

NORWAY'S GREEN INDUSTRIAL PARK

Eyde Material Park is a sustainable industrial park
focused on the battery value chain and the green transition



SUMMARY

Eyde Material Park (EMP) is a sustainable industrial park covering nearly 250 hectares in close proximity to Morrow Batteries, with an additional 94 hectares of land. EMP is strategically located for power-consuming and logistics-intensive businesses in the battery value chain and the green transition, near Morrow, Port of Arendal, green hydroelectric power, and the power grid. EMP plays a central role in the concept of The Battery Coast, with leading expertise in process industries and battery materials. EMP is therefore expecting to gain a competitive edge in the green transition.

EMP consists of four areas: Longum Nord, Helle 1, Helle 2, and Longumkrysset (Logistics Hub), all designated for industrial use.

Morrow is set to open its first 1 GWh battery cell factory in 2024, aiming for mass production of sustainable batteries using clean renewable energy. There is a focus on circular economy principles, facilitating increased reuse of materials and products related to production. Industrial symbiosis directed towards the battery value chain strongly contributes to EMP's role in the green transition.

The master plan highlights specific plots for development, such as Longum Nord, Helle 1, Helle 2, and Longumkrysset (Logistics Hub), each designated for industrial use. Stakeholders, including Morrow, Port of Arendal, and Arendal Mu-

nicipality, have actively participated in the process, ensuring a collaborative approach. To attract businesses in the battery value chain and support the green transition, EMP emphasizes flexibility, long-term planning, and industrial symbiotic relationships between establishments.

The area has a satisfactory power situation, with a total planned capacity of 800 MW, including 285 MW of available capacity for clients (as of the fall of 2023). This provides significant flexibility for potential establishments alongside Morrow.

A dedicated traffic management project and a logistics hub (dry port) will ensure sustainable management and execution of logistics and freight transport in and out of the area. Port of Arendal plays a central role in the project, establishing itself as a green business corridor in the region, including access to shore power for ships, emission-free fuel, short layover times, and efficient harbor operations.

The construction of a new road from Eydehavn to Morrow is expected to be completed by 2026/2027.

The progress of the EMP realization, along with associated facilities, is coordinated with Morrow's timeline, encompassing full-scale production at Morrow Battery cell 1 in 2024 and further expansions with Giga 1, 2, and 3 in 2026-2028.

EYDE MATERIAL PARK

The objective of establishing Eyde Material Park (EMP) is as follows:

Eyde Material Park aims to facilitate the realisation of a sustainable industrial park with industrialsymbiosis focused on the battery value chain and the green transition.

Eyde Material Park (EMP) consists of four larger industrial areas covering almost 250 hectares in close proximity to Morrow Batteries, along with an additional 94 hectares of land. EMP is strategically located for power-intensive operations, benefiting from its proximity to Morrow, close access to Port of Arendal (via a new road), green hydroelectric power, and direct connection to the central power grid with available capacity. Additionally, its short distances along the E-18 to the airport and the broader region make EMP a key element in the concept of Battery Coast, boasting leading expertise in process industries and battery materials. Power-intensive and logistics-intensive businesses will gain competitive advantages by locating in EMP as part of the green transition.



THE PLOTS UNDER DEVELOPMENT:

Longum Nord

82 hectares (net regulated industrial plot)

Helle 1

52 hectares (planning area – net area to be defined in detailed regulation)

Helle 2

99 hectares (planning area – net area to be defined in detailed regulation)

