Milestone planning towards Final Investment Decision

Hydrogen Valley Facility

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	• 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
Technical		
Regulatory		
Valley governance		

Target audience

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

Source: Roland Berger

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Source: Roland Berger

Key objective of this document is to enable hydrogen project developers to develop a workstream planning incl. activity breakdown to reach FID

Key objectives and content of this document

Key objectives

Develop a plan for **activities and milestones towards FID** that ensure to reach FID

Key content

A **Overview of milestone planning towards FID**
Description of key activities in each project phase and overview of milestones and activities by workstream

B **Detailed roadmap by workstream**
Illustration of roadmaps with activities, key milestones and interdependencies for each workstream

Source: Roland Berger

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A. Overview of milestone planning towards FID

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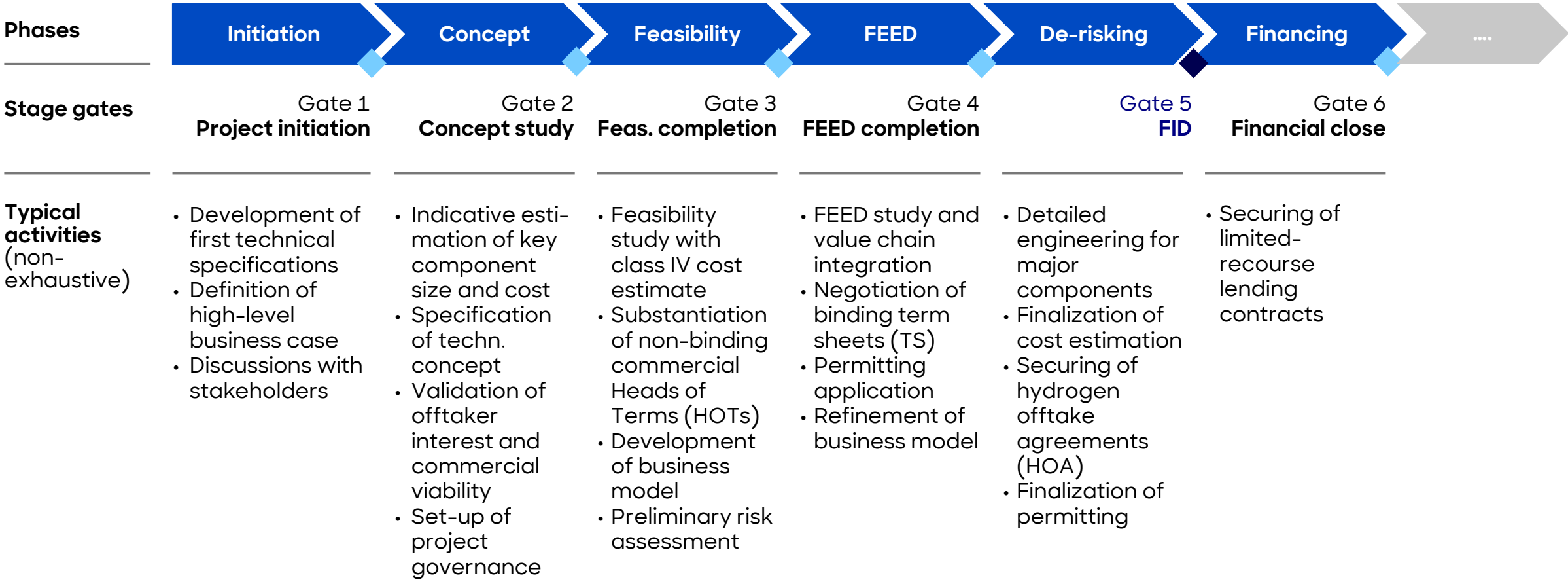
To reach FID, Hydrogen Valley projects typically progress via various project phases with each phase entailing distinct activities

Typical project phases and activities



Source: Roland Berger

To bring a Hydrogen Valley to FID, five key areas – political, technical, commercial, financing and project management – are to be advanced

