

CMP 460 - Improving Transmission Connection Asset Charging

Examples of Infrastructure Configurations

Option 3

Code Change Proposal – OPTION 3



Pass through a partial amount of attributable transmission works triggered by Users proportionate to the Developer Capacity or TEC of the triggering projects.

- CUSC code change required. New asset classification suggestion:
 - **Embedded Shared Connection Asset** – *A Transmission Connection Asset which connects more than one embedded customer via a licensed distribution network (includes IDNOs)*
- This would impact infrastructure sites where costs are not currently passed through to embedded customers.
- DCODE code change potentially required (DCP461 in progress).

Benefits

- Same charging mechanism now for ALL assets regardless of whether a GSP is an infrastructure site.
- NESO, TOs, and DNOs could use existing economic assessment mechanisms to determine whether new SGTs are an economically efficient solution to prevent excess TNUoS burden.
- locational incentive for generators to locate under less constrained GSPs

Disadvantages

- Significant additional TNUoS Burden collected through the Transmission Residual Charge
- Potentially Complex Legal Text
- Unclear who (TOs, NESO, and DNOs) is responsible for considering if the reinforcement is value for money

Charging on a Proportional Basis

- Users would be charged based on the MW capacity they are utilising
- The maximum that could be paid is the total cost of the asset.
- The calculation will consider the total capacity available within the relevant connection asset group, where the connection asset group includes all the connection assets that are utilised by a User.
- E.g. if there are 4 x 240MW SGTs then the group nameplate rating is 960MW.

$$\text{Connection Charge} = \text{Total Cost of Connection Asset Group} \times \text{Max} \left(1, \frac{\text{Transmission Entry Capacity (MW)}^*}{\text{Connection Asset Group Nameplate Rating (MW)}} \right)$$

* Or fault level contribution if the connection asset has been triggered due to a lack of fault level headroom.

Ownership Boundaries

- All examples assume an Air Insulated Switchgear (AIS) design, except where explicitly stated.
- For Gas Insulated Switchgear the User 'bay' would typically be a connection asset rather than a User asset due to the typical ownership boundary used for GIS substations.

[User connection boundaries | National Grid](#)

Glossary

Acronym	Definition
TO	Transmission Owner
DNO	Distribution Network Owner
HV	High voltage >132kV
LV	Low Voltage, $\leq 132\text{kV}$
GSP	Grid Supply Point
SGT 6	Super Grid Transformer
GIS	Gas Insulated Switchgear
AIS	Air Insulated Switchgear
User	A person who is a party to the CUSC Agreement, as defined by the table in in clause 1.2.4 of the CUSC . For CMP460 worked examples, each Bilateral Connection Agreement, i.e. Bilateral Connection Agreement, will be treated as a separate User of the Transmission Network.

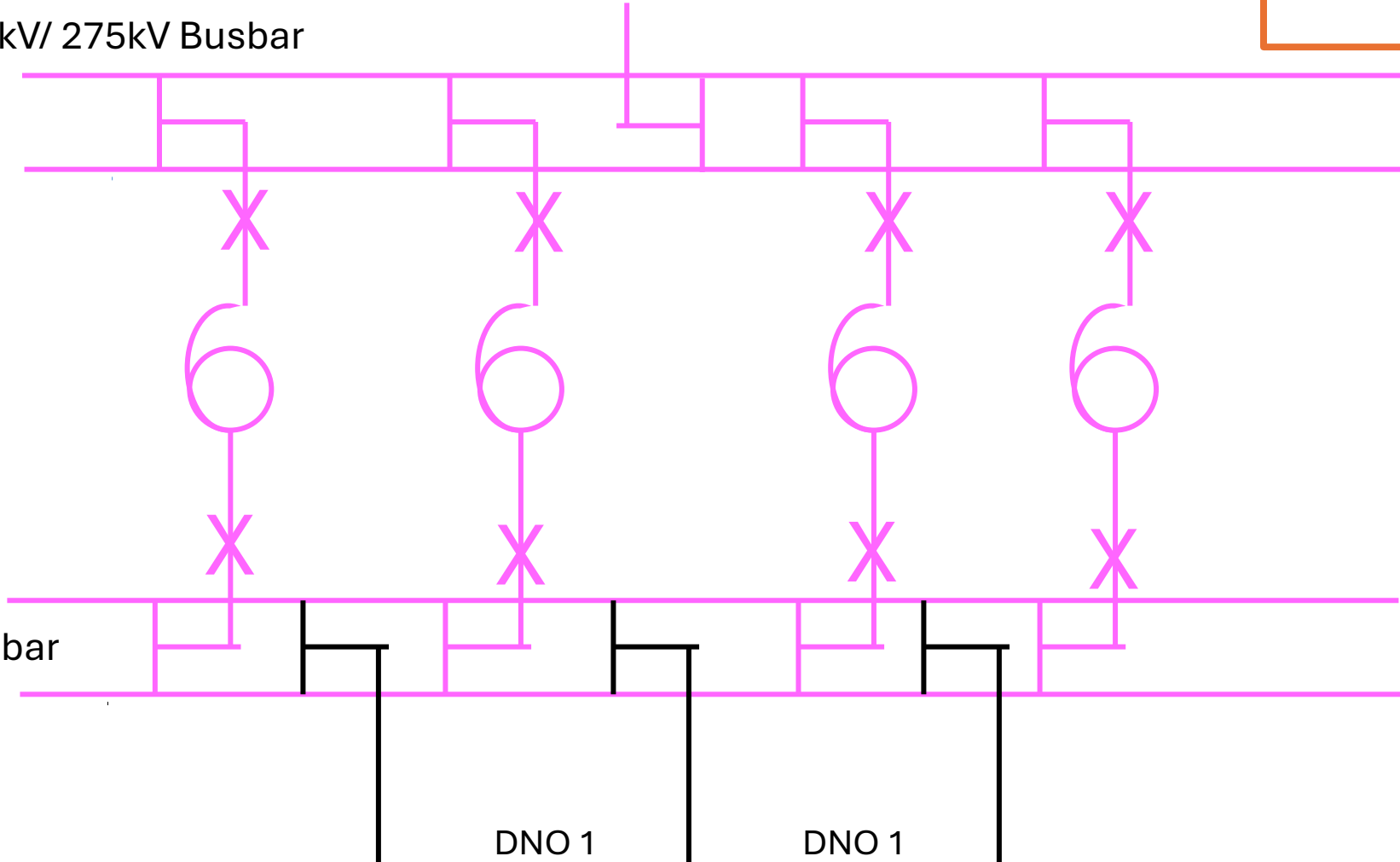
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Single DNO Customer at a GSP with TO owned LV busbars