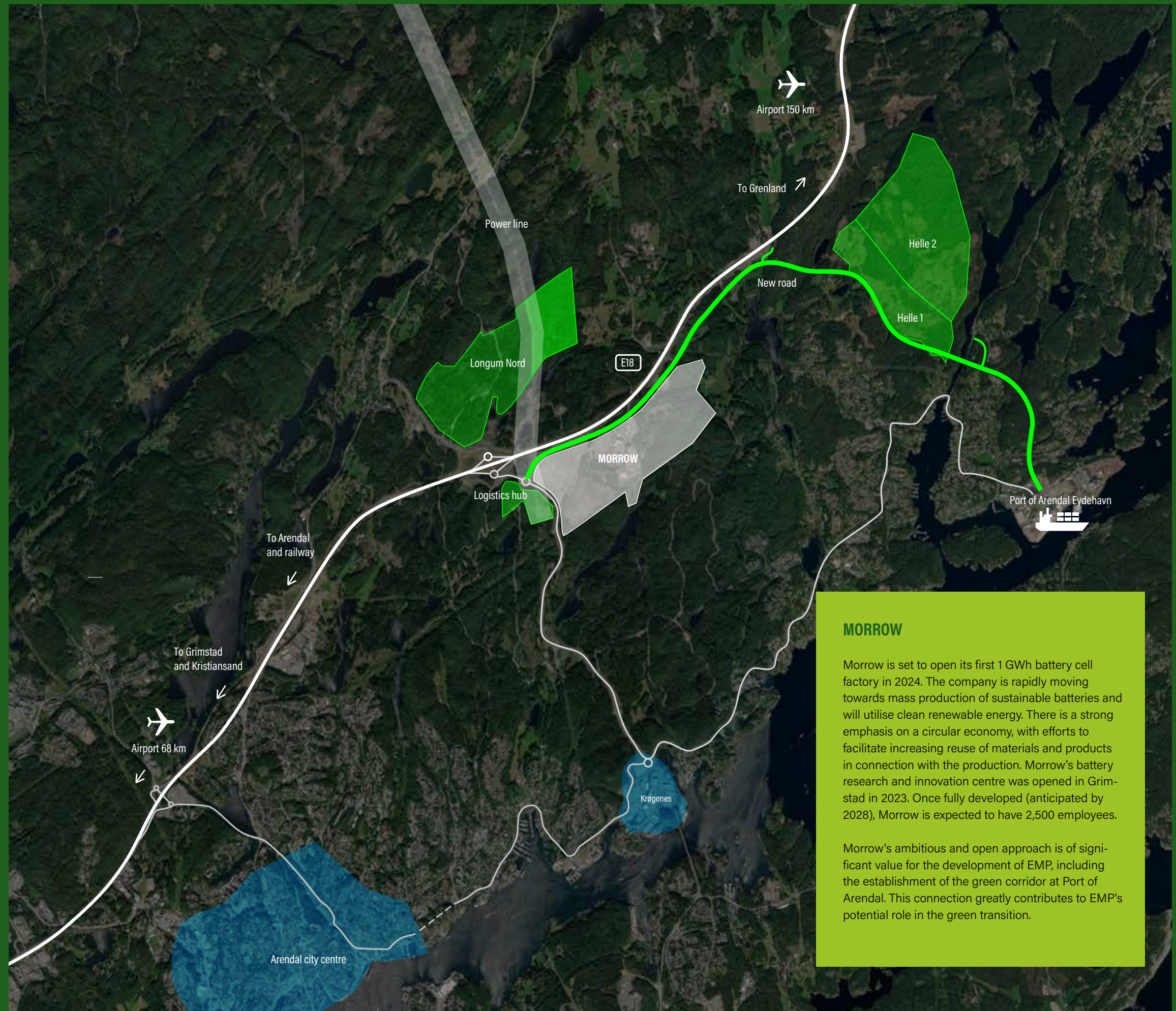
Longumkrysset (Logistics hub)

10 hectares (planning area – net area to be defined in detailed regulation)

All the plots have been designated for industrial use in the recently adopted municipal plan. The regulatory plan for Longum Nord is currently under development and is expected to be approved in early 2024. For Longumkrysset, there is a precondition that it will be utilised as a logistics terminal. Regulatory work has been initiated for the other plots. The subsequent process is dependent, among other things, on the regulation of the final section of the new road from Eydehavn to Morrow, which has also commenced and is anticipated to be approved by spring 2024.

It has been decided to relocate Agder Renovasjon from its current location «on the Morrow site» to a new location south of Longum Nord.

For additional information about the plots, you can visit eydematerialpark.com.



MORROW

Morrow is set to open its first 1 GWh battery cell factory in 2024. The company is rapidly moving towards mass production of sustainable batteries and will utilise clean renewable energy. There is a strong emphasis on a circular economy, with efforts to facilitate increasing reuse of materials and products in connection with the production. Morrow's battery research and innovation centre was opened in Grimstad in 2023. Once fully developed (anticipated by 2028), Morrow is expected to have 2,500 employees.

