Contracting and procurement strategy

Hydrogen Valleys Facility | Knowledge Centre

2025

Roland Berger

The H2V Facility delivers dedicated support to hydrogen practitioners via PDA services, the H2V Knowledge Centre and the H2V Platform

The Hydrogen Valleys Facility

h2v.eu

Dedicated support via the Hydrogen Valleys Facility by Clean Hydrogen Partnership

1 Project Development Assistance

Provision of dedicated Project Development Assistance (PDA) for Hydrogen Valleys projects towards Final Investment Decision

2 H2V Knowledge Centre

Sharing & dissemination of knowledge and provision of capacity building for the broader hydrogen community

3 H2V Platform

Maintenance & extension of the Hydrogen Valley Platform to enhance its positioning as the global one-stop-shop for hydrogen flagship projects

Delivery partners

Roland Berger · worley · Inycom

Aspirational target 2030

50 Hydrogen Valleys **operational/under construction**

within the EU

Source: Roland Berger

This document is part of the H2V Knowledge Centre that offers hydrogen practitioners knowledge material in written and interactive formats

The H2V Knowledge Centre

Structure and scope of the H2V Knowledge Centre

	Self-service Knowledge Material	Interactive Formats
Commercial Technical Regulatory Valley governance	• Knowledge material specifically developed as part of the H2V Facility project • Links and information to other third-party resources and material	• Webinars with content experts (Roland Berger, Worley and external speakers) • Project Development Assistance experience sessions with Hydrogen Valley practitioners

Target audience

- Hydrogen Valleys
- Project developers
- National, regional and local authorities
- Investors
- Other hydrogen practitioners

Source: Roland Berger

Disclaimer

This presentation is for informational purposes only and is not offered as professional advice for any specific matter. Professional advice should always be sought before taking any action or refraining from taking any action based on this presentation.

Roland Berger group of companies ("Roland Berger") and the editors and the contributing authors do not assume any responsibility for the completeness and accuracy of the information contained therein and expressly disclaim any and all liability to any person in respect of the consequences of anything done or permitted to be done or omitted to be done wholly or partly in reliance upon the whole or any part of the presentation.

The presentation may contain links to external websites and external websites may link to the presentation. Roland Berger is not responsible for the content or operation of any such external sites and disclaims all liability, howsoever occurring, in respect of the content or operation of any such external websites.

Source: Roland Berger

Key objective of this document is to support Hydrogen Valleys in selecting the appropriate contracting model for engineering, procurement and construction

Key objectives and content of this document

Key objectives

Develop and apply a **tailored contracting strategy** that optimize Hydrogen Valley engineering, procurement and construction

Key content

1 **Procurement and contracting strategy**
Guidelines on the development of a procurement and contracting strategy

2 **EPC and MC contracting strategies**
Comparison of EPC and MC contracting across project phases until COD, incl. evaluation of key trade-offs in risk, cost, schedule, and flexibility

3 **EPC vs. MC contract assessment framework**
Analysis of EPC vs. MC contracting model along 7 dimensions to select suitable contracting strategy

Source: Roland Berger

Contents

A contracting strategy is essential for Hydrogen Valleys to manage complexity, allocate risks, and ensure integrated execution across the full value chain

Relevance of a contracting strategy for Hydrogen Valley developers

The complex development of a Hydrogen Valley …

1. **Multiple interconnected technical components, infrastructures, and assets**
2. **Limited supplier and contractor capacity and capability, with potentially long lead times**
3. **Limited operational track-record of integrated renewables, electrolysis and derivatives facilities at commercial scale**

… requires an adequate contracting approach for technical project delivery

- **Mitigation of** technical and performance **risks**
- Clear definition of **contract scope and responsibilities** of stakeholders
- Effective **cost and schedule management**

Source: Roland Berger

A. Procurement und Contracting Strategy for the technical scope of the project

Clean Hydrogen Partnership

The development and project execution of Hydrogen Valley projects has various risks regarding technical aspects – An early addressing of these risks is key

Typical challenges in Hydrogen Valley development and execution

Strategic challenge:
Many H_2 projects are "exceptional" or even "first-of-their-kind"

