




Infrastructure

Plan of Action

Workstream 2.2 Infrastructure

 How to deliver a timely and comprehensive infrastructure network to facilitate 150 zero-emission inland vessels by 2030



CONDOR
zero emission inland shipping

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Chapter 1. Background and objective of this plan

Inland shipping is on the eve of a structural transition to cleaner operations. The first battery–electric vessels are sailing, hydrogen projects have started, and several ports and terminals are preparing charging and bunkering facilities. The technological foundation has been laid and the ambition of the sector is clearly visible.

The next step is scaling up. By 2030, 150 zero–emission inland vessels must be in operation. To enable this fleet to operate, a timely, robust and comprehensive network of energy infrastructure is required along the main logistics corridors. This means infrastructure development must move from individual projects to connected networks. Where previous pilots have already shown that technically it can work, scaling–up to these connected networks requires organisational capacity and demand aggregation.

In practice, infrastructure initiatives are often developed around one vessel, one shipper or one fixed route. This approach has proven effective in building experience and enabling early applications. The challenge now is to connect these initiatives into a scalable system in which locations reinforce each other and knowledge can be reused.

Scaling up becomes possible when parties join forces around promising locations. By aggregating demand, forming consortia and organising joint feasibility studies at an early stage, investment certainty can be created. The Condor programme will address key conditions in an integrated way, from grid capacity to permitting and financing, and hereby will reduce the lead time from idea to investment commitment.

Research and practical experience — including work by TNO, CE Delft and Topsector Logistiek — underline that decarbonising inland shipping is primarily a system challenge. In addition to vessel innovation, energy supply, infrastructure, regulation, financeability and organisation determine the pace of the transition. When these conditions are developed in combination, acceleration becomes possible.

This phase therefore requires focused execution. Not new visions, but organising collaboration, developing investment ready locations and creating scalable solutions. That is the core challenge for Condor within the Infrastructure workstream.





1.2 Condor's role in the transition

Condor is established as an execution programme to accelerate the transition to zero-emission inland shipping. The objective is to accelerate the roll-out of zero-emission inland shipping by organising supply and demand across the chain, making investment decisions possible and addressing systemic barriers in infrastructure, financing and collaboration. The programme works across three connected workstreams: vessel, infrastructure and market. The workstream covered in this plan focuses specifically on the development of zero-emission infrastructure.

In practice, this means Condor:

- brings parties together around shared locations and challenges;
- helps develop robust business cases;
- bundles knowledge and experience across projects and makes them transferable;
- puts bottlenecks on the agenda with policymakers and financiers;
- and ensures coherence between the vessel, infrastructure and market workstreams.

Condor acts as an initiator of infrastructure projects and brings parties together to accelerate realisation. Condor does not take investment decisions itself; responsibility for this remains with market parties and public owners.

1.3 Objective of this plan of action

This plan of action describes how Condor, together with market and public parties, can improve the conditions under which zero-emission infrastructure can be realised at scale in the years ahead. The plan has three objectives.

1. First, it provides a coherent analysis of the current state of play: where do we stand with zero-emission infrastructure, which initiatives are underway, and where are the main bottlenecks for scaling up?
2. Second, it translates this analysis into clear choices and starting points, building on insights from the Financing workstream, including the TCO model and discussions with financiers and banks. These insights clarify which forms of infrastructure are financeable in the short term and where the main risks lie.
3. Third, it sets out a concrete approach to execution. It is not about new visions or long-term scenarios, but about the concrete development of investment ready cases around specific locations. The objective is to develop 2 to 3 infrastructure locations towards investment commitments in the coming years, so that a first generation of scalable energy hubs for inland shipping can emerge.

This document is therefore explicitly action-oriented: it describes what Condor will do and with whom.



1.4 Scope and phasing

Based on the financial and technical analyses, Condor has chosen a phased approach. The core of this choice is that battery-electric infrastructure offers the greatest short-term potential for viable application, while hydrogen infrastructure currently still faces higher costs, greater uncertainty and more complex boundary conditions.

Electric sailing is becoming increasingly applicable on fixed routes and in corridors with sufficient volume. The technology is available, costs are declining and the infrastructure can be built in a relatively modular way. This means business cases can be made viable sooner, particularly where demand is aggregated.

For hydrogen, the technology is still at an earlier stage of market development. The cost of green hydrogen is high, availability is limited, and safety and permitting requirements are complex. Hydrogen remains relevant, particularly for specific applications and longer distances, but scaling up first requires targeted pilots and learning experiences.

