

Hinkley Point C

Project



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1. Introduction

The Hinkley Point C project has emerged as a major and controversial infrastructure effort in the United Kingdom throughout the last 10 years. Since the beginning of the initial planning phase in 2008, this project has encountered significant obstacles that have resulted in substantial delays and escalated costs. The project is seen as a significant milestone in the UK's nuclear development during the 1990s and is seen as a potential determinant of the role of nuclear power in a low-carbon future.

Drawing on the PMBOK guide, this analysis will provide insight into the significant advancements and obstacles encountered by the project. The project has been affected with several major obstacles, including construction delays, cost overruns, contractual problems, regulatory hurdles, and other related concerns.

In this analysis, I will evaluate many elements that contribute to the overall performance of a system. These factors include the dynamic nature of safety rules, challenges faced by suppliers, modifications in design, inadequate risk management practices, and deficiencies in the government's supervision framework.

In the end, a comprehensive analysis will be presented on the extent to which Hinkley Point C can be deemed successful or not, along with the valuable insights that may be gleaned from this attempt by the United Kingdom in successfully managing upcoming nuclear construction initiatives and other sophisticated infrastructure megaprojects.

2. Review of Hinkley Point C project

The PMBOK (Project Management Body of Knowledge) framework is well recognised for its versatility and acts as a significant resource for professionals in the field of project management. This is primarily because almost all project management approaches derive benefits from the comprehensive guidance provided by the PMI's (Project Management Institute) PMBOK handbook (Scheiner, 2022).

The Project Management Body of Knowledge defines certain crucial factors and knowledge areas that are relevant in the examination of issues encountered in a significant infrastructure project such as Hinkley Point C.

The use of advanced PMBOK practises, namely in the domains of scope, cost, risk, quality and procurement management, might have had a substantial impact on enhancing supervision and performance in the Hinkley Point C project.

2.1 Successful factors

2.1.1. Scope

The Hinkley Point C project, located in Somerset, England, involves the construction of two 1650 MW pressurised water reactors (EPRs). The primary objective of this project is to generate low-carbon electricity, which is estimated to meet the energy needs of around six million households. The project scope covers the following aspects (Blackridge, 2022):

- Constructing the reactors, turbine rooms, cooling water systems, fuel and waste facilities, and additional auxiliary infrastructure.
- The power station is connected to the national grid through the use of both subterranean cables and overhead wires.
- The development of transport infrastructure, the establishment of lodging campuses, implementation of park and ride sites and the creation of goods management facilities.
- The effective management of environmental implications, adherence to safety requirements, and active involvement with stakeholders.
- The development of Hinkley Point C has provided and will continue to provide employment opportunities to a significant number of individuals living in the vicinity.
- The power plant will be operated for a duration of 60 years, during which it will undergo decommissioning.

The primary objective of this project is to construct reactors that will effectively address the energy requirements of the United Kingdom and facilitate the transition to a net zero energy system by the year 2050. The successful realisation of this objective will significantly contribute to the overall success of the project, as examined from a scope viewpoint.

2.1.2. Quality

According to Vlasceanu, Grunberg, and Parlea (2004, pp. 49-50), quality management refers to a comprehensive range of activities aimed at ensuring the realisation of the quality policy and the fulfilment of quality objectives and responsibilities. These activities are implemented through the utilisation of processes such as quality planning, quality control, quality assurance, and quality improvement.

In terms of quality assessment, there are both favourable and unfavourable aspects.

Positive aspects:

- The EPR reactor type selected for Hinkley Point C has undergone thorough general design reviews conducted by the nuclear authorities in the United Kingdom, instilling assurance in its safety and quality (EDF, 2023).
- EDF Energy, together with its construction partners, have extensive expertise and a proven history of successful execution in intricate nuclear endeavours (EDF, 2023).

- There are stringent quality control measures and regulatory frameworks established to govern all stages of nuclear construction, including components, materials, welding, and concrete pouring (Peikko, 2023).
- To yet, routine regulatory inspections have not detected any significant instances of quality deficiencies or compromises (Peikko, 2023).

Negative aspects:

- Certain contractors have encountered issues with quality control, namely in relation to concrete batching and steel welding, resulting in failed tests (Smith, 2017).
- The necessity of modifying some components of the plant in order to comply with revised safety regulations highlights deficiencies within the initial reference design (National Audit Office, 2017).
- The United Kingdom has encountered the need to enlist the services of international inspectors as a result of a scarcity of local nuclear quality evaluation proficiency (Kraev, 2017).
- The presence of frequent contractor changes and a fragmented supply chain has presented obstacles to maintaining consistent quality (EDF, 2022).

