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The Functioning of the Cement Factory in the Rural Area of Királyegyháza, Hungary

Abstract

A real state-of-the-art cement factory has been recently built in Baranya county, in Királyegyháza, Hungary. The study intends to give a thorough overview on the impacts of the new plant. It is a typical rural area without large employers and industrial plants where agriculture has the strongest tradition. The investors and also the majority of the local community expect large economic and social benefits from this investment. The operator related to the regional waste management program aims to achieve sustainability and rational energy utilisation by involving local human resources, basic commodities, the ratio of the utilised fossil energy sources and the planned biomass which can be optimised. Environmental issues are also investigated, as the plant is still deeply committed to environmentally friendly production while the investment and the operation itself is continuously criticised by green movements.

Key words

Cement industry; Energy utilisation; Waste management; Sustainability; Locality; Human resources

1. Human geographical relations of the micro-region

The cement factory of *Királyegyháza* was built in the area of the *Szentlőrinci micro-region*. The *Szentlőrinci micro-region* composes a spatial, administrative unit with one town and 19 parishes (*Figure 1*). When it comes to its size, population (approx. 15 thousand persons) and the number of the settlements, it can be considered among the smallest in the country. Its position is peculiar, since it is situated between the most backwardly positioned (*Sellyei*) and the most dynamically developing (*Pécsi*) micro-regions. According to the 218/2012. (VIII. 13.) Government Regulation, from 1st January 2013 the *Szentlőrinci district* basically covers the same area as the micro-region, but it is enlarged by one more settlement.

According to the 67/2007 Parliamentary Decision, the micro-region was qualified to a lagging position (KSH, 2007), based on the measured complex social, economic, infrastructural and employment indicators. The micro-region consists of 11 settlements lagging by social–economic viewpoints and 15 suffering from unemployment which largely exceed the Hungarian national average. Therefore, based on the categories of the *National Regional Development Concept*, it is backward from social–economic points of view (SZENTLŐRINCI KISTÉRSÉG, 2008). It is a typical rural area with disintegrated countryside structure where *Szentlőrinc* provides 45% of the micro-region and 6,848 inhabitants at present. Three settlements may be classified as the most developed ones, namely *Szentlőrinc*, *Bicsérd* (1,008 inhabitants) and *Királyegyháza* (915 inhabitants), which concentrate nearly 60% of the spatial unit's population (KSH, 2012). 60% of the settlement substance belongs to the micro and dwarf villages out of which numerous settlements have only one road in and out of the settlement.

The area is divided in half by primary route no. 6. The landscape is dispersed north and south from this structural axis differ. On the north, the afforested foothills of *Zselic* and *Mecsek* are situated where the transport expansion of the settlements is on a nominal level. South from the main road, the villages with a more advantageous social–economic situation are allocated on the plain landscape. They are

traditionally and dominantly involved in agriculture, with *Királyegyháza* belonging to this category, as well (KECZELI, L. 2011).

