The Experience of Brownfield Regeneration in Ronneberg, Germany

Case Study on Former Uranium Mining Redevelopment

1 Background

With the development pacing into a post-industrial age, Brownfield has become a hot issue in urban development. The first official definition of “Brownfield” is from U.S. Environmental Protection Agency. In General, "Brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant”(Agency, 2011). In the United Kingdom and Australia, the term applies more generally to previous used land. No matter what’s the difference among these definitions, how to reuse the contaminant land is crucial for limited constructive lands nowadays. We should value every inch of land we have.

Especially in contemporary China, many cities are facing the dilemma of lacking constructive land, but on the other hand, most “Brownfield Land” emerging with the economic structural transformation is still in abandon. Therefore the research of the Brownfield Land redevelopment in China should be of great significance.

2 Germany experience

In recently years, Germany does lots of effort to reduce land consumption, which is important for low-carbon development. It indicates that Germany has proficient experience in Brownfield Land reuse, hence this paper will take a case study in East Germany, where the past Uranium mine now served as a leisure site for surrounding people.

2.1 Introduction

The studied case was a former Uranium mine located in Ronneburg, which is a town in the district of Greiz, Thuringia, Germany. It is situated on the A4 motorway. To its 7kms east is Gera, the second largest city in Thuringia. During the GDR time, the site was the biggest uranium mining is Germany. At that time, 11 percents of the world's mined uranium are from Ronneburg. Gera and the surrounding cities took lots of benefits much from mining industry.

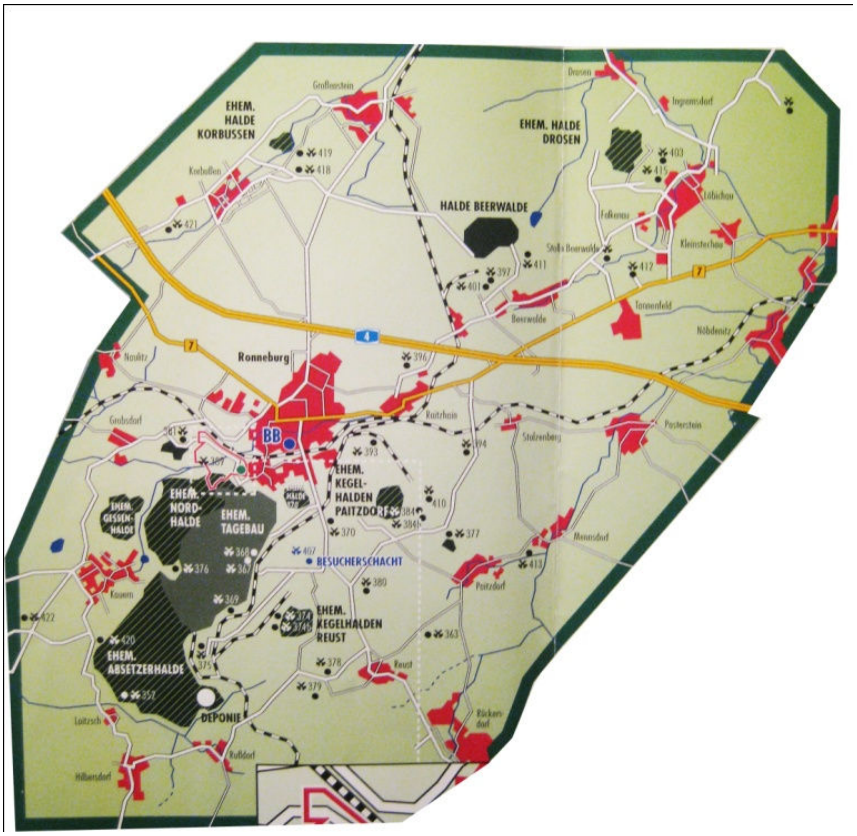

Fig1. Map of uranium mining site in Ronneburg

2.2 History

Nowadays, this former uranium mining site is belonging to a federally-owned company Wismut GmbH, which covers areas across Saxon and Thuringia in East Germany. The main task of this company is site remediation. But before that, the site has a very complicated history.

