximize the possibility for recycling. Recycled materials that classified to be of good quality were stored for future re-use in the renovation and rebuilding of municipal buildings. It was mainly stone products, good quality sanitary articles, stainless steel parts and technical facilities. This storage must be extended to store other materials and products from demolition. In order for this to work well, quality assessment and documentation of the products in storage is required.

With the increased demands for recycling materials in a circular economy, which this project largely is about, one will have to change the current tendering rules to contract contractors. A proposed model for such a new tender procedure is suggested.

- Materials Inventory
  - Technical personnel from the municipality's building engineering department make an inventory of each municipal demolition project in order to evaluate and document the building's components and materials. If it turns out that the building does not have something suitable for recycling or reuse, the current normal tendering procedure can be used.
- Early supply of suitable material for recycling / reuse
  - A new early tender procedure, gives stakeholders for recyclable materials and building components a possibility to get contracts for desired materials before a demolition contractor is selected and contracted.
- Demolition Plan
  - A plan and requirement specification for how the demolition should proceed based on the materials and building parts that are going to be recycled. The demolition must be carried out according to the current NMK96 and with regard to the result of the early tender. This type of selective demolition is considered to be about 10% more expensive than normal demolition, a cost that is believed to be covered by the sale of materials and building parts.
- Tendering
  - A tender for the demolition contract with requirements and specifications is made public. Approved contractor (certified?) who has given the lowest bid receives the demolition contract.
- Demolition Process
  - When the tender has won legal force and contracts are signed with a demolition contractor, the work on demolition can begin. The demolition contractor is responsible for ensuring that the materials and building parts already offered for sale are dismantled responsibly and delivered according to agreement with the buyer.

Other recyclable materials that are not sold, must be documented and go to suitable storage for future recycling and reuse. Hazardous substances and hazardous materials must be separated and handled in a safe and environmentally friendly manner.

### **Conclusions and future work**

The project has shown the importance of the municipality reviewing its procurement strategy so that it also becomes applicable for recycled building materials for its own construction projects. Today, the use of recycled material in municipal construction is not something that gives much attention to planning work. Increased awareness of material purchases can be a tool for raising social responsibility and realizing political goals for the municipality. Environmental and climate considerations should be an important parameter in all purchases. Environmental and climate requirements for products and building materials ensure, for example, that the municipality is at the forefront when it comes to reducing the environmental impact and climate impact.

To raise awareness of the results from this project, it is important to communicate this in a good way within the municipality and its inhabitants. This can be done through the project's and the municipality's websites, through reports in local press and press releases as well as social media. All in order to create awareness and raise a demand for this kind of products.

The project group has been very aware that the project could form the basis of a number of new projects, which was part of the intention of the project. A large number of small projects have already emerged, and some of them are believed to be successful.

By working for a change in the rules for waste management at national level, it is believed that the use of recycled material in the construction industry can increase and that a circular economy can be approached in this area. With increased demand for recycled materials, the focus on selective demolition methods will increase.

The materials that are considered suitable for recycling and reuse must be classified, documented, handled and stored in a good way. Through procurement procedures where local contractors with won tenders can sell selected materials before demolition and deliver directly to the customer. Then the quantities of materials that must be placed in storage are reduced. It is also important that all the materials for sale are made available through, for example, open databases to reach a wider market.