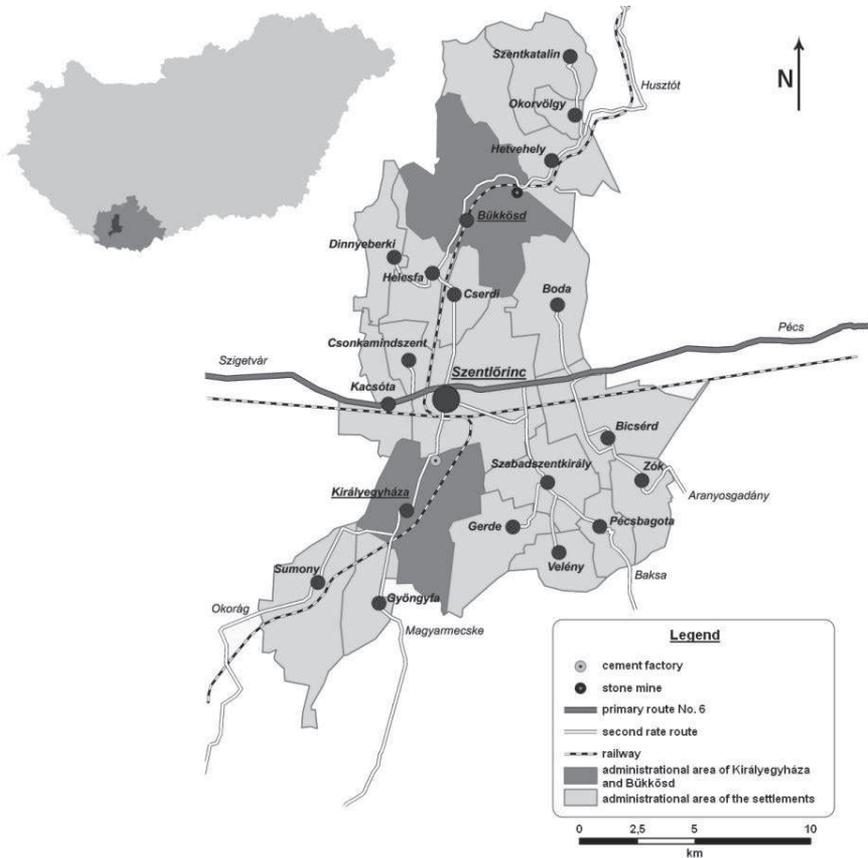


Figure 1 – The micro-region of Szentlőrinc

Edited by KECZELI, L. (2013)

2. The circumstances of the Királyegyháza cement factory’s construction

The planning period of the cement factory was an era full of conflicts. The initiation per se was also a peculiar phenomenon since in *Europe* no new cement factory had been built in the last 30 years (CE-

MENTVILÁG, 2011b). The first steps were carried out by the *Strabag Co.* in 2003. The original location in factory plans was *Bükkösd* referring to the limestone mine as a basic commodity base. The settlement is located along the meeting point of the *Mecsek* and *Zselic* slopes in an afforested, scenic environment in the so called *Green Valley ecological corridor*. The neighbourhood takes pains over the preservation of natural values and the notion of environmentally conscious settlement development. Therefore, it was expected that the firm would be directly affected by the hostility of the locals and the civilian organisations. One of the movements' leaders was *Zöld Völgyért Egyesület* (Association for the Green Valley). Several referendums were carried out unsuccessfully in order to start the investment. Although, the third referendum was successful and was valid from the point of view of settling the cement factory to *Bükkösd*, at that time the investor was looking for some new locations. In 2007, he announced that the object was going to be built on the administrative area of *Királyegyháza*.

The leading part of *Bükkösd*, concerning the building of the cement factory, ended, but they could not avoid the industrial investment since the stone mine provides raw material for the factory in *Királyegyháza*. Moreover, from an environmental point of view, the mine, which should be enlarged 10 times the previous size, may be much more controversial: even though the cement factory was built with the most modern technology, it has significant effects on nature and the environment. In respect of the village of *Hetvehely*, it will perhaps be facing the enlargement of the bordering mine, but it can also be advantageously considered on every account that the environmentally sensible region has been decontaminated since the incriminating effects of the cement factory (KECZELI, L. 2011).

Even before the launch of the construction, the investor was positive about the environmental charging impacts of the factory. *Strabag* asserted on numerous forums that it was going to be the possibly most modern cement factory in the world with the most innovative production technology carrying out the production process in a closed system. It is evident that today, in the case of construction, such works (e.g.

strict domestic and international rules, standards and limit values) have to stand the proof. This means that the emission rates of the occurring polluting materials, theoretically, are minimal and by far under the threshold limits. The highest rates are performed by the floating dust concentration which is continuously scrutinised by the environmental monitoring system. The latter measures emission values 5, 10 and 15 kilometres (3.1, 6.2 and 9.3 mi) away from the firm (*Figure 2*).