Initiation & concept studies[1]	(Pre-) Tendering	Project management, execution, and controls (Owner organization)			
		Basic & detailed engineering	Procurement	Construction	Commissioning
• **No technical blueprint** (difficult to plan budget and cost correctly) ⇔ **excessively optimistic planning** • **Complex permitting** procedures • **Lack of experience** of **permitting authorities**	• **Difficulties to find right partners** (only few have done H_2 projects before) • **Unfavorable contract design towards** client, subcontractors and suppliers	• Tendency **to overengineer** • Integration of different **user requirements** • Implementation of **completely novel technical concepts**	• **Challenging supplier selection** • Cost overruns due to **unforeseen changes** and **price fluctuation** • **Delays due to late deliveries** & slow decision-making • **Disregarded long-lead** items/equipment	• Uncontrolled, frequent **design changes during construction** • **"Urge"** to show **immediate physical** progress	• Technical challenges due to **Hydrogen Valley complexity** and lack of experience • **Safety and quality** inspection concerns • **Coordination** and resource difficulties

• Team & structures overwhelmed by complexity

1) (Pre-) feasibility and pre-FEED

Source: Roland Berger

The overarching objective of a procurement and contracting strategy is to find the right supplier for a good price and in line with compliance requirements

Key objectives of a procurement and contracting strategy

Identify the **right supplier** that can deliver the given scope in time and to quality

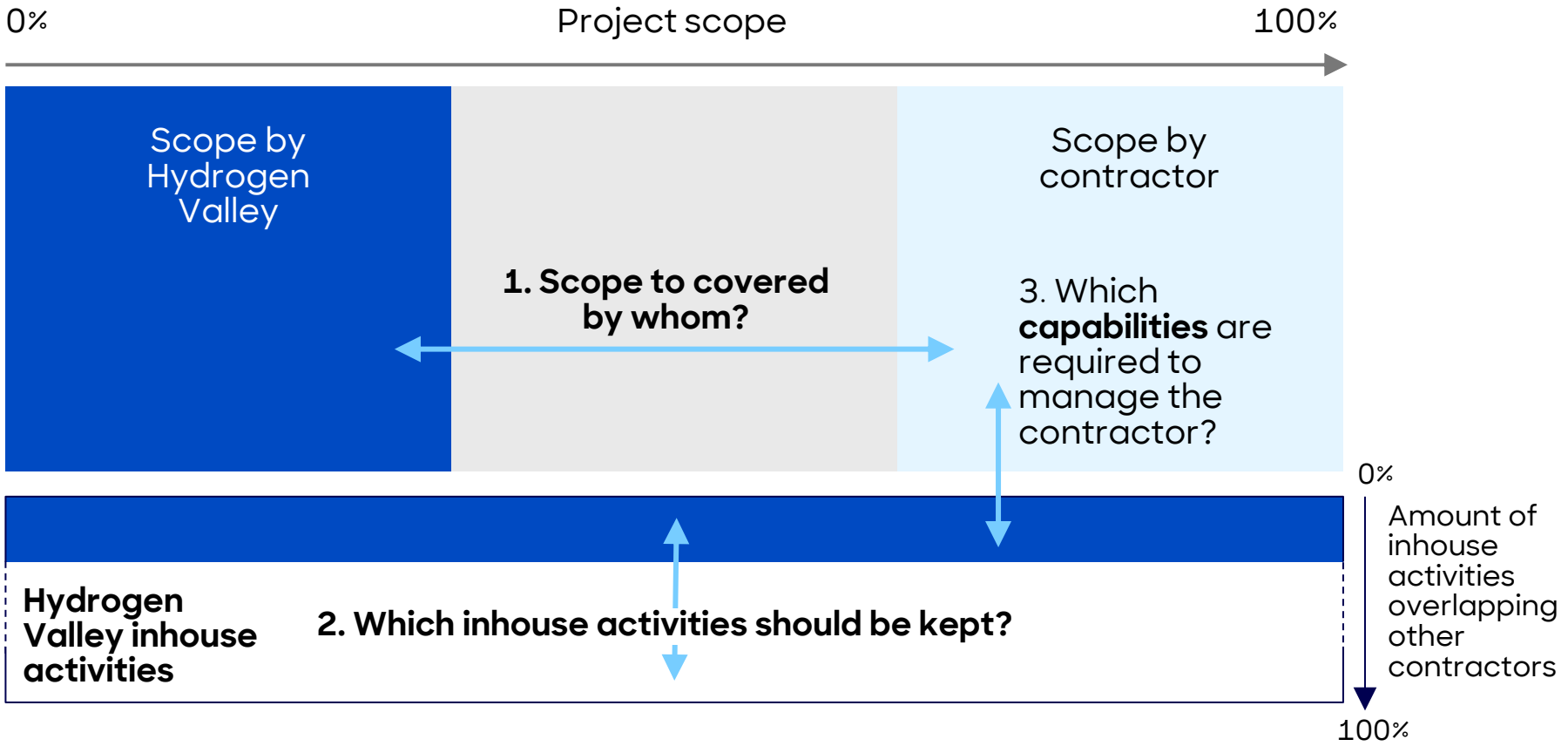
Ensure getting a **competitive price** for the goods/services