400kV/ 275kV Busbar



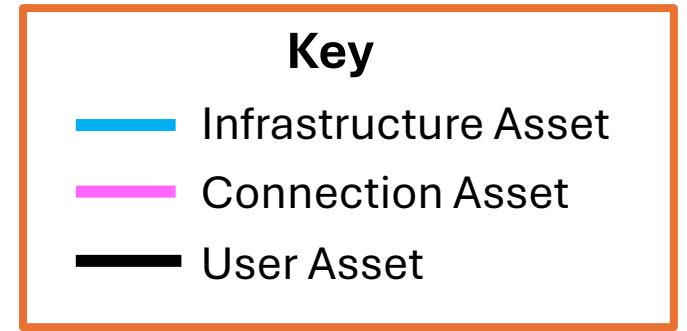
CUSC 2.12.1 b)
Ownership
Boundary

132kV TO Busbar

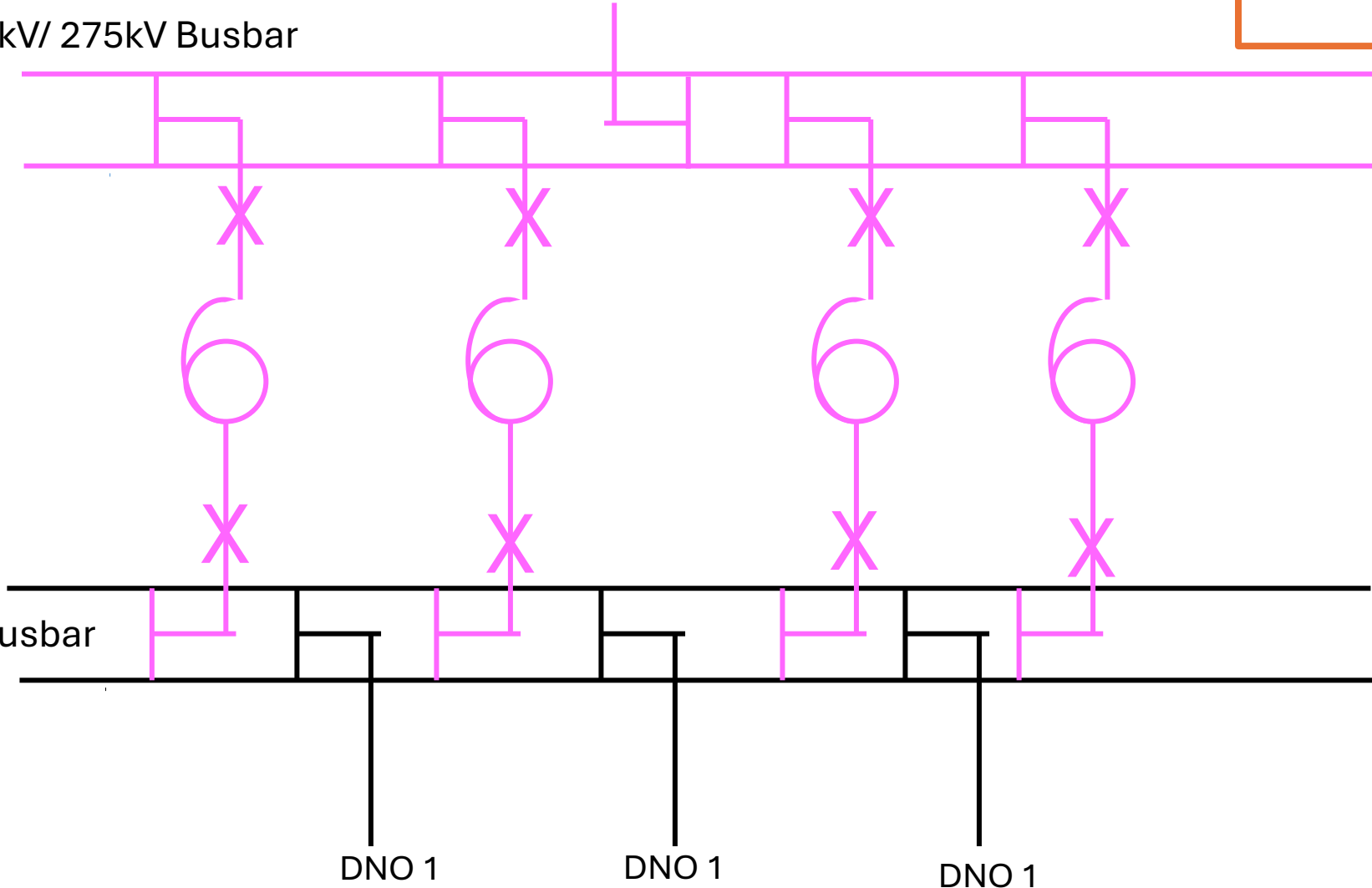
DNO 1

DNO 1

Single DNO Customer at a GSP with DNO Owned LV busbars

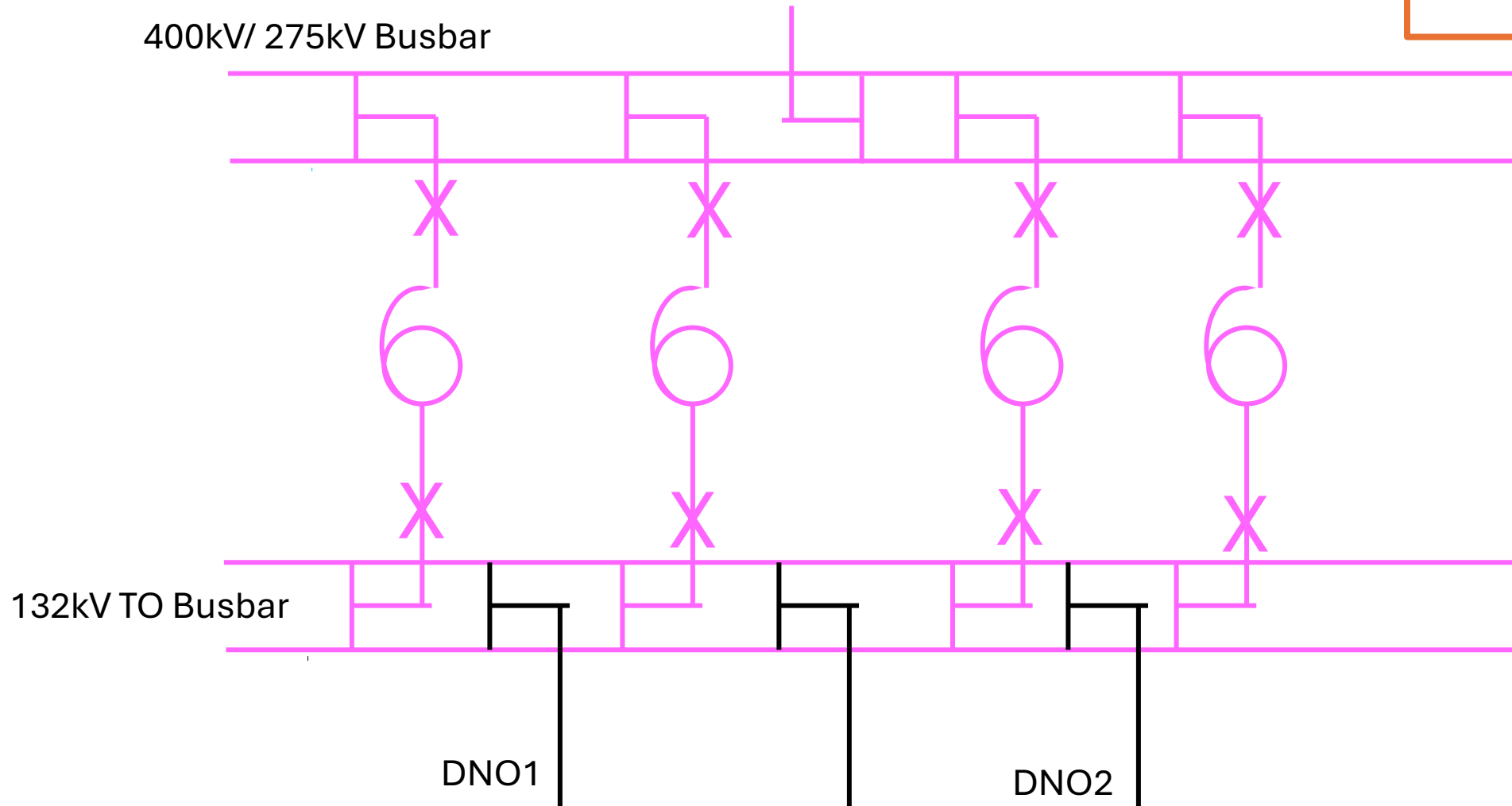


