

SCALED for POWER

Intangible dimensions in the hydroelectric landscape

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Photo: The mast, the dam and the pipe in relation to the human body.

Intentions

Our initial intention was to contribute to the debate about climate change and particularly in the current energy crisis. This led us to investigate the most prominent renewable energy source in Norway, namely hydroelectric power. The infrastructure connected to the production of renewable energy stretches around the whole world and provides us with heat, light and electricity. We believe that as architects we have the potential to see and show relationships connected to this vast infrastructure from an angle other disciplines may not.

Already early on it became apparent to us that one of the key skills architects have when working with large complex systems is our understanding of scale.

We started to look into the architectural concept of scale. For us, scale is essential to understand the world and to systematize our surroundings. Every idea, every project, every illustration has a scale. That is why we were really surprised when we discovered that the architectural concept of scale is nowhere to be found in Google's list of definitions of the word. Why is it that a concept that seems so self-evident to us, is not even on the general public's list of definitions.

Is scale the problem with overconsumption of energy? That most people cannot grasp the large gap created between the socket at home and what that consumption entails in the landscape. Maybe our traditional understanding of scale is not enough to explain these complex systems. Is there a hidden dimension yet to be uncovered?

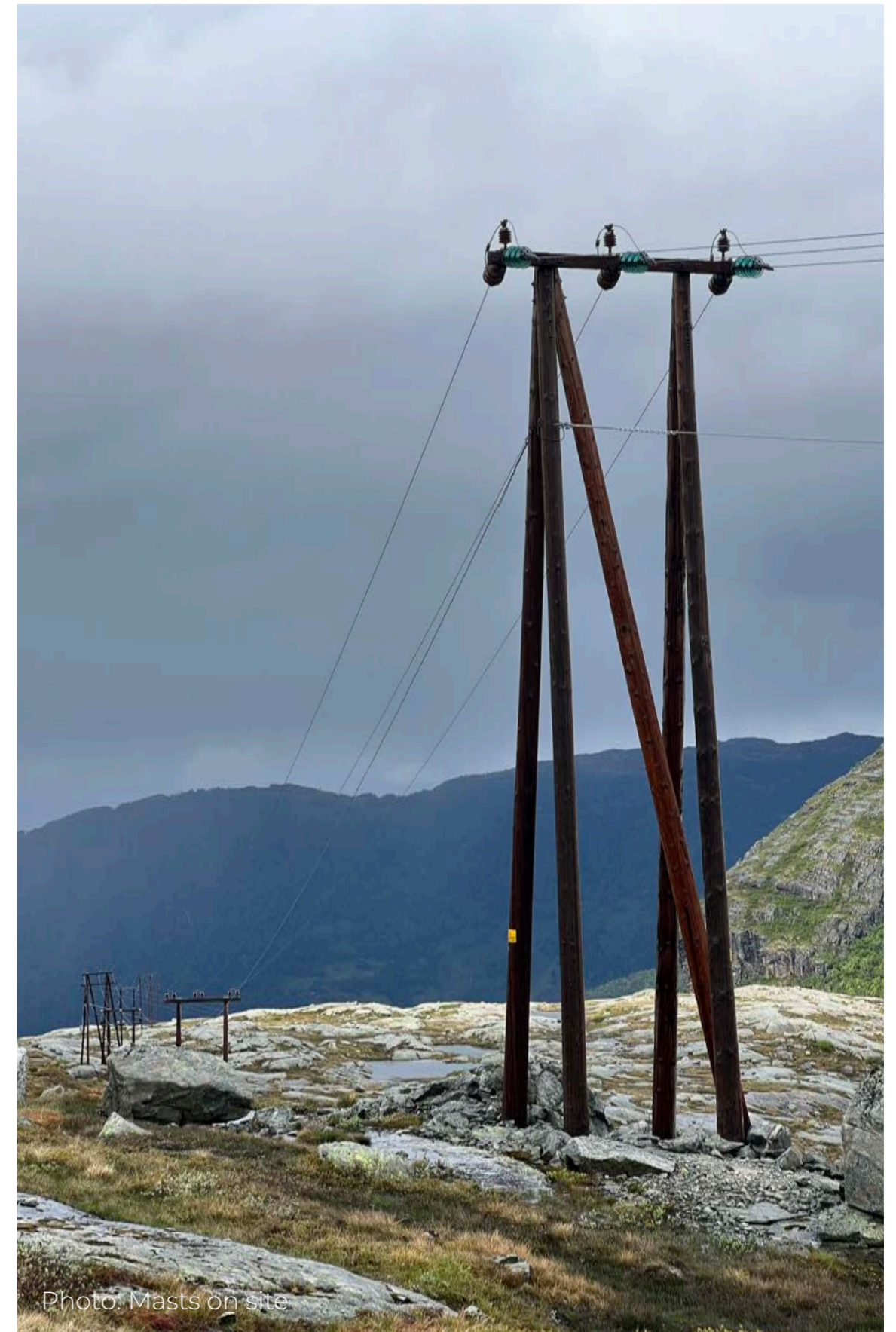


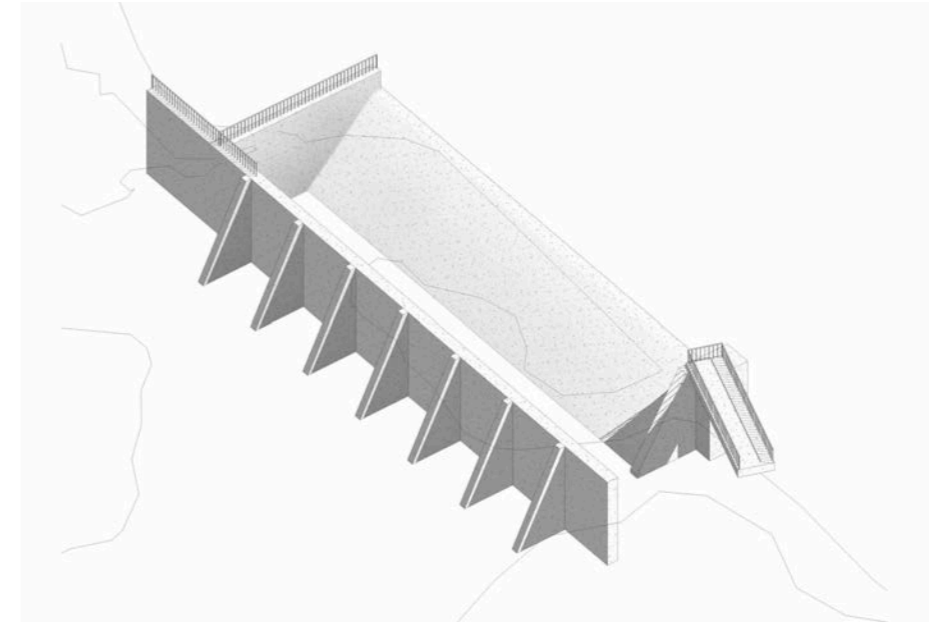
Photo: Masts on site

Through theoretic research we divided the architectural concept of scale into two:

The first being the **representational scale**: It refers to the objective understanding of one object in relation to another and how these objects can be represented through the use of different media. This is the known scale we work with as architects. 1:1, 1:50, 1:1000. It is about visualizing, designing, communicating and understanding. It is about dimension, size and proportion. It is about architecture or objects existing in a specific site and context. The representational scale is about representing our surroundings by making a careful selection, with a specified resolution with the intention of simplifying our complex three-dimensional world.

The second concept is the **experiential scale**. It refers to the subjective understanding and perception of one's surroundings in relation to their own body and sensory experiences. It encompasses how individuals interpret and experience the size, scope, and dimensions of the world around them. In our definition experiential scale considers factors such as culture, society, and time. Essentially, it involves how we sense and perceive the scale of our environment and our place within it, including both tangible and intangible elements.