This plan therefore focuses first on accelerating battery-electric charging infrastructure, while also giving parallel attention to facilitating hydrogen pilots and, where possible, incorporating spatial safety contours at selected locations.





Chapter 2. Analysis: where do we stand and what is blocking scale-up?

2.1 Introduction

To arrive at an effective approach, insight into the current situation is required. This analysis is based on three sources: the outcomes of the Financing workstream (including the TCO model), discussions with market parties and knowledge institutes, and existing policy and research documents on the decarbonisation of inland shipping.

Together, these sources paint a consistent picture: the main barriers to scaling up do not lie in the technology, but in organisation, financeability and boundary conditions.

2.2 Insights from the TCO and financiers' perspective

The TCO model and discussions with financiers show that investment commitments are strongly shaped by predictability of costs and revenues. Infrastructure will only be financed when there is sufficient certainty about utilisation and income.

Financiers indicate that they are hesitant about:

- projects with a single user or limited scale;
- new technologies without standardisation;
- business cases with major uncertainty around demand;
- and situations in which infrastructure investments and vessel investments do not align.

By contrast, the following types of projects are considered more promising:

- locations with multiple users;
- fixed flows or corridors;
- long-term contracts with shippers;
- and standardised solutions.

These insights are guiding for the approach set out in this plan. Infrastructure development is not treated primarily as a technical issue, but as an investment issue. Only locations where utilisation certainty, scale and standardisation come together offer a realistic perspective for scaling up.

2.3 Current practice of zero-emission infrastructure

A range of initiatives is currently visible in the market. Ports, terminals and market parties are working on charging points, battery-swapping concepts and hydrogen supply solutions. These projects provide valuable practical experience and demonstrate that zero-emission sailing is technically possible.

At the same time, these projects show that development trajectories are lengthy and strongly dependent on specific circumstances. They are often linked to one shipper, one route and a relatively high subsidy component.



As a result, the business case is directly intertwined with the specific project. This project-based approach makes scaling up difficult. Every new location has to be designed, permitted and financed again from scratch. Learning effects are only partly transferable and transaction costs remain high.

2.4 Insights from discussions with the sector

Discussions with terminals, port authorities, vessel owners, logistics service providers, energy companies and financiers reveal a remarkably consistent picture. The sector is willing to invest and sees the need for decarbonisation, but repeatedly runs into the same structural barriers.

A first recurring insight is that infrastructure development is still organised very much on a project basis. Almost all existing charging or bunkering facilities are tied to a specific customer, a fixed route or a single vessel. This helps make the business case viable, but at the same time limits repeatability. Every new location requires new tailoring, new agreements, new permits and new financing structures. As a result, transaction costs stay high and lead times remain long.

A second insight is that utilisation is the decisive factor for investability. Without certainty about volumes and duration of use, financiers are reluctant. Infrastructure without guaranteed demand is considered too risky. This explains why closed solutions — for example for a shuttle service or a fixed shipper — do come about, while open network solutions lag behind. The system rewards certainty at project level, but constrains scale at network level.

On top of that, grid congestion and connection capacity are increasingly functioning as hard boundary conditions for zero-emission infrastructure. It is not only the availability of capacity that matters, but especially the uncertainty around planning and prioritisation, which makes it difficult to make investment commitments. Initiators indicate that they sometimes have to wait several years for grid connections. As a result, the issue shifts from “delivering a charging point” to “organising an integrated energy system”, which considerably increases complexity.

Hydrogen infrastructure faces additional barriers. Alongside investment costs and permitting procedures, availability and the price of green hydrogen play a central role. Parties indicate that hydrogen is still too unpredictable and insufficiently competitive in the short term to justify large-scale infrastructure. Hydrogen is therefore mainly seen as a technology for targeted pilots and specific applications, not as the first route to broad scale-up.

Finally, nearly all discussions emphasise that standardisation is lacking. Technical interfaces, safety frameworks and operating models differ from location to location. This increases uncertainty, raises costs and complicates financing. There is a broad need for more uniform, modular and repeatable solutions.

In summary, these insights paint a clear picture: the sector has the technology and the ambition, but lacks organisation, scale and predictability.



2.5 External frameworks and initiatives

Research programmes and knowledge development

Parallel to these practical initiatives, there is a broad range of policy programmes, research projects and collaborative initiatives aimed at accelerating decarbonisation in transport.

