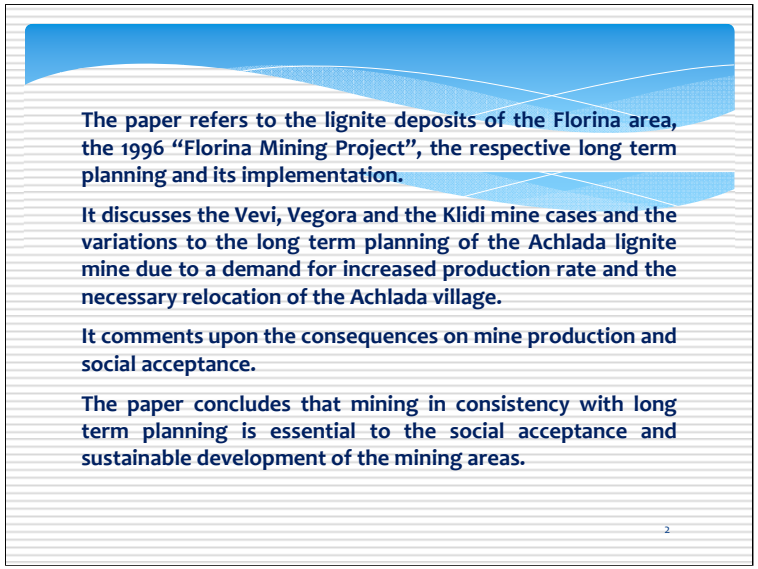
Good morning ladies and gentlemen, my name is Christos Kolovos and I will present you a paper on Mining in consistency with long term planning as a key element to social acceptance. I am very glad to present it here, at the magnificent island of Milos, since my last visit here was more than thirty years ago, as a mining student !

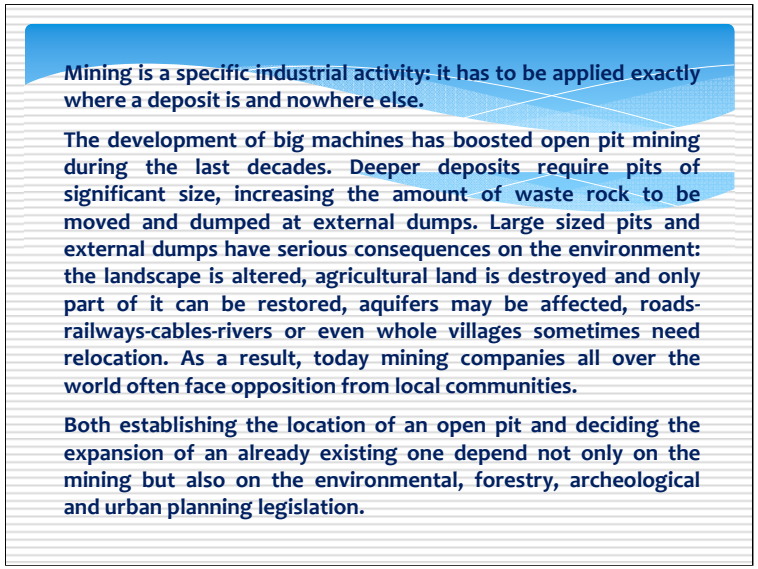


The paper refers to the lignite deposits of the Florina area in Northern Greece, the 1996 “Florina Mining Project”, the respective long term planning and its implementation.

So I ‘m going to present the Vevi, Vegora and Klidi mine cases and the variations to the long term planning of the Achlada lignite mine, due to a demand for increased production rate and the necessary relocation of the Achlada village.

I will comment upon the consequences on mine production and social acceptance.

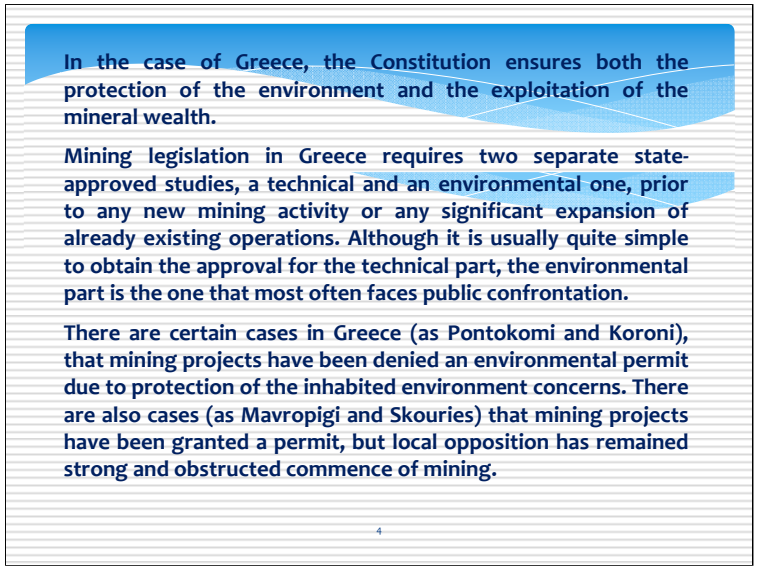
Finally, the paper concludes that mining in consistency with long term planning is essential to the social acceptance and sustainable development of the mining areas.



We must keep in mind that mining is a specific industrial activity: it has to be applied exactly where a deposit is and nowhere else.