This differentiation of the term scale provides a more complete view on the world: Scale as a tangible practical approach, and scale as a mindset, a way of understanding the world and ourselves in it. Our diploma project contains an investigation into the vast case of hydropower through these two concepts of scale.



Situatedness

Hydroelectric power, and the structures that are built to transport it is our case; a physical situation we can use to investigate an important aspect of our understanding. We are working with this immense network of energy ranging from the charger in your home, to power lines spanning across continents. Through our research we limited the project to mainly deal with three physical elements that make up the majority of the systems span: the mast, the dam and the pipe. We have treated these elements as architecture.

We started investigating on macro scale and worked our way towards micro. On this journey from large to small, we chose one specific power plant in Vestland county that could put our three elements into context.

Folgefonn-Verkene is the fifth largest producing power plant in Norway. It is a collection of two power plants in Kvinnherad, Ullensvang and Etne municipality: Jukla Kraftverk to the north, and Mauranger Kraftverk to the south. Folgefonn-Verkene utilizes the water running off the west side of Folgefonna, the second largest glacier in Norway. It contains a wide range of masts, dams and pipes. However, when you visit the site along the glacier, the infrastructure seems almost invisible at first glance. This relationship between its enormous production and its complex-, hidden- and inaccessible nature, convinced us to work here.