Research and knowledge programmes by TNO, CE Delft and Topsector Logistiek underline that the inland shipping transition is primarily stalled by system conditions: infrastructure, grid capacity, regulation, standardisation and financeability. These analyses confirm that scaling up requires chain coordination and a programme-based approach, not technological innovation alone.

Regional and European initiatives

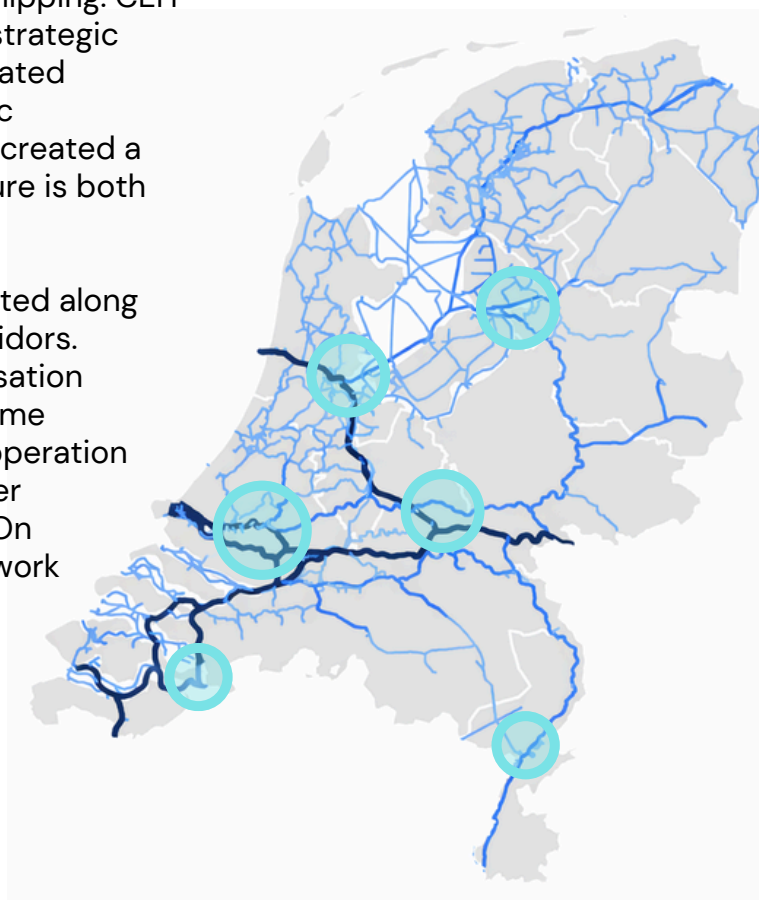
At regional and European level, several initiatives are also active that focus on alternative fuels and corridor development, including the hydrogen corridor programme RH2INE and various provincial programmes, for example from the Province of South Holland on the electrification of logistics nodes and energy supply along waterways. These initiatives provide valuable experience with technology, safety and permitting, but are often pilot- or region-specific.

Clean Energy Hubs as spatial framework

Within this broader landscape, Clean Energy Hubs (CEH) forms the most direct and relevant framework for infrastructure development in inland shipping. CEH has systematically worked on identifying strategic locations, analysing spatial and energy-related boundary conditions, and organising public collaboration around these hubs. This has created a national perspective on where infrastructure is both logical and promising.

Most of these strategic locations are situated along the main waterways and key logistics corridors. This is logical from the perspective of utilisation and investability: this is where volumes come together and where the chance of viable operation is greatest. This does not mean that smaller waterways or regional links are excluded. On the contrary, they can connect to the network over time. At the current stage, however, it is necessary to prioritise locations where scale and volume are realistic. By first developing a robust backbone along the main waterways, a basis is created on which further branching can become possible.

Identified strategic locations for zero-emission inland shipping infrastructure





Positioning of Condor

Condor builds on the principle of corridor-driven development: first organise scale where possible, then expand. The work of CEH is a clear starting point for Condor. Repeating similar location analyses would add limited value. Instead, Condor focuses on further developing these identified locations and translating potential into realisation.

Where CEH and similar initiatives primarily establish the framework and spatial conditions, Condor focuses on mobilising market parties and developing investment ready business cases. The roles are therefore complementary: CEH and similar initiatives define the framework and identify opportunities; Condor deepens, organises and delivers.

By combining these roles, a connection is created between policy-level preparation and actual implementation. This forms an important foundation for the approach described in Chapter 4.