Enable an **adequate risk allocation for project owner** compliant with ethics, standards, and rules & regulations

Source: Roland Berger

Effective contract mgmt. determines which activities to outsource and which to keep – Depending on project scope, activities and capabilities

Framework and key trade-offs for determining the scope of contracting



Key questions

- Which part of the **project scope** should be executed by the company, and which part should be done by a contractor?
- Which **activities** within this scope can be outsourced to a contractor?
- Given the outsourced activities, which **capabilities** are needed to control and check the work of the contractor?

Source: Desk Research, Roland Berger

Activities within Hydrogen Valley development and construction should be evaluated to determine which activities should be outsourced vs. kept inhouse

Approaches towards selecting inhouse activities vs. outsourcing

I. Activities

Listing of core activities for each part of the value chain

II. Evaluate

Evaluation of each activity based on:

- Lessons learned from previous projects performed by market parties
- Observations towards the capabilities of the evaluated market parties
- Long term consequences if the activity mentioned is outsourced

III. Categorise

Activities to keep inhouse in order to:

- Maintain a durable knowledge position
- Be able to check and control contractors
- Make proper investment decisions

Activities that can be outsourced:

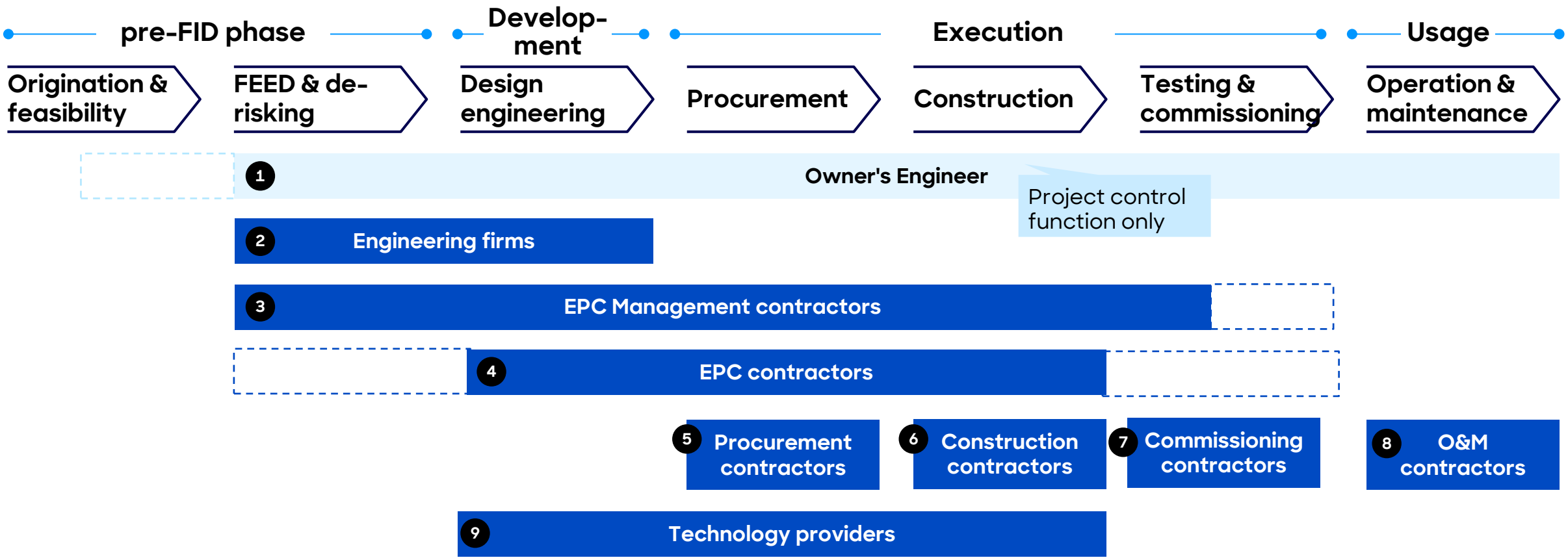
- Can be performed by multiple parties and/or
- Are time consuming/require large workforce and/or
- Are not performed on regular basis

Source: Desk Research, Roland Berger

Non-exhaustive

Along the value chain, Hydrogen Valley developers can outsource technical services to different degrees

Different types of technical contractors along the value chain



Typical **core activity** of contractor **Additional scope** contractor can cover

