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Assignment 2

Introduction

Located in the United Kingdom, the Hinkley Point C project is a nuclear power station being constructed by EDF Energy and China General Nuclear Power Group. In addition to providing low-carbon power to almost 6 million households, generating thousands of employments and providing long-term benefits to the UK economy the project is on schedule to open by the end of 2026. The project's budget ranges from £25.2 billion to £26 billion and it is anticipated that it would generate between 25,000 and 30,000 jobs including as many as 1,000 apprenticeships. The Covid-19 pandemic and the United Kingdom's HGV driver shortage have both contributed to the project's difficulties. Complex concrete buildings and excavating two enormous tunnels two miles out into the Bristol Channel are required for the Hinkley Point C project. A total of 120,000 litres of water per second will be pumped in and out via three separate tunnels to cool down two nuclear reactors. A volume of concrete equal to 7,600 double-decker buses has been poured thus far. Problems with labour, materials availability, transportation and significant price hikes for construction supplies have all hampered the project since the economic downturn after the epidemic. Power from Hinkley was set to cost £92 per megawatt hour under a "strike price" that would increase with inflation; any cost overruns would be covered by EDF not the UK government or power customers in the United Kingdom. Many people are concerned about the high cost of electricity from Hinkley citing the fact that the most recent offshore wind farms have strike prices of about \$40 per megawatt hour.

Main Body

I believe that the *Hinkley Point C project* will be ready for operation by the *end of 2026* (Gunduz and Almuajebh, 2020). EDF Energy and China General Nuclear Power Group are the first private companies to fund a whole nuclear power plant and Hinkley Point C is the result. As a worldwide experiment, the construction of the project is being closely monitored.

The first concern is whether or not the project can be finished on schedule (Ghansah *et al.* 2021). It has been five years after EDF Energy's estimated 10-year construction timeline. I am aware that they have completed 49% of the planned tasks. But they know that the post-pandemic economic situation will present significant obstacles, such as a lack of available labour,

materials, transportation and many more. I am aware that the pandemic delayed the project by six months in part because of slower work on-site owing to social distancing measures and in part because of slower work by suppliers. The construction industry is now up against challenges with HGV drivers and steep price hikes for building materials.

Second and perhaps more important is whether or not the price will increase (Alkhudary and Gardiner, 2021). When Hinkley was given permission to proceed in 2016, EDF put the price tag at £18 billion. The latest estimate from the organization is closer to £23 billion. If it takes longer, the price will go up which is something I can fight. The appeal of the fixed price agreement they arrived in 2016 is that the price to the customer would never fluctuate. However, if they want to move forward with the project, their shareholders may have to put up more money.

It is my opinion that digital technology has played a significant part in the Hinkley Point C project and BYLOR's construction of over 60 key structures including the buildings that will serve as the two identical nuclear reactors (Alghail *et al.* 2022). Tekla Structures was used for the project's design and details. As per my thoughts, this indicates that Tekla was used for the design of every concrete and reinforcement used on the site. Trimble Connect, a cloud-based collaboration tool was also used and I can confirm that it really aided in the kind of communication and coordination essential to a project of this magnitude in the nuclear industry.

Despite the Covid-19 health crisis, I am aware that significant progress was made in 2020 on the Hinkley Point C project's site in the design execution plans and in the manufacturing of equipment (Nachbagauer, 2022). An estimated 5,000 workers will be working on the site at any one time and its completion will take over 10 years and cost over £20 billion. When finished, I believe Hinkley Point C will be responsible for providing clean, reliable and low-carbon energy to almost six million households. It is the first nuclear power plant in the United Kingdom to be built in almost a decade and thus it is a huge deal in the fields of civil engineering and construction.

Many experts have questioned the feasibility of the ***Hinkley Point C project and the decision-making process that led to its approval leading me to the conclusion that it has been a highly controversial one*** (Bogdanova *et al.* 2020). Therefore, without considering its many facets it is difficult to label it as a success or failure for the future of the UK's energy sector.