From 1945 - 1953, the site belonged to SAG Wismut. The successful prospecting for uranium immediately after WWII prompted the Soviet occupation forces in 1947 to establish the state-run Wismut Company in Aue. Run by the Soviet military, the company's sole aim was the exploitation of German uranium deposits for the Soviet nuclear program. This followed the transfer of Saxon mining companies into Soviet ownership to cover reparation claims of the war. Employing an enormous workforce, uranium ore mining quickly spread across the Ore Mountains and to Eastern Thuringia. During the early "wild" years, uranium ore mining in Saxony and Thuringia was characterized by poor working conditions, complete disregard for the environmental concerns of the densely populated areas, and the destructive exploitation of resources.

From 1954 – 1991, the site belonged to SDAG Wismut. By the mid-50s, the "wild" years at Wismut had come to an end. Unrestrained exploitation was replaced by efficiency methods to ensure long-term viable mining. Scientific investigation of deposits was intensified, and underground working conditions were improved. Founded in 1954, **t**he new bi-national Soviet-German company SDAG Wismut continued uranium mining with the GDR being

shareholder. A permanent workforce levelled off at some 45,000 and remained at that level for more than three decades. Vested with privileges, Wismut remained a "state within the GDR state". During the 45 years of its existence, the company had produced a total of 231,000 tonnes of uranium. This ranks Wismut as the 4th in world-wide uranium production, after the USSR, the US and Canada as first, second and third, respectively. Following German reunification, uranium mining was terminated on December 31, 1990. In mid-1991, the USSR disclaimed its shares under the terms of a state treaty. The Federal Republic of Germany became the sole shareholder(Seeleman, 2007).

2.3 Ecological Revitalization

2.3.1 Wismut GmbH's Efforts

The first and most difficult problem facing to the Brownfield regeneration is the earth remediation, which is the same in the site in Ronneburg. After reunification, the task for site remediation was conducted by a federal company - Wismut. Rehabilitating large-size radioactively contaminated sites which were formerly operated by Wismut in Saxony and Thuringia is one of the largest ecological and economic challenges facing the reunited Germany today. Established in 1991, Wismut GmbH addresses itself to the task of reclaiming former mining sites and restoring the environment for the benefit of man and nature.

As an institutional donee, Wismut GmbH is financed by the federal government which is funding this exceptionally large environmental project and has committed a total of € 5.4 bn until 2010.Funding of Wismut GmbH is based on annual work plans and project budgets.

Fig3, the financial structure of Wismut GmbH

2.3.2 Ronneburg experience in remediation

The site that needs to be remediated is about an area of 170ha, all the remedial effort in Ronneburg is focused on such aspects.

Mine flooding

The aim of mine flooding is approximately 27 million m³ of open mine. At present, the flood water has risen to a level of ca. 250 to 260 m a.s.l. Based on the current state of knowledge it is estimated that water treatment will have to be continued for a period of up to 25 years.

Water treatment

In its present condition, the plant has a capacity to treat ca. 450 cubic metres of contaminated mine water per hour. For the purposes of controlled flooding, the plant capacity will have to be upgraded to 750 m³/h by the year 2011. It is anticipated that the plant will be in operation for up to 25 years.

Tailings ponds

Currently, and for a couple of years to come, focus is on recontouring the tailings sites and on placing a final cover. In a further step trails and ditches to catch and control surface water run-off will be constructed. Finally, the constructed landscape features will be seeded and planted.

The Lichtenberg open pit uranium mine

One of the most notorious legacies of SDAG Wismut is the Lichtenberg open pit mine. The focus today is on capping the constructed fill body as well as on the construction of trails and hydraulic engineering work. A surface in excess of 170 ha had been capped with a two layer cover by 2008. After completion, the trail network shall have a total length of 17 km and ditches to catch and control surface water run-off of more than 20 km.

