

ACTION C.3. Resource-efficient construction and housing in the Pori region - Concrete actions

Beneficiary responsible for implementation:

City of Pori, Environmental Agency

Description (what, how, where, when and why):

What

This action will contribute to NWP Aims 1.1., 1.3., 2.1., 2.2. and 7.1.

The aim of the action is to develop a resource-efficient residential area with a network of partners (developers, builders, construction companies, property owners, authorities, universities, professional colleges) through concrete implementation actions. The focus is on all phases of construction and housing: zoning, planning, product, construction, housing and demolition. The purpose of the action is to prevent construction waste, promote the use of recycled materials, develop new resource-efficient solutions in all phases of building a residential area, to promote green procurement and to actively implement new resource-efficient concepts in potential demonstration areas, single-family houses and apartment buildings. In 2017 starts a number of large real estate renovations (schools and educational institutions) in the City of Pori. The potential projects will be chosen based on the studies and calculations of the preparatory action A.1.

To be a success, green public procurement needs clear and verifiable environmental criteria for products and services. There are also lack of training and lack of co-operation between authorities, the project

How

For the selected building projects, complete building plans will be made for implementing best practices in construction and housing, including green public procurement, budget and financial plans (if needed), in cooperation with the partner network. The task of the action is to implement resource-efficiency measures since the start of the building projects and ensure their further implementation in cooperation with operators. Identified potential projects are divided into five sub-actions. The total number of demonstrations will be four.

Sub-action C.3.1. Schools and educational institutions

In 2017, a number of large real estate renovations will begin in the City of Pori. Projects are mainly schools and educational institutions. In this sub-action project will develop a proactive demolition and waste classification concept (the idea of waste sorting at source) in co-operation with the Satakunta University of Applied Sciences and regional company networks. The aim is to find target locations to the construction waste recycling at the stage of zoning and planning. In particular interests are to increase the recycling of soil materials, gypsum board waste, wood-based demolition waste, as well as tile and porcelain waste. The result is developed operating model:

Stages of operation model implementation

Step 1. Plans for implement

Step 2. Green public procurement

Step 3. Implement resource-efficiency measures

Step 4. Proactive demolition classification

Step 5. Recycling of materials

Step 6. Disposal of surplus materials

Sub-action C.3.2. Family house

In this sub-action focus is renovation process in family house and how to apply 6 –step operation model in selected project.

Sub-action C.3.3. Apartment building

In this sub-action focus is renovation process in apartment building and how to apply 6 – step operation model in selected project.

Sub-action C.3.4. Pilot projects in demolition examination procedure

Demo; How to minimize and recycle construction waste in renovation and demolition pilot projects of the city of Pori.

Sub-action C.3.5. Other targets

In co-operation with the Satakunta University of Applied Sciences, life cycle assessment of construction materials will be made for 1-2 selected building project demos in order to determine the environmental impact of materials and products.

In cooperation with companies, four case applications will be carried out on new resource-efficient solutions in potential case areas. One of them is the implementation of a soil bank (soil recycling area), where different qualities of soil will be separated, so that they could be utilized in other construction projects. The creation of a soil bank for the establishment of e.g. stone maintenance in connection with restoration of areas could bring synergies. Possible soil bank practitioners could be construction and soil actors in cooperation with the municipality.

In collaboration with the company network 3-6 new carbon-neutral technical building and service solutions can be further processed and used in other applications. Demonstration projects can identify good practices and export the information with other applications to be implemented.

Where

The resource-efficient construction and housing actions will be carried out in nine municipalities in the Pori region (Pori, Ulvila, Nakkila, Kokemäki, Harjavalta, Huittinen, Luvia, Pomarkku, Merikarvia) and in housing fair area. The coordinator is located in the City of Pori Environmental Agency. The work focuses on the presented potential projects.

When

This action will be conducted during phase one and phase two of the LIFE IP project.

For the four selected building projects, complete plans (six –step operation model) will be made for new demonstration, testing or piloting projects including budget and financial plans (if needed) in cooperation with the partner network: 3/2019 – 3/2020.

Life cycle assessment of construction materials in cooperation with the Satakunta University of Applied Sciences for 1-2 selected demos: 4/2018 – 10/2018

Cooperation with the University of Applied Sciences or other selected partner to build up a research method to develop a proactive planning of demolition waste, to start 2/2018.

Demo applications on new resource-efficient solutions in potential demonstration areas: 3/2018-12/2020.

3-6 new carbon-neutral technical building solutions for recycling materials: 1/2019-12/2020.

Identified resource-efficient business models and service solutions: 5/2018 -12/2020.

Why:

The focus in construction is shifting from new building to renovation, though waste volumes are predicted to grow. The EU Waste Directive requires that by 2020 member states will recycle 70 % of construction and demolition waste material. Certain materials are challenging, gypsum board waste, wood-based demolition waste, as well as tile and porcelain waste. how to recycling. The need for annual technical repair of Finnish housing stock is estimated to be 3.5 billion euros on average. For the upcoming ten years, the most significant increase in the need for repair will come from urban apartment blocks. At the national level, a total of 92 % of the technical need for repair is feasible in the economic sense.