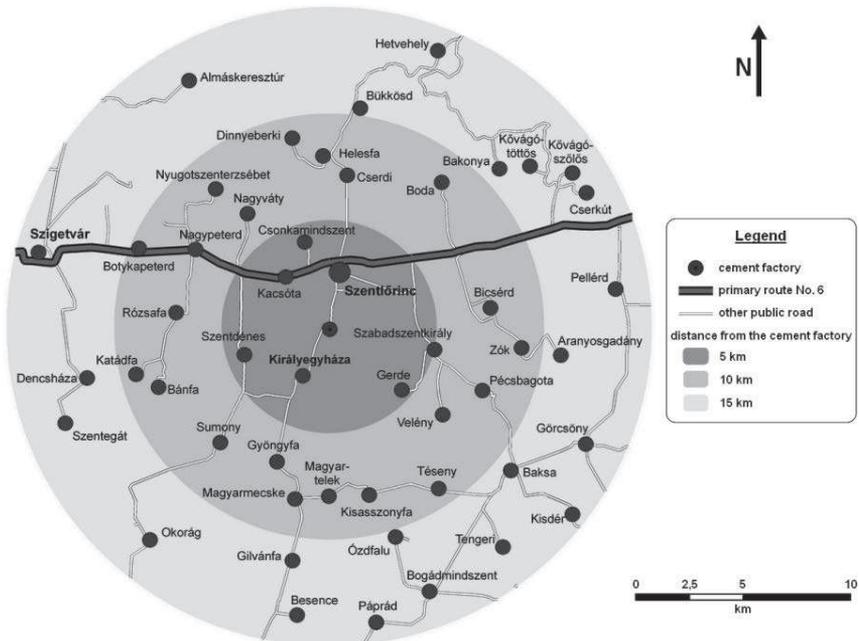


Figure 2 – The environmental monitoring area of the cement factory

Source: V-MED Bt. (2005); Edited by KECZELI, L. (2013)

Although, according to the reports, the emission of the air polluting materials is hardly perceptible; one has to consider other factors during the functioning, as well. Noise pollution is present mainly around the stone mine where limestone is excavated with blasts; light pollution can be experienced mainly in the case of the cement factory since, during nightshift, the luminous factory can clearly be seen miles away.

From a visual point of view, the mine is a serious landscape scar which significantly reduces the aesthetic quality of the landscape in its closest environment. Moreover, the factory is an intense land shaping and land changing object with concrete towers emerging from the earlier more monotonic plain areas (*Figure 3-4*).



Figure 3-4 – Views of the cement factory in Királyegyháza as of 2012

Photographed by KECZELI, L. (2012)

From environment and social points of view, the transport of the raw material, the finished product and the connected heavy traffic are very emphatic factors. Since the exploited lime stone and clay should be passed 15 kilometres (9.3 mi) away to *Királyegyháza*, they had to find the most optimal and effective way of transportation. Raw material is conveyed by railway. An industrial gorge was connected from the mine to the *Budapest–Pécs* railway line which cuts *Bükkösd* into two parts. From there via *Szentlőrinc*, the carriages are transported on the *Szentlőrinc–Sellye* line. However, with an industrial branch, the raw material is transported onsite. With this, the road section between *Királyegyháza* and *Bükkösd* was practically exempted from a significant

amount of traffic. On the contrary, the transport of the finished product is more problematic since the extension of the M60 motorway has not been finished and the latter was one of the most important settling factors for the cement factory. The investor lobbied very hard to effect this planned infrastructural and economy invigorating development in the area, because they needed it as a transport connection to the motorway. They intended to transport the finished material both by railway and road.

Due to the above mentioned, the inventor had to find another solution to avoid joining the main road through *Szentlőrinc*. It is obvious that it was neither in the interest of *Strabag* nor the population of *Szentlőrinc* or its leaders, because the heavy traffic passing through the settlement and the enhanced road quality destruction would cost too much. Presently, heavy traffic is drifted to main road 6 in a way that the building contractors created an industrial road out of a former dirt road leading as far as the outskirts of *Szentlőrinc (Tarcsapuszta)*. From there, for a short section the road continues to *Szabadszentkirály* where it joins main road no. 6.