Source: Desk research, Roland Berger

Non-exhaustive

The different types of technical contractors provide, depending the scope of the value chain they cover, different technical services

Typology of different technical contractors

	Contractor type	Description	Sub-types
1	Owner's engineer	Company that provides oversight, technical expertise and quality assurance throughout the entire project lifecycle to ensure compliance with owner's requirements, specifications, timelines and budgets	-
2	Engineering firms	Companies that specialize in the design and engineering of aspects of projects, offering services such as process design, feasibility studies, and technical consulting	Design engineering, consulting engineers
3	EPC Management contractors	Company that manages the EPC phases on behalf of the project owner, incl. coordination of sub-contractors, project management and control, but is not liable for any EPC work	-
4	EPC contractors	Contractor that is responsible and liable for the delivery of the entire or part of the scope and covers engineering, procurement of materials and equipment and physical construction	Turnkey EPC, specialized EPC
5	Procurement contractors	Specialists focused on sourcing and acquiring materials, equipment, and services required for a project, often negotiating contracts to ensure cost-effectiveness and timely delivery	-
6	Construction contractors	Companies responsible for the physical construction of a project, managing site operations, labor, construction activities to build the facilities according to design specifications	General contractors, specialized construction firms
7	Commissioning contractors	Companies that carry out the commissioning process, ensuring that all systems and equipment are installed and functioning correctly, and meet performance criteria for operations	-
8	O&M contractors	Contractors that operate and maintain the ongoing plant post-construction	-
9	Technology providers	Companies that develop and supply specialized technologies, equipment and solutions essential for the production, storage, distribution and utilization of hydrogen and related processes	OEM contractors, consulting techn. providers, specialized providers

Source: Desk research, Roland Berger

The general procurement and contracting process follows five steps – From strategy definition to supplier selection, execution and closure

Schematic procurement and contracting process

1 Contracting & procurement strategy

- Definition of work packages and scopes
- Market analysis and strategy approach definition
- Market dynamics and negotiation position
  - Quotation strategy
  - Target supplier structure
  - Evaluation criteria
- Development of supplier long-list
- Definition of short list based on knock-out criteria

2 Request for Information (RfI)

- Specification of high level scope
- Distribution of Request for Information (RFI) to shortlisted suppliers
- Prequalification of interested suppliers
  - Financial
  - Legal
  - Technical

3 Request for Proposal/ Quote (RfP/RfQ)

- Specification of detailed scope
- Analysis of technical proposals
- Clarification work-shops (if applicable)
- Pre-selection based on technical suitability

4 Negotiation and contracting

- Analysis of commercial offers
- Negotiation of offers
  - Price
  - Terms and conditions
- Provision of final offers and alignment of contract wording
- Decision and formal contract award

5 Execution and closure

- Monitoring of progress
- Management of commercial and technical changes
- Handling of claims
- Close out of the contract

Source: Roland Berger

With a procurement strategy, Hydrogen Valley developers specify what is needed, where the needs can be fulfilled and how to ensure the best deal

Elements of a procurement strategy

What do I need?

- Collection of high level **project needs**
- Definition of high level **scopes**
- **Break-down of** the different parts into **work packages**
  - For which parts does it make sense to combine
  - How big should these packages be

Where can I get it?

- Initial **analysis of supplier market** based on high level specifications of the project
- **First evaluation of supply options** based on
  - Desk research
  - Previous experience
  - External consulting

How do I ensure the best deal?

- Assessment of own **negotiation position**
- Definition of the preferred **target supplier structure**
- Definition of **quotation strategy**
- Definition of **evaluation criteria**

Source: Roland Berger

Depending on the type of work or product, different pricing strategies can be applied

Typology of pricing strategies

	Lump sum	Cost plus	Reimbursable	Fixed
Description	• Supplier estimates their costs, adds a profit margin and proposes this as the price to their customers	• Total costs are based on the actual costs incurred incl. mark-up • Can be turned into lump sum later in the process	• An hourly or daily rate is agreed, including additional expenses that could arise during the process	• Fixed price is often used for units with fixed requirements or units that are readily available
Pros	• Provides some certainty about costs • Incentive for supplier to provide on time at low cost	• Can be useful when uncertainty on scope and/or price exists	• Can be useful when scope is not clear or not yet defined • Owner risk can be minimized by defining a cap	• Easy verification of prices • Price can easily be adjusted up and down in case of negotiations and variations of orders
Cons and key risks	• No clarity about cost components • Potential for lower quality	• High maintenance to track and report • Expertise is needed for tracking	• Might lead to overprovision of services	• Potential for lower quality • Less incentives for efficiency
Examples	• Construction contracts	• Services • Complex works	• Small scope work	• Long-lead items

