An Investigation of Areva Inc. Huge Financial Loss in the Aftermath of Fukushima Nuclear Disaster

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***Abstract*:** Areva is a French multinational company, mainly known for its nuclear power activities. This Company is active in all parts of value chain of nuclear energy. After Fukushima disaster, this company faced a huge financial loss. This study investigates the reasons for the loss and how Areva could manage the loss better. Diversification, increasing the flexibility of its human resource management, not taking any unsafe bet after 2008 vulnerable global market, adopting more realistic and risk-averse approach for estimation of the cost of its nuclear projects are suggested as a preventive and corrective measures.

Introduction

Areva is a French multinational company, mainly known for its nuclear power activities. Areva's US headquarter is located in Charlotte, NC. After huge loss of Areva in 2012 (US$3.2 billion), it's been reported that it was mostly because of value drop of uranium and consequent profit drop of uranium-mining business of Areva in Africa. Fukushima accidents along with malpractice of Areva in Olkiluoto Nuclear Power Plant are believed to be the other reasons for Areva loss. Areva also sold its subsidiary for power transportation and distribution, Areva T&D, to Schneider Electric and Alstom in 2010 which raised some eyebrows. Areva is also active in renewable industry but it hasn't reached to the profitable level yet.

In this project, the operation of Areva in Olkiluoto, Finland has been surveyed and then Fukushima and its effect on the other aspects of nuclear business of Areva have been investigated. Areva's business in uranium mining, power system, renewable energies then have been introduced and studied. Finally some suggestion has been presented for improvement of the current situation of Areva.

Investment in New Nuclear Power Plant (Olkiluoto 3)

In the history of developing nuclear power plants (NPP), there is a significant gap during the years 1988-2003. During this period, investment in new NPP was ceased in Western European countries despite the fact that the region contains most of the world's nuclear power plants with 130 NPPs [1]. A significant turning point happened in 2003 when Finland announced the building of a new NPP and awarded the contract of Okiluoto 3 to a consortium comprising Areva and Siemens companies. The contract was fixed price and established as €3.2 billion for a new 1.6 gigawatt NPP. Areva took the responsibility for the reactor which was based on European Pressurized Reactor (EPR) technology while Siemens became responsible for the generator and steam turbine [1]. EPR, shown in Fig 1, is the third generation of pressurized water reactors (PWR). This new technology known as "Areva EPR" was expected to energize Olkiluoto 3 by 2009 and becomes World's first NPP based on "Areva EPR".

However, the completion date was delayed several times and the total cost dramatically increased.

Fig.1. European Pressurized Reactor (EPR) [4]

Fig.2. Olkiluoto3, November 2009 [4]

The new estimate suggest the project is at least 100% over budget reaching to €5.7 billion, and the plant will be finished not sooner than 2018 [1-2]. In addition to excessive construction cost, owner of the plant TVO is suing Areva and other contractor for €2.4 billion for missing the original completion deadline [1]. To recoup some costs, Areva is suing TVO for €1.0 billion for obstructing construction by imposing rigid security constraints [3]. Europe court must now decide to impose these costs to either French tax payers or Finnish tax payers.

The project confronted several construction problems soon after the construction started. Before describing some instances, we should mention the main underlying reasons. First of all, the construction team consisted of multinational working groups resulted in lack of coordination among teams. Along with language problems, culture differences in site caused further difficulties. Frequent change in plan was a major issue causing confusion among construction teams and imposed more delays. These reasons supported by numerous specific examples cast doubt on the level of expertise for implementing EPR technology and meet strict quality requirement. The gap in development of NPPs during past decades is the major reason for the lack of expertise in various levels of project [1]. The specific examples of construction problems are explained in the following section.

Incorrect composite of cement was used at the concrete floor slab. This error was spotted, and cement composition was changed for the rest of project. In spite of changing composition, porous floor slab were detected in some places. Another issue was the welding quality in containment building. This building is constructed by concrete armored and covered by steel shell. A worker who reported the welding issue was duly sacked. It turned out that the welding of steel shell also was based on obsolete blueprints and caused the damage in one part of the shell. These issues raised serious questions about the integrity of containment building [1].

Pipes of primary cooling were built with inappropriate steel. The pipes were replaced, but, cracks were appeared on the pipes after the welding of new pipelines completed [1].

Another issue was related to automatic control system. The contract required two independent control systems capable of working in all circumstances. However, it turned out that the designed control system is too dependent to electronic networks and computers which may lead toward a fatal vulnerability. The master control system was not properly insulated from the lower control level in primary design. The authorities, therefore, requested redesign of automatic control system, which caused further delays.