2.7 Conclusion

The analysis in this chapter shows that the building blocks for scaling up are in place. Technology is available, initial infrastructure has been realised, policy frameworks are under development and public instruments are available. The sector has knowledge, experience and a growing group of frontrunners.

The next step is to connect these building blocks into a coherent development process. When locations are no longer approached individually but developed programmatically, room is created for economies of scale, standardisation and, with that, investment certainty. By aggregating volumes and organising collaboration at an early stage, transaction costs can fall and lead times can be reduced.

Scaling up towards 2030 therefore requires a development model that is repeatable and transferable. A model in which:

- locations are systematically selected on strategic value and utilisation potential;
- supply and demand are organised at the same time;
- technical and organisational solutions are standardised;
- public-private risk sharing is applied where needed;
- and system bottlenecks are addressed in a timely way.

When these elements are applied in combination, a stable foundation is created for a comprehensive network of zero-emission infrastructure.

The added value of Condor lies in organising this coherence. By connecting parties, improving conditions and structuring investment cases, Condor will contribute to an accelerated and scalable roll-out of zero-emission infrastructure in inland shipping. This conclusion therefore forms the logical starting point for the challenge and design principles set out in Chapter 3.



Chapter 3. The challenge towards 2030

3.1 Challenge

The analysis in Chapter 2 makes clear that the transition to zero-emission inland shipping is not primarily being slowed down by a lack of technology or policy ambition. The first vessels are sailing, hydrogen pilots are operational and several charging points have already been realised or are under development. The basis is there. The challenge, however, lies in organising scale.

Where the past few years were mainly used to learn and experiment, the current phase requires infrastructure to be developed not incidentally, but programmatically. By 2030, a comprehensive and reliable network of energy supply points is needed that fits the main logistics flows of inland shipping. That network must be investable, function predictably and offer enough capacity to serve growing numbers of zero-emission vessels.

This calls for a fundamental shift in the way infrastructure is developed. The current model – project-based, location-specific and highly dependent on individual end customers – is not scalable enough. Every new location comes with its own design, its own permitting process, its own business case and its own risk allocation. This leads to high transaction costs, long lead times and uncertainty for financiers. As a result, scaling up is slowed down.

The challenge, therefore, is not to start more projects, but to build a repeatable development process. A process in which locations are selected systematically, boundary conditions are addressed early, and business cases are built in a standardised way. Only then can infrastructure development move from bespoke solutions to more standardised development – and therefore create more room for scale.



For Condor, the focus is on execution and realisation. The approach is integrated and connects three core elements: vessel, market and infrastructure. This allows issues to be addressed quickly and the right parties from the network to be involved. It also means that bottlenecks arising in one project can be resolved more quickly by drawing directly on insights from other projects. This programme-based approach accelerates development and lowers transaction costs.



3.2 Design principles for scaling up

To fulfil this role effectively, Condor works with a number of design principles that guide all activities.

1. A first principle is corridor- and cluster-based working. Infrastructure is developed where logistics volumes come together and where utilisation is most likely. This increases economic viability and makes it possible to serve multiple users. Locations are not assessed in isolation, but as part of broader networks.
2. A second principle is electric first, hydrogen phased. Based on the TCO perspective and market insights, battery-electric sailing is the most promising route in the short term, both financially and technically. Hydrogen remains important for specific applications and for the longer term, but requires a different development logic, focused on pilots and learning. This prioritisation prevents fragmentation of resources and enables faster progress.
3. A third principle is standardisation and modularity. Where possible, technical and organisational solutions are standardised. This lowers costs, shortens development time and improves financeability. Repeatability is an explicit objective in itself.
4. A fourth principle is demand aggregation and chain collaboration. Infrastructure is only viable when volumes are secured. That is why shippers, terminals, vessel owners and energy parties are involved from the outset in location development. The focus is not on the individual asset, but on the shared cash flow.
5. A fifth principle is public-private risk sharing. The first generation of infrastructure inevitably carries higher risks and lower utilisation. Public instruments, such as subsidies or guarantees, are needed to bridge these early-stage losses. Condor helps combine these instruments with private investment.

Finally, the principle of learning by doing applies. There is no waiting for full certainty in advance. By starting with concrete cases, bottlenecks become visible and the development model can be improved along the way. Together, these design principles form the basis for the approach in Chapter 4.



