Connecting to the Grid

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Once you have made the decision to connect to the grid or maintain your existing connection, it is necessary to engage in a discussion with your local Electricity Distribution Business (EDB).

Regardless of whether your project is grid-connected or not, it is vital to recognise that you are undertaking the responsibility of providing an essential service for modern living. People will rely on your project to deliver this service for at least the next 25 years.

Engaging with EDBs early on is crucial for the success of community energy projects as they are likely to be significantly affected by such initiatives. It is important to understand any challenges or opportunities that your project may present to the EDB and address them proactively to avoid unexpected complications. By positioning your project as compatible with the EDB's goals and offering them an opportunity to learn and test their systems for managing Distributed Energy Resources (DERs), you may increase the chances of gaining acceptance.

Many EDBs are striving to be more customer-friendly and responsive to customer needs. However, providing a tailored experience to all customers, including DER owners and community energy projects, can be a challenge. This may result in a learning process for both parties, with some mixed experiences along the way.

The connection or interconnection process

The process of connecting to the electricity grid may vary depending on the EDB involved, but there are commonalities due to compliance with the requirements outlined in the Electricity Industry Participation Code 2010, (the Code). This includes filling out specific forms, undergoing inspections, and obtaining necessary permits.

For a Community Energy Project (CEP), an important section of the Code is Section 6, which it provides valuable information, such as:

- The information EDBs are obligated to provide.
- The potential fees they can charge.
- The requirement for the EDB to respond to a connection request within 30 days.
- The need for EDB approval if the connection application meets certain criteria.
- The list of approved inverters for use with Distributed Energy Resources (DERs).

However, some aspects of the connection process are specific to each EDB and can be subject to change. It is beneficial to have someone on your team who understands the process and knows where exceptions can be made, as this facilitates discussions.

Effective communication and information exchange in both directions are essential for a smooth experience. EDBs often encounter incomplete or changing information, which can lead to delays and unforeseen costs. Providing all the required information accurately at the beginning of the connection process, and having a good understanding of the process itself, will help ensure a seamless process. It is advisable to be well-prepared and knowledgeable from the outset.

The standard process

The standard process is typically managed by an EDB customer support or new connections team who endeavour to run every new request through a standard process.

The process typically starts with filling out a form on the EDB's website. The complexity of the form depends on the size of the project (over or under 10kW).

Once the form is submitted, the new connections team would make an assessment as to whether an upgrade to the grid infrastructure was needed. The EDB may require upgrades to the line from the property to the distribution transformer, or even further up the network.

Initially the EDB would provide an early indicative cost, which would allow the customer to decide if they wanted to proceed.

One key element of the cost is the location of the connection to the property. If multiple locations are possible, it would be worth providing a few alternative locations. This could be based on consenting requirements, terrain and the grid topology or constraints. Information regarding the grid topology and constraints may need to come from the EDB, but it is worth exploring how changing the location of the connection could change the cost of the connection.

Once the optimal location has been determined, and if the customer decides that they still want to proceed, then the EDB would often send out one of their designers. The designer would visit the site, take some photos and measurements and then run the parameters through an estimation model to generate a formal quote. The quote would be valid for a specific period like 90 days. This quote is just the network side,

that is up to the boundary of the customer property. There is also the customer side of the upgrade such as installing a new or additional conductor on the property. There may still be opportunity for negotiation on the formal quote particularly in terms of actions the CEP could take to minimise the overall cost of the upgrade (EDB network side and customer side.) This may result in further studies or re-running the calculations for the upgrade based on new information.

In most instances, if the upgrade is clearly attributable to the customer, then the EDB would expect that the upgrade cost would be 100% paid by the customer. The EDB would later ask if the customer wants to own and maintain the asset or if the customer would prefer that the EDB does this. In most cases even though the customer has paid for it, the EDB ends up owning and maintaining everything on the network side.

