UPACMIC - LIFE12 ENV/FI/000592

Assessment of the socio-economic impacts

Description of work

Assessment of the socio-economic impacts was made at the end of the UPACMIC project. The impact on the local community, population and economy was evaluated. The information was gathered in many discussions with project partners, seminars and, also in cooperation with other projects working at Hitura Mine (KAIVASU and LeKaT projects). UPACMIC project partners Fortum Waste Solutions Oy (later Fortum) and Skarta Finland Oy (later Skarta) acted as a constructor at projects piloting sites. Partners representatives, construction site managers, were interviewed in April 2022. Local newspapers and social media were also reviewed to assess the situation.

Location

Hitura Mine is located in Northern Ostrobothnia in a small city called Nivala. It operated in the area since 1970s and employed approximately 110 persons. The mine company went to bankruptcy in 2015 and the closure of the mine started. The closure operation continued until 2021. Total population of Nivala is ca. 10 000. Hitura mine is located next to Aittola village, in a sparsely populated area approximately 10 km distance from the center of Nivala. Aittola village has a school ca. 1,5 km distance from the Hitura mine area. The scenery around the mine is countryside with fields and forests and a riverside. Agriculture and forestry have been practiced in the area since a long time and there are farms operating in the area. Locals are using the area surrounding the mine for recreation (e.g. jogging, cycling) and there are several recreational routes surrounding the area. There are activities also inside mining area as the slopes of the side rock piles are used by a local farmer to graze cattle and hunting is practiced near the open pit mine area.

Figure 1. Satellite image from Hitura mine and its surroundings. Aittola village is located North-West from the mine. (Source: Maanmittauslaitos 2022)

Information about pilot projects

Hitura mine was owned by the company Belvedere Mining. Belvedere Mining was initially also an associated beneficiary of the UPACMIC project, but when the company went to bankrupt in December 2015, it was withdrawn from the project. Mining activities stopped in the mine already in 2013 when the nickel price dropped dramatically below the break-even point. Since the bankruptcy the Centre for Economic Development, Transport and the Environment of Northern Ostrobothnia has overseen the closure of Hitura mine. The total area of the mining concession is approximately 350 hectares, of which approximately 100 hectares were to be closed.

The objective of the UPACMIC project is to promote the utilization of industrial by-products with the possibilities existing in European countries in relation to mine construction with common alternative construction materials. Fortum was responsible of the pilot during the first phase of Hitura mine closure, which took place in 2017-2020. The work was supervised by the Centre for Economic Development, Transport and the Environment of Northern Ostrobothnia. Closing of tailings ponds was part of the contract, for which the Fortum offered the UPACMIC solution utilizing fiber clay in the structures. This was the first time to use fiber clay in the mining environment in Finland in cover structures. Fortum also carried out pilot project in Kuopio Sorsasalo industrial waste landfill in 2020-2022 but this assessment only focuses on Hitura mine and Nivala area, where most of the pilots took place. In Hitura Fortum also replaced current water treatment process with new equipment and designed and constructed additional water treatment system. However, this was not part of UPACMIC project.

Skarta was responsible of the pilot during the second phase of Hitura mine closure, which took place in 2019-2021. The work was supervised by the Centre for Economic Development, Transport and the Environment of Northern Ostrobothnia. During the second phase, the cover structure was piloted in the closure of the crushed rock pile. In the construction, clay from the mining area was used to replace the use of moraine. Skarta also constructed reactive structures which were piloted at Hitura mine. Closing of the rest of the tailings ponds was part of the contract as well, but this was not part of the UPACMIC project.

Impacts on economy and employment

Pilot projects had positive impacts on local employment as many locals from Nivala area were employed to work short- and long-term during the construction activities. To carry out the work, Fortum used a subcontractor from Kotka, which provided a supervisor and machinery. In addition, the subcontractor hired 6 local employees. When necessary, contribution from local contractors was also obtained. In total, the pilot project in the first phase employed 10 locals.

In the second phase Skarta used a subcontractor operating in Haapajärvi at about 30 km from the Hitura mine area. The subcontractor used its own employees and equipment, as well as local contractors and their machinery in Nivala. About 10-13 people from Nivala and surrounding areas worked for Skarta's subcontractor, mainly on a long-term basis. Longer work periods ranged from about three weeks to three months. When necessary, locals were hired for short-term work, and up to 30 machines were in use at the same time during the busiest time. In addition to the work taking place in the mining area, locals also took part in other activities, such as transportation of moraine from outside the mining area to be used at the site.

There is a lot of agricultural activities and farmers operating in Nivala area, which made it possible to have both off-road vehicles (e.g. tractors and other vehicles) and labor available locally. This had a positive impact especially on the Skarta pilot. Without local farmers, getting facilities and vehicles would have been more difficult. As the equipment was easily available locally and did not need to be imported from further afield, it could be used flexibly at short notice, when necessary. The piles at the site were not accessible by truck, but as tractors could be used, no additional loading was required separately. The use of off-road vehicles allowed for smoother work and movement in the mining area. Although fiber clay was used for the first time in the mining environment in Finland in cover structures, it was possible to work it using conventional machinery. No special machinery were needed for the works. This meant that construction was relatively easy and locals, who had no prior experience on it, could work on the cover structures.