400kV/ 275kV Busbar



CUSC 2.12.1 c)
Ownership
Boundary

Multiple DNOs with a Shared 132kV Substation

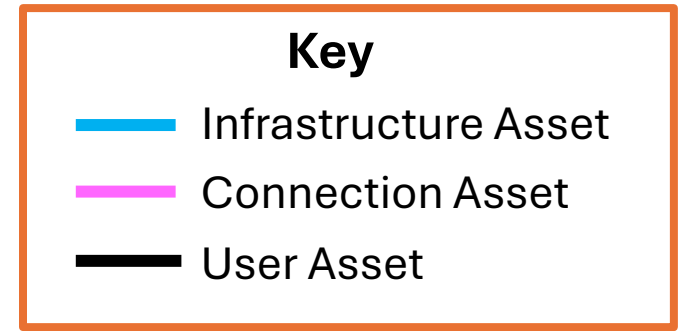


Key

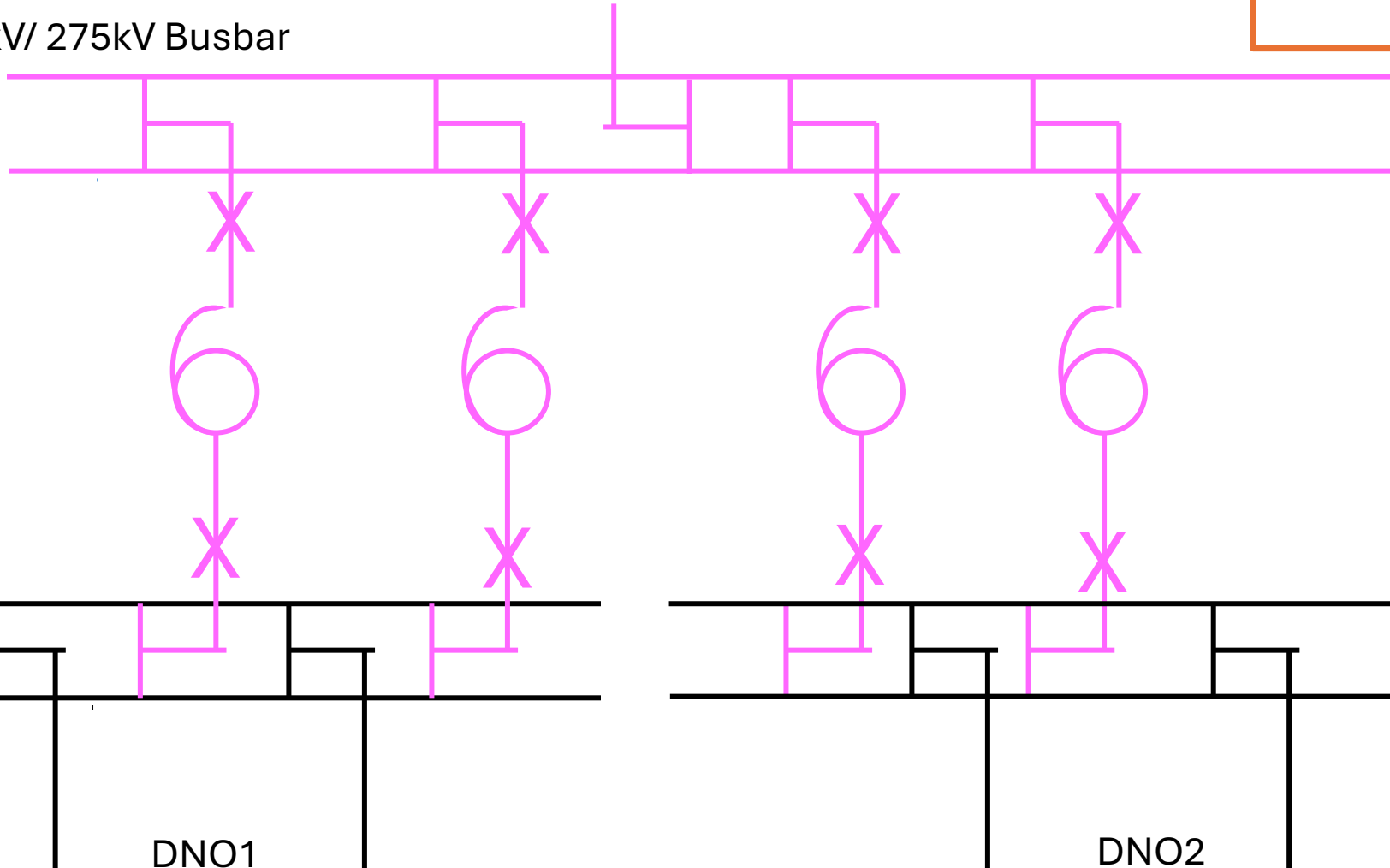
- Infrastructure Asset
- Connection Asset
- User Asset