Chapter 4. Condor's approach and execution

4.1 From strategy to execution

The previous chapters make clear what the challenge is and which principles are guiding. The next question is how Condor translates these principles into concrete action. The core of the approach is that Condor works with concrete locations and investment cases. Not generic consultations or broad explorations, but targeted trajectories with a clear scope and committed parties.

Strategic positioning of Condor

Within the broader ecosystem of initiatives, Condor occupies a specific position. As described in Chapter 2, research programmes provide knowledge and policy initiatives such as CEH provide spatial frameworks and location identification. What is missing is a party that takes the step from potential to concrete investment decisions — a role taken on by Condor. Condor operates as an execution programme and chain orchestrator, focused on organising collaboration, aggregating demand and translating ambitions into investment ready business cases. In that role, Condor acts as a bridge between public frameworks and private investment. Many barriers cannot be resolved within a single organisation and affect multiple parties at the same time. Without coordination, these issues simply wait on each other. As a neutral party, Condor can structure and accelerate the process. By developing projects as part of an integral portfolio, acceleration and scale become possible.

The approach consists of three connected workstreams that reinforce one another: creating insight, organising collaboration and developing investment cases. See below for a visualisation of the workstream approach and, on the following pages, an explanation of each workstream.

- Workstream 1 – Portfolio overview and insights
- Workstream 2 – Organising collaboration
- Workstream 3 – Development of investment cases

Workstream 1

Portfolio overview and insights



Workstream 2

Organising collaboration



Workstream 3

Development of investment cases





4.2 Workstream 1 – Portfolio overview and insights

The first workstream focuses on systematically mapping ongoing and potential infrastructure locations. This is done by building a current portfolio overview in which information is collected on existing charging points, planned initiatives, corridor developments and relevant stakeholders.

This overview builds on existing sources, including CEH location inventories and provincial trajectories. Condor adds market intelligence to this: which parties are involved, where concrete demand exists, where projects are getting stuck and where opportunities are emerging.

The portfolio overview serves several purposes. It reveals where overlaps or gaps exist, supports prioritisation and forms the basis for conversations with partners. Over time this overview will be translated into a digital tool, but in the first phase it serves as a strategic steering instrument.

4.3 Workstream 2 – Organising collaboration

The second workstream focuses on organising collaboration between public and private parties. Different working groups are set up on a structural basis, each with distinct roles and responsibilities.

At strategic level, a validation group is established in which public parties, knowledge institutes and system players participate. This group safeguards alignment with policy, regulation and subsidy schemes, and serves as a sounding board for prioritisation and approach. Initiatives such as CEH and provincial authorities provide important input here. At operational level, smaller working groups are set up for each selected location and project. These groups consist of directly involved market parties: terminals, ports, vessel owners, energy companies and financiers. The focus is on concrete decision-making rather than general discussion.

Condor acts at both levels as organiser and process facilitator. The programme takes care of preparation, information flow and progress monitoring, and ensures that insights from different cases are shared.

4.4 Workstream 3 – Development of investment cases

The third workstream – and the core workstream – focuses on the systematic development of investment cases. Each selected location is assessed through a fixed analysis framework that provides structure and comparability between projects. This framework consists of three connected dimensions:

1. Spatial and infrastructural

In this phase, the physical and energy-related boundary conditions are assessed. This includes:

- available space and spatial integration;
- grid capacity and connection options;
- permit requirements and safety frameworks;
- connection to existing infrastructure and energy systems.



2. Operational and logistics

Here the demand side is analysed:

- which vessels and volumes can realistically be bundled;
- which sailing routes and corridors are served;
- what the charging or bunkering rhythm looks like;
- and how infrastructure is integrated into existing logistics processes.

Demand aggregation is central in this phase. Without operational certainty, financeability is not possible.

3. Financial and business case

Based on the first two dimensions, an integrated business case is developed, including:

- CAPEX;
- OPEX;
- utilisation scenarios;
- risk profile;
- use of public instruments (for example SPUK);
- possible financing structures.

Within this dimension there is an explicit test on bankability, drawing in part on insights from the Financing workstream. Applying this framework creates a structured approach that can be transferred to the next locations. Each case is not treated as a unique project, but as part of a learning process towards standardisation.

4.5 Condor's role and responsibilities

Within this approach, Condor's role is clearly defined. Condor is not an owner or operator, but facilitates, connects and structures.