First, I can confirm that Hinkley Point C is a nuclear power facility that will start operations in 2023. The project's manager, Nigel Cann claims that after five years of construction they are on schedule to open by the end of 2026.

What I have observed is a representative for the Department of Business, Energy and Industrial Strategy said that some see *Hinkley Point C* as a *success* because it will bring new nuclear energy generating capacity to the UK which is crucial to securing the country's energy future and reducing carbon emissions (Lo Presti *et al.* 2022). Unlike renewable energy sources which are subject to fluctuations in output due to weather, I am aware that nuclear power can maintain a steady output rate. As a result, nuclear power can be relied upon to be a reliable and regular contributor to the grid.

As far as the future of the UK's energy industry is concerned, I can also state that many experts see Hinkley Point C as a failure (Ford and Lyneis, 2020). The anticipated overall cost of £20.3bn is astonishing; that is more than twice as much as the London Olympics. It will cost British power users billions over a 35-year period, thanks to a complicated financial deal the government of Great Britain has engaged into with Électricité de France (EDF) and China General Nuclear Power Group (CGN). I have no doubt that it has prompted worries about people's capacity to pay their energy bills.

Second, I can confirm that there have been several setbacks in the construction of nuclear reactors and that none have yet begun operations. Some professionals think it might be impossible to construct. As I know the experts from the UCL Energy Institute agree that the reactor has failed and is continuing to fail. SI can say that serious environmental and public health effects may result from this compromising the reactor's safety and dependability.

Thirdly, I may state that nuclear power is facing existential issues worldwide due to the declining cost and increasing appeal of renewable energy (Jalali Sohi *et al.* 2020). "Nuclear simply does not make sense anymore," argues Tom Burke, a former environmental policy consultant for BP and a visiting lecturer at both Imperial and University Colleges. In my experience, renewable energy sources like wind and solar power are more competitive with traditional energy sources while also being more environmentally friendly. Therefore, spending money on nuclear power might not be the best option.

The Hinkley Point C nuclear power project in Somerset is one of the biggest construction sites in Europe. During construction, the project is projected to employ 25,000 people and provide 1,000 apprenticeships. A wholesale price of £92.50/MWh has been agreed upon for the first 35 years of the life of the project which represents a huge energy development. The Hinkley Point C nuclear power project led by CGNPC of China and EDF of France has been approved by the British government.

According to what I have said, one thing that may be ***learned from the Hinkley Point C project is the need for change management*** (Bushuiev and Kozyr, 2020). I found this to be particularly true for electric buses where a strong business case and mature technology are just half of what is needed to launch an EV project. While planning ahead to account for sufficient battery capacity for routes reduces some range anxiety, I have found that other considerations such as local conditions and behavioral shifts are still important. Some of the most important things to think about are, in my opinion, driver education, passenger comfort, preventative maintenance and route planning. For instance, drivers will have to be “brought on board” with the plan and retrained to operate a car that may act substantially differently than they are used to. I can assert with confidence that bus procurement and operation should prioritize passenger comfort and convenience. One startling result in my opinion is that air conditioning and heating for passengers on electric buses may account for as much as 30 percent of overall energy use.

Another thing I may learn from the Hinkley Point C project is that policy and presentation decisions should not be made by political advisors but by government officials. The project review was handled in a manner that may have potentially damaged Britain’s relationship with China but it was not necessary. Therefore, the only option was to restart the project under the appearance of additional safeguards. It seems plausible to me that if security was a real issue, all-knowing Sir Humphrey would have discreetly sent the project into review on some obscure financial reasons that may take years to resolve without mentioning security worries about the UK’s Chinese partners. I can state that the diplomatic blunders elevated the diplomatic stakes to the point where no meaningful assessment was possible and a quick retreat by Britain was necessary. It has been very evident to all parties that Britain is only cooperating with China because it has no option but the strategic cooperation will continue anyway.

As per my knowledge, the “*International Atomic Energy Agency’s Milestones Approach*” is the standard way for rolling out nuclear power projects worldwide (Ghorbani, 2023). It may be broken down into three distinct stages such as careful consideration of the nuclear power option in the context of overall energy policy; development of supporting frameworks, institutions and infrastructure; and construction and operation of the plant itself.