Morrow's ambitious and open approach is of significant value for the development of EMP, including the establishment of the green corridor at Port of Arendal. This connection greatly contributes to EMP's potential role in the green transition.

Master plan – Objectives and Description

The goal of a masterplan for EMP is to ensure an ambitious, coordinated, and cohesive development of the area for new business establishments. Emphasis is placed on the government's national battery strategy, Roadmap 2.0 for the Green Industrial Initiative, and the green transition. The masterplan will ensure the overall objective of establishing a large industrial park that can facilitate industrial symbiosis in the battery value chain and the green transition. Morrow's focus on sustainable production and sustainable batteries makes additional establishments in close proximity to Morrow crucial to support these goals. Companies that are suppliers or participants in the battery value chain can benefit from common synergies by establishing themselves in the area.

The masterplan has been developed in dialogue with the owners of the commercial areas, as well as Port of Arendal, Morrow, and other public stakeholders. It is important to note that in this context, a masterplan is an implementation plan representing the collaborative approach of the stakeholders to the further development and realisation of the overall area/ concept. It is not a public plan according to planning and building regulations or a separate marketing plan.

Market – who do we want to establish in the area?

The starting point for establishments in EMP is businesses that can play a role in the battery value chain (see the illustration below), as well as businesses that can contribute to the green transition.

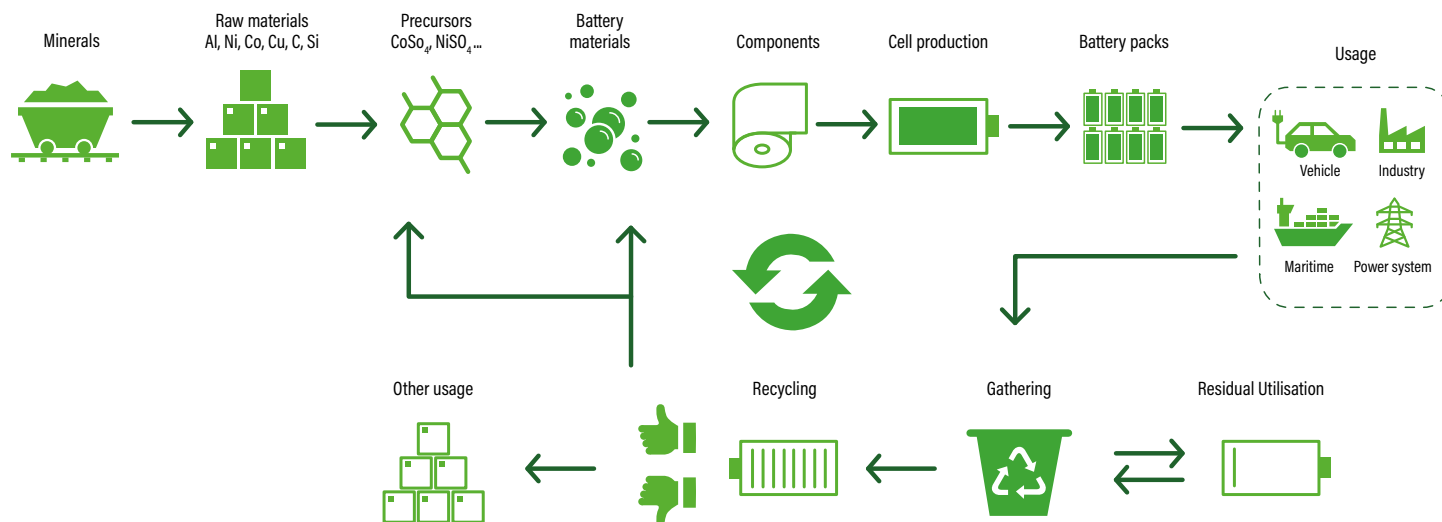
To achieve this goal, a flexible, comprehensive, and long-term approach to potential establishments in the park and in marketing will be crucial. This is because the development of the battery value chain, technology, and the green transition may open up opportunities for establishments that are not currently known. The key is that the specific establishments being considered and worked on must support the achievement of EMP's goals. Symbiosis and mutual reinforcement of different establishments are important aspects in this context, while the approach to various potential establishments must also be flexible.