The development of big machines has boosted open pit mining during the last decades. But shallow deposits are rare and deeper deposits require pits of significant size, increasing the amount of waste rock to be moved and dumped at external dumps. Large sized pits and external dumps have serious consequences on the environment: the landscape is severely changed, agricultural land is destroyed and only part of it can be restored, aquifers may be affected, roads-railways-cables-rivers or even whole villages sometimes need relocation. As a result, today mining companies all over the world often face opposition from local communities.

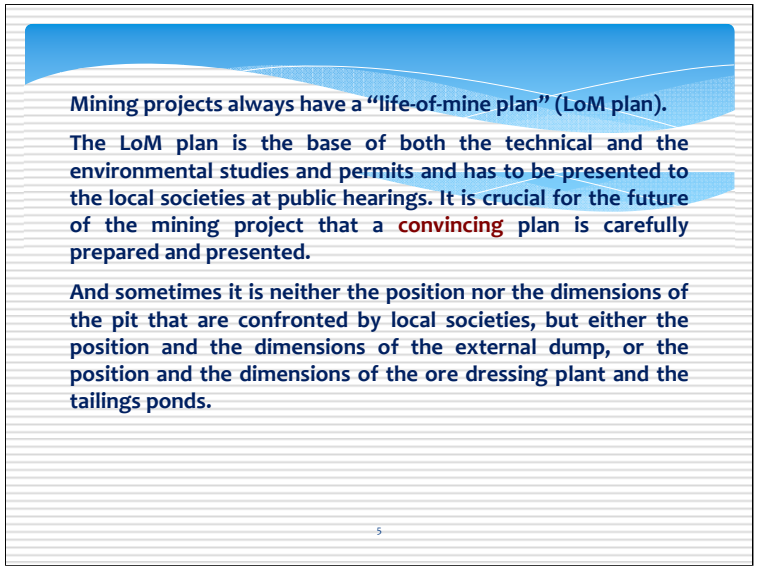
Both establishing the location of an open pit and deciding the expansion of an already existing one depend not only on the mining but also on the environmental, forestry, archeological and urban planning legislation.



In the case of Greece, the Constitution ensures both the protection of the environment and the exploitation of the mineral wealth.

Mining legislation in Greece requires two separate state-approved studies, a technical and an environmental one, prior to any new mining activity or any significant expansion of already existing operations. Although it is usually quite simple to obtain the approval for the technical part, the environmental part is the one that most often faces public confrontation.

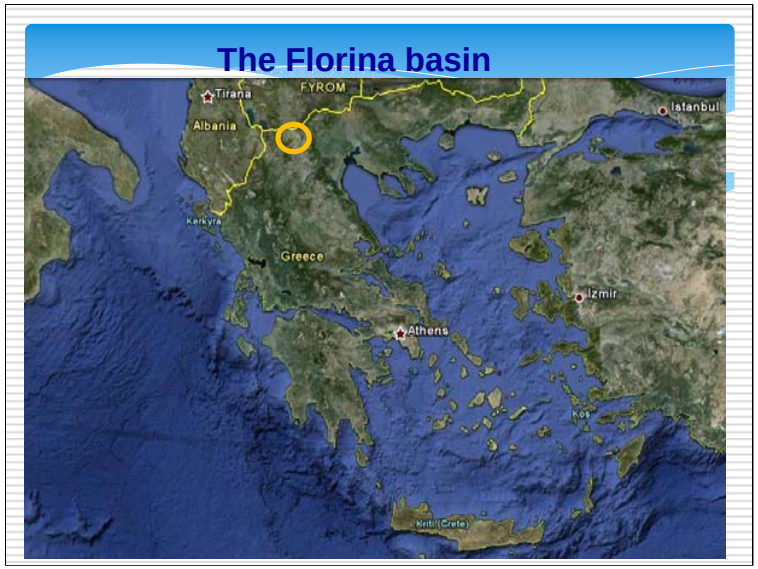
There are certain cases in Greece (as Pontokomi and Koroni), that mining projects have been denied an environmental permit due to protection of the inhabited environment concerns. There are also cases (as Mavropigi and Skouries) that mining projects have been granted a permit, but local opposition has remained strong and obstructed commence of mining.



Mining projects always have a “life-of-mine plan” (LoM plan).

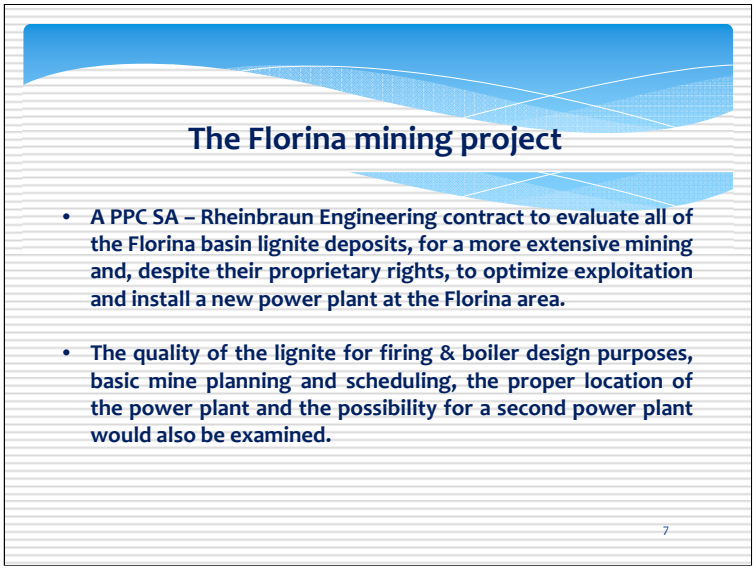
The LoM plan is the base of both the technical and the environmental studies and permits and has to be presented to the local societies at public hearings. It is crucial for the future of the mining project that a convincing plan is carefully prepared and presented.