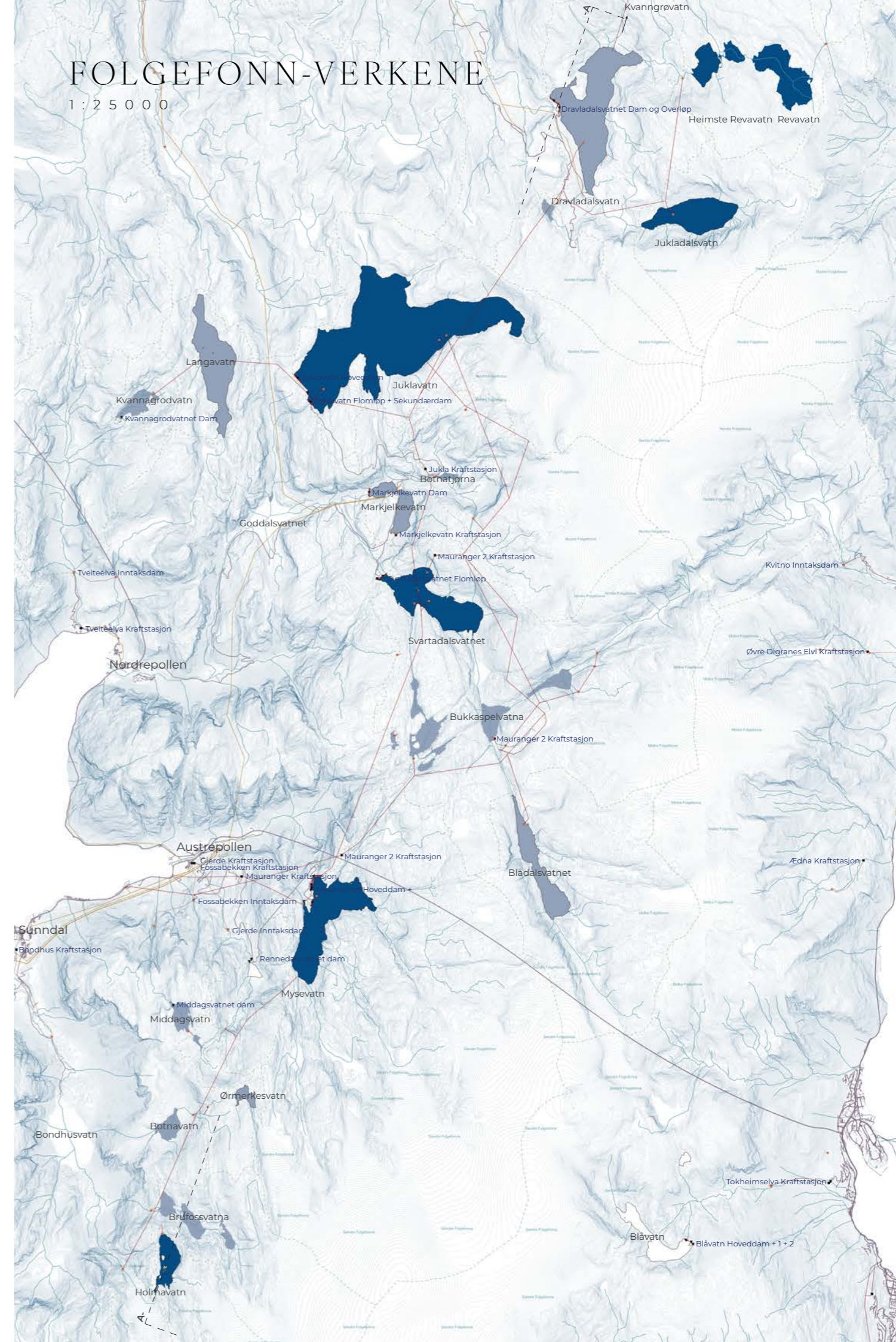




Photo: Svartadalssvatn

Through our investigations on site we have found that the electrical grid is in fact perfectly scaled for the power it carries. The mast is scaled for carrying the tension and compression from the wires. The dam is scaled for holding back the power of water stored in the reservoir. And lastly the pipes are scaled for transporting the right amount of water.

Our two definitions of scale, the representational and the experiential, are both embedded in the human brain. Together these concepts allow us to understand and categorize our surroundings. It is the tool that helps us construct a physical and mental image of our world.

We have drawn our three elements in its representational scale. In addition we have tried to show the experiential scale, the scale in which humans perceive and feel this system. It is in this contrast between how and why it exists and how we interact with it that things become interesting.

