

[municipal crest] Oslo

Agency for Improvement and Development

Mapping of available network capacity for construction projects

How principals collect and share information on the available network capacity in the request for tender.

20/06/25

What is the purpose of this procedure?

This procedure provides a step-by-step guide on who the principal/client can proceed to map the available network capacity in the project area, and how this information should be clearly laid out in the request for tender.

Why should the principal map the available network capacity?

The City of Oslo's 'Guidelines on the application of climate and environmental requirements in construction procurements from the City of Oslo' specify, in section 3.4, that "Undertakings shall carry out necessary investigations and clarifications with network operators or other relevant entities on the available solutions for energy and output prior to any procurements."

This means the principal is responsible for collecting information on the available output in the project area.

Clear information on the estimated available output makes it possible for potential tenderers to calculate costs and prepare a realistic plan for the execution of zero-emission projects.

Roles in this guide

Principal:

The principal is the entity that, in practice, is having the construction project done, and that, therefore, is the client for the planning and execution, and the one that is responsible for the construction work. The principal may delegate the project planning or execution to an external undertaking. In the following, the term 'principal' is used for both of these roles.

Supplier (in this context):

the chosen contractor for execution of the construction project. This undertaking is responsible for planning the electric infrastructure, procuring the equipment needed for zero-emission execution, establishing network connections, and submitting applications required for temporary network substations.

Network operator:

responsible for power networks and connections and will answer enquiries and questions about available network capacity.

NVE:

The Norwegian Water Resources and Energy Directorate – processes and grants applications for construction permits.

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Enquiry	Principal sends enquiry about capacity in power network	Supplier plans the project's energy and power consumption		Supplier requests power and installation	
	Estimated power requirements must be specified.				
Planning phase	4–6 months before request for tender	Procurement	Contract awarded	Period before initiation	Initiation and execution
The principal calculates the estimated power requirements for the execution of a zero-emission construction project		The principal puts out a request for tender with information about the available network capacity			

1. The principal estimates power requirements

Why does the principal have to estimate power requirements?

Elvia needs information about power requirements in order to operate the power network in a manner that is socio-economically sound. When some customers lay claim to all or a majority of the available output, this could lead to a situation where a small number of customers use a majority of the available capacity. This limits network flexibility, which is important for the ability to connect more customers without risk of overloading the network. This flexibility is also essential in order to be able to offer temporary connections, e.g. at zero-emission construction sites.

How are power requirements calculated?

When estimating power requirements, it is recommended to base the estimate on the most power-demanding phase of the project. Rapid charging of construction machinery often make up a majority of the demand, whereas electricity for workmen's cabins and vehicles come on top of this. The estimate can be based on simplifications and experiences from previous projects, and is often based on the number of units that need charging and/or electric connections at the same time (power peak).

The estimate is intended as a guide, and it falls on the contractor to plan fleets and operations based on the available power output/capacity at the start of the project.

In some cases, the available network capacity may not be sufficient. If so, the supplier must decide on appropriate measures to ensure sufficient capacity for project execution. For more information about this, see page 5.

Experiences from previous projects:

1. Small projects (1–2 construction machines) approx. 100 kW
2. Small-medium projects (2–3 large construction machines and multiple small machines) approx. 250 kW
3. Medium projects (multiple large construction machines requiring simultaneous rapid charging) approx. 500 kW

How big are the power requirements?

The power requirements of a construction site will depend on many different factors:

1. The size of the project
2. How many energy-demanding activities taking place at the same time
3. Which types of machinery requiring simultaneous charging
4. The scope of the earthworks required for the project

2. Principal sends enquiry about capacity in power network

Why does the principal have to enquire about the capacity of the power network?

The principal is responsible for identifying and providing information about the available power network capacity, so that all tenderers have access to the same information when they plan their use of electric machinery and vehicles in the project before they submit their tender. This gives the supplier time to plan their charging and any additional measures, such as the rental of BESS (Battery Energy Storage Systems).