Resource efficiency in construction still requires development. Companies, authorities and educational institutions require a coordinating body for co-operation.

Increase the proportion of green procurement is important. The Project will create and ensure the use of the green procurement practices also in other municipalities, the city of Pori area.

One of the driving forces is that Pori will organize the 2018 Housing Fair, which will offer an excellent opportunity to demonstrate material efficiency in a new residential area.

In 2017 start a number of large real estate renovations at the City of Pori. Projects are mainly schools and educational institutions. There is a need for find cost- effective solutions for placement of demolition and construction waste.

The energy use during the operational phase of a building is reducing, therefore the embodied energy due to a building's materials and construction is becoming a larger percentage of a building's total energy over its lifetime. Therefore, it is essential to investigate the embodied energy of structures and determine ways to reduce this energy in the same way operational energy has already been reduced. The results are useful to architects, structural engineers, contractors, and owners interested in predicting environmental impacts throughout a structure's life.

Constraints and assumptions

It is assumed that the development themes of the resource-efficient residential area are an excellent place to test resource-efficient services and innovations. However, it is realistic to expect that conflicts of interest may arise between different actors on construction quality, materials utilization, recycling and utilization of by-products. To overcome these conflicts, the action will produce and disseminate relevant information on long-term sustainable solutions among stakeholders to be used in regional decision-making.

The challenge is to find the demo projects and to ensure financing. Therefore a feasibility study will be carried out.

Any company or actor in Finland can join the network if they have an interest in the Pori region. However, the resources of the network are limited. For this reason, the resourceefficient construction and housing network in the Life IP project will limited its action to demo projects in the Pori region.

Expected results (quantitative information when possible):

- 70 % of construction and demolition wastes are recycled in cases implemented
- List of good practices, five of which will be successfully implemented in demo cases.
- At least four new resource-efficient business models and service solutions in cooperation with Satakunta University of Applied Sciences, network companies and actors.
- Increase the proportion of green procurement in demolition of buildings projects.
- Four selected demo applications of new resource-efficient solutions.

Cost estimation:

City of Pori:

Personnel 102 327 €, Travel 9 180 €, External assistance 29 000 €, Consumables 4 200 €, Other costs 2 500 € + overheads

Life funding is required for implementing resource-efficient construction and demonstrations of recycled material, providing information, maintaining and developing a collaborative network.

Salaries and contributions of the project personnel account for most of the costs (70%). A total of 22 man-months are available for project personnel: a total of 11 man-months for the project manager and 11 man-months for a specialist. The average cost for one man-month is € 3 550: project manager € 3 900 /mth and the specialist € 3 200/mth.

The outsourced expertise required in the project will account for 20 % of the total costs of the project. This will be opened to tender as required for public acquisitions.

The objective of Life funding is to support the implementation of demonstration projects. Demo projects will have their own funding, which depending on the project will be municipal or private financing.

All public permanent staff will be specifically seconded to the project.

Deliverables:

- Reports of profitability calculations for 4 demonstrations / pilots. (9/2019)
- Report of actual construction waste reduction in the demo applications.
- Reports of new resource-efficient solutions in demo applications.
- Project plans for 4 demonstrations / pilots.
- Life cycle assessment of construction materials for 1-2 demonstrations / pilots.
- Website information on Pori Housing Fair to feature new carbon-neutral technical building solutions or services.
- Final report of the activities. (3/2021)

Milestones:

- First Project plan for new demonstrations 8/2018

- Project plan for demolition and renovation demos at the city of Pori 3/2018
- Method to verify the entering and exiting materials, construction material demo 12/2019
- First new carbon-neutral technical building solutions 3/2020
- Housing Fair in Pori 2018

Code of action	Name of the Milestone or Deliverable	Type	Deadline according to original project plan	New suggested deadline
C.3	Reports of profitability calculations for 4 demonstrations / pilots.	Deliverable	31.1.2017	30.9.2019
C.3	Report of actual construction waste reduction in the demo applications.	Deliverable		31.3.2021
C.3	Reports of new resource-efficient solutions in demo applications.	Deliverable	31.3.2018	31.3.2020
C.3	Project plans for 4 demonstrations / pilots.	Deliverable		30.9.2019
C.3	Life cycle assessment of construction materials for 1-2 demonstrations / pilots.	Deliverable	31.8.2018	Completed
C.3	Website information on Pori Housing Fair feature new carbon-neutral technical building solutions or services.	Deliverable	31.3.2018	Completed
C.3	Final report of the activities.	Deliverable	31.12.2018	31.3.2021
C.3	Project plan for waste reduction demos (at Pori Housing Fair 3/2017)	Milestone	31.3.2017	30.6.2019
C.3	First Project plan for new demonstrations 8/2017	Milestone	31.8.2017	30.6.2019
C.3	First new carbon-neutral technical building solutions 3/2018	Milestone	31.3.2018	31.3.2020
C.3	Housing Fair in Pori 2018	Milestone	31.7.2018	Completed
C.3	Method to verify the entering and exiting materials construction material demo 2/2017	Milestone	28.2.2017	31.12.2019