

JEREMIE AVEROUS

**Industrial Projects  
Practical  
Owner  
Guide**

*Securing your capital investment*



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# First Edition - 2020

Published by Fourth Revolution Publishing, Singapore  
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8 Burn Road #08-02/03 Singapore 369977  
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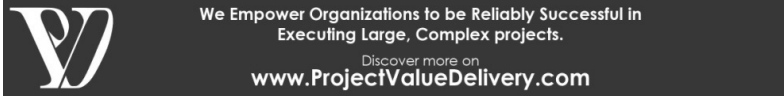
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ISBN: 978-981-14-5500-1

ISBN e-book: 978-981-14-5501-8

First print – Print-On-Demand, June 2020 / worldwide availability on all e-bookshops through LightningSource.



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# Foreword

## by Bruno Bensasson

Life projects, political projects, industrial projects, software projects: we all have projects, large or small, and projects are everywhere. If we were to take just one example, let's just look at the Nile river as it flows from the *Renaissance* dam in Ethiopia, the largest hydroelectric plant (6,500MW) on the African continent, down to the pyramids of Egypt, wonders of the world built 5,000 years ago with the sweat and blood of slaves, which still continue to fascinate us today.

The industrial projects that Jeremie Averous invites us to visit never cease to impress me. It is an ever-renewed wonder to observe how human ingenuity combined with the industrial organisation of work allows hundreds or even thousands of men and women to bring out of the ground, in a few months or years, facilities that will serve the economy and therefore people for decades. Those are facilities that none of these people could ever have built alone.

These industrial projects, unlike political or software projects, are part of a very material reality, where physics leaves limited room for imprecision and adaptation: if we load the tenth version of IOS without any worries, it would be quite more complicated and much more expensive to make a v2 of the Millau viaduct, a superb 2,500-metre structure overlooking the Tarn. Not to mention the ephemeral port of Arromanches, a brilliant design by the British installed in 3 weeks for the 1944 Normandy landings.

And it is undoubtedly because there is only limited room for imprecision and adaptation that it is so challenging to carry out these projects in accordance with the main objectives we set ourselves. While Jeremie Averous

never compromises the safety of people, the first responsibility of an asset owner, he does well to alert us quickly that the objectives of quality, costs and schedule constitute a kind of infernal triangle, at the centre of which it is not possible to remain when unexpected events arise.

Indeed, experienced owners of large industrial projects are well aware they will meet some of those unexpected events! Especially in these times of intense economic competition, it is no longer possible to win an invitation to tender by taking excessively comfortable precautionary margins on the schedule or costs of an industrial project. Taking the time to properly design a project, with the right skills and in the right order, aiming for objectives with reasonable margins, is one of the necessary ingredients for success.

There are of course many other ingredients required: designing equipment that satisfies the expectations, distributing responsibilities and risks as well as possible between the parties to the projects, calling on the skills required from within the organisation or from suppliers, gathering financing, coordinating all the players in time and space, keeping the helm as the project progresses and dealing with requests for modifications or issues that may or may not be anticipated in the contracts, etc.

Jeremie Averous' guide addresses all these issues and a few more. He does so with a great deal of clarity, common sense and humility, backed by proven experience in the field, which does not start from great theories but from the observation of facts. It covers from special cases to global statistics, from successes but also, no less interesting, to failures which are unfortunately still very frequent. Quite a piece of advice to be put in everyone's hands!

Bruno Bensasson

EDF Group Senior Executive, VP Renewable Energies  
Chairman and CEO of EDF Renewable  
June 2020

# **Foreword to the French Edition**

In the course of my career, I have noticed that project owners of industrial projects often lack experience and skills in project management, whereas it is a real profession in its own right and a difficult job with very high added value.

They then don't have the right reflexes and don't control properly their projects. They don't sufficiently challenge their main contractors or owner support consultants, the risks are not under control and then the projects drift in terms of schedule, cost and quality.