What it takes to bring Hydrogen Valley projects to Final Investment Decision

Political, regulatory & permitting

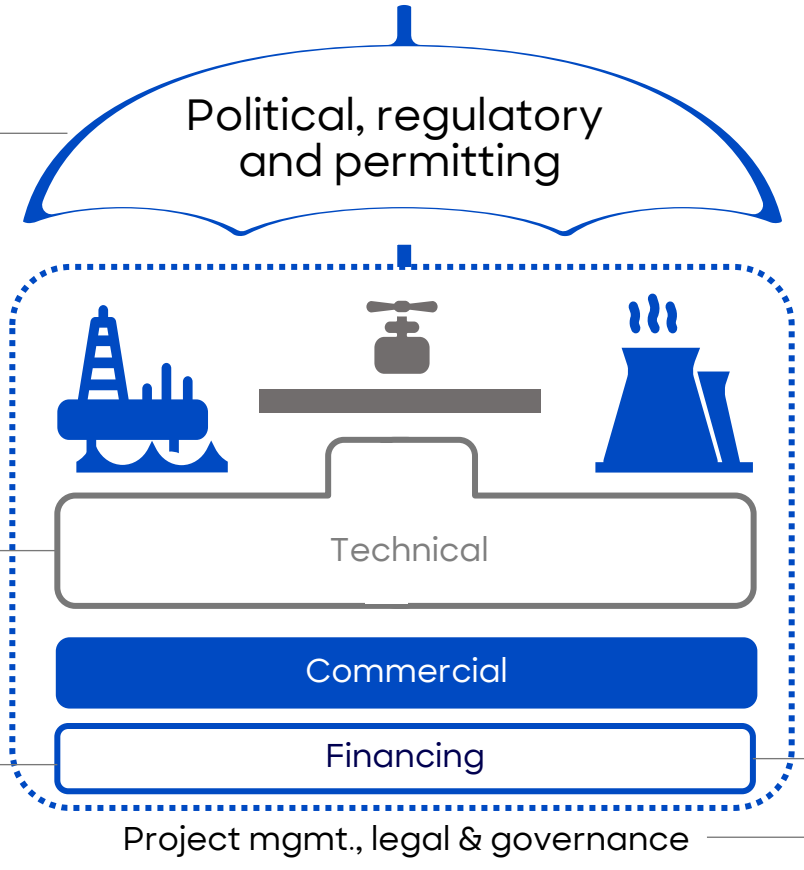
Local stakeholders, incl. local and national authorities, are to be involved. **Permits** are, based on a permitting concept, to be obtained. A thorough understanding of all **regulatory requirements** is necessary.

Technical

Engineering studies, incl. technical concept, feasibility and FEED study, are to be performed, thereby demonstrating const competitiveness. If necessary, **surveys** are to be conducted. Regarding procurement, **tenders for the construction**, are to be prepared.

Commercial

A viable **business case** is to be developed and a **commercial architecture** along the value chain is to be set up. Binding long-term **offtake agreements** are to be reached.



Financing

(Bankable) **project financing** is to be secured via a combination of public grants, equity and debt financing.

Project management, legal & governance

A project structure, incl. **project governance** and a **project organization** with clear roles and responsibilities is to be set up. Stakeholder management of all **consortium partners** is to be conducted. If needed, a **legal structure** is to be established, e.g., via the creation of a Special Project Vehicle (SPV).

Source: Roland Berger

These five areas can be reflected in dedicated workstreams that need to be advanced from the beginning of the Hydrogen Valley project until FID

Typical workstreams to bring hydrogen projects to FID

Workstream	Description
1 Commercial	The commercial workstream focusses on hydrogen market intelligence activities (expected local willingness to pay for hydrogen and demand volume), the commercial architecture of the Hydrogen Valley, the development of offtake agreements with end users and the detailing of a business case and the underlying financial assumptions, incl. CAPEX and OPEX estimates.
2 Technical	In the technical workstream, the technical concepts of the project are being developed by conducting consecutive engineering studies from first technical specifications to a detailed Front-end engineering study (FEED study). It also covers further technical topics such as the planning and execution of required surveys and procurement activities for engineering studies and the preparation of the tendering of the construction.
3 Political, regulatory & permitting	The political, regulatory and permitting workstream focusses on the interaction with relevant local, national and international stakeholders and authorities as well as the understanding of the regulatory framework that is relevant for the Hydrogen Valley development, construction and operation. It furthermore covers the preparation of a permitting plan and the application for relevant permits.
4 Financing	The financing workstream covers all aspects of project financing, i.e., public funding, equity and debt financing of the project. It also focuses on the interaction with potential (equity) investors, project partners and lenders.
5 Project mgmt., legal & governance	The project management workstream involves, besides the overall project management, the set-up and implementation of a project governance structure and a project organization, the consortium management, incl. the onboarding of new partners, and all legal aspects related to the project organization.

Source: Roland Berger

To take a Final Investment Decision, each workstream needs to reach certain conditions

Typical conditions for FID

Workstream	Typical conditions to FID	Description
1 Commercial	Offtake agreements signed	Fully termed and binding (long-term) offtake agreements with offtakers signed
	Other relevant agreements along the value chain signed	Agreements with any other players along the hydrogen value chain, such as infrastructure access agreements or transportation agreements signed
	Business case approved	Feasible business case and with plausible underlying assumptions incl. final cost estimate with acceptance typically by all shareholders
2 Technical	FEED results validated	Completed and validated FEED study, incl. final cost estimates for CAPEX and OPEX
	Construction tender(s) advanced	Supplier screening done, tender documents for construction prepared and potentially issued
	Surveys conducted	All necessary surveys have been conducted
3 Permitting	Major permits advanced or already received	Permitting strategy in place with application for major construction permits ongoing or ideally permits already received
4 Financing	Financing plan approved	Financing plan based on public funding, equity and debt financing approved by all shareholders
	Bankability validated	Financial advisors confirmed bankability of the project
5 Project mgmt., legal and governance	Consortium partners onboarded	Consortium partners along the hydrogen value chain onboarded, incl. – if relevant – signature of letters of commitment or other formal agreements
	Post-FID execution plan in place	Detailed post-FID execution plan for detailed engineering, construction and commissioning in place
	Legal structure established	"Investible" legal structure established, e.g., a Special Project Vehicle

Source: Roland Berger

Indicative and non-exhaustive

A roadmap divided in five workstreams can be developed to plan and detail the activities per project phase until FID