Initially, during the closure of the crushed rock pile, it was intended to obtain moraine from outside the mining area. This would have required long distances for transportation of rock materials. However, at Skarta's suggestion local landmasses were exploited and clayey soils were obtained from a local farm area about 1 km distance from the pilot site. The area was an old field from which both clay soil and the topsoil could be utilized. Some moraine was still needed during the construction, but the amount of rock material imported from outside the mining area was eventually lower than planned.

The fiber clay used in Fortum's pilot was imported from the factories, and no transport companies from Nivala were used for transportation. The vehicles used to transport fiber clay were mainly peat and wood chip trucks, which were able to transport larger volumes than normal cassette trucks. However, the off-road capability of peat and chip trucks was not very good compared to, for example, dump trucks. There were challenges, especially during the frost breaking period, when the condition of local roads used for transportation deteriorated, and they had to be rehabilitated on several occasions. In addition to fiber clay, moraine was also used in Fortum's pilot. The use of fiber clay reduced the need for moraine. Technically it would have been possible to use even larger amounts of fiber clay in the structures, but there were challenges in its availability.

During the pilot projects, employees and other project staff used local services such as shops, restaurants and accommodation, having positive impact on local economy. Stores (e.g. Agrimarket, Hankkija, K-Rauta) were also used for obtaining tools and utensils. Local knowledge of contractors and employees was utilized in activities such as sourcing materials and contacting good local actors for installations and crane services.

Social impacts

In addition to the positive impacts on local economy and employment, especially the closure of the tailings ponds has been generally welcomed by the locals as covering the pools reduced dusting. The tailings sand basins were in a low-lying area about 20 m above the ground. Before the covers were constructed, during a severe storm, the dust rising from the surface layers of the basins traveled as far as the village of Nivala and caused nuisance.

Moraine was transported to the mine area from approximately 10–20 km distance. There were two schools along the transport route and the children use the road as a school route. As the number of moraine transports was lower than planned, it had a positive effect on the road safety for the children and other locals using the road.

During the pilots, there was some dialogue with landowners around the mining area. There was a chapel for funeral services and a cemetery located near the mining area. It was agreed with the parish that during the funeral ceremonies the works on that side of the mine site would be silenced

to make no disturbance. The site manager went through the burial schedules with the parish in advance so that the work could be phased in, so the activities had no effect on the work schedule.

During the pilots, some locals, mostly old Miners, visited the site to see the progress of the work. There were prohibition signs in the mining area, but it was possible to infer from the traces left in the terrain that local youth had occasionally spent time in the area. There are several recreational routes around the mining area. Some of the nearby residents of the mining area also took walks within the mining area, but it was assumed that several of them had previously worked in Hitura mine. The distance of the mining area from the village of Nivala was about 10 km, so it did not attract many villagers to the area. The locals who occasionally moved around the mining area did not mainly cause any problems. The barriers to close the area were not built in the area until the final stage of the second phase.

Involvement of locals on the construction activities during the pilots has increased their capacity and knowledge on working with alternative building materials. It also helps spreading the information in the field and increases the social awareness of residents. When wider public gains more knowledge about the use of alternative materials and their benefits, it can increase positive attitudes towards different opportunities on sustainable practices.

Possibilities for further use of the Hitura mine area

Possibilities for the future use of the Hitura mine were studied in the KAIVASU project, which also held a public meeting in Nivala in October 2021. The re-use of the mining area was discussed at the event and locals could give ideas for re-use of Hitura mine area. Giving information about the closure and related activities and involving locals in the planning of future activities of the mine area can decrease possible negative impacts and increase the acceptability of the future activities. During the project's final webinar is March 2022 participants could also give ideas for possible re-use of Hitura mine. Views collected during the KAIVASU project and during the webinar are combined in following chapters.

There are various possibilities for future use of the Hitura mine area. Even today, the slopes of the side rock piles are used by a local farmer to graze cattle. Local farmers also have hopes to get some more land area for farming.

It has potential as a renewable energy production area. There are plans to implement an industrial-scale solar park for the tailings sand areas released from the Nivala Hitura and Pyhäsalmi mines.

Examples of other possible re-use opportunities for tourism and recreation include recreational and outdoor activities, motorsports, downhill skiing, an adventure park and bird watching. Incorporating the mining environment into existing trails and routes around the mine would provide additional opportunities for downhill biking, jogging path, frisbee golf, and other sports activities throughout the year. From a tourist point of view, the area could be used, for example, as an observation deck and related services, or for mining area hiking, where one would also learn about the history of the area. On the other hand, the area could be used, for example, as a research area for the reuse of materials or as a demonstration site for mine aftercare / environmental impacts.

Summary

The UPACMIC project had a positive impact on local employment and economy and built the capacity of locals working with the project.

The knowledge and attitudes towards using the alternative constructing materials in the field of mining has increased. There is a will to use these methods but the road from piloting stage to commonplace method is long. The applications presented by UPACMIC project are needed in the field. The UPACMIC project has developed an easy-to-use guide for the stakeholders and Material

matrix to facilitate the selection of the suitable materials. Positive experiences on the use of local workforce, contractors and local actors during the UPACMIC project can support the use of locals in other projects as well. This in turn increases their capacity and spread of information on the use of alternative building materials and sustainable practices in mine closure.

There is a chance for raising the profile of the Nivala area if the re-use of Hitura mine area in the future is implemented in a sustainable way which attracts positive interest. In the planning of re-use it is necessary to acknowledge the durability of any cover and protection structures and the possible restrictions caused by them, as well as requirements and liabilities of the area. Good experiences and information gained and shared publicly during the UPACMIC project can also have a positive impact on the image of Hitura mine area.