It is emphasised that developing the attractiveness of EMP is important. Flexibility is crucial for market attractiveness, not just in terms of the type of business but also in terms of size. Experience from other clusters highlights the importance of facilitating smaller new establishments, which may have the potential for growth, development, and innovation that could play a significant role for EMP over time, alongside possible larger establishments, such as suppliers to Morrow.

Regarding which stakeholders are desired to establish themselves in specific areas of the EMP, this will depend on a market-oriented approach. Proximity to the port or to Morrow will play a role regardless. Establishments that can utilise excess heat from Morrow or have a direct connection for delivering resources to Morrow should be located in Longum Nord. Establishments dependent on port access or related to port activities can be situated in Helle 1 and Helle 2. Currently, however, the plots are in different phases of regulation and realisation. This, along with the need for flexibility and the focus on each stakeholder constituting an interconnected part of the overall EMP, means that there is no internal prioritisation between the plot areas in the masterplan beyond what has been mentioned regarding relevant proximity to the port and Morrow.

If a competitive situation arises between the different plot areas in EMP, it is considered a «luxury problem» for EMP, and such issues must be resolved internally among the parties. Transparency within the EMP organisation is therefore an important premise for successful implementation. Further market efforts are expected to focus on the above-mentioned contexts.

A clarification of the «balancing act» between industrial symbiosis and flexibility, in conjunction with the objective of who should establish themselves in the area, can be summarised as follows:



Eyde Material Park will focus on businesses that can play a role in the battery value chain, as well as those that contribute to the broader green transition. Examples include:

- Suppliers to Morrow.
- Businesses with direct connections to elements in the battery value chain.
- Entities that support the green transition.
- Businesses or land use that contribute to the goals by freeing up other areas. For instance, ensuring necessary logistics capacity for Port of Arendal or freeing up areas for businesses aligned with EMP's objectives that need to be located near the quay at Port of Arendal.
- Businesses that provide additional development opportunities for other establishments in the area, such as recycling companies.
- Entities that can utilise by-products or waste streams from other businesses in EMP, such as utilizing excess heat.
- Logistics services, maintenance services, and other support services that complement the operations of businesses in EMP.

Power

The area has a satisfactory power situation with a total planned capacity of 800 MW and significant available capacity. There is, therefore, great flexibility regarding accommodating potential establishments, in addition to Morrow. This is due to the expansion of the grid and transformer capacity currently underway to supply Morrow.

As of September 2023, applications have been submitted for permits for new 132 kV power lines from the Arendal transformer station (Bøylestad) to Eyde, as well as a permit for a new transformer station at Longum Nord. The process of applying for permits for new lines from Longum Nord to Eydehavn/Port of Arendal has begun. The dialogue between EMP and Glitre Nett (the power grid company) is very positive, and continued work on the permit applications is crucial for the overall realisation. A realistic timeline is to commence construction in 2024/2025 and completion/operation by 2027 in Longum and 2028 in Eydehavn.

The available power for distribution in EMP, based on defined needs as of September 2023, is:

Total Power Capacity in EMP: **800 MW**

Available Unused Power for Distribution in EMP, in addition to Morrow, North Ammonia, and Port of Arendal: **285 MW**

The final total available capacity from Bøylestad may be subject to minor adjustments depending on the choice of technical solutions. As evident, EMP has a significant power availability with its total of 800 MW and 285 MW available for distribution. Consequently, EMP is in a unique position overall regarding access to green power for sustainable industry, thereby strengthening the potential for goal achievement.

Traffic management project

The establishment of Morrow and other businesses in the battery value chain in EMP involves the transportation of goods and people on a massive scale, and it needs to be addressed in a sustainable manner. Therefore, a preliminary project, including a feasibility study, has been conducted to explore the issues and assess possible solutions. The emphasis is on maximising the transport of goods and people with the fewest possible vehicles in Eyde Material Park.

With the given assumptions (including daytime driving only), there could be up to 116 trucks per hour on the new road. This estimate is just for Morrow's gigafactory 1. The numbers will increase with the addition of workers and industry in Helle, Longum, and with the expansion of the port. Through the feasibility study, a model with a sustainable traffic management scenario has been considered:

- Prioritisation, coordination, and control of traffic through a traffic centre for Eyde Material Park.
- The port and dry port receiving necessary data from vehicles, relevant logistics stakeholders, and surrounding traffic centres.
- High filling rate for goods and workers' vehicles.
- Goods transported around the clock.
- A new 5 km county road between the port and Morrow.