In general, although there have been no explicit indicators of compromised quality, the delays and cost overruns indirectly suggest the presence of quality control challenges in design, building practices and supply chain management. From a technical perspective, it is quite probable that the finalised facilities will demonstrate an excellent level of quality, according to the rigorous requirements that are strictly followed. Persistent monitoring will be necessary in order to preserve quality during both the commissioning and operating stages.

2.1.3. Human resources

Human resource management involves the activities of organising, coordinating, and overseeing the existing workforce inside an organisation, with the aim of effectively executing the organization's purpose, vision, and goals. This covers the processes of recruitment, selection, development, compensation, retention of employees and employee motivation. The Human Resource Management (HRM) team is responsible for overseeing compliance with government and state laws aimed at safeguarding employee's confidential information and promoting their physical safety, as well as their emotional and mental health (Coursera, 2023). The implementation and functioning of Hinkley Point C will generate a wide range of job and apprenticeship possibilities across a variety of industries and professional pathways. In the years to come, a range of opportunities is anticipated to emerge, including various sectors such as construction, civil engineering, electrical installation, hospitality, catering, logistics, security, site services, support jobs, and more fields. Upon its completion, Hinkley Point C is projected

to employ a staff of around one thousand individuals who will be responsible for the operation and maintenance of the power plant during its anticipated operational lifespan of sixty years. It is anticipated that the construction of the new nuclear power station on the Somerset coast would provide around 25,000 possibilities for employment (EDF, 2023).

EDF and its contractors at Hinkley Point C have encountered significant human resources challenges in recruiting and managing a sizable construction workforce with specialised qualifications. These difficulties primarily stem from the scarcity of qualified nuclear construction workers in the United Kingdom. In addition, the COVID-19 pandemic further aggravated the situation by causing increased absenteeism and necessitating adherence to social distancing protocols, thereby impeding construction activity levels and workforce productivity. Hinkley Point C has made a commitment to provide £1.5 billion towards supporting companies that are located in the immediate area. The current expenditure figure exceeds £5 billion, including numerous companies around the United Kingdom, along with their associated employees (EDF, 2023).

2.2.Unsuccessful factors

2.2.1. Budget

The initial budget allocation for the Hinkley Point C project experienced a notable increase from an estimated 18 billion pounds at the start of project approval in 2016. This increase can be attributed to various factors, including the impact of the COVID-19 pandemic and other setbacks. Presently, based on current projections, it is anticipated that the budget will further escalate to approximately 33 billion pounds, taking into account inflationary factors (Gosden and Sage, 2023).

Several key elements have influenced the upward trajectory of the budget:

- The incorporation of design revisions to adhere to the ever-changing safety rules resulted in a substantial increase in expenses (Jack, 2019).
- The presence of construction delays and issues with contractors resulted in a decrease in overall efficiency and production (Taylor, 2023).
- The pandemic has had significant effects on both labour and supply systems, leading to disruptions and increased expenditures (Taylor, 2023).
- The occurrence of high levels of worldwide inflation and the presence of materials shortages can be attributed to the ongoing conflict in Ukraine, resulting in significant cost constraints (Gosden and Sage, 2023).

The initial budget of £18 billion has seen significant inflation over time, reaching an estimated £33 billion, representing an approximate 78% increase over the initial cost projection. The

project's financial situation has been adversely affected by inadequate preparation and unanticipated external circumstances.

2.2.2. Time

Effective time management is a crucial element of the Hinkley Point C project since it involves the coordination of a substantial and diversified workforce, adherence to strict deadlines and budgetary limitations, and the assurance of exemplary quality and safety standards. Several characteristics of time management at Hinkley Point C can be identified:

- The implementation of a staff bus service, equipped with a specialised timetable and mobile application, to facilitate the transportation of employees to and from the worksite (Somerset Passenger Solutions, 2023).
- The implementation of a dry storage system for spent fuel, which effectively minimises the need for maintenance and lowers the duration of decommissioning activities (EDF, 2023).
- Providing skills and behavioural training programmes targeted towards aspiring individuals seeking employment at Hinkley Point C, including valuable insights on time management strategies (EDF, 2023)
- Regularly engaging in communication with the public and relevant stakeholders on the development and significant achievements of the project (EDF, 2023).