Multiple DNOs, separate 132kV Substations

DNO Owned LV busbars



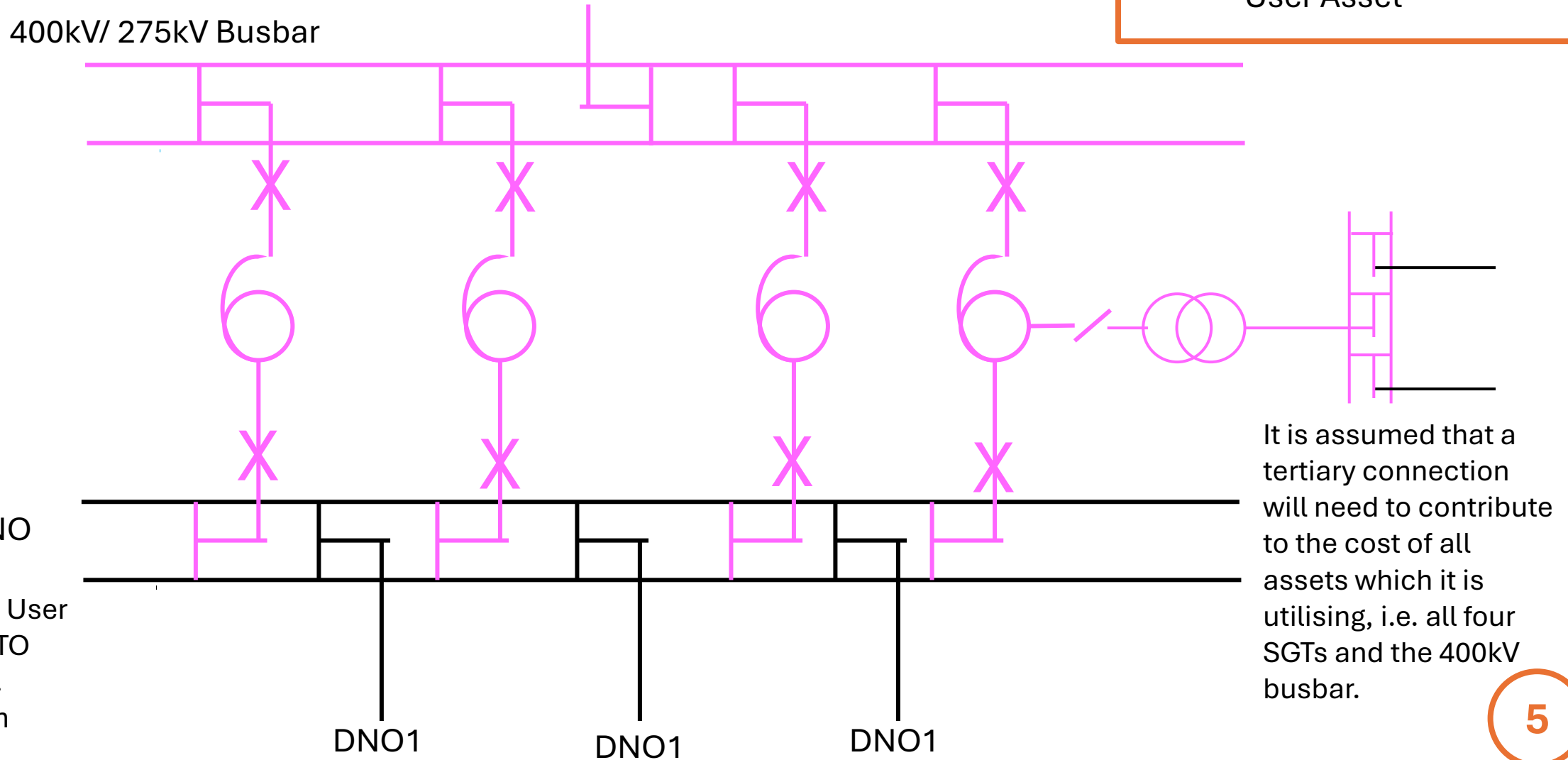
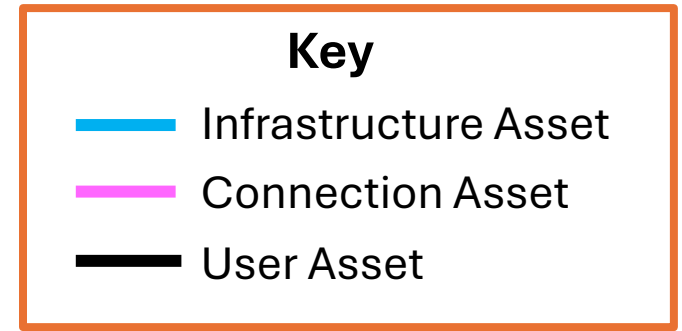
400kV/ 275kV Busbar