Holistic roadmap towards FID

Activity *: optional

1.1 Market intelligence
- Market fundamentals
- Market sounding
- Offtaker longlist and shortlist
- Tender identification
- Quarterly offtake review

1.2 Offtake agreements
- Commercial architecture
- Initial offtaker discussions
- Negotiation of key terms
- Negotiation of remaining terms
- Relationship management

1.3 Partner & infra. agreements
- Partnership LOI/TS*
- Negotiation of JV agreement*
- Infrastructure access

1.4 Business case
- Creation of business model
- Model refinement

See chapter B for exhaustive project plan with milestones for each activity

Source: Roland Berger

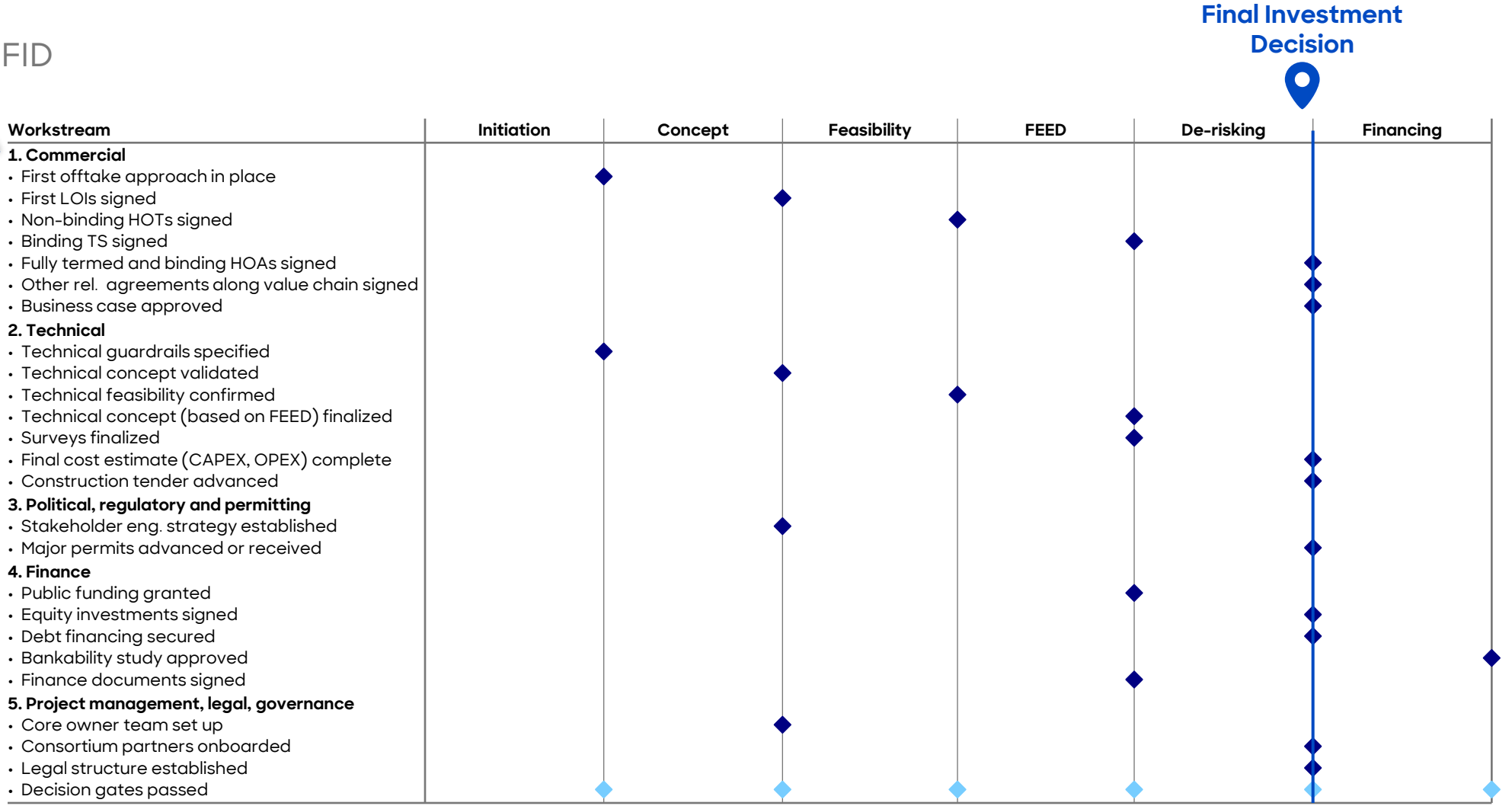
Indicative and non-exhaustive

Within each workstream and along the different project phases until FID, different milestones should be reached

Milestones towards FID

Activity	*: optional
1.1 Market intelligence	
• Market fundamentals	
• Market sounding	
• Offtaker longlist and shortlist	
• Tender identification	
• Quarterly offtake review	
1.2 Offtake agreements	
• Commercial architecture	
• Initial offtaker discussions	
• Negotiation of key terms	
• Negotiation of remaining terms	
• Relationship management	
1.3 Partner & infra. agreements	
• Partnership LOI/TS*	
• Negotiation of JV agreement*	
• Infrastructure access	
1.4 Business case	
• Creation of business model	
• Model refinement	