Source: Market consultations, Roland Berger

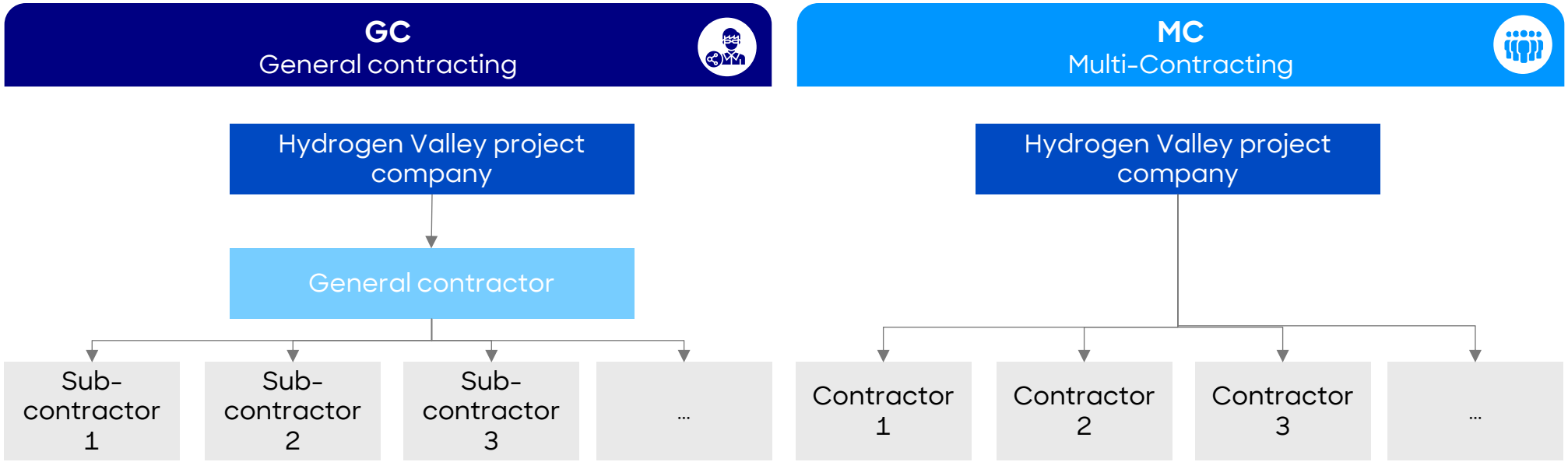
B. Overview of General vs. Multi-Contracting models

Clean Hydrogen Partnership

Suppliers can be managed via a single big contract with a general contractor or by managing supplier contracts directly

Contracting models: General contracting vs. Multi-Contracting

Contracting model



Definition

A **single contractor** is responsible for the full delivery of the project until COD (design, procurement, and construction)

The Hydrogen Valley developer manages **multiple direct contracts** until COD with different suppliers & contractors

Source: Roland Berger

EPC is best for high-risk, complex, or time-critical projects where risk transfer and accountability are key, MC suits more experienced H_2 Valley developers

Overview of Engineering, Procurement and Construction vs. Multi-Contracting

	GC General contracting	**MC** Multi-Contracting
Definition	A **single contractor** is responsible for the full delivery of the project until COD (design, procurement, and construction)	The Hydrogen Valley developer manages **multiple direct contracts** until COD with different suppliers & contractors
Main risk allocation	**General contractor (if not specified otherwise in contract)**	**Hydrogen Valley developer**
Advantages	• Simplified management via single point of accountability • Key risks (interfaces, delays, performance) not with hydrogen project owner • Strong performance guarantees & warranty enforcement	• Greater control and flexibility for design and execution • Cost-efficient if owner has internal expertise • Better learning and asset familiarity for operations phase
Disadvantages	• Higher cost due to risk premiums in lump-sum pricing • Limited flexibility for scope changes after contract award • Less owner involvement and knowledge transfer	• Higher coordination for Hydrogen Valley developer • Weaker enforceability of guarantees and delay penalties • Fragmented responsibility complicates quality and risk management

Source: Roland Berger

A general contractor handles all phases end-to-end, while MC uses multiple contractors with the Hydrogen Valley developer coordinating activities