If you agree with the quote, the EDB will then do the upgrade work (either directly or through a contractor).

The EDB issues the ICP number if needed. Sometimes the EDB installs the new meter in which case you will need to tell them which retailer you will be using and if you will be exporting electricity. In other cases, the EDBs will coordinate with the retailer and get the meter installed by a contractor. In yet other cases, meter installation is done by a third party, and this would require the CEP to contact the retailer and coordinate the issuance of the ICP number by the EDB with the installation of the meter by the contractor.

The completion of the work requires obtaining a Certificate of Compliance (CoC), an Electrical Safety Certificate (ESC), and a Record of Inspection (RoI).

The EDB holds significant authority over the connection upgrade and its associated cost:

- The EDB typically determines the required upgrade type.
- The EDB determines the cost of the upgrade.
- The EDB decides how the cost will be divided.
- The EDB carries out the actual work.
- The EDB establishes the schedule and priority, although delays might occur without penalty due to factors such as cable supply issues.
- The EDB receives payment for the upgrade from the customer and often becomes the owner of the asset.

Due to the high volume of requests processed by the EDB and the standardised nature of most requests, there is usually limited opportunity to engage with a person in advance. This restricts the CEP's ability to discuss alternatives or strategies to minimise the upgrade cost. If the new connections group cannot resolve an issue, it may be escalated to the network planning department.

Specific components of the connection process

When integrating a DER (Distributed Energy Resource) smaller than 1 MW, two primary questions arise:

- Will the distribution transformer need to be upgraded?
- Will the ICP (Installation Control Point) need to be upgraded or changed?

Typically, for DERs smaller than 1 MW, it is uncommon for a feeder or network transformer to require an upgrade. The responsibility and cost-sharing for upgrading the feeder and network transformer vary depending on the specific EDB and the situation. There is no definitive rule, as it depends on how the EDB perceives its obligation to provide grid services and how the associated costs are allocated.

If there is ample capacity available on a line or network transformer due to a recent upgrade, there may be no additional charges. However, if the addition of a new DER pushes the line or network transformer to its thermal or voltage limit, an upgrade might be necessary. This aspect is crucial to consider when determining the project's location and conducting an early economic assessment.

A distribution transformer upgrade

The distribution transformer serves the purpose of reducing the voltage from the medium voltage (11 kV) distribution grid to the low voltage used in homes (240 V, single-phase or three-phase) and businesses (400 V, three-phase). It can be located on the property or positioned off the property on a pole or the ground. Additionally, it can be dedicated to a specific property or shared among multiple properties. Ownership of the distribution transformer can either belong to the EDB or the property owner.

This stage presents the most significant opportunity for minimising interconnection costs. If the CEP can demonstrate to the EDB that they will require the same capacity already allocated to the property, an upgrade can be avoided. This necessitates well-documented calculations and a comprehensive understanding of the CEP and its control system, outlining how it will consistently remain within the capacity limit.

Typically, upgrade work is outsourced to a third party, which could be affiliated with the EDB or entirely independent. The local EDB usually manages all aspects of the upgrade on behalf of the CEP and handles contractor management while billing the CEP for the services rendered.

Upgrading or installing a new ICP (Installation Control Point)

If you are installing generation for the first time or need advanced billing, an import-export meter will be necessary to account for energy flowing in both directions. Additionally, if you are switching from multiple meters to a single gate ICP or aiming to reduce capacity and demand charges, a new meter will be required. Currently, a smart meter capable of reading at least at 30-minute intervals is needed, but this is likely to shift to 5-minute intervals in the future.

To access information about your ICP (Installation Control Point), including your connection details and rate plan, you can visit this website: **The EA - Your meter**. If you don't have an ICP and need to get connected, follow these steps:

- Contact your local EDB (Electricity Distribution Business) directly or through an application page on their website.
- Fill in your details and submit the application. It may take 30 days or more to process and receive a decision.
- An electrical contractor must handle the power supply up to the EDB's pillar, as only approved contractors can access the pillar or pole and make the connection.
- Before the connection can be made, a certificate of compliance is required.