See chapter B for exhaustive project plan with milestones for each activity



Source: Roland Berger

B. Detailed roadmap by workstream

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A detailed roadmap with the key activities, interdependencies and milestones in can be established for each workstream to outline a coordinated path to FID

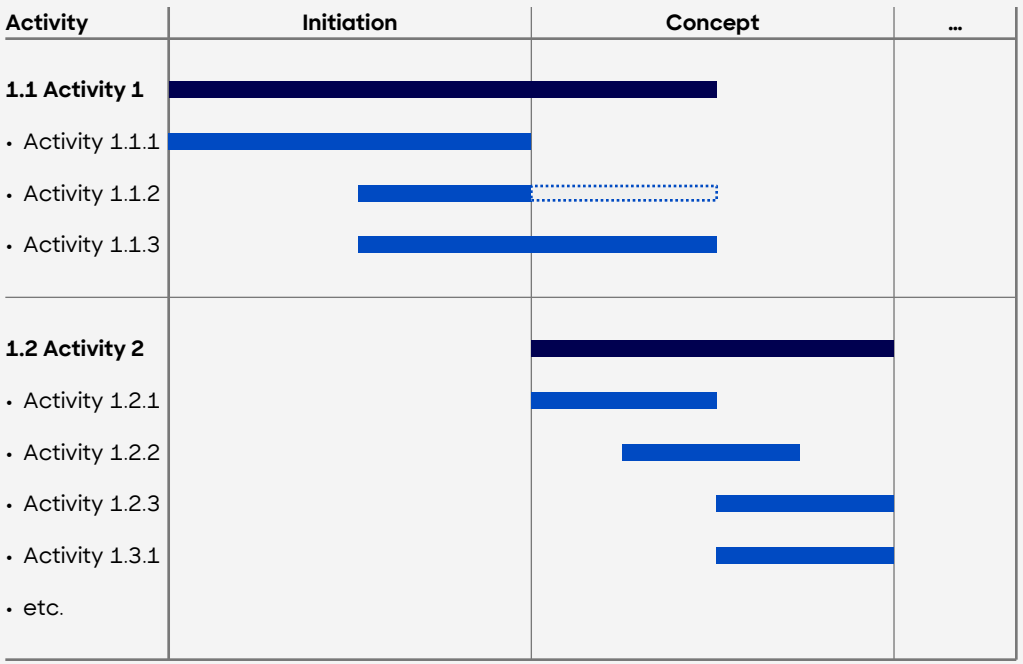
Structure for the detailed roadmap towards FID per workstream

Project workstreams

1. Commercial
2. Technical
3. Political, regulatory and permitting
4. Financing
5. Project management, legal and governance

Template for detailed roadmap towards FID (project workstream level)

Roadmap (example)



Selected interdependencies

#	Activity	Interdependency
1.1	Activity 1	Interdependency 1
1.2	Activity 2	Interdependency 2
1.3	Activity 3	Interdependency 3