General vs. Multi-contracting along different project stages until COD

	Design engineering	Procurement	Construction	Testing & commissioning
General contractor	• General contractor responsible for design, **either in-house or via specialized firms**	• General contractor **handles all procurement**, ensuring system compatibility	• General contractor **oversees construction**, coordinating all activities	• General covers **mechanical completion & commissioning across interfaces**
Multi-contracting	• H2 Valley developer **manages design, using in-house or contracted firms**	• H2 Valley developer **runs procurement**, split across multiple contractors and tech suppliers	• H2 Valley developer **manages contractors & suppliers** • MC contractors **handle construction** for specific scopes	• H2 Valley developer **manages contractors & suppliers** • MC contractors handle **commissioning of individual scope items**

Comments

- In the different project stages until the COD, General contractors and MC contractors have **different roles and responsibilities**
  - General contractors steer the entire design, procurement and construction process
  - Hydrogen Valley developers are more involved in the design engineering and procurement when an MC approach is chosen

Source: Roland Berger

Depending on the Hydrogen Valley project characteristics, either a general contracting or an MC approach can be suitable

Impact of project characteristics on General contracting vs. MC trade-offs (1/2)

Project characteristics	Assessment General contracting vs. MC	
	Greenfield	**Brownfield**
1 **Project type**	• Clarity of scope, clearly ring-fenced • Allows for effective delegation of end-to-end responsibility to EPC • General contractor able to price competitively	• Clarity of General contractor scope impaired due to legacy asset interfaces • General contractor with limited appetite to take on/likely high price premium to cover risks
2 **Tech novelty / complexity**	**High** • Project technology risk is not acceptable or too high for Hydrogen Valley developer	**Low** • Project technology risk is acceptable for Hydrogen Valley developer
3 **Time pressure on project schedule**	**High** • General contractor accountable for schedule • Risk transfer to General contractor (at premium) preferrable for Hydrogen Valley developer's perspective	**Low** • Hydrogen Valley developer may be more comfortable to manage and carry schedule risk in MC set-up, since negative consequences of schedule risk are less severe

Benefits of general contracting — **Benefits of MC**

Source: Roland Berger

Depending on the Hydrogen Valley project characteristics, either a general contracting or an MC approach can be suitable

Impact of project characteristics on General contracting vs. MC trade-offs (2/2)

Project characteristics	Assessment General contracting vs. MC	
	High	**Low**
4 **Project volume and interfaces**	• General contractor accountable for interface management and resulting delays • Effective risk-transfer to General contractor (at premium)	• Hydrogen Valley developer may be more comfortable to manage and carry interface risk • Limited benefit from contracting General contractor at premium
	Limited	**Extensive**
5 **Hydrogen Valley developer experience with similar projects**	• Risks can be transferred to General contractor better placed to absorb them • Hydrogen Valley developer's organization can use first project to learn in de-risked environment, opening possibility for future in-sourcing to MC	• Hydrogen Valley developer can leverage existing in-house capabilities • Limited benefit from contracting General contractor at premium