When information about network capacity is available in the request for tender, it means the suppliers do not have to collect this information from network operators themselves, which speeds up the process.

To ensure that the network operator is given enough time to process the enquiry before the request for tender is issued, the principal must submit their enquiry in good time, preferably at least 4–6 months before the request for tender. The principal should use the form for network capacity enquiries for all projects, regardless of power requirements. This ensures that the enquiries have one contact person and one case number with the network operator, which simplifies the process and provides a better overview.

Procedure for submitting enquiry about power network capacity

1. **Go to the form**
“Forespørsel om tilknytning av større prosjekter”
2. Select *“Utslippsfrie byggeplasser”* under the question
“Hvilken type utbygging/tilknytning gjelder det?”
3. **Fill out the estimated power requirements in MW**
 - Effektbehov (MW): Power requirement (MW), e.g. 1 MW (=1,000 kW)
 - Nedre effektgrense: Minimum power output, the lowest power output you can use
 - Energibruk/år (GWh): Energy consumption per year (GWh), estimate, if known.
4. **Specify where the construction will take place**
 - Specify the project location in Elvia’s map
 - Search for the address or specify the cadastral unit no./property unit no.
5. **Fill in contact information**
Name, telephone, e-mail, and undertaking name
Tick box to indicate if you have been in contact with Elvia before
6. **Describe the project**
 - Project name:
 - Brief description
 - Estimated construction start date and duration
7. Copy and paste the text included below in the free text field under *“Kort beskrivelse av prosjektet”*

“Oppgitt samlet effektbehov er ønsket effekt for gjennomføring av dette utslippsfrie anlegget. Effekten skal hentes ut fra en eller flere trafoer/nettstasjoner i nærheten av tiltaksområdet. Det

ønskes primært 400 V og det er fint om dere oppgir spenningen ved hver aktuell nettstasjon/trafo samt estimert tilgjengelig effekt.”

8. Attachment(s): Upload a map of the project area where the specific project area is outlined. Zoom in.

When you submit the enquiry, you will receive a receipt via e-mail.

3. The principal will include information about the available network capacity in the request for tender

Elvia will not reserve power for the relevant start-up date, but will issue an estimated advance statement on the available capacity for the area and time, as well as recommendations for the drawing of current. The advance statement will also include contact information. Please note that the available capacity may have changed by the time the supplier applies for connection after the contract is awarded, as other undertakings may have reserved capacity in the meantime.

Response time:

Elvia currently has a response time of approx. 2–4 months, but this could vary.

Measures if the available output is limited

If the network operator finds that the desired output is not available in the area, it could be useful if the principal requests a rough estimate of possible measures to increase capacity. This could, for example, include potential measures, an estimate of costs and an approximate time frame for execution. It is important to note that this information should not be assessed or decided by the principal, but rather included as an annex to the request for tender. This provides suppliers with a better foundation for decision-making and give them an opportunity to consider the most appropriate approach – e.g. whether to include the proposed measure in their tender, or whether alternative solutions, such as BESS, would be better suited.

What must be included in the request for tender?

The advance statement, incl. enquiry number and contact person, shall be included in the request for tender. This will streamline the process of requesting power, as the initial enquiry is already registered in Elvia's system.

The request for tender shall include information about the available output and voltage in the surrounding substations, based on estimates from Elvia, as well as any information provided by the district heating company. This information should preferably be presented in a map for better overview.

Example of available network capacity in the project area:

See attached map for substations near the project area and availability:

- NS123: 400V, where approx. 150kW is available for drawing
- NS246: 400V, where approx. 50kW is available for drawing

The following capacity estimates are for
date (dd.mm.yyyy) and have not yet been reserved.

Enquiry number: XXX.

Contact: Ola Nordmann.