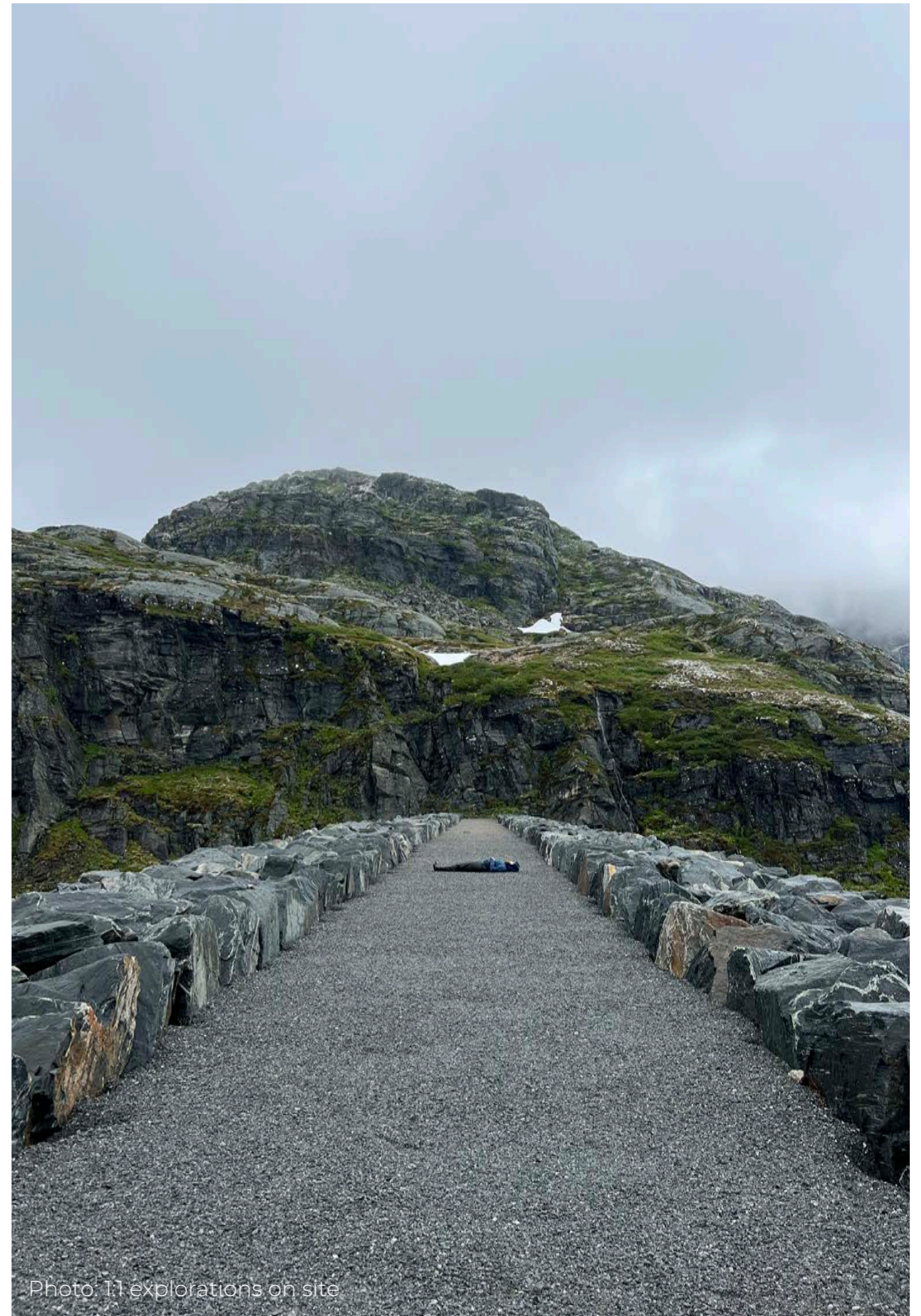
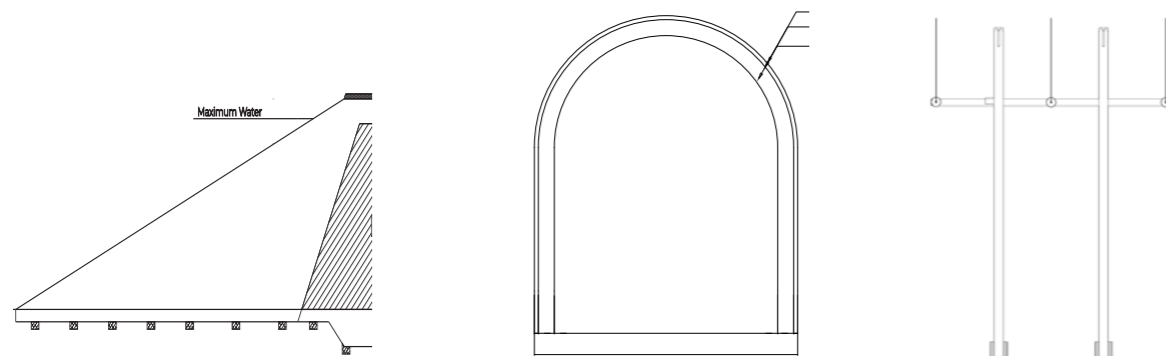