This requires that all stakeholders connect to the same ecosystem and share information with each other. This approach can lead to a reduction to 3.5 trucks per hour and significant decrease in CO2 emissions.

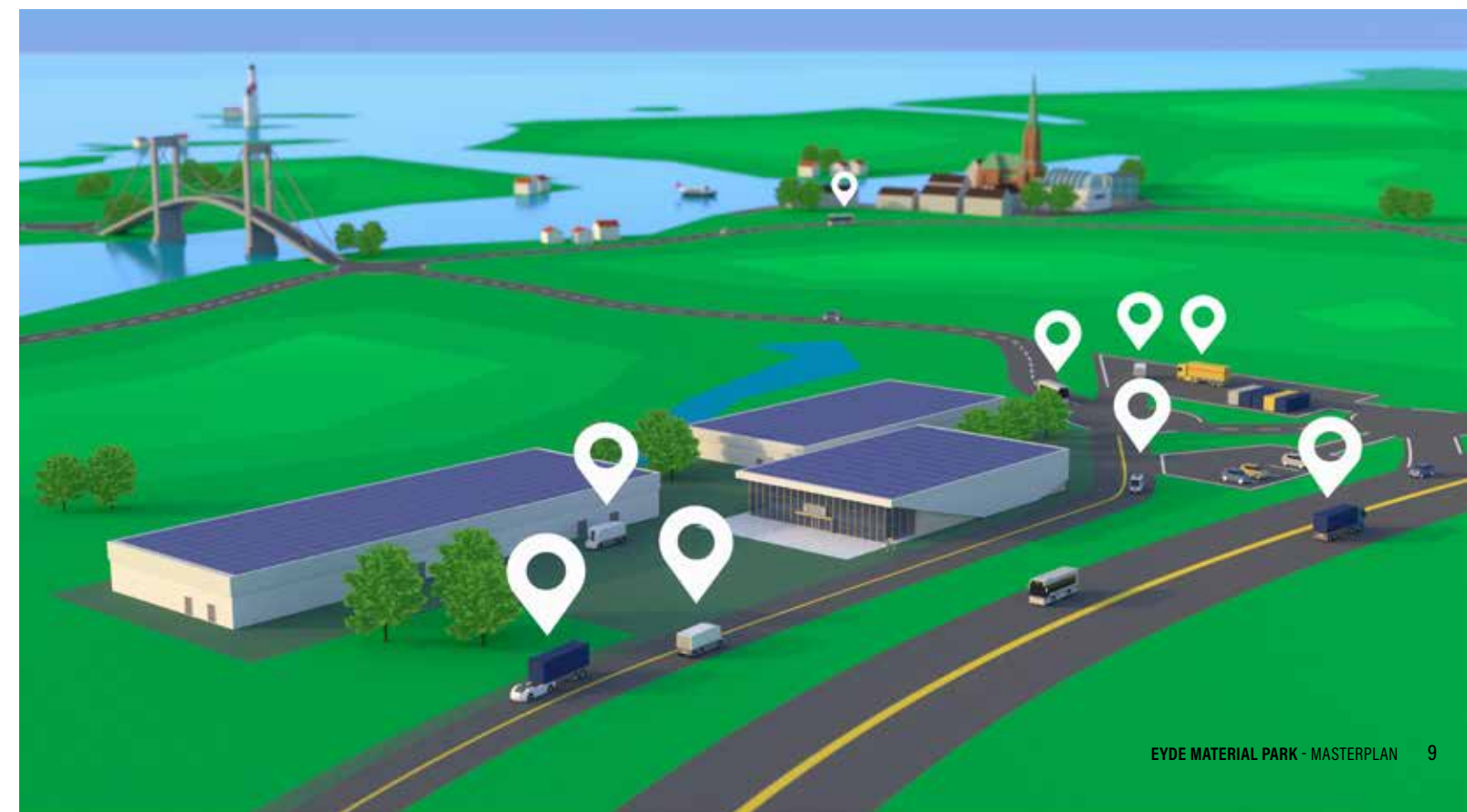
The preliminary project recommends that Arendal municipality, along with Morrow Batteries and Port of Arendal, should have overall responsibility in the further work. EMP is expected to collaborate closely with the main project.