Finally, the serious issues were attributed to project client. The most important one was related to the narrow base of nuclear engineering's experts in Finland. These experts frequently take over critical positions from power utilities to government's ministry. The result is that the voice of TVO and watchdogs mostly sound as one voice, and hearing the independent voices who warn against serious issues becomes more complicated [1].

Increasing the safety and providing economic competitiveness were the main objective of implementing EPR in Olkiluoto 3 [4]. However, because of discussed issues, this promising project at first glance turned out to be a disaster for Areva.

Fukoshima disaster

The partial meltdown of Fukushima nuclear reactor of March 11, 2011 had a real chilling effect on reconsideration of the future role of nuclear energy in power production. Germany and Switzerland cancelled their plans for replacing their old nuclear power plants. Germany also decided to deactivate some of its existing plants. UK delayed some of its nuclear plans for safety check. Italian public also oppose the push for nuclear revival. In the US, this disaster halted some of the discussions about nuclear renaissance [5]. These decisions by nations altogether are reported to lead to the increase of nuclear cost by 50% mostly because of increased safety expectations [6].

After Fukushima, the price of the uranium is collapsed, the FT reported that its price decrease from $138 a pound to $50 a pound since Fukushima [6].

It is reported [7] that Areva expected to sell 50 new reactors in this decade, but it hasn't even received an order since 2007. Fukushima and its effect on nuclear energy is definitely going to exacerbate this trend amidst the optimism of Areva's CEO who pointed out during an interview with financial times that "Considering the expected growth in electric consumption, we are convinced that the outlook for nuclear and renewable energy development remains strong. . . even if expansion of the global installed base of nuclear reactors is postponed" [6].

"At will" Vs. "just cause" employment

Different countries put different emphasis on job security issues. Governments try to provide enough provisions to protect their employed citizens against the volatile economic environment.

In the US because of the capitalist system and the minimal government intervention in businesses, job security varies depending on the economic condition. Employment system in the US is mostly "at will". It means that except certain cases, the job security of the employee is at

the mercy of the employer. One of the main differences between the US and the EU in terms of job security for employees is “indefinite contracts”. Indefinite contracts in the EU are one of the measures for employee protection. It means that an employee who has been employed on successive fixed term contracts and has now reached a certain appointed limit can be offered the indefinite duration contract. This contract means that the employees are guaranteed to hold the post as long as the work continues. The contract can be cancelled if there is no work for some reasons or the employee still ceases to cooperate after some formal warning [8-9].

Many economists argue against this practice. It’s believed that labor market flexibility is necessary for the market. Many economists also believe that threat of unemployment is necessary to keep the employees incented for higher productivity. In the meantime, some other European economists believe that that not firing the workers and just reducing their work time can function as stimulus for the economy in a recession [10]?

Reducing the number of the workers at the time of recession or economic downturn is arguably a tactic that can be used to keep the firms competitive. It can reduce the costs and it also helps the firm to close some of its unnecessary or unproductive branches at the time of the hardship. Job cuts of Areva during its economic downturn are not proportional to the size of its workforce and also the size of its deficit. The only reported job cuts in Areva is 1500 job cuts in Germany and according to Areva formal statement, their goal is to keep as many job as possible. They froze hiring in many of their different sites and also suspended some of their costly projects without firing the staff [11].

Areva decided to cut the loss mostly by selling assets and suspension of the projects and stopping the investment. Areva slashed around 1 billion euro of its costs with aforementioned ways.

Areva in Mining

a) Contract renewal problem in Niger

Niger is the fourth largest uranium producer and provides a third of French consumption. Areva has been operating two mines and it was the only uranium producer in Niger up to 2007 when President Mamadou Tandja opened the field for competition. Ultimately, a Chinese nuclear energy company, Sino-U, broke four decades monopoly of Areva. Approaching the end of a ten-year contract, Areva encountered some problems for the contract renewal owing to having a competitor and a report released in 2009 which revealed high levels of radiation in two villages near Areva's mining operation [12]. Some findings show that Areva failed to clean up and check the villages and it can be considered as an engineering malpractice. In last week, they came up with an agreement, but no one is aware of the details. Needless to say, Areva should have decreased its profit to be in the circle of producers in Niger.

b) Harmful bet on uranium prices

Areva purchased UraMin, a Canadian-based company which owned many assets in Central African Republic and South Africa, based on a certain price of uranium. Areva paid $1.86bn for UraMin when uranium was traded around $140-$150 a pound, but this commodity was traded about $50 per pound in 2011 after Fukushima disaster. Therefore, it's estimated that Areva paid $486m more than what UraMin valued [13].