And sometimes it is neither the position nor the dimensions of the pit that are confronted by local societies, but either the position and the dimensions of the external dump, or the position and the dimensions of the ore dressing plant and the tailings ponds.



Now let's come to the mine cases. The Florina lignite basin is located at the Western Macedonia region in Northern Greece.

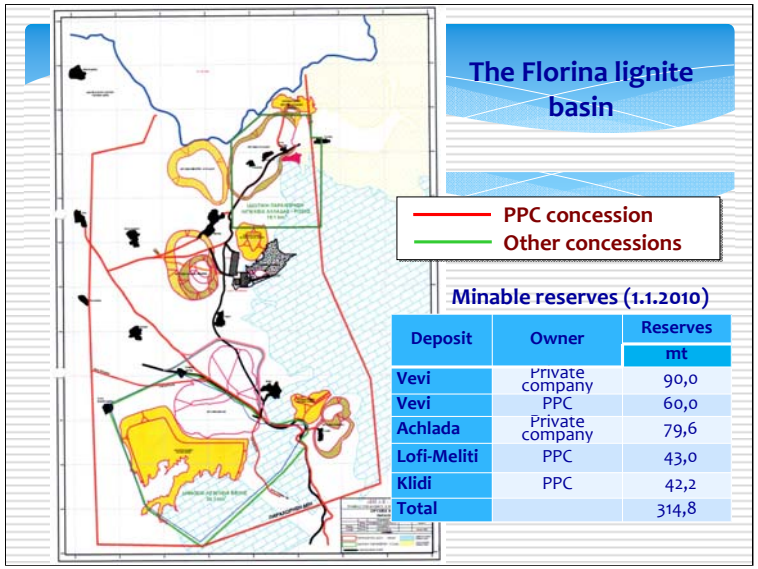
Deposits of xylitic type lignite exist at the eastern part of the Florina and the nearby Amynteon basins. Lignite mining concessions have been granted near the Vegora, Vevi and Achlada villages since 1924, 1933 and 1936 respectively, only a few years after the liberation from the Ottoman empire in 1912 and the exchange of populations between Greece and Turkey in 1923. Small scale open pit exploitations were developed at Vevi and Achlada. The initially underground room-and-pillar works at Vegora were abandoned and an open pit had already been created by the 1970s.



In August 1994, the Greek State granted the lignite mining concession for the biggest part of the Florina basin to the State owned Public Power Corporation of Greece SA (abbreviated as PPC), (except for the aforementioned areas near the Vegora, Vevi and Achlada villages).

In 1995, the PPC signed "The Florina Mining Project" contract with Rheinbraun Engineering (a subsidiary of the German energy company RWE). The aim of the contract was the evaluation of all the Florina basin lignite deposits for a more extensive mining and despite their proprietary rights, to optimize exploitation and install a new power plant at the Florina area. The quality of the lignite for firing & boiler design purposes, basic mine planning and scheduling, the proper location of the power plant and the possibility for a second power plant would also be examined.

After the mass and the quality calculation results and after examining several mine and deposit combinations, The Florina Mining Project concluded that the best combination, from a technical point of view, was to have two big mines (Vevi and Achlada) supplying one power plant with two units of 350MW over roughly 46 years. The remaining deposits would only supplement production in difficult mining periods.

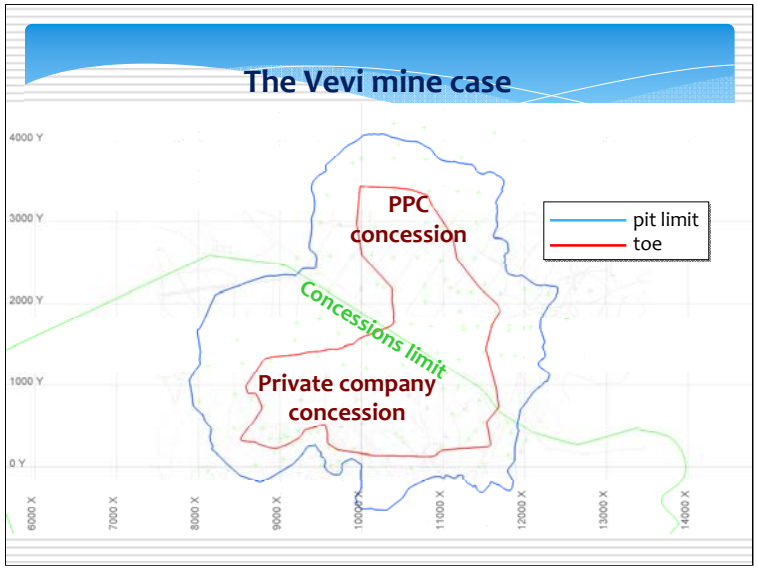


Deposit	Owner	Reserves mt
Vevi	Private company	90,0
Vevi	PPC	60,0
Achlada	Private company	79,6
Lofi-Meliti	PPC	43,0
Klidi	PPC	42,2
Total		314,8

Here we van see the concessions at the Florina basin. The red coloured line is the boundary of the PPC concession. The green lines are the boundaries of the Achlada and the Vevi concessions, owned by other companies. The blue line is the borderline to the Former Yugoslav Republic of Macedonia. The table presents the minable reserves at the different fields as of 2010.