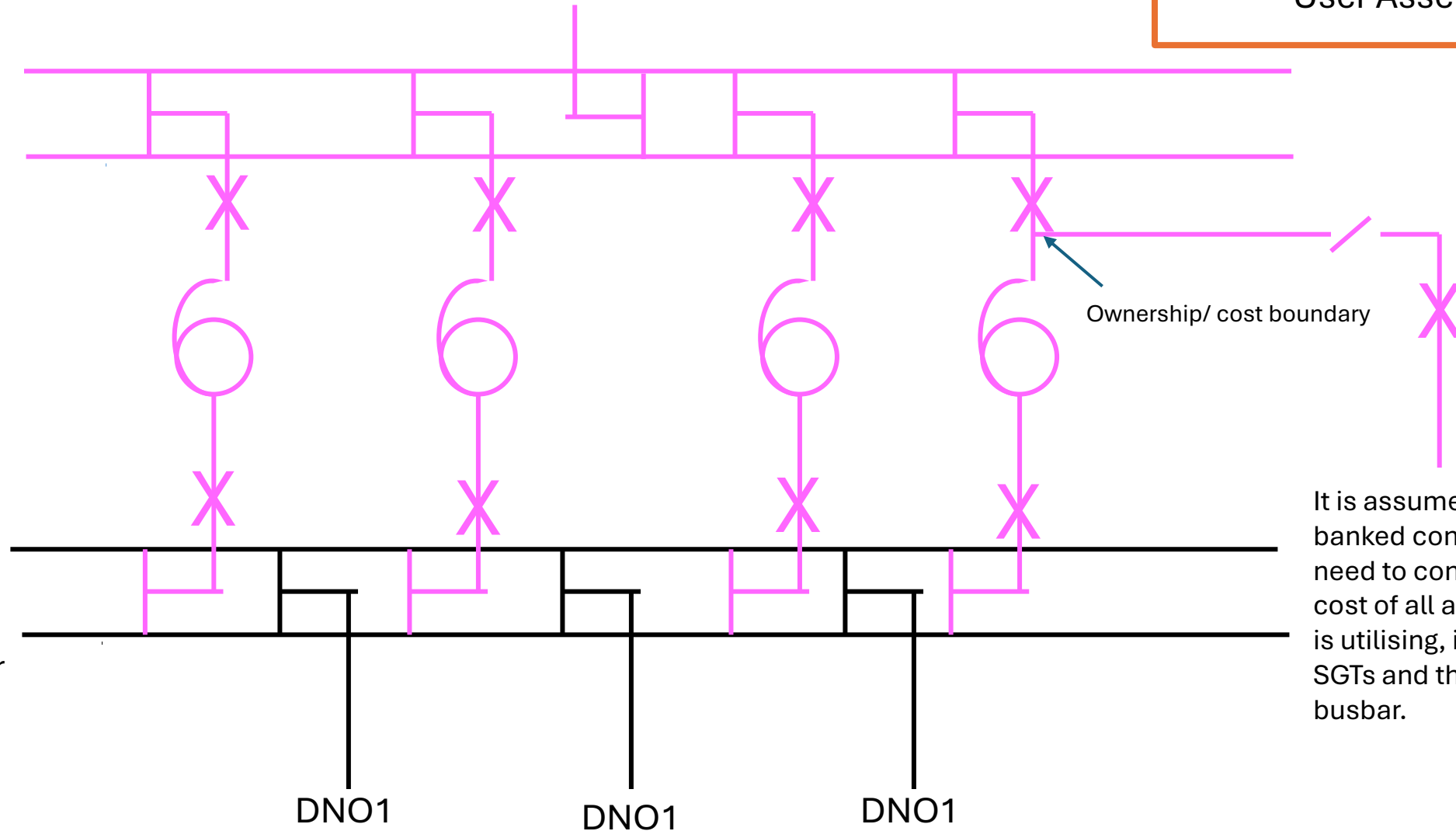
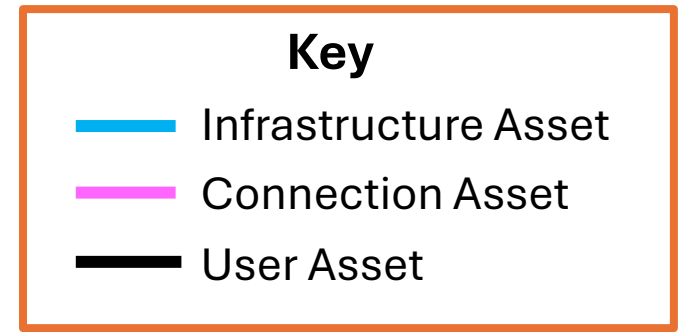
132kV DNO Busbar.

* Could be User Owned or TO owned, i.e. connection assets.