Sale of Areva T&D to the consortium of Alstom and Schneider Electric

The business practice discussed in this part is sale of Areva T&D to the consortium of Alstom and Schneider Electric which is studied as an ineffective business practice. Sale negotiation of Areva's transmission and distribution subsidiary was started in 2009. However, Areva, Alstom and Schneider Electric finalized the sale process on July 7, 2010. The price paid for Areva

T&D's shares was U.S. $2.75 billion. According to the deal, Alstom took over the transmission business which was about two thirds of the total. Schneider Electric got the distribution business which was one third of the total [14-15, 16-23].

Business diversification can be a corporate strategy to increase sales volume from new products and new markets. It helps firms to make profit from their other businesses or practices when they have loss in one or more businesses. Areva's main focus is nuclear power and its transmission and distribution subsidiary could diversify its business and activities. In economic point of view, sale of Areva T&D reduced the diversity in Areva's businesses and practices.

Moreover, sale of Areva T&D excluded Areva from transmission and distribution markets which other companies active in those fields are making profit. It should be addressed that Areva T&D won several major contracts in 2007 and increased the total order for the T&D division by 34%. Moreover, sales revenue grew for the division 16.2% in 2007 [24]. In 2008, the division had sales revenue of U.S. $7.2 billion which accounted for 38% of the Areva's sales [25].

Sale of Areva T&D, the division which was profitable and could diversify company's practices is considered as an ineffective practice. Areva expected 50 new nuclear reactor contracts in this decade but it has not received one order since 2007[26]. Moreover, after Fukushima disaster which was a break point in nuclear industry, Areva's business and strategy planners should have considered a business strategy change to move torward the emerging markets with a bright future or increased their business diversification. Sale of Areva T&D was not at action in favor of company's practices diversification and led to loss a profitable division of the company.

Areva Renewables

In this part of the paper Areva Renewables group is studied. In 2006, Areva Renewables division was created as an expansion of Areva's clean energy portfolio with renewable energies.

The group has a portfolio of four energies: wind energy, solar power, bioenergy, and hydrogen power. The renewables group subdivisions can be seen in figure 3. A brief description of Areva Renewables is provided in the rest of the paper.

- **Offshore wind power**

Areva bought 51% of the multi-megawatt offshore wind turbine designer and manufacture Multibird in 2007 [27]. The remaining 49% was purchased in 2010 and it formed Areva Wind [28]. Areva Wind designs, assembles, installs 5-Megawatt wind turbines for offshore wind farms.

- **Concentrated Solar Power**

In February 2010, the Areva bought Ausra which was the first comprehensive solar thermal manufacture in the United States and formed Areva Solar [29]. AREVA Solar designs, manufactures and installs solar steam generators for power generation and industrial process steam facilities.

- **Biomass power**

Bioenergy is the world's second largest source of renewable energy. Areva Bioenergy is the leading manufacture of biomass power plants in the world with 100 biomass power plants and the largest installed base generation more than 2500 MW [30].

- **Hydrogen Power Storage and Distribution**

Hydrogen can be employed to generate electricity with high performance anywhere at any time. Areva is revolutionizing hydrogen production industry by developing clean hydrogen production (CO2- free). Moreover, by coupling the hydrogen production and storing hydrogen in a fuel cell, it is possible of implement independent energy management systems.