By the end of the construction period, there had been a change in the ownership relations. It is well known that *Strabag* had never owned an independent cement factory and, based on its profile, the firm adepts much less at making basic commodities instead of applying them. Perhaps this is the explanation for the fact that the world's greatest cement making firm is the French *Lafarge*, which owns 150 factories altogether, has created a Central European cement holding in the latter years. The holding consists of 5 firms, comprising 4 factories in the neighbouring countries of *Hungary* and the factory of *Királyegyháza* with a 30% ownership of *Strabag* and 70% of *Lafarge* (KONYÁRI, T. 2010). The termination of the era of ownership relation changes and personal fluctuation more or less overlaps with the deliverance of the 70 billion HUF (198.5 million GBP) investment in the autumn, 2011 (CEMENTVILÁG, 2011b). At this time in 2013, the entire cement factory fully belongs to the *Lafarge group*.

3. Cement production with secondary fuels

When the campaigns, dealing with environmental charging and harmful effects on human health, were relatively put down and the majority of the local population accepted the circumstances of the investment, the *Lafarge Cement Magyarország Kft. (Ltd.)* was perceived as a new development. The latter is now fanning the flames again. It was a redeemed and innovative method in the foreign factories of the firm to use secondary fuels to overshadow the utilisation of coal based fuels as much as possible which would ultimately decrease the ecological footprint. By this procedure, the original production technology is altered. According to the *314/2005 (XII.25) Government Regulation*, there is a need for a new admission from the *Environment Protection Advisory Board of South Transdanubia* (Dél-dunántúli Környezetvédelmi Felügyelőség). The factory in *Királyegyháza* started the authorisation procedure in April 2012, during which one had to stand the proof of extremely rigorous directions. First, the *Preliminary Consultation Documentation* had to be handled in based on which no excluding factors appeared in order to modify the admission, as it was also supported by the *1571/2012 regulation* of the EPABST. Following this, the *Authorisation Documentation* was carried out and handled in. Moreover, a detailed environmental impact assessment was also created. Its first point includes the topic of noise protection related to the construction and operation phases. The second point contains the protection of the air clearness and the third point of the document deals with the topic of waste management.

“In the member states of the European Union, the cement industry proved in practice that instead of the conventional fossil fuels, the utilisation of secondary fuels (primarily waste material) significantly contribute to sustainable development by decreasing greenhouse gases (such as carbon dioxide)”—this can be read on page 9 of the impact assessment. According to the study prepared by the *Cross-roads Foundation* (Válaszúton Alapítvány), the solution would be the so-called eco-cement or geopolimer, for which a lower temperature oven is needed due to which the polluting material emission from the fuels is decreased by

two thirds. According to the study, hazardous waste and rubber should not belong to the scope of alternative fuels, since 17 types of heavy metals get into the environment (SZUHI, A. 2007).

According to the plans, the *Lafarge factory in Királyegyháza* would like to cover the need for the secondary fuel mainly from the *Mecsek–Dráva Waste Management Programme* where one of the outputs is the so-called light fractioned waste material. They primarily use non-utilisable paper, plastic and grinded rubber sparing the sewage disposal and the environment. Besides the assorted and treated waste, biomass could be used as well, with the exception of timber produced with forest clearing. The latter should be produced locally and remain as agricultural waste (e.g. corn-stalk, energy grass and other plant waste). With this development, the neighbouring farmers and entrepreneurs were given new possibilities, as well. The secondary fuel would be transported on public roads to the area of the plant and would be located in a closed container at the south, southwestern part of the factory from where the material would be brought to the system with a closed conveyer-belt. The need for public road transport would increase from the present 120 lorries to more than 160 (LAFARGE, 2012).

The maximum annual production of the cement factory is 1,130,000 tons, the minimum is 840,000 tons. This latter amount of finished products would be produced, if their product was portland cement only. 75% of the production would be loose, while the remaining 25% would be sacked cement (TOTAL KFT., 2012).

The traditional fuel for the turning out of the cement is coal and petrol coke (82,500 tons per year), natural gas (1,000,000 m³ per year/1 m³~1000 litres) and the pyro-coke (5,000 tons per year). This latter material is made during the pyrolysis of car tyres and plastic wastes when a very small carbon deposit-like particle is created with a heating value of 30–32 MJ/kg. Natural gas is used to start the burners and for fuel as well (TOTAL KFT., 2012).