The project owner often falls for the illusion of transferring the risks to the contractor, but in reality, if the project goes badly, what it will cost the project owner in terms of unavailability or lack of performance of the asset is out of all proportion to the penalties he will be able to recover from the contractor. Moreover, the project owner who does not control his project tends to take refuge in legal and contractual defence, but when a project is run by lawyers, industrial problems are not always better solved.

When a project owner does not have enough experience and does not identify that his project is not sufficiently under control, it can happen that the project is pursued even though all the indicators are in the red. In this case, one must know how not to persist relentlessly. The owner must be able to stop and take a break, to learn lessons, to modify everything that needs to be modified and to reorganise the project in order to get off to a good start.

In my opinion, the best solution for the project owner is to recruit a real Project Director, an experienced leader, surrounded by a small team of industrial project

professionals: he will be able to enlighten the project owner's decisions, defend his interests with loyalty, keep the project under control. It is not necessarily a question of recruiting large battalions or setting up an engineering department, but of having the minimum experienced skills to effectively manage industrial projects and control risks. It is also necessary to set up with the prime contractor and subcontractors an industrial and contractual organisation that aligns everyone's interests around a single common goal: the success of the project.

The salutary objective of this book is to develop an understanding of the pitfalls of industrial projects for project owners. I hope that it will find an attentive audience and that it will indeed help to increase the performance of projects.

Yannick d'Escatha

Chairman of the Board, AREVA SA  
Former Chairman and CEO, French Space Agency  
(CNES)  
Former deputy general director, EDF  
Former General Administrator of the French  
Atomic Energy Commission (CEA)

May 2020



# Preface

This guide has been conceived after we have realised that owners often lack awareness on how to properly approach their capital projects, in particular when they are few and far apart in time. A reference guide specifically written for owners to provide relevant guidance seemed to be lacking in the available project literature. Our aim is to address in a practical manner, from the owner perspective, the entire project lifecycle from project definition to implementation, with a specific focus on the latter phase. This guide has thus been written to fill the gap.

The guide is focused on industrial projects and it is founded by our experience across many industries, as well as academic research available. The approaches would be applicable to many other projects as long as they are large and involve the physical construction of an asset.

The guide has been written as a very practical handbook including examples from our experience. Following our editorial philosophy, it has been kept relatively short to be readable within a couple of hours. It has also been written in a simple language to be easily approachable by business readers not specialised in project management. References are provided for those that would like to deepen their knowledge in certain areas.

This guide is consistent and complements the excellent *“Pocket Guide for those Daring Enough to Take Responsibility for Large, Complex Projects”* by Jean-Pierre Capron, which remains a must read due to the depth of the experience it shares. The present guide takes a more systematic owner perspective and covers strategic aspects of project implementation.

Since 2011 our mission is to empower organisations to be more reliable in delivering their industrial projects. Because of the high failure rate of those projects and the dire consequences of those failures, this is a societal challenge. It is my hope that this guide will be useful to owner organisations throughout the world and thus contribute to the fulfilment of our mission.

Jeremie Averous

Founder, Project Value Delivery  
consultancy

Paris, June 2020

# **Introduction to the Owner's Guide**

## **Why this guide?**

During the course of our consulting activities we have found that many industrial owners face notable difficulties to properly address the challenges of their major capital projects, therefore creating substantial risks for their organisations and their economic sustainability. This also applies to financial owners that invest in a specific industrial asset, governments that launch major defence or civilian programmes, or contractors who take a role akin to an owner by financing, building and operating assets under some form of lease arrangement for an ultimate client.

Common issues include a lack of proper understanding of the risks and drivers of capital projects, and therefore, a lack of awareness of the associated traps. This problem is particularly prevalent for owners that are primarily operators or financial bodies and that define and execute such large projects infrequently, but not only.

It has appeared that there is no practical guide readily available for owners in this situation. Consistent with our mission we have therefore decided that such a handbook would be useful, with the aim to diminish the number of capital project failures and increase the awareness of owners on decisive aspects of project management from their perspective.

