

Land Policy and Reform to Support Sustainable Use of Land

Urban Transformation for The Prevention of Disaster

Marija JURIC, Sweden

Key words: urban transformation, Kiruna, mining

SUMMARY

Sweden's northernmost and as for area largest municipality - Kiruna - is undergoing major urban transformation as a consequence of large-scale mining. Changes in the physical environment caused by the mining operations are cracks, collapse of land, pollution of water and soil, dust, poor air quality, etc. There are approximately 20 000 inhabitants living in Kiruna. To prevent a future disaster not only for residents but also for animals and plants, the municipality of Kiruna along with other actors have started a long-term project of moving the town to a new place within an acceptable distance, approximately three kilometers to the east.

There is a special bond between Kiruna and mining. People living in this so-called "Arctic town" use to say that without the mining, Kiruna would not have existed, and without Kiruna, it would be impossible to mine the ore.

Kiruna's iron ore mine is the largest underground mine in the whole world, producing over 26 million tons of iron ore each year.

The transformation of Kiruna is a complex process which includes collaboration between many actors. A few to mention: the Municipality of Kiruna, the County Administrative Board, Lantmäteriet (the Swedish mapping, cadastral and land registration authority), property valuation experts, architects, the state-owned mining company LKAB (Luossavaara-Kiirunavaara Aktiebolag), residents of Kiruna and others.

This paper presents the different phases of urban transformation implemented so far with success and in good time. The objective is not only to protect people, animals and plants, but at the same time to ensure important raw material (iron ore) for Sweden and the rest of the world.

Urban transformation for the prevention of disaster

Marija JURIC, Sweden

1. BACKGROUND – KIRUNA AND THE MINE

Long before Kiruna became a city, the area has been populated by the Sami people. Sami is a group of natives who came to the northern parts of Sweden, Norway, Finland and Russia after the inland ice cap retreated. Main occupation of the Sami was and even today is reindeer herding.

Existence of iron ore in the ground around Kiruna was known already during the 1700s. Because the area was too far away, there was no option to begin to mining the ore. There was no railway and the roads were in poor condition, often non-existent.

Mining of ore commenced under the 1800's during the summer time because of the cold weather in the winter. Transportation was handled during the summer with the help of reindeer and horses.

Problem with the transportation was solved under lately 1800's by building railway from Luleå on the Swedish coast to Narvik on the Norwegian coast.

Industrial company LKAB (Luossavaara-Kiirunavaara Aktiebolag) was founded in year 1890 in order to take advantage of the richness of the iron ore. This led to that Kiruna became a city year 1900. Very fast LKAB became an important factor in Swedish export industry and industrial development. Year 1976 the Swedish government became the owner of LKAB.

LKAB helped financially to build houses and provide jobs to residents. This led to that the inhabitants had a reason to stay and settle in the vicinity of the mine. Kiruna became a major center of iron ore extraction and mining industry.

Today is the LKAB, often called "The Kiruna mine" the largest underground mine in the whole world, producing over 26 million tons of iron ore each year. In December 2015 LKAB celebrated 125 years of successful mining.