2.4 Social Revitalization

Redevelopment of a Brownfield is not only “clean” the earth, but also “relive” the human environment and communities. But how to find the trigger for an abandon land is a key issue. The 2007 National Horticultural Exhibition (BUGA2007) held at Gera and Ronneburg, lasting form 27 April to 14 October, really brought positive effect for further social development(BUGA2007, 2011).

BUGA is the “Biennual Federal Horticulture Show” in Germany. It also covers topics like landscaping. Taking place in different cities, the location changes in a two-year cycle. With a high budget, extensive landscape architectures and gardening are realized that support the regional development objectives in the respective cites. The first BUGA was held at Hanover in 1951. Just like any other cities after the Second World War, this event not only restore damaged parks but also provide an atmosphere of optimism and creativity. From the half-century history of BUGA, it’s much more than a forum for the horticultural industry.

Under such circumstances, BUGA2007 was held in Gera and Ronneburg, form 27 April to 14 October. In Ronneburg, the former Lichtenberg open pit mine is a main site of BUGA2007 and covered approximate 60 hectares of exhibition space. The theme for this site is “new landscape”, which means the profound change from a Brownfield to be a green space for public.

The original idea of BUGA 2007 is from the uranium mining industry development in Ronneburg. After 40 years heavy pollution for the environment, the site decided to combine the rehabilitation of former mining areas with the revitalization of the entire region. This contaminant area should be transformed to a regional greenbelt area. Therefore the corporation with Gera is according with the aim: linking parks in these two towns center with a new greenway, creating a 4km “green corridor” between two sites. The success of BUGA2007 obviously realized these goals and was even better than imagined.

In view of spatial distribution, the whole site in Ronneburg is divide into three different functional areas. The first is a garden exhibition area including four theme parts. It comprises a large arboretum with collection of trees in northern hemisphere, a rose Garden with 261 varieties roses including 70 new products, a companion plants and a Thuringia world where garden architectural representation from 12 Thuringia landscape images(Theokas, 2004). The second is a memory landscape named Lichtenberger edges, which has 3 terraces, being about 1 kilometer long with 187 oak trees. The edges illustrate the enormous scale of the mining and remember events in their levels form of the former mine in Lichtenberg. The walk-in edges are lined with large oak trees and meadows covered with site-specific. The third part lies in the participation function which mainly has three structures: a discoverer tower, an adventure bridge as well as a nature theater. The discoverer tower offers a phenomenal view for visitors. Groups can reach the top by an outside staircase. Those with more experience can challenge themselves with various climbing routes, which is targeted at school groups in particular. The adventure Bridge is an Europe's unique wooden one, being 240 meters long. The nature theater is a paradise where you can enjoy the magnificent panoramic view while sitting on the natural terraced seats.