This guide describes how to properly strategize and plan for those projects to be a success and also covers aspects related to their practical implementation up to facility start-up.

This guide is particularly focused on large industrial projects, typically capital projects exceeding 50 million US dollars, up to several billion US dollars. The principles also apply to smaller projects (such as the revamping or improvement of part of an existing facility), however the level of complexity and challenge is often lesser.

The guide is applicable to a very wide range of industries. We have successfully applied those principles to oil & gas (onshore and offshore, including petrochemical), naval, nuclear, renewable, railroad and rolling stock, infrastructure, power plant, mining industries, and the list is not exhaustive. Those project management and control principles and methods thus apply to all kind of industrial projects aiming to build a large and possibly complicated physical deliverable.

Industrial projects need to be developed and implemented using a conventional project delivery approach sometimes called ‘waterfall’ where the project is well defined before it is launched according to a plan, and subsequent changes during implementation are minimised. The opposite approach is ‘agile’ project management where the deliverable gets defined as it is built, based on customer feedback. ‘Agile’ project management is used for software development or for innovative products development. It cannot be applied to industrial projects due to the supply chain constraints involved, and the need to organise a significant physical logistics organisation.

### **Who is this guide for?**

This guide is primarily for owner board members, executive management, project sponsors, project managers and project management core team members that are faced with defining and implementing industrial capital projects.

It is also useful for project management students and academics. This guide is a reference handbook bringing in a consistent summary what is currently considered good practice in the industry for managing capital projects.

## Essential terminology

In this guide, we have chosen to use the following terminology.

An **owner** is the entity that finances the industrial facility and owns the asset. It is often the same as the **operator** but not always (projects are increasingly financed by a purely financial entity that owns the asset and contracts with a separate operator). The owner will live with the asset when it is built and is directly concerned about its lifecycle operating performance (both financial and non-financial, depending on the objectives targeted).

For large projects, several **partners** will often join their resources to develop the project. This setup is very common for raw material producers (oil & gas, mining) and this also serves for them to spread their risks across more deposits. In this case generally, one of the partners is designated as 'operating partner' and will deal with the project over its entire lifecycle, therefore playing the part of the owner. Partners will then only get involved at the governance level. In some cases, a formal joint venture may also be setup between partners, and the joint venture as an incorporated company will then be the owner for the project.

The **operator** is the entity that will operate and maintain the facility and will be accountable for its production performance (availability, throughput, etc.). It is often a specific department of the owner. It can sometimes be a totally separate legal entity, or a service provider.

Key stakeholders for an industrial project include **local government** and **authorities**. When the facility has the potential to generate substantial hazards to the workers, public or environment, **regulators** get involved that manage a **licensing** process. Licenses provide specific conditions that have to be complied with for engineering, construction and operation of the facility. Types of licenses and relevant moments for the implication of regulators during the project lifecycle will be dependent on national and local laws and regulations.

**Projects** are temporary endeavours undertaken to create a specific deliverable. Here we concentrate on projects that create or improve industrial facilities or assets.

**Large projects** are projects that have typically a value above 50 to 100M\$. It is the threshold where project managers can't manage the project by themselves, they need to be supported by a substantial infrastructure and team. Complex projects under this threshold have also to use the same approaches. Conventionally in literature, **megaprojects** are projects above the billion \$ (B\$) mark. To be noted, for some highly capitalistic owners such as oil & gas majors, the thresholds may increase by an order of magnitude: projects of a few hundred million dollars are typical revamping and upgrades, large projects are those between 1 and 10 B\$, and megaprojects are those above 10 B\$.

Projects are led by a person, which we call here **project manager** as a generic terminology. Titles such as 'project director' are often used particularly for large projects. 'Project leader' is also sometimes used. Projects can sometimes be split in several sub-projects or **project packages**, led by a **package manager**.