Photo 1:1 explorations on site

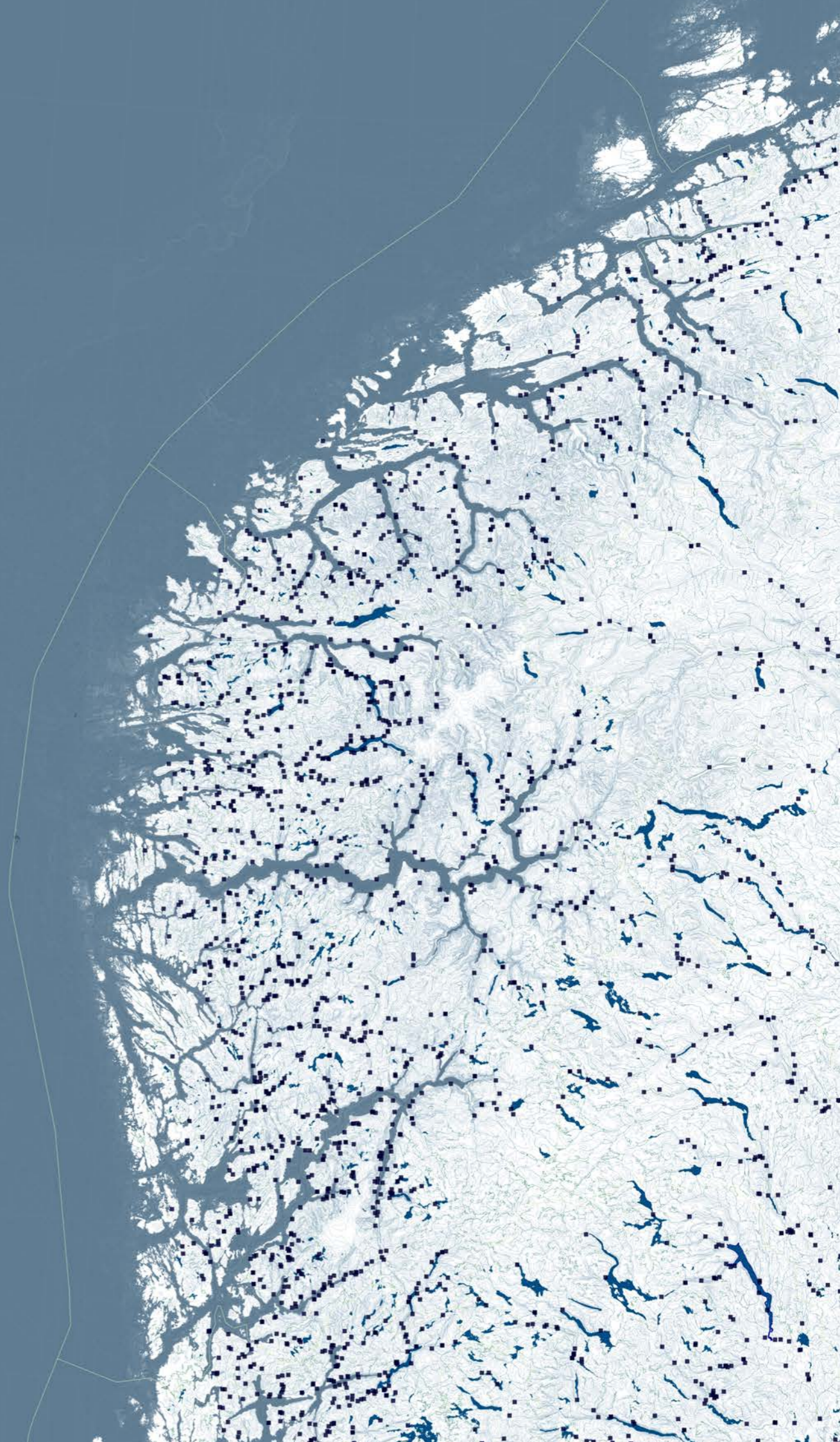
Purpose

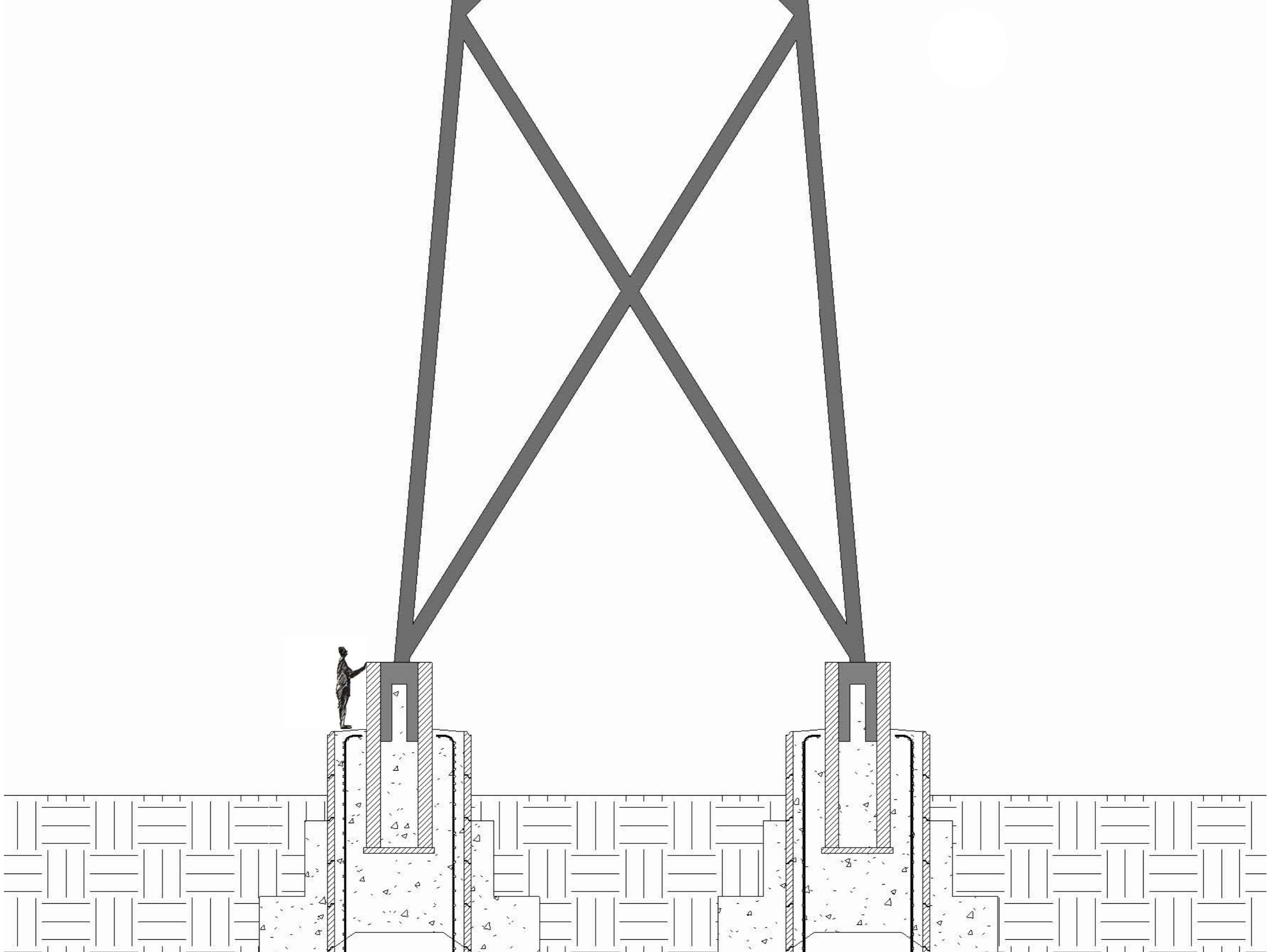
The issue of hydroelectric power is an inflamed political and societal topic. We want to use the whole scale of the electrical grid as a case to study our potential as architects to bring another perspective to an already heated debate.

In Norway 87% of the energy production comes from hydroelectric power plants. Due to its enormous scale there are always people talking about monster masts and ugly dams.