Key milestones

#	Milestones
1.1	Milestone 1
1.2	Milestone 2
1.3	Milestone 3
1.4	...

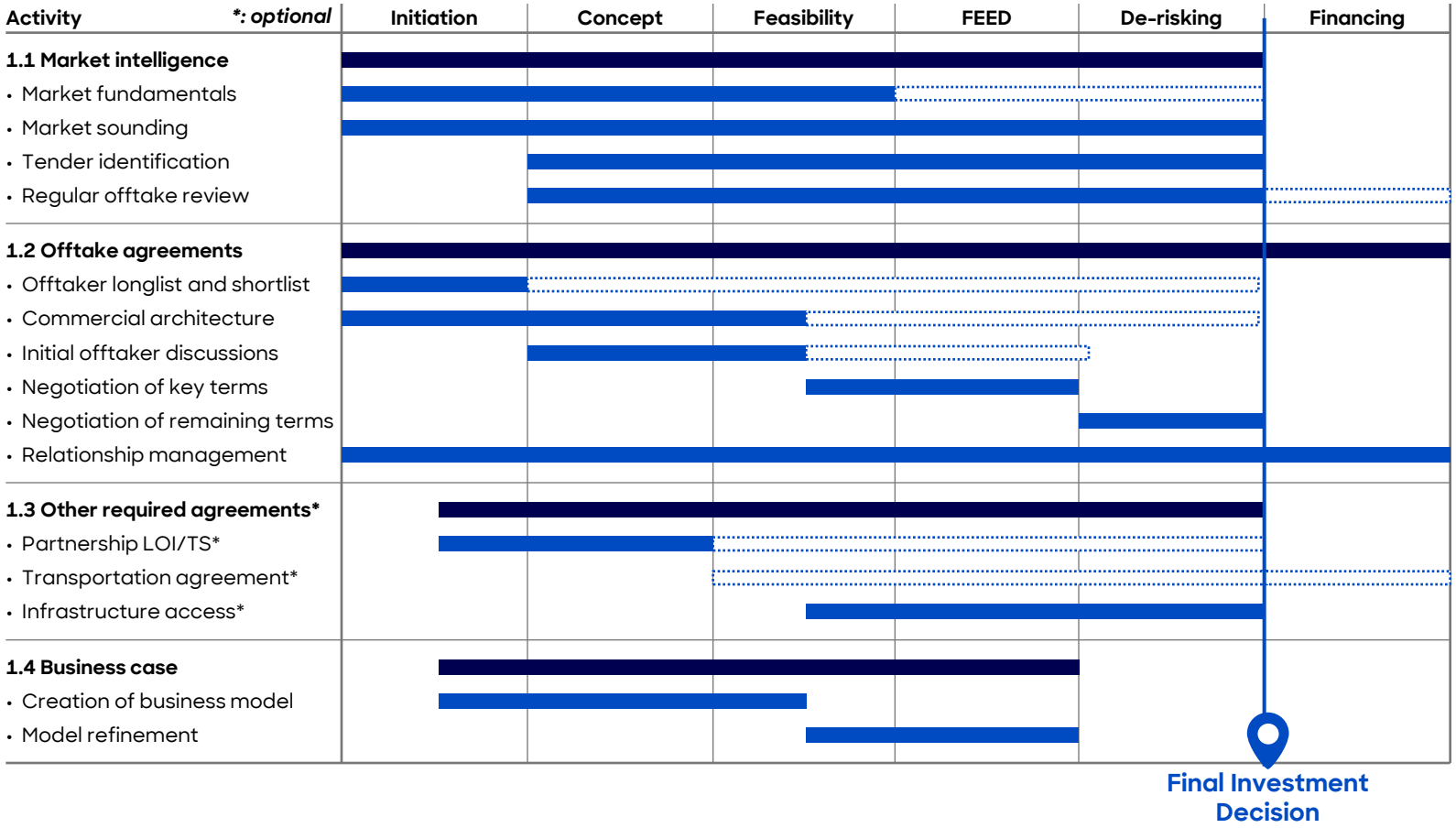
Source: Roland Berger

Illustrative

In the commercial workstream, the focus is on market screening, offtake and other agreements, financial modelling and bankability of the project

Detailed roadmap – Commercial workstream

Roadmap (excerpt)



Selected interdependencies

#	Activity	Interdependency
1.2	Negotiating of key terms regarding offtake	Cost estimates from engineering studies and business case
1.3	Other required agreements	Partner / investor discussions lead by Finance / PM
1.4	Creation of business model	Cost estimates from technical engineering

Key milestones

#	Milestone
1.1	Offtaker shortlist finalized, continuous development
1.2	First LOIs signed at DG2, non-binding HOTs signed at DG3, Binding TS signed at DG4, HOAs signed at FID
1.3	Other relevant agreements signed
1.4	Business case approved