According to the data shown in *Table 1*, the grinded concrete waste and car tires would display twice as much than the formerly annually

applied coal and petrol coke. The allocation of the car tires would be solved in an open container built on the area of the firm, in which 360–400 tons could be settled at once.

Table 1 - The utilisation of secondary fuels by types of waste groups

Source: TOTAL KFT. (2012)

Waste group	Amount (thousand tons/year)	
	minimum	maximum
Grinded concrete	23	152
Biomass	0	102
Car tyre	0	5.5
Total	23	259.5

The change of fossil fuels to waste could even be decreased by 20% of the price of the energy needed for cement manufacturing. While the price per ton of the original materials is between 30–39 thousand Forints (87.00–110.00 GBP), the waste materials are under 30 thousand (less than 87.00 GBP). Lafarge aims to decrease the manufacturing costs by firing waste, decreasing carbon dioxide emissions and contributing to the monitored utilisation of those materials which cannot be recycled. The firm has aspired to decrease the manufacturing costs due to the decreasing utilisation of cement from 2008 as a consequence of the lack of investments (SZABÓ, Y. 2013).

Despite the social forums and dialogues propagating the environmentally friendly green technology, the local population expressed their objections almost immediately when they were informed about the utilisation of waste material as fuel. In *Szentlőrinc*, they started to canvass for signatures, and in the forums, those are regularly giving forth to their voice. Among them are also family doctors, who object this plan and fear for the health conditions of the local population. Namely, as a consequence of waste firing, the health risk for tumour illnesses within 5 km (3 mi) radius of the factory would be increased between 1.46–2.68 persons, exceeding the internationally accepted, value of 1 (SZABÓ, Y. 2013).

4. Employment and economic change

Based on the disseminated information, the factory employs 130 employees and directly contributes to the employment of further 300 persons (CEMENTVILÁG, 2011b). In the spring of 2011, the mayor of *Királyegyháza* reported that the firm employed 34 persons from the settlement and a further 10–15 increase was expected. *Szentlőrinc* contributes to somewhat the same number of employment with 30 persons, but an increase is expected there, as well, by 40–50 employees (GRÍM, F. *ex verb.* 2010). From the point of view of local employment, it is a negative phenomenon that—in relation to the agrarian settlement and the industrial great scale investment—the supply and demand meet in a much smaller scale than previously expected. In this case, the demand should be monitored in a much wider scope, mainly in the county, but, in certain cases, regional perspectives should be given, as well. It is a very important question whether the labour force prefers the local or the skilled one. Although, the positive aim is to employ as high ratio of the local workforce as possible, such a modern and professional firm requires skilled human resources with adequate education and qualification which is only scarce in the reviewed settlements (KECZELI, L. 2011).

The construction was such a great scale investment that in the later years 3,500 workers were involved in the construction, from the local as well as from the county and the country's environment altogether. They were employed by the sub-contractors (CEMENTVILÁG, 2011a). In *Szentlőrinc* and its surroundings, 200–400 non-local construction workers were accommodated in the different periods which resulted in serious advantages and goods in the micro-region with multiple effects. It is enough to consider that the employees—to pay for the accommodation, shopping and entertainment—spent a major part of their income locally. The planned and expected production values in the short and long run, and the production multiplier effects can greatly transform the region's economic construction (KECZELI, L. 2011).