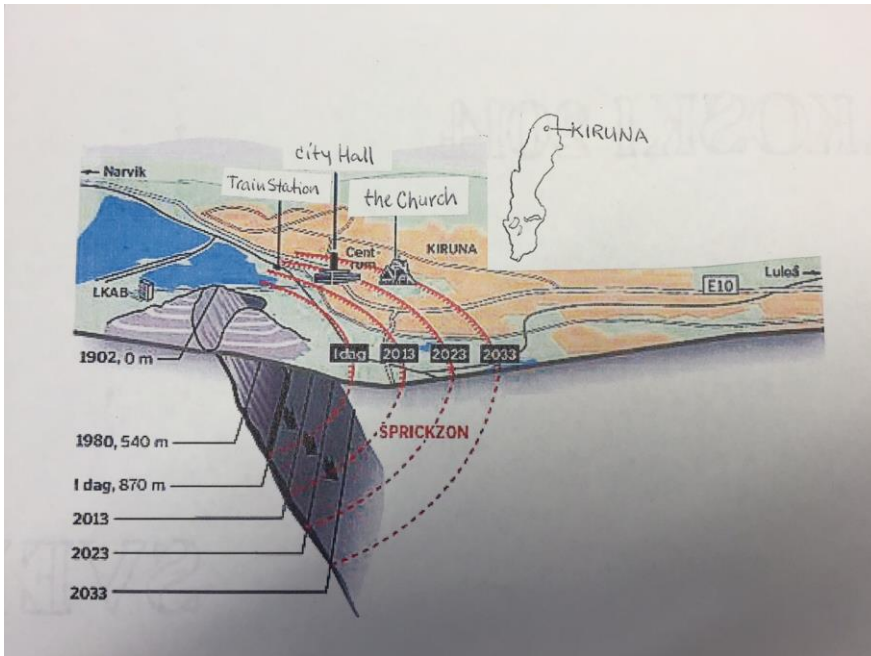
There is a special bond between Kiruna and mining. People living in this so-called "Arctic town" use to say that without the mining, Kiruna would not have existed, and without Kiruna, it would be impossible to mine the ore.

Today Kiruna is Sweden's northernmost and as for area largest municipality with about 20 000 residents. Located about 145 km north of the Arctic Circle, Kiruna is also a very popular touristic destination that offers experience of polar night and the midnight sun among others attractions such as the Ice Hotel, sledge dogs rides, snow scooter tours, skiing and snowboarding, impressive mountain scenery, reindeer grazing, etc. The many lakes in the area around Kiruna create opportunities for fishing and kayaking in the summer.

The natural resources that surround the city of Kiruna are an important prerequisite for industry in Kiruna.

Today Kiruna is undergoing major urban transformation as a consequence of large-scale mining. Changes in the physical environment caused by the mining operations are cracks, collapse of land, pollution of water and soil, dust, poor air quality, etc.

The question that everyone started asking was - what needs to be done to prevent disaster?



(Part of the picture - source: NyTeknik. Image by: Ingemar Franzén)

2. URBAN TRANSFORMATION – DIFFERENT PHASES OF THE PROJECT

2.1 Beginning of project

Year 2004 LKAB announced that mining of ore had come to such level that continued mining would jeopardize security of the city and that therefore the city needs to be relocated. Over 3000 apartments and almost 200 000 square meters facilities for service, retail and municipal activities will be affected by year 2035.

After long discussions the City Council decided year 2011 to move the town to a new place within an acceptable distance, approximately three kilometers to the east. The same year the municipality of Kiruna requested to acquire new land owned by the state to build the new Kiruna.

The ongoing project has been given the name: Urban transformation of the city of Kiruna. This is a huge project where a lot of surveys, permits, decisions and projects must be coordinated. The

Urban Transformation for the Prevention of Disaster (8095)
Juric Marija (Sweden)

FIG Working Week 2016
Recovery from Disaster
Christchurch, New Zealand, May 2–6, 2016

Municipality of Kiruna decides over the detailed development plan and how the new community should look. The urban transformation is a collaboration between several actors and stakeholders, such as the County Administrative Board, Lantmäteriet (the Swedish mapping, cadastral and land registration authority), the Swedish rail administration authority, property valuation experts, architects, residents of Kiruna and others.

The next step was to announce an architectural competition to find a strategy for urban transformation. The winning proposal will be the basis for municipal work with a new structure plan by year 2013. Tasks during the competition were to come with ideas considering:

- Description of a vision for the “new Kiruna” should be durability, attractiveness and identity. The vision should embrace growth and robust patterns of life.
- Description of a strategy and basic sustainable structure for how urban transformation should take place to the east in a dynamic value creation process, where the new and the existing form a unity.
- To provide suggestions on how to design a sustainable, inspiring and pleasant city center.

The White architecture firm won the competition with their project called “Kiruna 4-ever”. In short, the project aims for a mixed city where new homes will be built in varying tenure and price levels. The city will be build step by step. The project expresses a desire to buildt a sustainable society based on ecological, social and economic aspects. Buildings must be energy efficient and built with recycled and local materials wherever possible. Waste heat from the mining operation will be used to district heating and ecosystem services. Selection of plant species and biological diversity should be considered when planning green surfaces (Kiruna municipality, 2012).