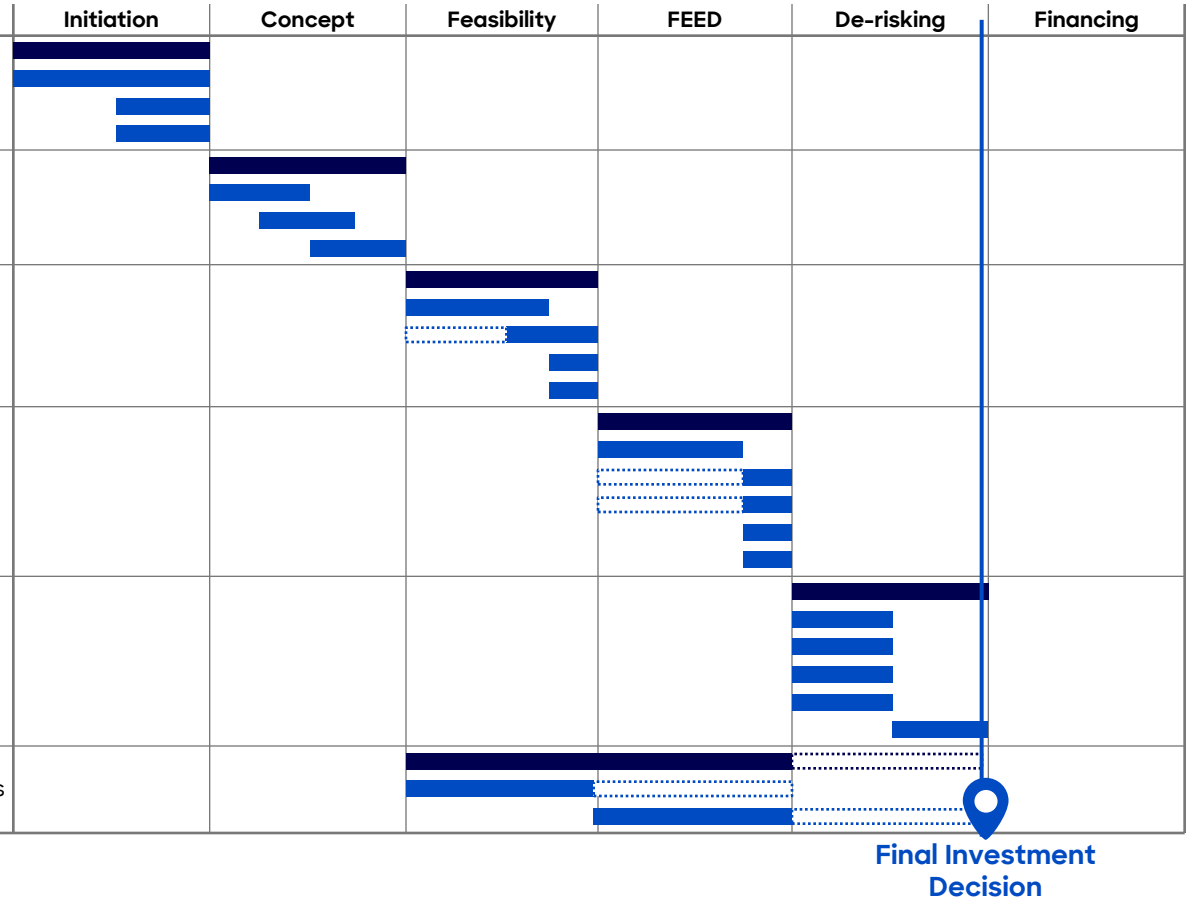
Source: Roland Berger

Illustrative

The technical workstream develops the technical concept of the project with consecutive engineering studies, plant dimensioning and cost estimates

Detailed roadmap – Technical workstream

Roadmap (excerpt)



Selected interdependencies

#	Activity	Interdependency
2.2	Technological options	Defining preference also depends on commercial viability
2.3	Feasibility study	Depends on internal capabilities of core owner team and/or procurement
2.4	FEED study	Depends on procurement and tender process for FEED study

Key milestones

#	Milestones
2.1	First technical concept finalized, incl. indicative component size and cost estimate
2.2	Technical concept validated, based on preferred technological option, incl. validated component size & class V cost estimate
2.3	Technical feasibility confirmed, based on study results with class IV cost estimate; technical risk register
2.4	Technical concept finalized, based on FEED study results, incl. class III cost estimate; integration with value chain aligned
2.5	Final cost estimate complete, based on detail engineering for major components

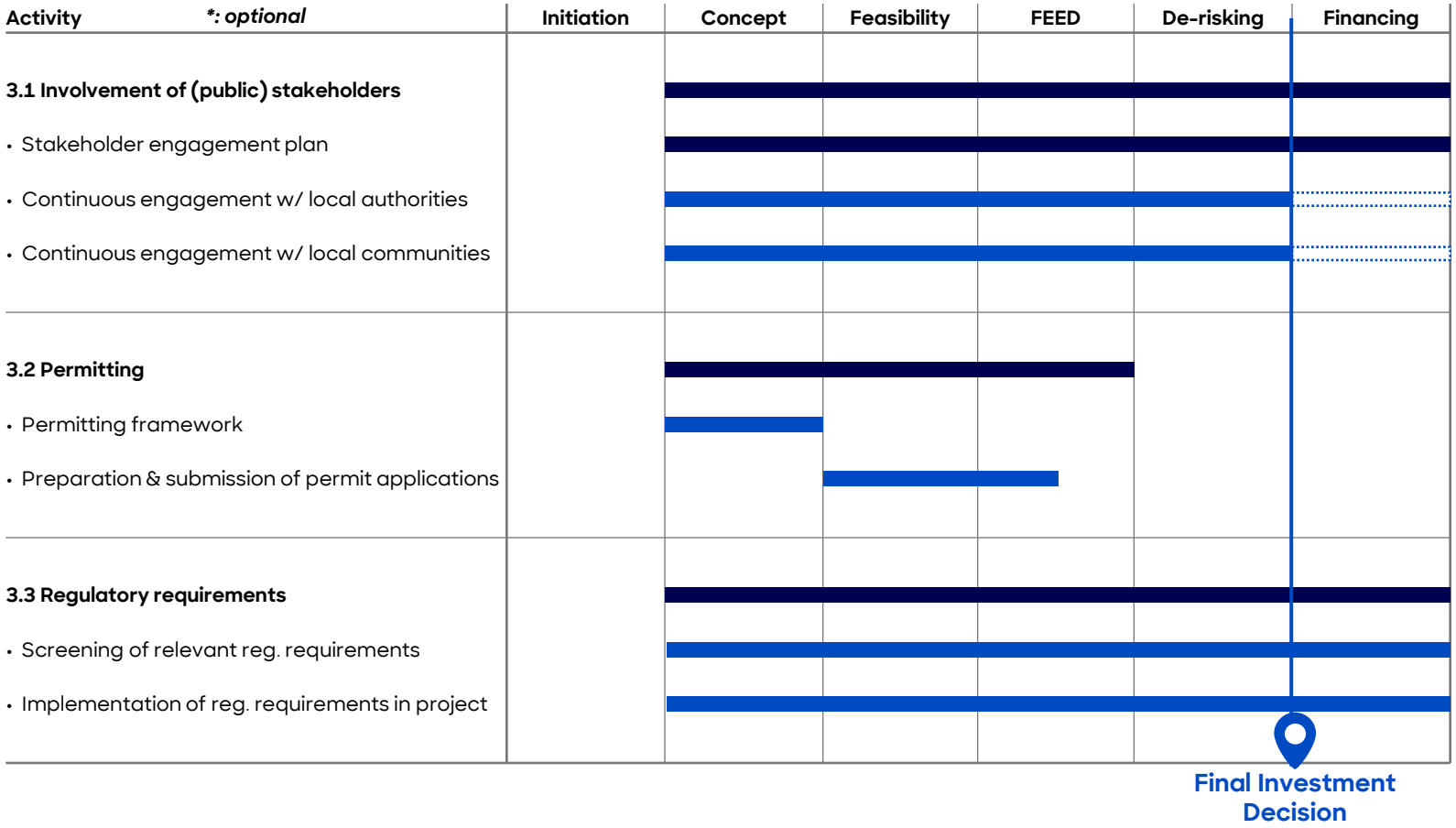
Source: Roland Berger

Illustrative

The political, regulatory and permitting workstream focusses on the regulatory framework, permitting, and the ESIA