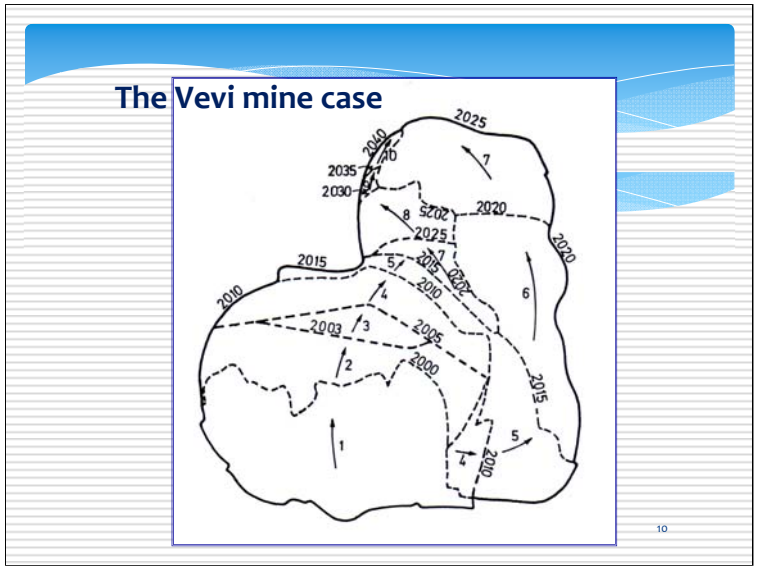
At the end of 1995 PPC decided to build the first unit of the Meliti power plant (330MW). This unit entered into commercial operation in 2003. To ensure lignite supply to the power plant, PPC signed mid-term contracts with the owners of the Vevi and Achlada mines and additionally opened a small mine of its own at Achlada. The reserves at this small scale exploitation had been exhausted by 2006.

A bidding process for the second Meliti power plant unit (450MW) was cancelled in 2009, due to mine production problems. The second unit is still in plans; despite a lignite supply problem described below, a part of PPC, including the Meliti power plant, may be privatized in the next two years.



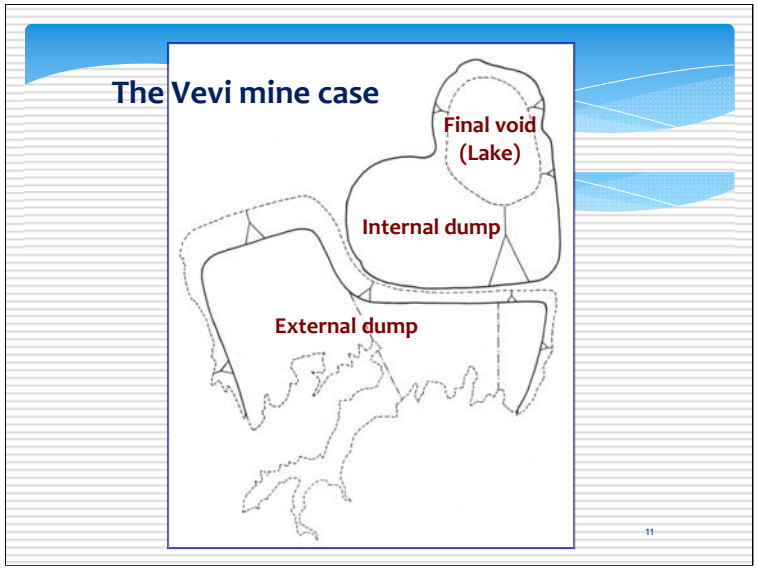
Now let's see the Vevi mine case. The Vevi lignite field is located at the southern part of the Florina basin. The northeastern part of the field belongs to the concession owned by PPC and covers 45% of the minable reserves of the entire Vevi field. The remaining 55% of the minable reserves, at the southwestern part, belonged to a concession owned by a private company, which started shovel + truck operations several decades ago.

The Vevi mine owner had also the concession of the Vegora mine, a small open pit operation located south of Vevi, at the northern rim of the Amynteon basin. The Vegora xylitic deposit dips smoothly to the west, to the concession owned by PPC. Deep boreholes have found the Vegora xylite a lot deeper than the technical bottom of the PPC-owned Amynteon mine. Due to the increasing depth of the deposit and therefore the increasing exploitation ratio, considerations on abandoning surface and moving into underground mining had been already made by 1982 ; however the acceptable mining cost due to the low level of oil price in the 1990s permitted the continuation of surface mining for a few years.