Benefits of general contracting — **Benefits of MC**

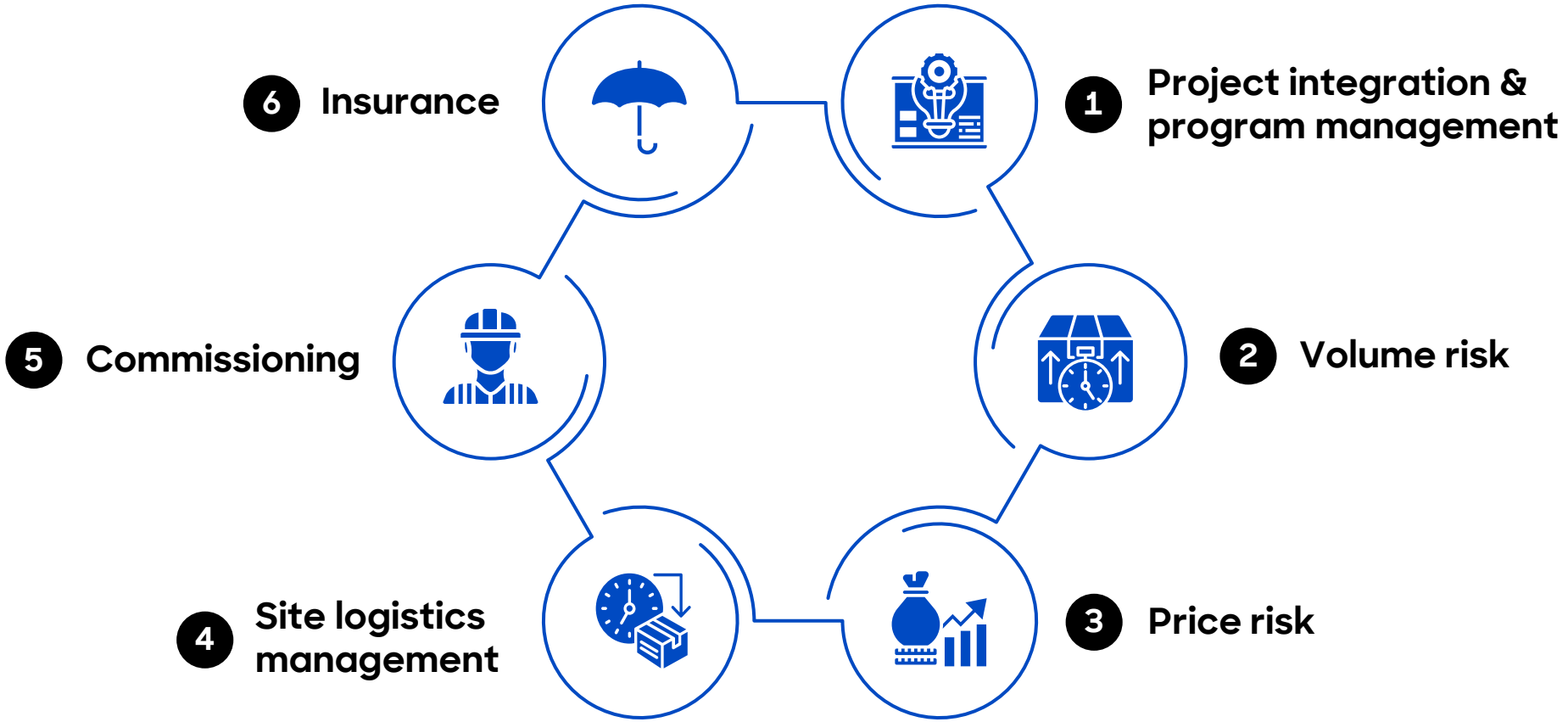
Source: Roland Berger

C. Detailed assessment of General vs. Multi-Contracting along different dimensions

Clean Hydrogen Partnership

Along several project dimensions, Hydrogen Valleys can assess the benefits of the General vs. MC contracting model and tailor it to their project specifics

Selected dimensions to assess General vs. MC contracting models



Comments

- With 6 qualitative project dimensions, Hydrogen Valley developers can **assess whether** a **General or a MC contracting model is suitable** for their specific project characteristics

Source: Roland Berger

1

The General contractor assumes full responsibility for timely delivery and within budget – MC contractors need to be managed proactively by Hydrogen Valley

Project integration and program management

	General contracting	Multi-Contracting
Project integration Responsibility & integration risk	• Single General contractor responsibility for delivery on time and budget under fixed-price lump-sum contract • Integration risk at EPC contractor	• Partial responsibility by MC contracting parties (only within scope) • More complex contract coordination for Hydrogen Valley developer
Program management Schedule, quality & interfaces	• Schedule extensions require mutual agreement • General contractor with end-to-end quality responsibility • Cost overruns borne by General contractor under lump-sum arrangement	• Clear accountability for schedule is to be established by Hydrogen Valley developer • MC quality of work needs to be controlled proactively by Hydrogen Valley developer • MC contractors will only absorb direct additional costs

Key insights

- Project integration risk is passed on to General contractor
- MC contractors need to be clearly incentivized to ensure timely delivery and quality

Source: Roland Berger

2

Volume risk is fully transferred to the General contractor via a lump-sum model - Volume changes to be borne by Hydrogen Valley developer in MC contracting

Volume risk

	General contracting	Multi-Contracting
Volume risk Uncertainty regarding quantity	• Volume risk is transferred to the general contractor through a lump sum pricing model • The contractor is responsible for completing the design and bearing any risks from design changes, errors, or re-measurements • Any variations in labor or material volumes from the initial plan are also the General contractor's responsibility	• Volume risk is only partially transferred to MC contractors • MC contractors bear volume risks for their agreed scope if they accept lump-sum pricing • Hydrogen Valley developer handles cost increases from management issues, scope changes and makes technical decisions • Capturing volume gains during changes is difficult due to limited information

Key insights

- General contracting option transfers volume risk to General contractor
- Volume risk is partially transferred to MC contractors, while Hydrogen Valley developer manages cost increases

Source: Roland Berger

3

Both the General and the Multi-Contracting do not provide inherent protection against price risk – risk allocation depends on contractual arrangements