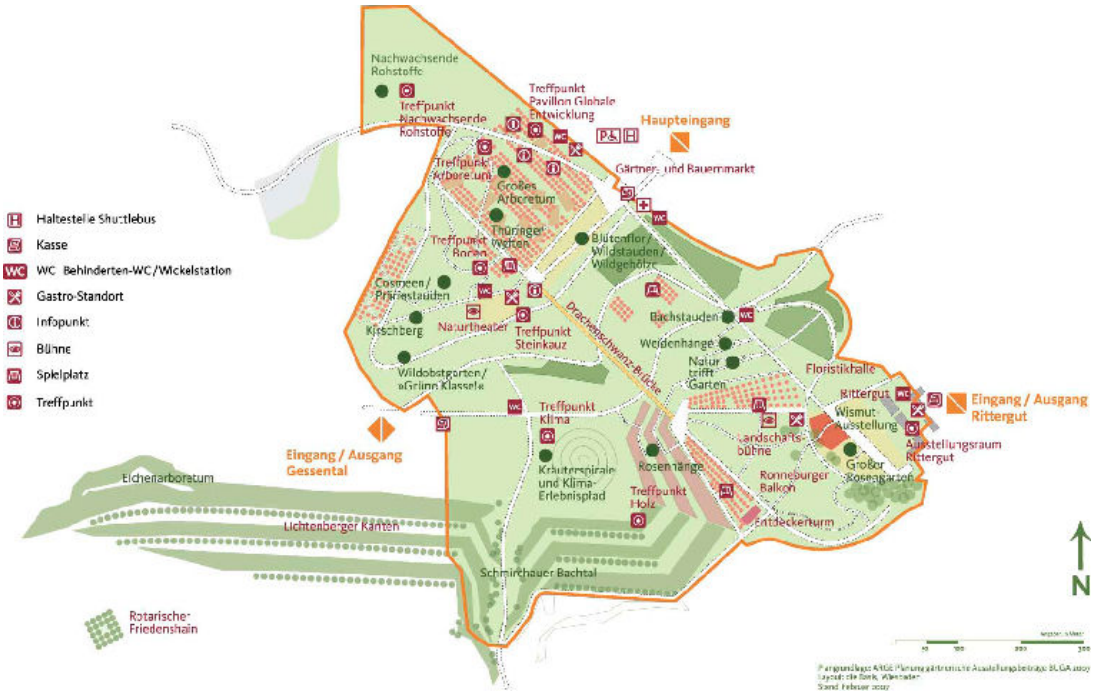

Fig 4, the site plan in BUGA2007 in Ronneburg

Fig 5: photo of BUGA 2007

Besides these ground exhibitions, more events in every week and month will be held to attract more guests. The service offered ranges from classical music to pop, from swing to rock. And some events are especially for target group, such as Children and family program.

2.5 Post-site Use

Big event could really promote the dynamics of region, but the post use is more important for sustainable development of a place. Nowadays, the old site for BUGA2007 has become a main recreation and hiking place for local residence. After BUGA, a series of facilities and hotspots have been preserved for visitors nowadays, such as the Discovery Tower and Adventure Bridge. Moreover, there is still a small museum which served as an education center for schools. It shows the history of the profound change of the site. Some models of old mining structure reminded people what has happened in the past. On top of the restored mount, there is a great place for BBQ and leisure.

3 Inspirations Derived from the Experience

3.1 Compact in land use arrangement

From the case in Ronneburg, attitude for land saving and compact land use is highly appreciated. They devote much energy and money on this project. As an unclear polluted site, the task is complicated and hard. But the 20 years efforts really give an attractive place for city. Based on this, the idea of low-carbon planning in Germany is so strong and pioneered.

3.2 Smart planning intention

Redevelopment of Brownfield site is not just a process of “cleaning”. Looking back to the history of preparation of BUGA2007, we find the idea start at 1995, just a few years later than the ecological restoration began. And the aim of this event is not only change the polluted site but also a larger region. It suggests that the ecological and social revitalization are both important. And they should at the same pace through planning .The aim of clean contaminant is to have a positive social effect, and the large social goal stimulate the process of earth restoration. Along with the long planning period, local governors also initiated some small projects. Hence the experience of managing the big task in a long time is very precious.

3.3 Post event use

When the big event ends, the aim of the site should be emphasized on local demand. Only the support of neighborhood could lead to sustainable future. Although the case in Ronneburg is still in the progress, the priority issue is changing it from a big party site to a permanent recreation and leisure space for people. But we can see that, the BUGA2007 supports the economic and tourist development of Ronneburg and large area. It evaluates the housing and living environment and creates local advantages. So that is what we look forwards in post-event time.

4 Outlook

Just like the introduction of Wismut GmbH said: It’s too valuable to be used only once. We should learn how to save the earth and where is the way to our future. We have used the land, giving pollution on it. But it’s not the end. We should not use it just once. Brownfield revitalization is long-term and hard task. To achieve a better future, profound planning and permanent action are needed.

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Name: Guan Ye

Current Status:

Postgraduate in College of Architecture and Urban Planning, Tongji University, Shanghai

Master of Advanced Urbanism in Bauhaus University, Weimar, Germany

Country: China