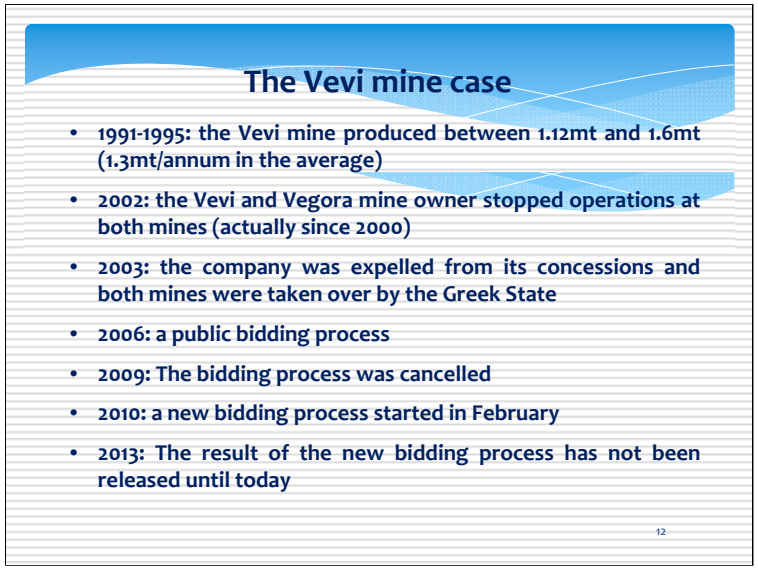


The “Florina Mining Project” had concluded that the whole Vevi field should be exploited by only one big mine, which would include both the private company’s and the PPC’s concessions. The Life-of-Mine plan established the final pit limits for the entire Vevi field. The proposed sequence of mining ensured that the exploitation of the existing mine would continue towards the PPC part of the deposit; the two concessions would then be joined and continue with a long mine face to the rest of the deposit.

Based on the Life-of-Mine plan, PPC has never opened a separate mine at its own part of the Vevi deposit.



And here is the Life of Mine concept, with the pit limits, the external dump and the internal dump areas with the final void, which is supposed to form a small lake.



During the period 1991-1995, just before the "Florina Mining Project", the Vevi mine produced between 1.12 million tons and 1.6 million tons (1.3 million tons per annum in the average), supplying mainly the existing PPC power plants for blending reasons. Minor quantities of good quality lignite were sold for local heating purposes (houses, bakeries, potteries, etc.) and as far as to Central Greece.
Unfortunately, by 2002, the Vevi and Vegora mine owner had faced serious financial problems and stopped operations at both mines.
In 2003, the company was expelled from its concessions and both mines were taken over by the Greek State.
In 2006, a public bidding process was announced in order to concede the Vevi mine to a new company. A similar process for the Vegora mine has never started. The bidding was cancelled in 2009 and a new direct negotiations process was announced. However, after a government change, a new bidding process started in February 2010. The result of the new bidding process has not been released until today. Both the Vevi and the Vegora mines have been closed for more than ten years now.

The Vevi mine case

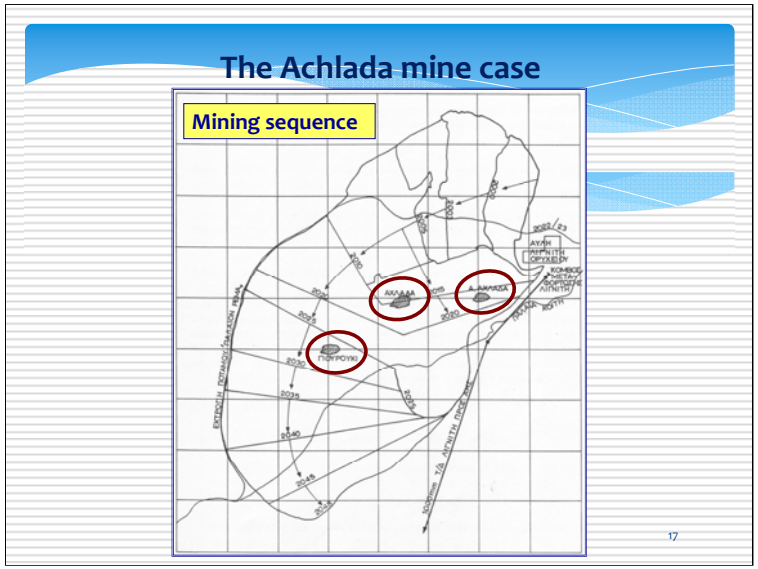
The pit is partly flooded.

The pit is partly flooded, and

The water level is raising slightly during the last seven years.

Here we can see the most significant lake from the small ones formed behind the external dump.

The internal dump has recently failed, but fortunately has not covered the excavation side.
The over ten-year close-down of both the Vevi and the Vegora mines has resulted in unemployment problems for the local residents. Some land owners, who had permitted the former mine owner to excavate at their properties and waited to be compensated, were not paid and asked the State for compensation by the new owner. The local society is quite anxious with the situation; the initial enthusiasm for the industrialization of the area has given its place to skepticism and the Vevi elementary school pupils have expressed their opposition to the re-opening of the mine. However, once a new mine owner is found, the initial Life-of-Mine plan can still be implemented and society connected problems can be smoothed down.

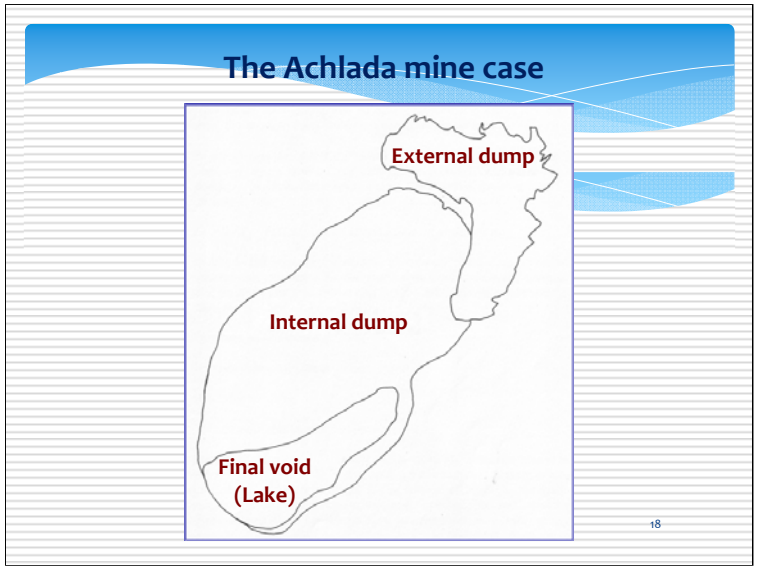


Now let's see the Achlada mine case, which is located at the northern part of the Florina basin.