Logistics Hub

The logistics hub holds a unique position in realizing the EMP concept compared to other industrial areas. EMP will consist of logistics-intensive industries, and it is crucial that logistics become a competitive advantage rather than a bottleneck. To handle the volume of goods, a logistics hub must be established to coordinate traffic in EMP (and Morrow), alleviate port areas, and reduce empty runs. Check-in at Port of Arendal will take place at the logistics hub. As mentioned in the description of the traffic management project, the stakeholders in the area must be part of the same transportation system and share information about their transport. The goal is to maximise the transport of goods and people with the fewest possible vehicles and reduce the effects of the balance of goods in/out. In addition to playing a role in traffic management, the consolidation and coordination of logistics services in the logistics hub will free up areas for other industrial activities. This strengthens the overall concept for realising EMP, and the logistics hub should therefore be located on publicly controlled land.

It is assumed that charging infrastructure for electric vehicles must also be set up in the logistics hub, and this needs to be considered in further planning and design, particularly regarding power requirements and sufficient capacity. Other typical amenities such as food, fuel, rest areas, and toilets should be included in or near the logistics hub.

The ongoing work to realise the logistics hub is led by Port of Arendal, which is expected to own it, and EMP is assumed to collaborate closely in this effort.



Infrastructure

The first part of the new road from Eydehavn to Morrow is under construction (completion in 2024). The final part of the road is currently in the planning stages (Neskilen – Morrow). If the planned progress is followed, the road could be completed by 2026/2027. The road is a critical factor in the realisation of the entire EMP, including Morrow, and delays, especially concerning other establishments (not least Morrow), must be avoided.

The establishment of other infrastructure, such as water and sewage, and waste heat/district heating, is crucial. The municipality has the primary responsibility for providing water and sewage to the property boundaries of commercial areas when there is insufficient capacity or the infrastructure is not readily available nearby. This includes ordinary consumption, and any specific needs must be addressed separately. Developers will also be responsible for internal infrastructure on their own property.

Regarding the preparation for the use of waste heat/district heating, this should be incorporated into the overall plans in a comprehensive approach.



Port of Arendal

Port of Arendal is a central player in the entire project and is also obligated to provide transportation services to all stakeholders. Numerous new requirements for transitioning to the green shift are now applicable to all ship traffic in and out of the EU/EEA. Port of Arendal must be established as a green business corridor in the region for both existing and new businesses. Requirements for shore power (and charging power) for ships, emission-free fuels, short layover times, and efficient port operations must be a focus. Port of Arendal in Eydehavn has good conditions to meet new regulatory requirements and customer needs, as evidenced by the reported need/commitment of 30 MW for ship connection. The delivery of emission-free fuels/alternative fuels (hydrogen/ammonia) at Port of Arendal is being considered, and planning is underway. The availability of space at the port may become a limiting factor, potentially requiring the use of other areas in EMP to ensure competitiveness in the overall logistics process.

FULFILMENT

The overall realisation of EMP will naturally depend on several factors. The completion of the last part of the new road from Eydehavn to Morrow/EMP is dependent on both regulation and funding, and the power supply to both Longum Nord and Helle 1 and Helle 2 depends on obtaining permits (currently on track and in line with other establishment assumptions). The assumed overall progress currently looks like this:

2024

- Full-scale production at Morrow Battery Cell 1 (1 GWh)
- First part of the new road from Eydehavn to Morrow

2024/2025

- Ready to build areas at Longum Nord

2026

- Ready to build areas at Helle 1 and Helle 2
- Establishment of the logistics hub
- Full-scale production at Morrow Eyde 1 (Giga 1) 14 GWh

2026/2027

- Commissioning of the transformer at Longum Nord
- Second part of the new road from Eydehavn to Morrow:

2028

- Full-scale production at Morrow Eyde (Giga 2 and Giga 3)
14 GWh x 2
-

The current master plan was developed in the fall of 2023 by the stakeholders in EMP in consultation with Port of Arendal, Morrow, and other public entities, and it is expected to be revised as needed.

eydematerialpark.com

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ARENDALE KOMMUNE