Single DNO and Tertiary Connection

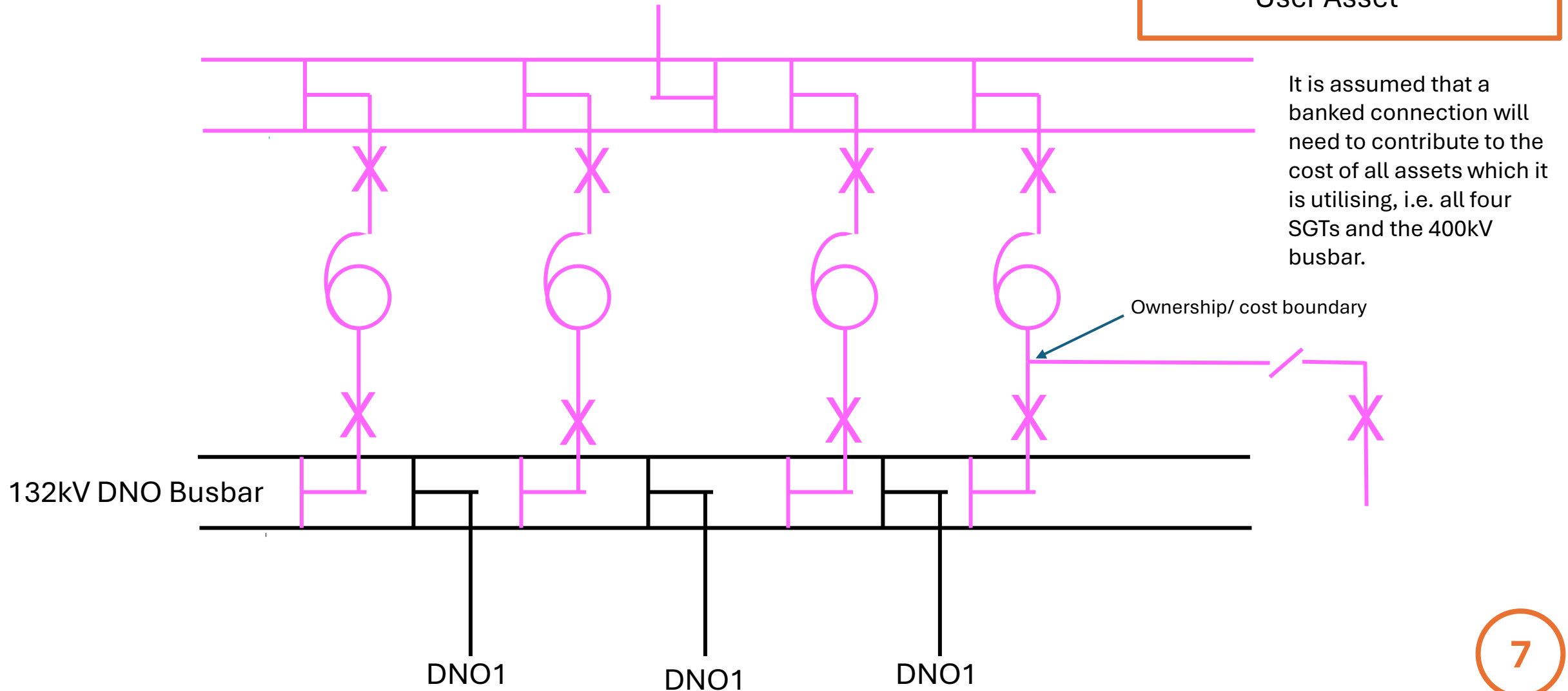


Banked HV (>132kV) Connection, single DNO

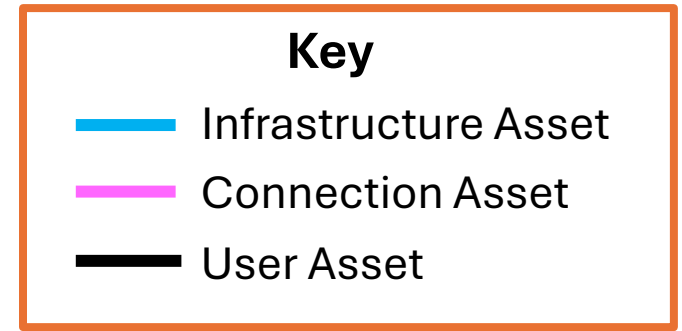


It is assumed that a banked connection will need to contribute to the cost of all assets which it is utilising, i.e. all four SGTs and the 400kV busbar.

Banked LV Connection, single DNO



Grid Park Full Capacity – One Customer Contracted



400kV/ 275kV Busbar

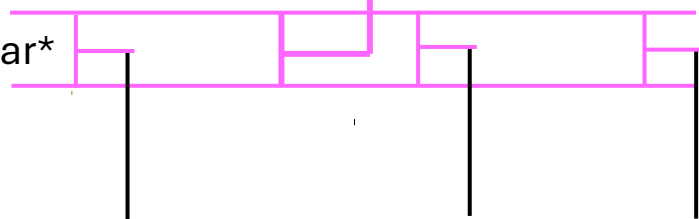


The single Grid Park User is using the full capacity of the Grid Park.

*GIS 33kV Substation. An AIS would mean the 33kV 'bays' are classified as User Assets.

It is assumed the Grid Park is a separate connection asset group to the two SGTs. The cost of the 400kV busbar would be contributed to by all Users.

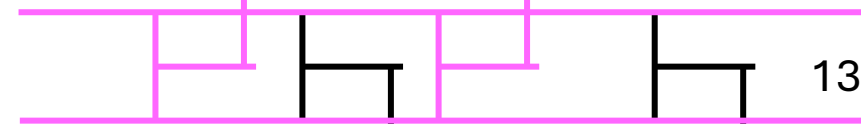
33kV TO Busbar*



Grid Park User 1
(contracted, not connected)

Grid Park User 1
(contracted, not connected)

Grid Park User 1
(contracted, not connected)

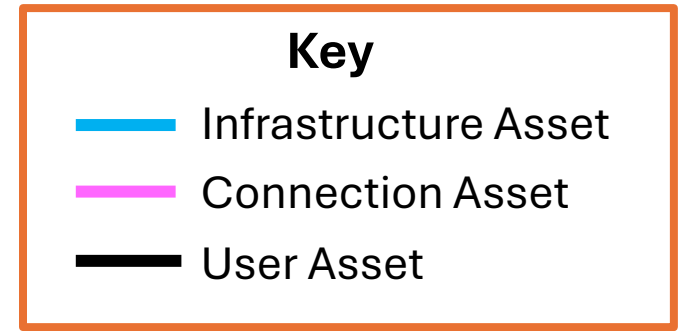


132kV Busbar

DNO 1

DNO 1

Grid Park Full Capacity – One Customer Connected



400kV/ 275kV Busbar



The single Grid Park User is using the full capacity of the Grid Park.

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It is assumed the Grid Park is a separate connection asset group to the two SGTs. The cost of the 400kV busbar would be contributed to by all Users.