4. Supplier's responsibilities

The supplier plans the project's energy and power consumption

The supplier is responsible for planning the project's energy and power requirements. These requirements will largely depend on how the supplier organizes its fleet of machinery and plans out energy-demanding activities in the project. The available network capacity is a central factor in this process. Based on the supplier's planning, an assessment can be made of whether the existing network capacity is sufficient, or whether additional measures will be necessary, such as increased network capacity or the implementation of mobile power supplies. It is up to the supplier to decide which measures would be preferable.

The supplier requests power and installation after establishing a contract with the contractor

The supplier should put in a request immediately after signing the contract. The supplier will contract an authorized installer, who will request and install temporary power. It is recommended to use as few connections as possible with the highest output possible ($>125\text{A}/50\text{kW}$) per power point.

5. What if the available network capacity is insufficient?

In some cases, the available network capacity will not be sufficient to facilitate a zero-emission project. This could happen in areas where the network capacity is limited and the project has high output or voltage requirements, or needs to charge many large machines simultaneously. As the supplier is the one responsible for planning and requesting power after a contract is awarded, it naturally falls to the supplier to identify the most appropriate measures to ensure sufficient capacity.

It is recommended that the principal consider these challenges beforehand, so that delays in start-up can be avoided or planned for.

If a network upgrade is deemed necessary, this could take months. If a temporary substation is required, the contractor must apply for a construction permit from NVE. The processing time can be 1–3 months for substations inside the fenced in project area, and 2–4 months for new substations outside this area.

Which measures can be considered if the network capacity is insufficient?

If the available network capacity is insufficient to meet the estimated demand, the following measures must be considered:

- a) **Network upgrade** – This could take between 2 and 4 months, and is normally not a preferred solution due to high costs.
- b) **Temporary substation** – A substation connected to the high-voltage transmission network or low-voltage distribution network can be an option. If such a temporary solution is required, the contractor must apply for a construction permit from NVE. The processing time can be 1–3 months for substations inside the fenced-in project area, and 2–4 months for new substations outside this area.

- c) **Mobile power supply** – Alternatives include BESS or hydrogen fuel cells, which can serve as temporary solutions where network capacity is limited.

The choice of measure will depend on the project's specific needs and the practical and economic considerations associated with each solution.

Who is responsible for each measure?

The principal is responsible for collecting information about the available network capacity and including this information in the request for tender. It can be difficult to say whether the available network capacity will meet the demand, as the principal only has estimates.

The supplier is responsible for planning energy and power requirements and requesting power after a contract has been established. If additional measures, such as a temporary substation, are required, the contractor must apply for a construction permit from NVE. The contractor may also consider whether mobile power supplies, e.g. BESS or hydrogen fuel cells, are an appropriate solution for project execution.

6. Definitions:

Current (A):

The quantity of electric charges per second. On construction sites, current values are used in distribution boards, circuit breakers and cables.

Voltage (V):

Electrical potential difference. Standard systems are 230 V and 400 V, and the equipment must be compatible with the voltage provided by the network or substation.

- Low-voltage: Up to 1,000 V AC, direct connection to substation (typically 230/400 V).
- High-voltage: Over 1,000 V AC, requires special permit before connecting.

Output (kW):

How quickly energy is used/transferred. Important for charging speed and dimensioning of electrical infrastructure. Calculated as follows: $(kW) = (V) \times (A) \times 1.73$.

Energy (kWh):

Total energy consumption over time. One kWh is equivalent to consumption of one kilowatt in one hour.

Power requirement:

Max. power output required for a project to be effective. Can be reduced with good planning, e.g. by avoiding concurrent processes requiring high output, but will vary across project phases.

Advance statement:

Network operator's assessment of available capacity for a specific location at a specific time, as well as recommendations for connection points. The stated capacity has not been reserved, and is subject to change if other undertakings request capacity before the request for connection is submitted.

Construction permit:

Application for a temporary substation. Required for power requirements with voltages exceeding 1,000 V/high-voltage. The processing time can be 1–3 months for substations inside the fenced-in project area, and 2–4 months for new substations outside this area.