



White Paper 2022-10

How to Prepare for Very Long Industrial Projects

Some industrial projects or programmes can span over very long periods of time for their development phase or even for their execution phase, much more than the typical 3-4 years cycle. Typical examples include nuclear power plants, or very large energy or infrastructure developments. Such long projects generally show a lower success ratio. Specific measures must be contemplated when setting up those projects to address the challenge of their expected duration. This White Paper exposes some of those challenges and how to prepare for them.

Introduction

There is a substantial and commercially measurable benefit of keeping industrial projects as short as possible to ensure their environment and field of constraints can remain as stable as possible, thus leading to minimum changes during their execution. Sometimes long durations are however unavoidable, but this will typically make projects more fragile, prone to disturbances and induce additional costs and delays.

In addition, project personnel will seek to develop their careers and thus typically expect to change position and evolve every 3-4 years. Therefore, projects that last very long durations need to account for personnel turnover or at least for the need to recognise explicitly that project contributors evolve in terms of experience and capabilities by having personnel individual responsibilities evolve.

We define here long industrial projects to be projects with an execution phase exceeding 4-5 years. Very long projects typically last more than 8 years. We take the duration of the execution phase as a reference, and not the full project lifecycle including project development (which can sometimes be very long for the owner). This is because it is after Final Investment Decision that the intensity of the work is continuously high, intricate and work cannot be stopped without jeopardising the project benefits.

If possible, this situation is to be avoided, for example by splitting a full programme in successive coherent sub-projects that can each be implemented in less than 3-4 years – with the condition to maintain a full programme oversight to ensure that alignment with the strategic intent is maintained (refer to our White Paper [\[2022-07\] How to Manage Long Term Industrial Capex Programmes That Get Approved Piecemeal](#)). The intrinsic nature of the infrastructure does not always make this approach possible.

Examples of long duration projects

Nuclear facilities are typically long to very long projects due to their magnitude and the intrinsic density and complication. It can also be the case for major defence projects or programmes. Major challenging infrastructure can also sometimes rank in this category such as trans-

mountain range tunnels. Major upgrade programmes of a significant portfolio of industrial facilities can also span over long durations. Extreme examples of projects spanning over several decades include nuclear decommissioning or nuclear waste disposal facilities.

Specific caution should be exercised when contemplating projects which development or execution phases exceeds 3 to 4 years because of the additional complexity involved

Specific challenges of long duration projects

Challenges are both of an external and internal nature.

External challenges

The issues are related to the instability of the project environment generating changes to the project. Stabilising the project environment is the ultimate goal of project development. The longer the project execution, the higher the risk that external factors will break into this protective shell, and by experience this risk tends to increase exponentially with time:

- Significant evolutions and changes of public policies and regulations, possibly as a consequence of major accidents or crisis elsewhere, independently of the current project; or as a result of societal evolution,
- Political and geopolitical crisis and changes, from elections to global geopolitical upheaval,
- Turn-over of key stakeholder representatives, with different views and opinions,
- Financing challenges if the financing has not been fully secured and committed upfront,
- Significant economic changes impacting the facility output economics,
- Evolution in the supply chain and contractors (bankruptcy, mergers and acquisitions etc)

Internal challenges

The criticality of internal challenges will increase substantially with time beyond typically 3-4 years and cover areas such as the following:

- Partners in owner partnerships or contractor JV change strategy in a non-coordinated manner,
- Turn-over of personnel who expect to change position after maximum of 3-4 years; this requires careful planning and anticipation, and providing career development paths within the project,
- New ideas or suggestion of implementing innovative technology to the project,

- New ideas or innovative solutions on how to build part of the project sometimes resulting from new technical solutions not being available at definition stage,
- Obsolescence of the information management tools used to design, management and/or control the project,
- Obsolescence of the technology of key equipment of the infrastructure under construction,
- Contractors do not follow with further commitments on the project when requested because they cannot commit with such a time horizon and may change focus after some time,
- Preservation and maintenance of the equipment delivered on the project and possibly already erected.