Price risk

	General contracting	Multi-Contracting
Price risk Contracting scope	Price risk is not transferred to General contractor / remains with Hydrogen Valley developer • Price fluctuations in labor and raw materials are likely managed through indexation / price revision clauses • Depending on contract negotiations, pricing can be structured as Lump Sum for the agreed scope or managed through indexation / price revision clauses • Use of free-issue materials (FIM) can also be considered, which impacts how material-related risks are allocated.	Price risk is not transferred to MC / remains with Hydrogen Valley developer • Similar to General contracting, contract negotiations can result in Lump Sum agreements or indexation-based adjustments for labor and materials • The contract price will likely be subject to adjustments based on specific indices for labor and materials • The use of free-issue materials (FIM) is also possible in MC set-ups and can influence the price risk distribution

Key insights

- In both options, handling of price risk depends on contractual design (e.g., Lump Sum, indexation, FIM)
- Structurally, no fundamental difference between General contracting and MC in price risk; must be negotiated case by case

Source: Roland Berger

4

In General contracting, the contractor manages logistics and risks, while in MC, the Hydrogen Valleys developer handles risks, requiring more coordination

Site logistics management

	General contracting	Multi-Contracting
Site logistics management Involves managing materials, personnel, and safety to ensure smooth operations	• General contractor is responsible for managing site conditions and consequently assumes risks/claims to site conditions impacting the works • General contractors are legally bound to perform following activities regarding site logistics managements: – Ensure access routes maintenance – Arrange rights of way in case of additional access – Optimize traffic management – Minimize public access interference – Ensure equipment standards	• Hydrogen Valley developer manages site logistics and, therefore, assumes the risk of contractor claims arising from poor site conditions affecting project activities, e.g. blocked access, etc. • Hydrogen Valley developer faces high likelihood of receiving contractor claims, as individual contractors may use poor site conditions as a justification for delays in completing work

Key insights

- General contractor manages all site logistics and risks, ensuring streamlined operations
- In MC, the Hydrogen Valley developer takes on site risks, increasing coordination challenges

Source: Roland Berger

5

The General contractor handles full commissioning, taking on the risk of quality issues from many interfaces – MC contractors only responsible for own scope

Commissioning

	General contracting	Multi-Contracting
Commissioning Testing and verifying that all systems installed correctly	• General contractor is – if agreed in contract – typically responsible for commissioning, including mechanical and other phases, and must provide a detailed scope and schedule for testing • General contractor offers an easy route to resolution in case of quality issues – Single point of contact – Full responsibility	• MC contractors only responsible for mechanical commissioning within their scope • Potential unclear responsibilities between contractors in case of Interconnected quality issues • High likelihood of unclear responsibilities due to the large number of MC contractors and interfaces in large projects • Typical challenges – Inadequate documentation – Poor coordination between different stakeholders

Key insights

- General contractor is fully responsible for commissioning and serves as a single point of contact for quality issues
- MC contractors are only liable for own individual scope, likelihood of unclear responsibilities

Source: Roland Berger

6

General contractors and MC share required insurance policies, but differ in insurance conditions and cost implications

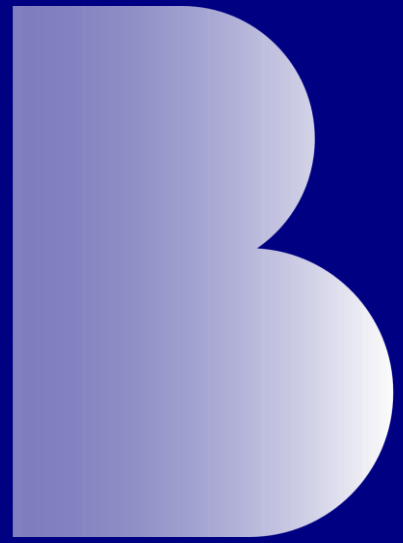
Insurance

	General contracting	Multi-Contracting
Insurance conditions	• Strong ability of general contractor to obtain cost-effect. insurance: – Scope for insurance is clearly ring-fenced – General contractors tend to have market track-record – Insurance companies have a solid understanding of EPC players' activities and offer risk premiums that reflect market conditions	• Defining project management scope vs. MC contractors' insurance is challenging • Ambiguity between Hydrogen Valley developers and MCs raises insurance costs • High contractor insurance costs lead to increased contract prices
Required insurance policies	• Construction All Risk (CAR), Third-Party Liability, Professional Indemnity Insurance, All Risks Insurance, Mandatory Statutory Insurances, Employer's Liability and Worker's Compensation, Contractor's personnel	• In line with general contracting

Key insights

- General contractors typically achieve cost-effective insurance due to clear scopes and well-defined risk profiles
- MC may face challenges with scope definition, potentially increasing insurance costs and contract prices

Source: Roland Berger



Roland
Berger