Despite demonstrating indications of efficient time management, the Hinkley Point C project situated in Somerset is projected to commence operations in June 2027, which is one year later than the originally scheduled date. The cause of the delay was attributed to the ramifications of the epidemic, and EDF claims that it will not have any adverse consequences for British customers or taxpayers (BBC, 2022).

The delay will have a significant effect on its final cost. According to expert Martin Young, the historically low costs observed in offshore wind energy place additional pressure on the Hinkley Point C project. The projected costs for newly implemented wind power installations, anticipated to be operational by the year 2025, were established at very affordable rates, reaching as low as £40 per megawatt hour. In contrast, the anticipated cost of power generated by Hinkley Point C is projected to be £92.50 per megawatt hour (BBC, 2022).

Solar farms and wind parks are known for their relatively short construction timelines, often ranging from 1 to 2 years, which is significantly faster compared to the extensive time frame of 10 or more years required for the building of new nuclear power facilities. Renewable energy sources provide the capability to fulfil electricity requirements at a more rapid pace, implying that any potential postponement in the Hinkley Point C project would result in its lack of success (Richardson, 2018).

2.2.3. Procurement

Procurement refers to the acquisition of products and services by an organisation in order to facilitate the functioning of its supply networks, with the aim of achieving profitability and completing the project on time (CIPS, 2022).

The project is dependent on a multitude of worldwide vendors for critical components such as reactors and turbines. The occurrence of delays in global supply chains can be attributed to several factors, including the COVID-19 pandemic (Lawson, 2022).

The Hinkley Point C project's procurement process was influenced by an additional issue, namely the conflict in Ukraine, which has resulted in interrupted supply lines and an inadequate supply of raw materials. With the decline in the reliability of imports, suppliers were compelled to reassess their strategies for attaining profitability and sustainability (Bush, 2023).

The success of Hinkley Point C is dependent on the efficiency and effectiveness of its supply chain. The project's financial excess costs, which have had an unfavourable effect on its effectiveness, may be attributed to several significant causes, such as the Covid-19 epidemic, the war in Ukraine and the Brexit situation.

3. Conclusion and lesson learned

Since the beginning of construction in 2016, the Hinkley Point C project has encountered many setbacks and financial discrepancies. The projected completion date for the plant was initially set for 2025; however, it has been postponed to 2027 at the earliest. The budget has experienced a significant increase from its initial estimate of £18 billion to over £33 billion at now.

One notable aspect is that the project has seen consistent advancements in development over the past few years. Significant achievements, such as the successful construction of the reactor buildings and the installation of crucial components, have been accomplished. Hinkley Point C will effectively provide sustainable power with little carbon emissions over an extended period of time. The capacity of 3.2 gigawatts has the potential to fulfil about 7% of the power consumption in the United Kingdom.

Nevertheless, it might be argued that the project's image as a success for the United Kingdom's nuclear sector has been compromised by the occurrence of delays and escalating expenses. The striking price of £92.50 per megawatt-hour, which has been agreed upon with EDF, appears to be too favourable for the developer while placing a significant burden on British energy customers and taxpayers. The prices associated with renewable energy have experienced a more rapid decline than initially anticipated.

In general, it is anticipated that the completion of Hinkley Point C will provide important production of electricity. However, this project serves as an important example of the significant obstacles encountered in the construction of modern nuclear facilities, particularly

in relation to project schedules, funding issues, and expenses. The promotional campaign for nuclear energy in the United Kingdom has not evolved as smoothly as previously anticipated by the government.

In order to enhance the efficacy of future similar projects, it is advisable for government organisations to implement more robust supervisory measures and systems for managing costs. It is imperative to undertake a thorough project planning process, including comprehensive risk analysis, in order to optimise construction deadlines and budgets prior to making a commitment to begin building. Implementing early fixed-price contracts with developers has the potential to effectively manage costs for customers. Collaborating with established nuclear construction organisations such as state-owned firms in China or Korea might also prove advantageous.

It is imperative for the United Kingdom government to conduct a comprehensive investigation into the underlying issues that have contributed to the unsatisfactory cost and schedule performance of the Hinkley project. The use of gained expertise can significantly contribute to the successful execution of the prospective Sizewell C initiative and other upcoming nuclear construction initiatives across the globe, ensuring adherence to predetermined schedules and financial allocations.

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