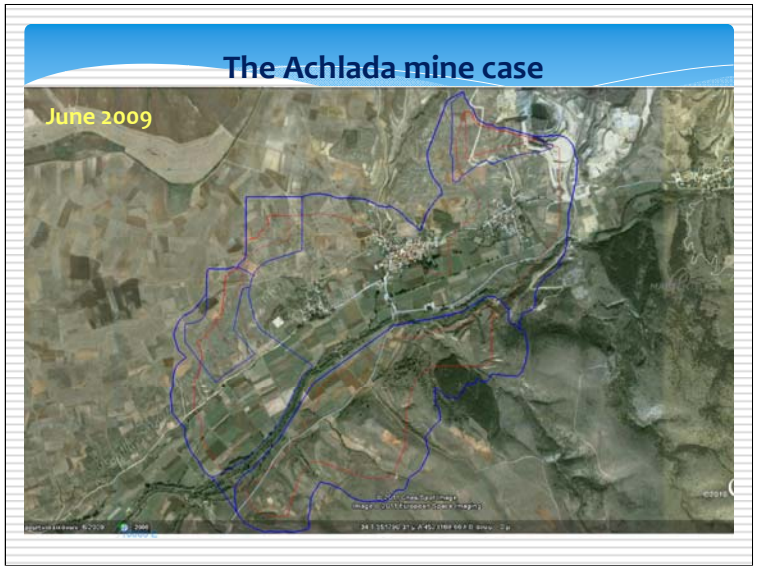
During the period 1992-1995, just before the "Florina Mining Project", the Achlada mine produced between 0.5 million tons and 1.4 million tons (0.95 million tons per annum in the average), supplying mainly the existing PPC power plants for blending reasons. Minor quantities were sold for local heating purposes. The Achlada lignite is inferior in quality compared to the Vevi one; however the exploitation ratio is more favorable.

According to the "Florina Mining Project" Life-of-Mine plan, the exploitation would start from the already existing open pit at the shallow northeastern edge and would progress to the southwest one.

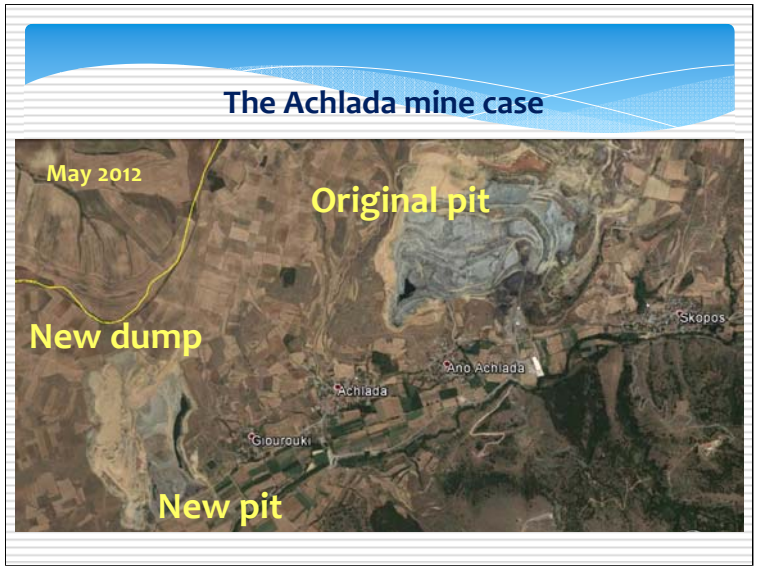
The middle part of the Achlada deposit is covered by the Achlada village, which is developed as three adjacent settlements (Upper Achlada, Achlada and Yiourouki from east to west). The small river Geropotamos runs along the eastern part of the deposit. According to the "Florina Mining Project" both the village and the river had to be relocated, to allow mining all of the deposit. The mining sequence indicated that the relocation of the three settlements of the Achlada village needed to have been completed by 2012, while the river needed to have been resettled by 2022.



All the waste to be extracted until 2004 should be dumped at an external dump northeast of the pit. After that stage, exclusively internal dumping would be possible.



However, the problems at the nearby Vevi mine affected the development of the Achlada mine significantly. The necessity to supply the Meliti power plant without the Vevi mine required an increased production from Achlada and the mine advanced more rapidly than scheduled. By 2010 the mining front was at a distance of 250m from the Upper Achlada settlement, the minimum permitted by the Greek Mining Regulation. The mine owner had been in discussions with the residents on the relocation issue, but the two parts have not reached an agreement till today and the village's location has not changed.

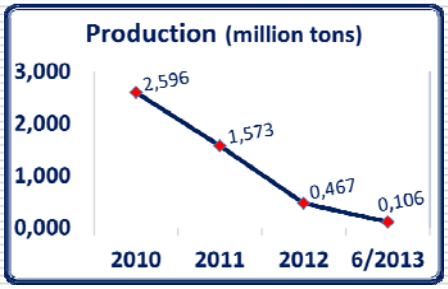


As a consequence, in 2010, a new pit was opened at the southwestern edge of the deposit, west of the Yiourouki settlement. As remuneration of the village properties (houses and agricultural land) as a total had been discussed, a separate expropriation process for the agricultural land was not implemented in time and only limited land is now available to develop the pit.