Parallel to the plans and the opportunities, however, we can list numerous weaknesses and threats, as well, which should be consid-

ered to stay realistic. Basically, it can be reported about the region that the agrarian feature dominates due to its natural endowments. The mean arable land value of the micro-region is the highest after the *Mohácsi micro-region* in the county. The sectoral share of the economy reflects a much less modern position. The 12% employment ratio in agriculture is more than double of the national average and almost double of the county average. This is one of the most important indexes of the region's rural characteristics. The greatest agrarian settlements are *Bicsérd*, *Szabadszentkirály* and *Királyegyháza*. Unfortunately, food processing is practically missing in the micro-region. The quality and characteristics of the micro-region's agriculture is negatively affected by the fact that the industrial firm allocated on 60 hectares and the surrounding areas are, for the present, empty. In the long run, another 60 hectares of industrial area (120 hectares altogether) of excellent soil are withdrawn from agricultural production. The representatives of the secondary sector are present mainly by small and micro ventures and 60% of them are concentrated in the town. The ratio of people employed in the industry is 33%. The micro-region lacks great employers. We can only highlight the cheese factory in *Kacsóta* and the cement factory which can apply a considerable number of labour force.

The town of *Szentlőrinc* and its closest area have never had any important large-scale industry. There are only few small and medium sized firms that can be found in the town. Traditionally light industry prevails, namely shoe & clothes industry and also craftsmanship, out of which numerous ventures have already become bankrupt. There are some unique firms in the region, as well, such as the *IKR Agrokémiai Kft./Ltd.* netting chemical fertilisers. On the contrary to industry, tertiary sector has a relatively highlighted position with a 55% ratio, but lagging behind the national average. From the employees' point of view, it is an important characteristic of the micro-region that *Pécs* has an extremely strong pulling effect. A good example of this is that more than 50% of the employees of *Szentlőrinc* are not locally employed, but primarily commute to *Pécs* (GEOPÓLUS BT. ÉS TÍMÁR ÉS TÁRSA KFT. 2005a; 2005b).

Cement production started in the second half of 2011. Optimists explain this as a first step of economic progression. The firm could generate real regional development, if the overlaying logistical services employed a further significant number of local workforce and the modern industrial firm came into being; adumbrating the earlier agricultural façade. However, we also have to add that ‘one swallow does not make a summer’, so a cement factory itself could not provide the key for the economic development of the region, since a complete vertical development is needed for that. The network of ventures correlating and being built next to each other—relying on local and human resources—could result in a complex boom and later economic impacts could exceed the region. In default of this, negative factors can be projected; e.g. such baulking threats which—considering the economic façade of the region—may even develop harmful effects, as well.

The earlier regional development concepts of the micro-region and today’s development direction demonstrate similarities. It is a strategic program proposal to industrialise the micro-region by settling down green field industrial investments and to create an industrial park and a logistical sub-centre which would primarily be connected to the town. They mainly emphasise the opportunities provided by the cement factory, the technology industry development (applying environmentally friendly innovations) and the interconnection of the *Szentlőrinc–Királyegyháza* industrial–transport axis. The industrial park could primarily be the site for processing industry ventures, where numerous enterprises, which function in the town presently, could move to (GEOPÓLUS BT. ÉS TÍMÁR ÉS TÁRSA KFT. 2005a; 2005b).

5. Conclusion

The owners of the plant propagate the venture as it brings “a sustainable economic profit” to the area (CEMENTVILÁG, 2011a). Its future façade is the question of the next years or decades. We can see three kinds of clearly identifiable ways of development. The agrarian space will remain admitting to an industrial profile which is coequal with it. The relationship of the agrarian production will be strengthened with the

cement factory by the production of biomass fuel. In the second scenario, the dominance of the primary sector could be completely underplayed, and the secondary and tertiary sectors would take up the majority of the employees. According to the third version, based on the negative tendencies of the world economy, the unsuccessful economic structural change would result in a state, where the original, agricultural façade, which is at present behind the times, dominates further on. This could also be perceived as an advantage with technological innovations and the settling down of food processing industry taking place. For the objective draw of the conclusions, we can frame an advantageous and a disadvantageous general aspect, as well. Based on the positive point of view—considering the modern production—the so far minimal environment charging effects could be accepted by the majority of the local population with adequate and correct information provision. The expected economic development can really be felt in the middle and long run. According to the negative approach, the micro-region is exposed to significant environment charging effects which are further strengthened by the factory's changing energy utilisation and the possible growing risk of illnesses. The economic advantages will have only slight efficiency and so, due to the present global tendencies, we also have to take into account that the experienced development will lag behind.

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