Detailed roadmap – Political, regulatory and permitting

Roadmap (excerpt)



Selected interdependencies

#	Activity	Interdependency
3.1	Engagement with local authorities	Stakeholder management from project management
3.2	Preparation of permits	Preferred technological option from engineering

Key milestones

#	Milestone
3.1	Stakeholder engagement strategy established at gate 2 for effective stakeholder involvement
3.2	Permits received for FID

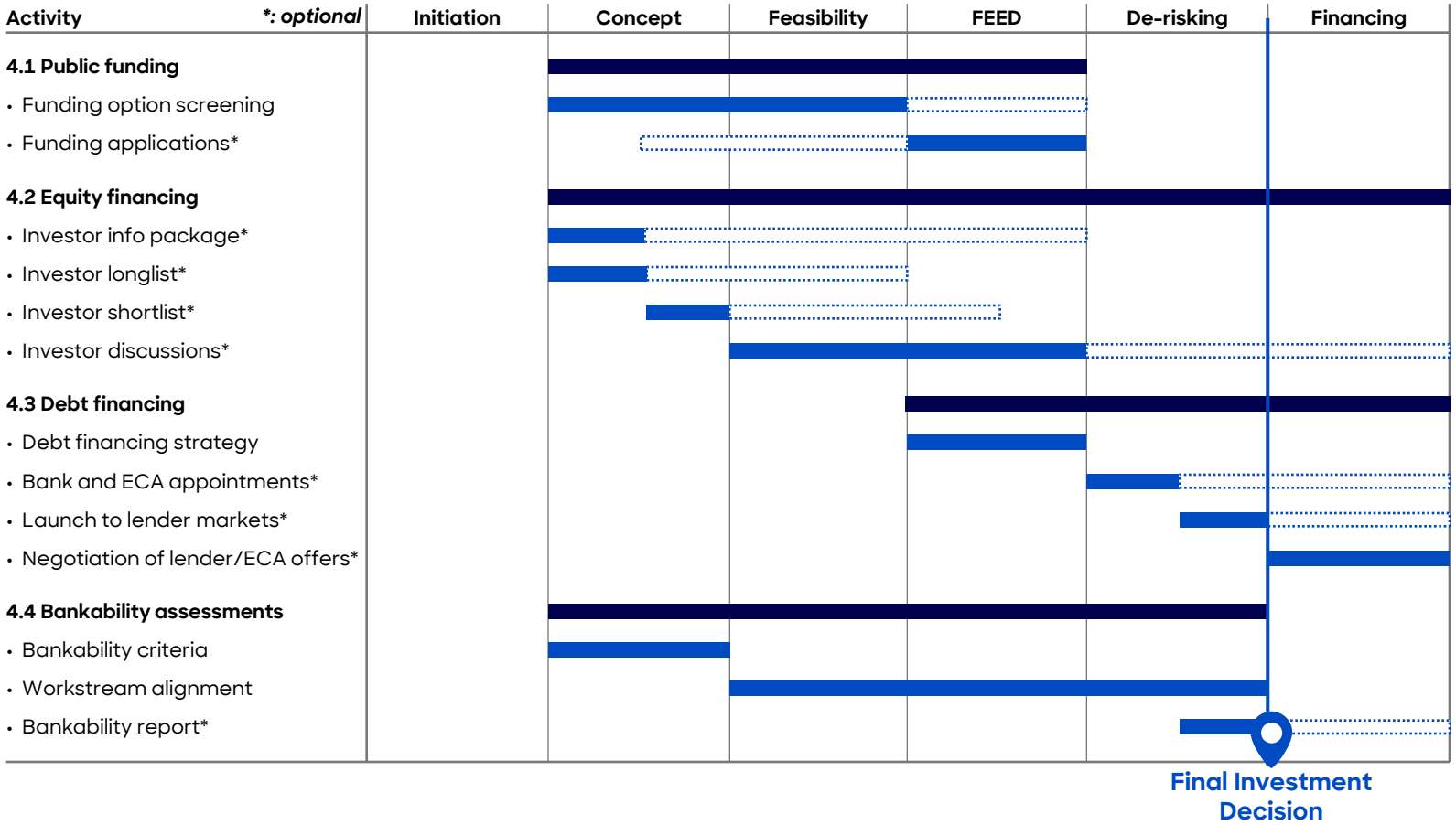
Source: Roland Berger

Illustrative

In the finance workstream, the focus is on securing public funding, equity and debt financing and on bankability assessments

Detailed roadmap - Financing

Roadmap (excerpt)