There is a clear paradox. We need energy, and particularly clean energy, but building and maintaining the necessary infrastructures proves to be difficult. Currently around 50% of all hydroelectric infrastructure in Norway is outdated or lacking as they were built in the 20th century. If we are to meet the energy needs of future generations we have to do something.

Our project is dealing with two things: We are investigating the potential of representational and experiential scale in human perception of the hydroelectric system. Secondly, we are highlighting some of the contradictions in this debate through architectural tools.





Approach

We believe we can use our tools to show what may be hidden or intangible. Through theoretical analysis and architectural mapping we can better grasp concepts that are otherwise too large, too small or too complex to understand.

We approach the topic of scale and hydropower with ourselves as origo, our subjective mind and sensing body. The importance of promoting an understanding across scales, cannot be emphasized enough. The potential for the human to understand, comprehend and see what is not readily available to the naked eye, is what makes scale so interesting and so important. Our whole world is built around the concept of connecting the small with the large and the complex with the simple. As our knowledge is ever growing, the need for simplifying and understanding how large concepts or structures interact with us will only grow.

Everything is related and to solve the climate crisis we have to create something that people can understand. Seeing is believing, and scale is a central part of getting people to see. Can scale as a tool provide us with a holistic image of what our renewable energy consumption means in the landscape? And can we through architecture create a place where people can come and experience this?

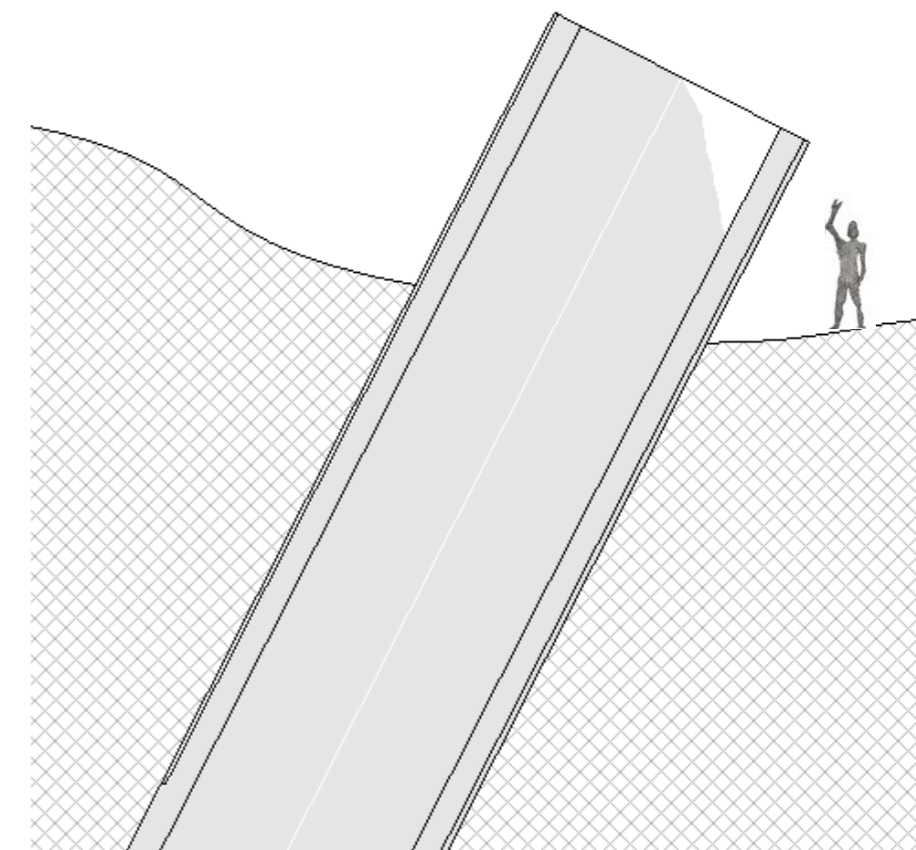


Illustration: Modular man and the pipe

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