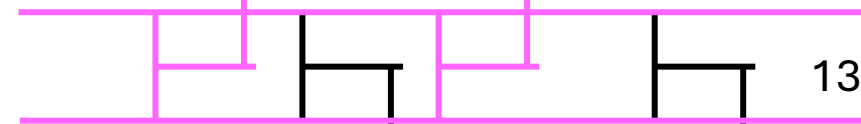
33kV TO Busbar*



Grid Park User 1 (connected)

Grid Park User 1 (connected)

Grid Park User 1 (connected)

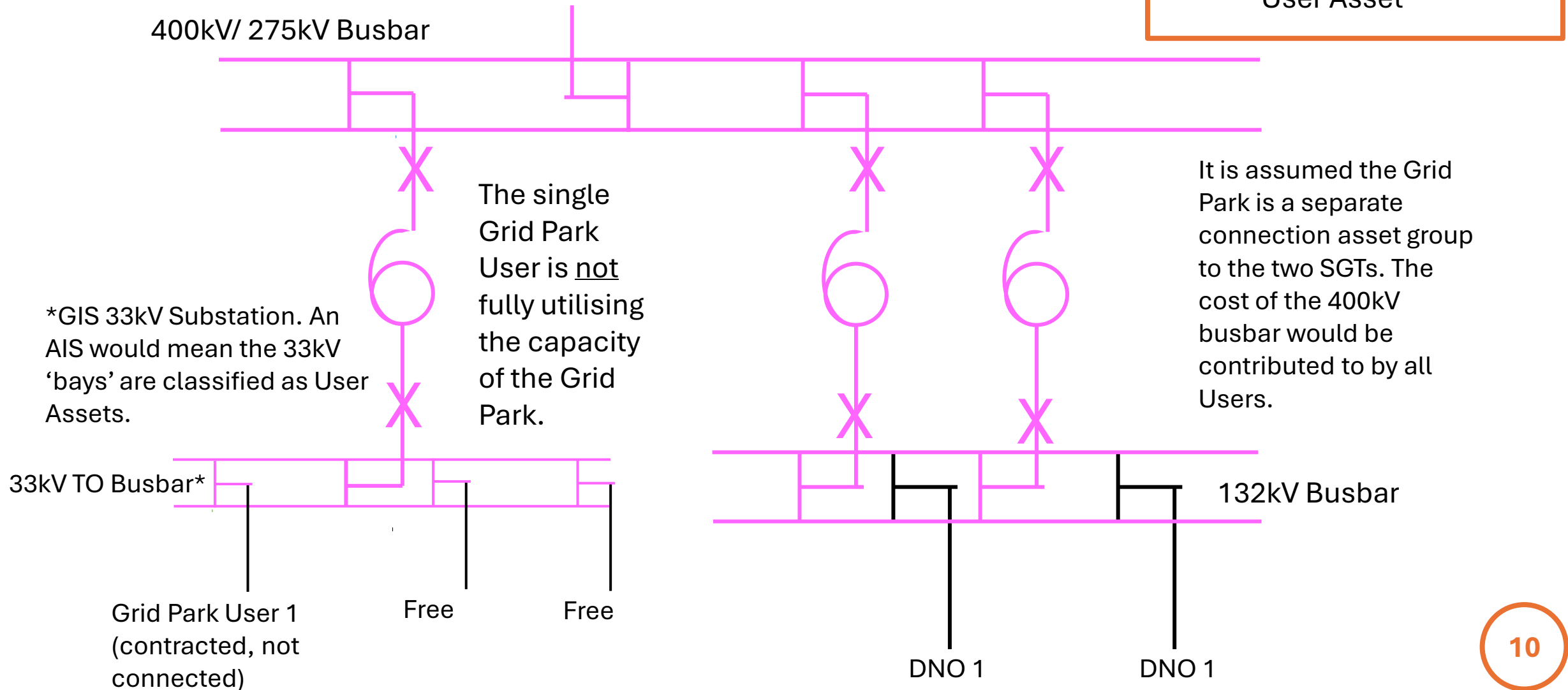


132kV Busbar

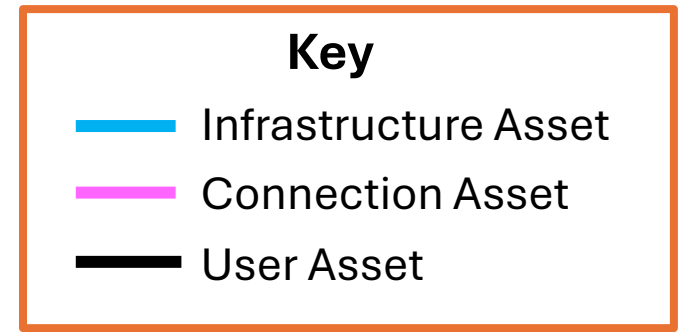
DNO 1

DNO 1

Grid Park Partially Full Capacity – One Customer Contracted



Grid Park Partially Full Capacity – One Customer Connected



400kV/ 275kV Busbar

*GIS 33kV Substation. An AIS would mean the 33kV 'bays' are classified as User Assets.

The single Grid Park User is not fully utilising the capacity of the Grid Park.