The requirements and complexity of the process increase as the power rating of the connection increases. For specific guidelines on connecting Distributed Generation (DG) to the grid, refer to section 6 of the Electricity Industry Participation Code 2010.

Upgrade for the line from the distribution transformer to the ICP

The line connecting the distribution transformer to the ICP (Installation Control Point) can be divided into two sections:

- The section from the distribution transformer to the pillar at the property boundary is owned and maintained by the EDB.
- The section from the property boundary to the ICP is typically owned by the property owner, and they are responsible for its maintenance and upgrades.

If the distribution transformer is located on the property boundary, then the entire line falls under the ownership of the property owner. In cases where the distribution transformer is upgraded, it's highly likely that the line connecting it to the property's ICP will also require upgrading. This is because the increased current capacity may necessitate a thicker line or the installation of a second line. The work within the property is usually overseen by the CEP and subcontracted to a certified company specialising in handling high-capacity lines. In many instances, the same company responsible for upgrading the transformer can also handle the line upgrade.

Guide to harmonious grid connection

The successful integration of a Community Energy Project (CEP) or any Distributed Energy Resource (DER) into the grid depends on effective collaboration between the EDB and the CEP. Both parties need to understand each other's perspectives, constraints, and objectives to achieve harmonious integration. Here are some important considerations:

- Both the EDB and the CEP are driven by a genuine intention to serve their respective communities and feel accountable to them. However, the definition of community may differ, with the EDB serving a larger population within their service territory, while the CEP's community may consist of a smaller group of individuals who are more closely connected.
- The EDB has a legal responsibility to operate, maintain, and reinforce the grid to ensure reliable service to the community. On the other hand, the CEP organisation has a self-defined responsibility to provide electricity and other community services.
- The EDB's actions and business model are regulated, aimed at consumer protection. However, these regulations can sometimes constrain EDBs from acting in the best interest of DER owners.
- While the grid is a cost-effective way to provide power to a large number of people, it may not fully meet the customised energy needs of a specific community. The EDB's perspective is to serve everyone effectively within operational constraints and economic considerations.
- While the EDB is a vital part of the electricity ecosystem, it is not the sole entity the CEP must navigate. The CEP must engage with all relevant stakeholders to succeed, and the EDB can only assist within its areas of control.

Despite the apparent differences, there is significant common ground between the EDB and the CEP. Consider the following examples:

- The EDB can achieve flexibility from the CEP without direct control through methods like sending price signals or Demand Response (DR) signals. They can also work with aggregators.
- The CEP may have the opportunity, through special permission, to participate in demand reduction programs typically reserved for much larger operations.
- The EDB may only require load reductions, energy production, or VAR support for a few hours per year, allowing the CEP to retain full control for the rest of the year.
- The CEP might prioritise energy resilience over energy sovereignty, being open to trade-offs in owning and controlling all assets.
- The CEP could incorporate additional controllable loads, such as an electric shuttle bus, or enhance control capabilities within their system.
- Both parties can view the project as a training ground or showcase for future similar projects.
- The CEP may help mitigate the impact of other nearby DERs (existing or planned) in the area.
- The EDB might offer a contract for demand reduction that includes an upfront capacity payment for the initial years, along with ongoing response payments in the future, providing certainty and potential benefits.
- The EDB may allocate some of its community outreach funds to support the CEP's upgrades.
- Reaching a middle ground requires well-prepared and knowledgeable discussions from both sides, along with patience, diplomacy, and a belief that a solution can be reached.
- Establishing a mutually beneficial relationship not only aids in securing financing and project delivery but also facilitates ongoing management.

By engaging in open dialogue and finding common interests, both the EDB and the CEP can establish a harmonious and mutually beneficial relationship that supports the project's success and ensures effective ongoing management.

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