Selected interdependencies

#	Activity	Interdependency
4.1	Funding applications	Technical concepts from engineering, LOIs/HOTs/TS from commercial
4.2	JV Agreement w/ commercial	Draft and negotiation of JV agreement lead by commercial
4.4	Bankability report	Negotiation of remaining terms of HOA by commercial and signing

Key milestones

#	Milestone
4.1	Public funding granted
4.2	Equity investment signed
4.3	Finance documents signed
4.4	Bankability study approved

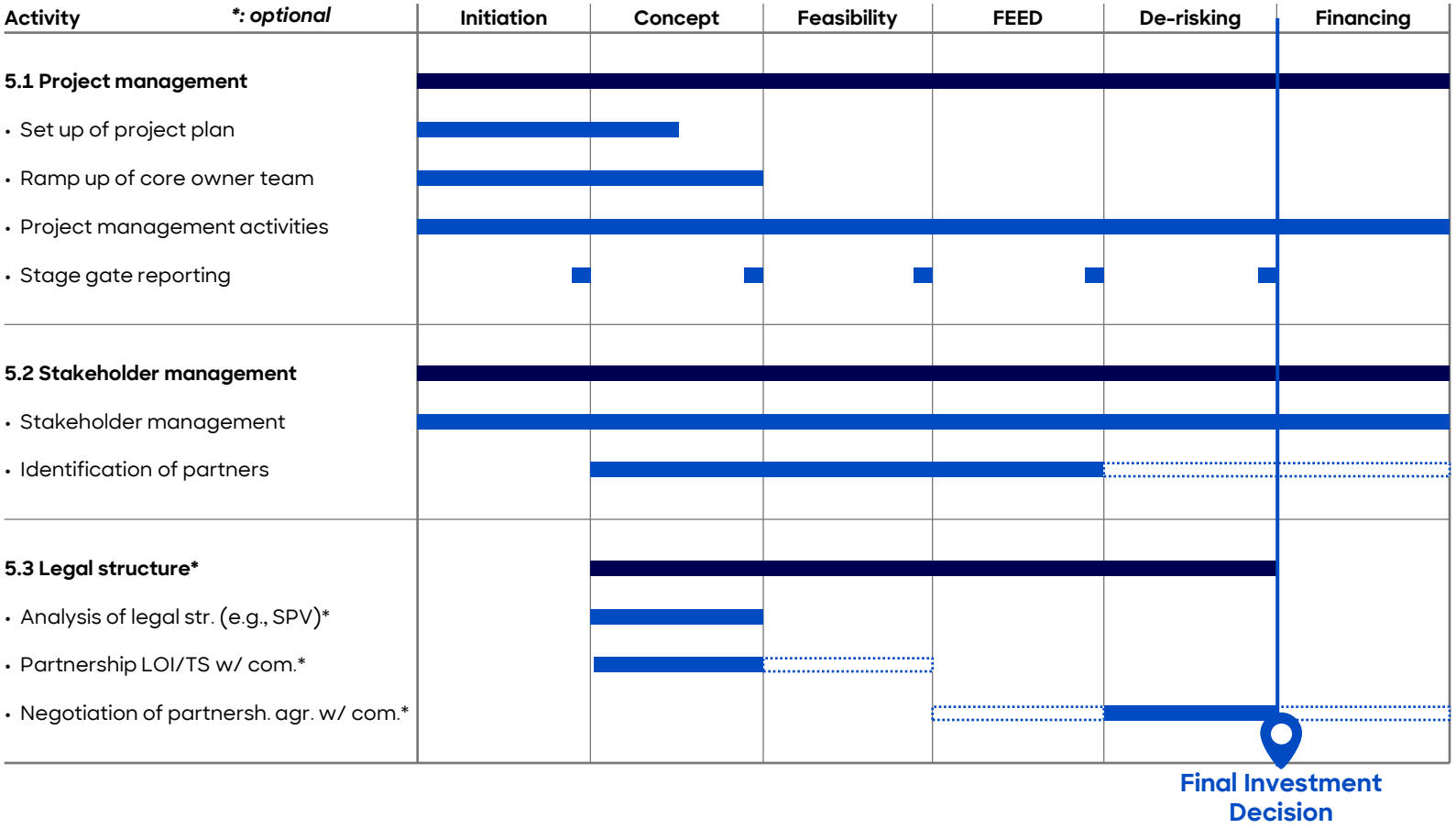
Source: Roland Berger

Illustrative

The project management, legal, and governance workstream focusses on governance, project management, partnering set-up and the legal structure

Detailed roadmap – Project management, legal, governance

Roadmap (excerpt)



Selected interdependencies

#	Activity	Interdependency
5.1	Organization set up	First technical concepts from engineering and other inputs
5.1	Stage gate reporting	Technical concepts from engineering, quarterly offtake reports from commercial, etc.
5.3	Negotiation of partnership agr. w/ commercial	Investor discussions with finance, and draft of JV agreement lead by com.

Key milestones

#	Milestone
5.1	Governance documents finalized, organization fully staffed, decision gates passed
5.2	Stakeholder engagement plan established, suitable partner(s) identified (if applicable)
5.3	Partnership agreements signed / SPV created (if applicable)

Source: Roland Berger

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