2.2 Collaboration between Kiruna municipality and LKAB

In February 2011, two agreements were entered between Kiruna and LKAB. One of the agreements is a civil contract governing expenses and the other is an implementation agreement that manages the transformation of the area from the current operations/activity to parkland and finally to the industrial park. Furthermore, Kiruna Municipality council decided about a detailed development plan for area called “Gruvstadspark 1”.

In June 2014 the City Council adopted in Kiruna civil contract “Gruvstadspark” part 2 between Kiruna and LKAB, an agreement about how parts of the city should be phased out and how the new areas will be developed (LKAB, 2015).

In the spring of 2015 the Municipality of Kiruna and LKAB presented proposal on purchase - schedule and resettlement schedule for the center of Kiruna. Along with the contract “Gruvstadspark” part 2 and the development plan for the new Kiruna everything is now ready for to start urban transformation before dismantling of the housing.

2.3 Lantmäteriet's role in the project

In recent years, Lantmäteriet (the Swedish mapping, cadastral and land registration authority) has greatly expanded workforce in Kiruna. Working as a cadastral surveyor in Kiruna means to try all kinds of cadastral adjudications in the property formation and gives a good insight into the work of municipality and LKAB's work on urban transformation. The cadastral surveyor gets also a good understanding of how individuals and other parts affect the project and each other during the project of urban transformation.

Work already completed by Lantmäteriet:

- Rights to Kiruna's new waste water management and electricity supply system are formed - one of the largest investment network, carried out in Sweden and comprises a total of 60 km new wiring.
- Approximately 15 km of the railway has moved to crack-free land. This was a huge investment that was inaugurated in August 2012.
- Land owned by the municipality of Kiruna is being with help of reallocation transferred over to LKAB's property to enable for future mining (Lantmäteriet, 2013).

As soon as the new detailed development plan becomes final, it will mean even more work for the Lantmäteriet such as implementing subdivisions, reallocations, formation of joint facilities and utility easements, etc.

3. CONCLUDING REMARKS

The implementation of the different phases in urban transformation in Kiruna is ongoing, and the interest among locals and rest of the world is as high as ever. The fact that planning began in good time, before it was too late, serves a good foundation to further development.

REFERENCES

Kiruna municipality (2012), *Architecture competition brief*, Planning office, Kiruna, 9 Februari 2016.

Lantmäteriet, the Swedish mapping, cadastral and land registration authority (2013), Report: *A lot of work for the relocation of Kiruna*, Stockholm, 8 February 2016.

LKAB (2016), Department of urban transformation, *Borders and lines that guide the planning*, available: <https://www.lkab.com/sv/Framtid/Samhallsomvandling>, viewed 8 February 2016.

Urban Transformation for the Prevention of Disaster (8095)
Juric Marija (Sweden)

FIG Working Week 2016
Recovery from Disaster
Christchurch, New Zealand, May 2–6, 2016

NyTeknik (2014), *cracks threatening town*, available:

<http://www.nyteknik.se/nyheter/basindustri/gruvindustri/article3872402.ece>, viewed
February 2016.

12

BIOGRAPHICAL NOTES

Ms Marija Juric has been working as a cadastral surveyor for Lantmäteriet, the Swedish mapping, cadastral and land registration authority, since 2007, after graduating with a bachelor degree in Surveying from University West in Trollhättan, Sweden. She works with all types of cadastral procedures but mostly with forming utility easements. Since 2012 she is a delegate to FIG Commission 7.

CONTACTS

Marija Juric, Land administrator / Cadastral surveyor
Lantmäteriet, the Swedish mapping, cadastral and land registration authority
P.O. Box 47700
Stockholm
117 94
SWEDEN
Telephone: +46 8 709 57 68
Mobile phone: +46 729 99 26 07
Email: marija.juric@lm.se

Urban Transformation for the Prevention of Disaster (8095)
Juric Marija (Sweden)

FIG Working Week 2016
Recovery from Disaster
Christchurch, New Zealand, May 2–6, 2016