For about 18 months the original pit at the northeastern part and the new one at the southwestern part had been working simultaneously and since 2012 only the new pit has been operational.

The new pit is too narrow to permit internal dumping, so it has been combined with a new nearby external dump, which was not necessary for the life-of-mine plans. The exploitation ratio is higher in this area than the original excavation side and, combined with the necessity for external dumping, mining costs have increased. In fact, the pit can now advance only around the village, creating a wide trench-like excavation surrounding the settlements. This type of operation was granted environmental permits; however the local society is quite anxious and in 2012 the Regional Authorities of Western Macedonia decided to appeal to the Supreme Administrative Court of Greece and ask them to recall the environmental permits of the Achlada mine.

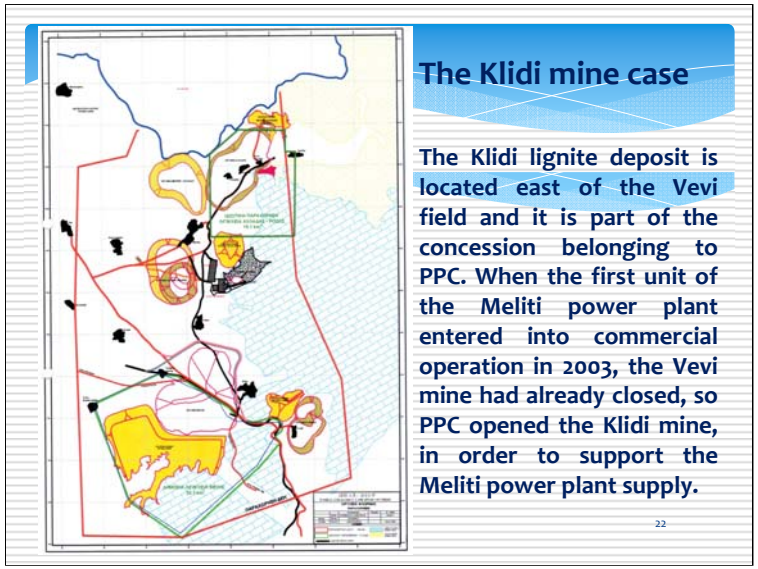
Year	Production (million tons)
2010	2.596
2011	1.573
2012	0.467
Till 6/2013	0.106



As a result of the narrow pit mining, the limited availability of land and some financing problems, the Achlada mine lignite production fell rapidly from 2.5 million tons in 2010 to 1.5 million tons in 2011 and only 0.4 million tons in 2012. The production in the first semester of 2013 still remains at about 0.1 million tons.

The necessity to resettle the river will also appear some years earlier than planned and an extra temporary resettlement has become necessary, since the originally designed pit and internal dump can no longer be formed.

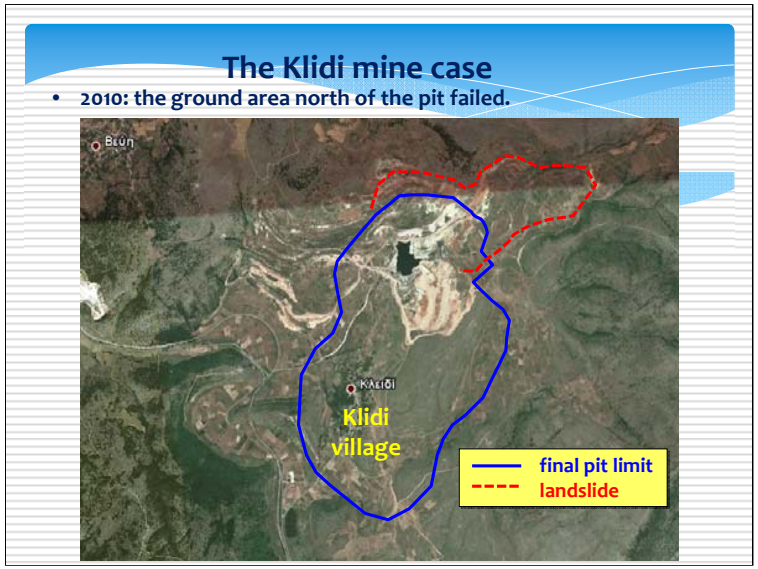
As a result, the strategic life-of-mine plan of the Achlada mine can no longer be implemented, even if the relocation of the village can be completed soon enough. Although the final pit limits can be quite the same as the initially planned ones, a separate external dump has already been created, covering additional agricultural land and thus affecting the sustainability of the area.



The Klidi lignite deposit is located east of the Vevi field and it is part of the concession belonging to PPC. When the first unit of the Meliti power plant entered into commercial operation in 2003, the Vevi mine had already closed, so PPC opened the Klidi mine, in order to support the Meliti power plant supply.