In the guide, we separate the **project level**, under the authority of the project manager, and the **governance level**, which supervises the project on behalf of the owner without getting involved in the day-to-day project activities. The **project sponsor** is a governance role, promoting and following the project. It is often an executive officer of the owner; or, if the owner has setup a dedicated project delivery organisation, a responsible person of that department. The **project steering committee** is the main governance body, that includes representatives of the main partners and other owner divisions. It is generally chaired by the project sponsor.

A **portfolio** of projects is a set of projects that are undertaken by the same organisation and may share some resources, but that do not concur to a unique objective. On the contrary, a **programme** is a set of projects that concur to a unique objective (e.g. a defence programme, an aircraft programme).

Owners contract **contractors** and **suppliers** to implement the project. Suppliers typically supply material and equipment with no or little associated service. Contractors are service providers that provide engineering, procurement, construction and/or commissioning services.

## The guide's structure

The guide starts by setting the scene with chapters 1 and 2 describing the owner's general challenges with capital projects, and what the project lifecycle comprises of.

Chapter 3 focuses on the project definition phase – its quality being the best predictor of project success. It is complemented by appendix 1 which details the expected definition level at Final Investment Decision.

Chapter 4 underlines that in all cases, a minimum scope must be managed by the owner and that everything should not and cannot be delegated to contractors. Chapter 5 and 6 then address specific owner challenges in more detail. Chapter 5 exposes the relationship with future operations and maintenance throughout the entire project lifecycle. Chapter 6 addresses the issue of project financing and its possible impact on the project implementation plans.

Chapters 7 to 9 provide essential elements about how to setup the project in terms of governance, project team organisation, and infrastructure.

Chapters 10 and 11 address contractor management. Chapter 10 explains how to develop a contracting strategy. Chapter 11 then delves in more detail into commercial approaches and how to manage contractors practically.

While all former chapters addressed projects on their own, chapter 12 addresses the specific issues and approaches that are needed when the owner manages an ongoing portfolio of projects.

Chapter 13 includes specific guidance for certain typical types of projects.

Chapters 14 to 16 finally address project implementation risks. Chapter 14 provides an overview. Chapter 15 explain how to detect project health risk during implementation. Chapter 16 finally explains how to deal with major issues – including if required, cutting the owner’s losses before they become too large to bear.

Finally, as references:

- Appendix 1 includes a more detailed checklist to check the project definition at Final Investment Decision stage,
- Appendix 2 and 3 include a checklist to check the adequacy of the governance and project organisation,
- Appendix 4 includes key pointers in case the owner wishes to set up a reliable and performing project delivery organisation.





# Project Value Delivery,

a **Leading International  
Consultancy for Large, Complex  
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This cutting-edge Project management book is sponsored by Project Value Delivery, a leading international consultancy that **“Empowers Organizations to be Reliably Successful in Executing Large, Complex Projects”**.

Part of our mission is to identify and spread the world-class practices that define consistent success for Project leadership. Ultimately, we want to be able to deliver a framework that makes Large, Complex Projects a reliable endeavor.

Our Book Series are a crucial part of this framework, spreading indispensable good practices and skillsets for leaders in Projects.

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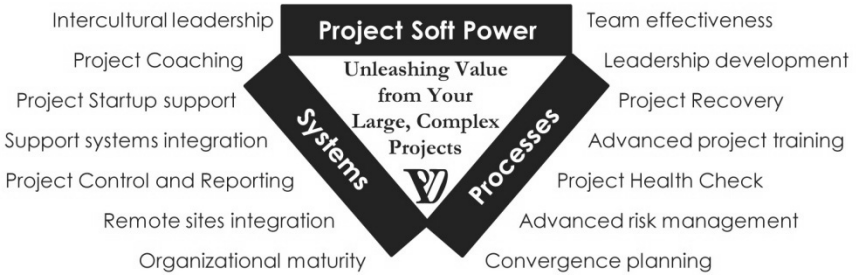
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