It is worth designating a direct report to the project director to be overall in charge of all those long-term issues in a transverse role

Planning for long duration projects

It is essential to plan in advance for the additional complexity related to project duration to make sure that the project delivery organisation properly anticipates and responds to the additional challenges. This generally requires additional resources, processes and tools to be included in the planning and set up of the project, and the extra cost involved should be included as part of the project estimate. Particularly important additional processes include:

- Developing from the outset a manning plan that includes succession planning. Each critical position on the project should have an identified successor, ideally someone inside the team who can be given responsibilities and training or coaching within the project to prepare for a possible succession. Such succession planning can be explicit with planned succession dates to enable structured career development within the project team with preservation of project history and knowledge. Key employees can be identified for several successive positions within the project, being promoted inside the team. Proactive succession planning and people development within the project will provide resilient to sudden departures of key personnel. Specific strategies will depend on the extent of project activity within the organisation and whether project personnel can develop their career while executing the project.
- Specific team familiarisation and building effort should be implemented on an ongoing basis to properly integrate newcomers.
- Being particularly careful with the project sponsorship and governance. Continuity of support to the project is essential, as well as discipline to minimise change to the project scope while it is being implemented. This is not easy: regulations may change, economic conditions of the market will evolve leading to possible different facility operating points. Success will require significant organisational self-discipline and a strong governance.

- Developing an explicit information system architecture and planning for its flexibility and evolution over time. This requires:

- Using information systems in an as standard possible configuration (no customisation) to easily benefit from editor upgrades,
- Maintaining information systems architecture, integration and implementation resources in the project to manage the necessary evolutions over time of the information systems architecture. Implementation of upgraded or new systems will be made more difficult than usual by the need to recover historical data and minimise disruption to ongoing project operations,

- Including a budget for upgrades, new systems implementation and migration in the project estimate,

- Ensuring that the entire project value chain including partners, supply-chain and contractors plans for a similar flexibility in their information systems and information management practices to ensure consistency across the entire project value chain. Therefore, changes to the project architecture will require change management across the value chain, inasmuch as systems tend to be increasingly integrated across the value chain through the use of Product Lifecycle Management and shared 3D design systems.

- Developing a plan regarding preservation and management of obsolescence of infrastructure components themselves, due to the long duration between procurement of components to putting them into service.
- Developing a plan for maintenance of equipment that has been installed and commissioned up until the actual start-up of the facility.

Impact of project duration on estimates and contingency

This additional effort and associated investments and expenses is unfortunately often overseen at the estimating stage while it should be explicitly taken into account. It should be reflected both as:

- An extra budget in the estimate to cover expected efforts of the associated plan (based on some assumptions about the renewal of information systems, preservation, industrial policy and supplier development etc).
- Duration, and particularly the external challenges, should also be explicitly identified as a contributor to a higher contingency in terms of risks of changes to the project and to the project execution plan.



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Implement a specific position within the project team

Because of the far-reaching consequences of project duration, we believe that to ensure a sufficient focus and strategic view on the issue, it is worth designating a senior team member, direct report to the project director to be overall in charge of all those issues in a transverse role. It can often be justified to have a full-time role devoted to the strategic planning and coordination of those aspects, and it has to have sufficient authority to force implementation of changes to ways of working across the entire project value chain if needed. This role should typically be close to Project Control and Supply Chain to ensure maximum effectiveness.

Summary

Specific caution should be exercised when contemplating projects which development or execution phases exceeds 3 to 4 years because of the additional complexity involved. Measures must be planned and included in the estimate to cater for the major impacts in terms of human resources, governance, preservation and maintenance, and information systems, that can be sometimes significant both in terms of project resources and budget. In addition, the challenges will easily span across the entire supply chain requiring extensive coordination of all contributors. Because of the importance and reach of the actions needed we believe that a specific executive position should be designated within the project organisation with sufficient overview and authority to address such challenges in a proactive manner.

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