For future nuclear power facilities, I think *safety and cost* should be the highest priority (Karanja and Malone, 2022). Safety advantages seem to be roughly equal across all reactor types at this point of the design process with the greatest potential for competitive prices being with big evolutionary and mid-sized advanced designs of LWRs.

I can confidently declare that major reforms on the part of both *business and government are necessary* for the widespread deployment of new nuclear power facilities. Better techniques for managing nuclear plant design and construction, agreements among players to ensure the timely, cost-effective and high-quality construction of new nuclear facilities and the establishment of state prudence legislation all fall under this category of improvement.

When it comes to expanding access to nuclear power, I believe that medium-sized facilities equipped with passive safety safeguards will play a crucial role (Haverila *et al.* 2021). With support from the Department of Energy and private companies, the designs of these reactors are moving forward toward certification in the years 1995-2000.

Some utilities both big and small, public and private have been found to have poor management practices. Public acceptance of nuclear power requires a constantly *higher degree of proven utility management standards* due to the great visibility of nuclear power and the responsibility for public safety.

For safety reasons, I recommend picking a design previously approved by the government from the official list of approved designs (Torres *et al.* 2021). After settling on a location and layout that have been given approval the firm will submit an application for a Combined License. The application for the nuclear power plant’s construction, operation and ITAAC (Inspections, Tests, Analyses, and Acceptance Criteria) verification is then reviewed by staff, stakeholders and the general public. From my understanding it takes around five years for the whole process to

reach its conclusion including the firm selecting the location and design, having them authorized, the company issuing the COL and the company evaluating the COL.

Using the most *efficient construction procedures* is another option to accelerate the building process which I am aware of. The most successful projects are those that have been meticulously planned, that have rigorous processes that guarantee the plant design, materials and personnel are all prepared before construction begins that put these policies, procedures and safety culture into practice on the site and that guarantee coordination between entities like the regulator, the licensee, the vendors and the subcontractors.

If I may make a suggestion, I would say that acceptance criteria and test techniques including those for testing done in vendor factories should be thoroughly considered and prepared for throughout the commissioning phase of the design and procurement process (Peña and Muñoz, 2020). A project's construction and operations stages are not complete until the commissioning team is involved in my view. In my opinion, commissioning staff human resource development planning is an essential part of every nuclear power plant.

In my opinion, the most significant obstacles include not only the technical and financial considerations but also licensing regulations, public and stakeholder participation and effective project management. *Competent project management, as I propose, should implement more effective work sequences* to cut costs and boost productivity and strive to lessen the accumulated financial liabilities that arise throughout the course of construction.

Conclusion

The nuclear reactor is a unique and controversial design that has not been put into operation anywhere in the world which has led certain critics of the project to doubt its practicality. There have been setbacks during construction and some specialists think it will be difficult to complete. Others have argued that providing the UK grid with carbon-free energy is essential to its continued operation. The expense of the Hinkley Point C project which is more than double that of the London Olympics has been a significant source of controversy. Electricity customers in the United Kingdom will be on the hook for billions of pounds over a 35-year period due to an intricate financial deal between the British government, Électricité de France (EDF) and China

General Nuclear Power Group (CGN). The contract has been criticized for being absurdly beneficial to EDF and even some employees at EDF are dissatisfied about it. There have been technological challenges with the project as well especially with the preliminary work that needs to be done. On a site the size of 240 football fields, 2.3 million m³ of mudstone with limestone bands were excavated to depths of up to 34 m for the earthworks. Excavation, ground nailing and concrete substitution/replacement have all had to be carried out because of problems caused by the enormous extent of the faulted zones and the presence of severely worn rock. Some people continue to support nuclear energy despite the many obstacles the Hinkley Point C project has encountered. In order to promote “safe and affordable” nuclear reactor construction, the government will fund such efforts. Despite the fact that the plants were supposed to be finished “well before 2020” without any subsidies from the British government.

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Appendices



Appendix 1: Hinkley Point C project