In practical terms, this means that Condor:

- takes the initiative to start case trajectories;
- brings relevant parties together and structures collaboration;
- supports and safeguards substantive analyses;
- monitors progress and prepares decision-making;
- and escalates system bottlenecks to strategic level.

This role definition ensures that responsibility for investment commitments remains with market parties, while Condor creates the conditions under which those commitments can be made.

This role is possible because Condor operates independently and has the time and capacity available to guide the process. This makes the programme a stable partner for both market and government.



4.6 Planning, KPI's and milestones

The implementation of this action plan is phased. It creates a realistic timetable in which feasibility studies and investment preparation take place in 2026 and actual investment decisions are expected to follow in 2027. The points below are an indication of possible activities, depending on the location and context.

2025 Start-up phase

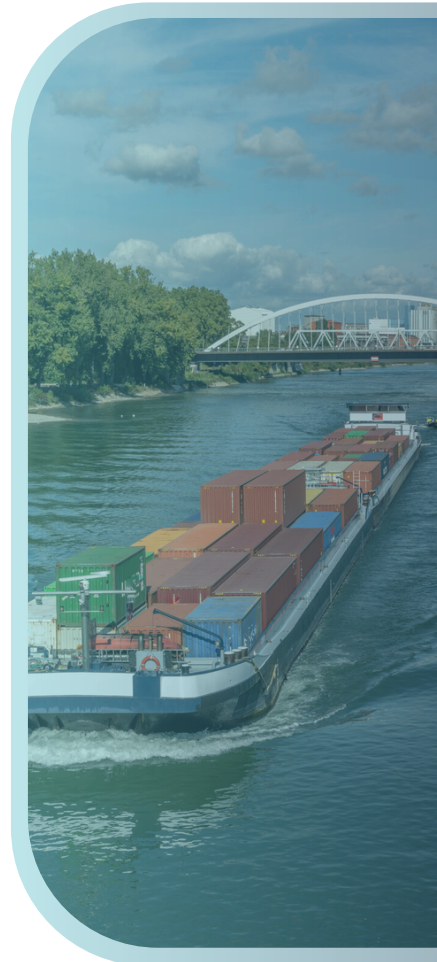
- Validation group and operational working group approach;
- Portfolio set-up completed – further developed into a tool in 2026.

2026 Deepening phase

- Establishment of the validation group and operational working group
- Selection of 1–2 priority locations
- Active consortium building around these locations
- Starting feasibility studies (where possible in combination with SPUK applications)
- Working out spatial-infrastructure and operational analyses
- Developing integrated business cases
- Where applicable: submitting or executing SPUK-related feasibility studies
- Decision-making on investment readiness

2027 Decision-making phase

- Completion of feasibility studies
- Working towards investment decisions by market parties
- Securing financing structures
- Preparing for realisation





KPIs 2026–2027

1. Case selection and consortium formation

- 2–3 priority locations selected in 2026
- At least 2 active consortia formed around selected locations
 - Per case, participation by at least: 1 port/terminal and 1 user (vessel owner/logistics service provider).

2. Feasibility phase

- At least 2 feasibility studies started (where possible linked to the SPUK scheme)
- For at least 1 location, completion of a spatial-infrastructure analysis, an operational-logistics analysis and a concept business case.

3. Investeringsgereedheid

- At least 1 location that, within the programme period, works towards an investment decision or a formal go/no-go on the basis of a developed business case.
- For at least 1 location, explicit involvement of a financier (bank/investment fund) during the business case phase.

4. System impact

- Establishment of a standardised development model (framework) that is transferable to new locations.

Monitoring structure

Monitoring takes place at three levels:

1. Case level (operational)

For each location, a progress format is used in which, on a periodic basis, the following aspects may be tracked:

- status of spatial conditions
- status of grid capacity
- status of permits
- status of demand aggregation
- business case maturity (concept – developed – investment-ready)

Progress is discussed periodically in the case working group, depending on phase and need.

2. Programme level

(Condor core team, Ministry of Infrastructure and Water Management, partners)

Every quarter, an overview is prepared in which each case is reported on:

- progress against planning
- main risks
- required interventions
- expected next milestone

This overview is shared within the core team and, where relevant, with the Ministry of Infrastructure and Water Management. Confidential information is not shared.

1. Strategic level (validation group)

Every six months, the validation group discusses:

- progress on KPIs
- use of public instruments (such as SPUK)
- structural barriers (grid congestion, regulation, standardisation)
- required policy interventions

This creates the link between execution and system level.