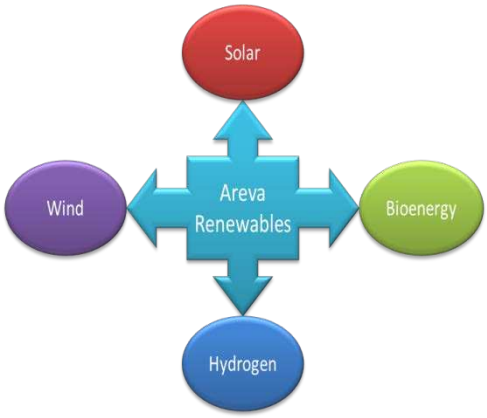

Fig.3. Areva Renewables subdivisions

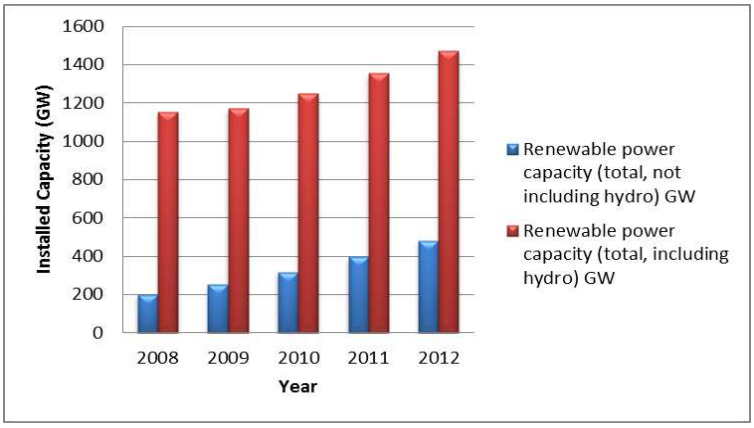

Fig. 4. Renewable power capacity during 2008-2012 [31]

Areva's main practice is nuclear power and Areva Renewables group can diversify its businesses. No one can guarantee a 100% bright future for the renewable energies, but it is definitely obvious that renewable energies generation has been increasing in the recent years [31]. In comparison with nuclear energy which does not have so many fans nowadays especially after the Fukushima disaster, green and renewable energies are getting more and more popular and with government's subsidies, they are now economic and cost-effective. Therefore, investment in an emerging market is good practice for Areva which also diversifies its practices.

Areva Renewables reported a net loss in 2012 and 2013 and the reason was announced a drop in bioenergy operations in Brazil [32]. However, still renewable energies generation grow all over the world is a promising sign for the companies in the renewable energies filed. Moreover, Areva expects a revenue growth of 4 to 5% per year on average for the 2015-2016 period [32].

Areva in the U.S.

Areva plays a great role among suppliers in nuclear industry and it has been counted as the largest supplier in nuclear industry with 35 locations and more than 5,000 skilled worker and specialists. Areva was created by merging Fragatome, Cogema, and Technicatome in 2001.Thus, Areva was founded 13 years ago but it has roots in the U.S. nuclear industry for more than 40 years.

Significant increase of investment in nuclear industry in 70s were shockingly ceased by an accident in Three Mile Island power plant in Pennsylvania which occurred in March 1979 as a result of a fault in the control room and the bad action taken by the operator [32]. More than 100 nuclear plant constructions have been canceled and postponed following the Three Mile Island accident [33]. Following diagram shows that no construction permit has been issued since 1979[34].

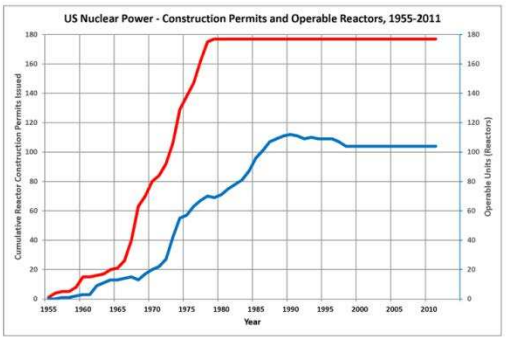

Fig. 5. construction permit for nuclear power plants in the US [35]

Due to this accident and cancellation of many power plants construction, the best business practice for Areva was to supply uranium and provide maintenance services to the existing nuclear power plants.

However, in 2001, fossil fuel prices and new concerns about the "greenhouse gas" led the energy experts and politicians to think about the nuclear energy potentials. Therefore, term of "Nuclear Renaissance" has been used from 2001 to 2011 when Fukushima disaster happened. Being maintenance service provider and uranium supplier, Areva never gave up finding new opportunities to grow up its business in the United States. In 2008, Areva announced that it would seek approval for uranium enrichment facility in Idaho. It started passing stream of federal rules and regulations as well as managing financial resources. Eventually, Areva scheduled spring 2012 as the commencement for construction. However, due to some underestimations, the

construction has not been started yet and it's assumed to be rescheduled for late 2014. Nonetheless, impact of Fukushima disaster in nuclear projects cancellation and delay, was not negligible.

Conclusion

Areva Company is active in all parts of value chain of nuclear energy hit a huge loss after Fukushima disaster. The major part of the loss was rooted in the unexpected Fukushima; but as a company which has an experience of 2008 recession, it should have made itself more prepared for any unforeseen event.

Diversification, increasing the flexibility of its human resource management, not taking any unsafe bet after 2008 vulnerable global market, adopting more realistic and risk-averse approach for estimation of the cost of its nuclear projects can be suggested as a preventive and corrective measures. These suggestions, in case of taking quickly, could alleviate the amount of pain inflicted by Fukushima. All these suggestion are based on the evidences provided in the report.

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