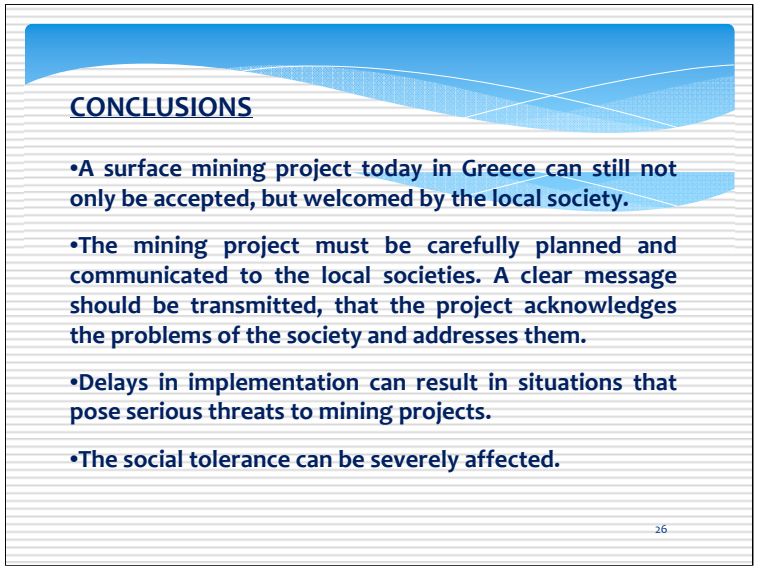
Excavations started in 2004 with a contractor backhoes + trucks system.

Unfortunately, in 2006 the ground below the external dump failed. Since the mine was still in the opening phase and no room for internal dump had been created, the mining operations stopped in early 2008 due to the unstable conditions and limited available dumping space at the external dump. The mine had already supplied 0,9mt of lignite to the Meliti power plant. The mountainous area around the Klidi mine, combined with certain limitations (railway, main road, army exercises field, etc.) at the only few available proper places for a new nearby external dumping area, has complicated the issue of obtaining a new environmental permit and acquiring new land.



Besides the external dump area stability problem, a landslide has also appeared near the pit. The Klidi mine is located at a major faulted zone, stepping downwards from the Florina to the Amynteon basin. The topsoil layer is red clay of low cohesion, seemingly a fault filling material. Insignificant surface ground landslides had been observed at the pit area well before the initial operations. At the end of 2010, the ground area northeast of the pit, where a small aquifer is relieved to the surface, started to fail. Until today, it has evolved to a major landslide, extending more than 1Km to the north, well beyond the designed pit limit.

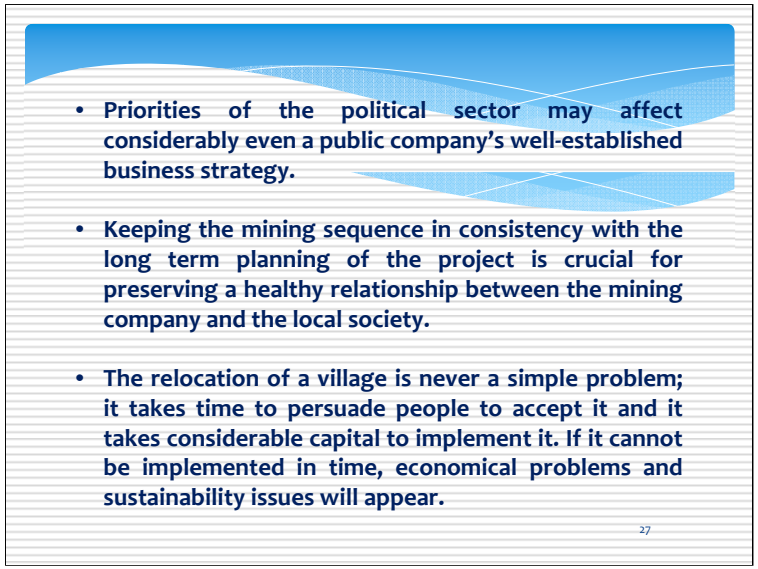
An effort to stabilize the landslide started in 2013 and is in progress.
The pit is partly flooded. Even if the landslide is stabilized and secured, there is still the problem of dumping areas to be resolved.
As a result, the situation at both the Klidi and Achlada mines makes the re-opening of the Vevi mine crucial for both the lignite supply of the Meliti power plant and the employment in the Florina area.



Lignite mining at the Florina area has declined significantly from the long term planning. The implementation of the "Florina Mining Project", a project welcomed by the local society, has not been possible for some years now.

In areas where surface mining has been active for many years and the residents are quite familiar with common mining practices, a surface mining project today in Greece can still not only be accepted, but welcomed by the local society. The mining project must be carefully planned and communicated to the local societies. A clear message should be transmitted, that the project acknowledges the problems of the society and addresses them.

The mine cases described indicate that delays in implementation can result in situations that pose serious threats to mining projects. If both the Life of Mine plan mining sequence and timetables are not strictly kept, then mine production as well as the employment rate in the area, which is connected with the social tolerance, can be for sure severely affected.



The 10-year delay to re-open the Vevi and Vegora mines indicates that mining companies should always keep in mind that priorities of the political sector may affect considerably even a public company's well-established business strategy.

The Achlada mine case indicates that keeping the mining sequence in consistency with the long term planning of the project is crucial for preserving a healthy relationship between the mining company and the local society.

The relocation of a village is never a simple problem; it takes time to persuade people to accept it and it takes considerable capital to implement it. If it cannot be implemented in time, economical problems and sustainability issues will appear.

- During the entire mine life minor changes in mine planning are most certain to happen; nevertheless, the LoM plan should be strictly kept, except for the case that a significant change of the economic conditions makes a remarkable extension of the mining area beyond the LoM plan final pit limits possible.

  In such a case, the extension of the mining project should be once again carefully planned and communicated to the local societies.

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Mining in consistency with long term planning:
a key element to social acceptance

Thank you for your attention

* Christos J. Kolovos
* Mining & Metallurgy Engineer, PhD
* Mines Division / Mines Strategic Development Unit

Public Power Corporation of Greece SA