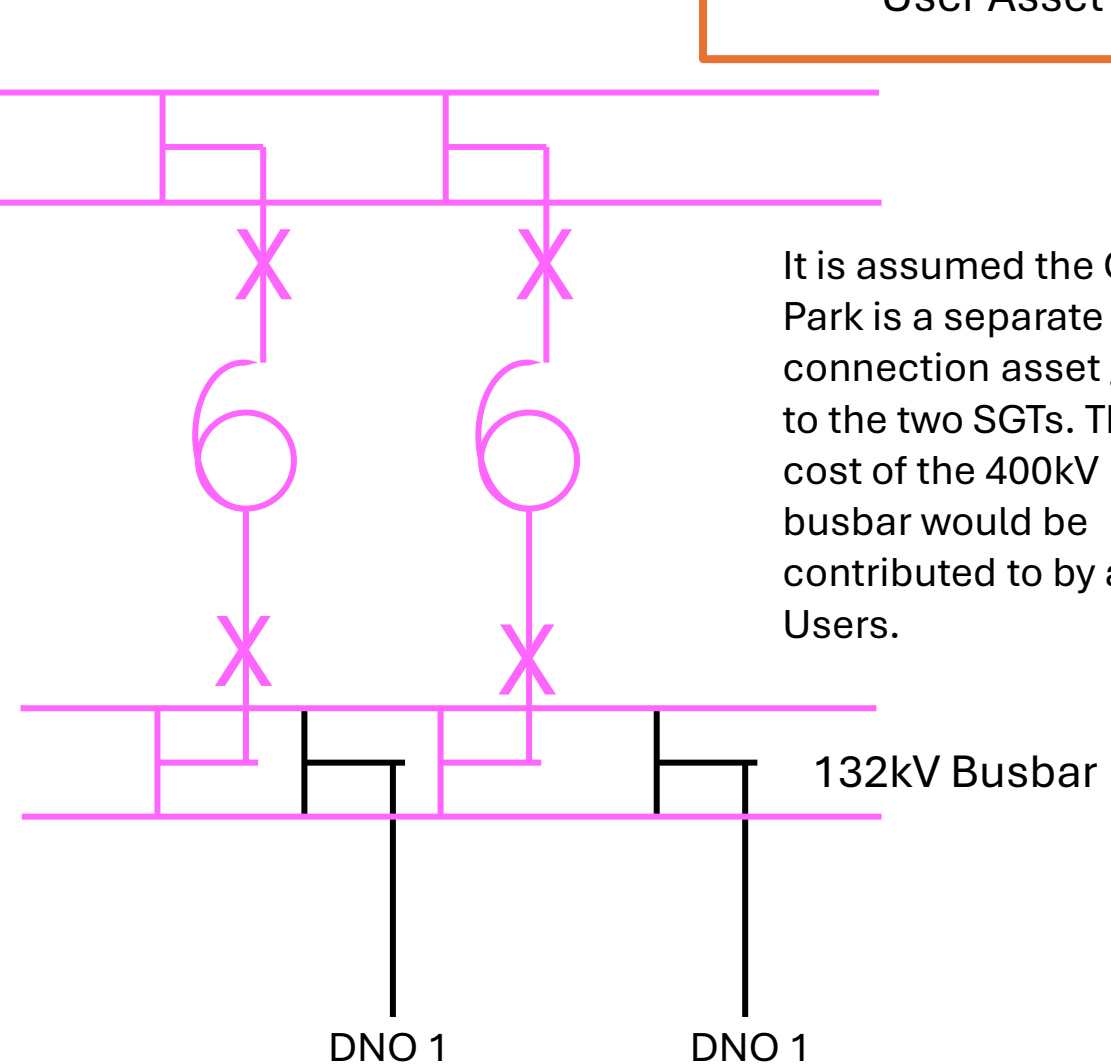
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33kV TO Busbar*

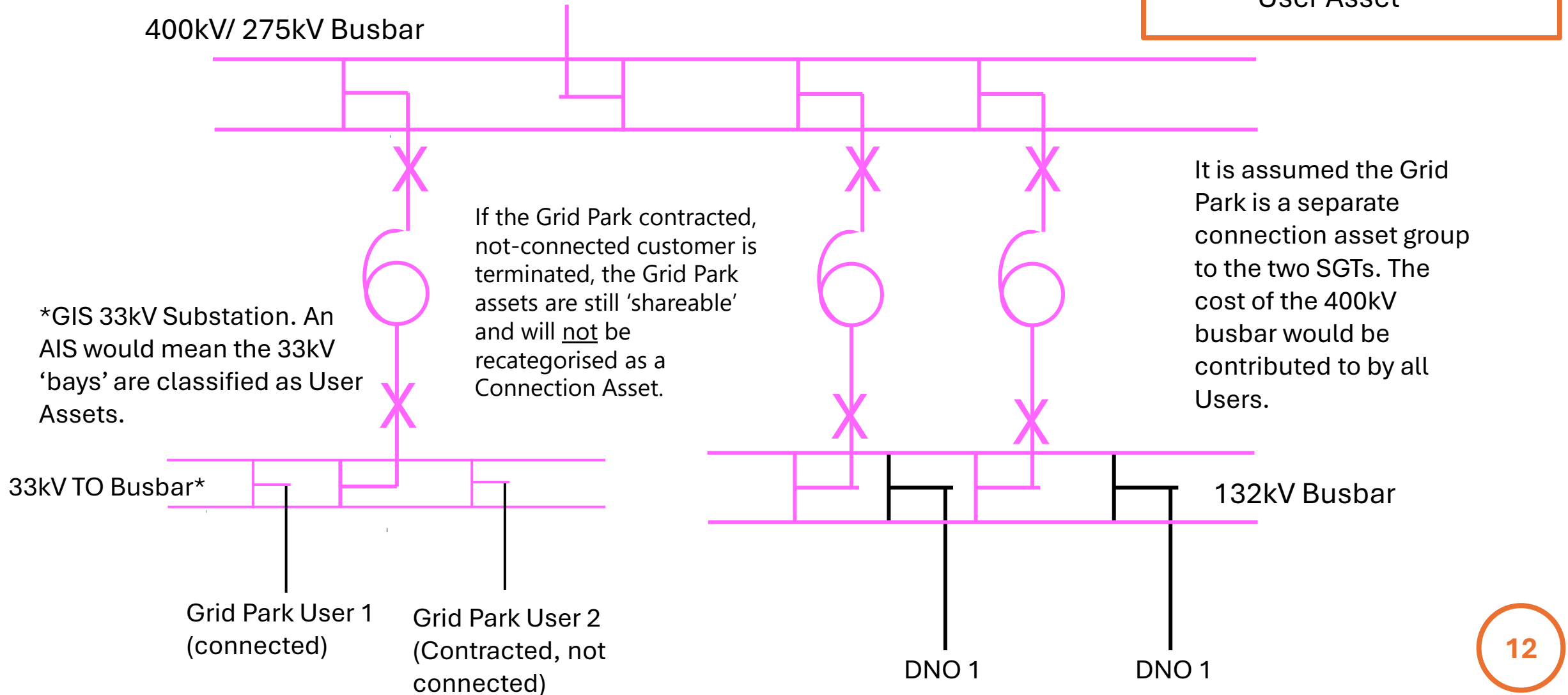
Grid Park User 1
(connected)

Free

Free



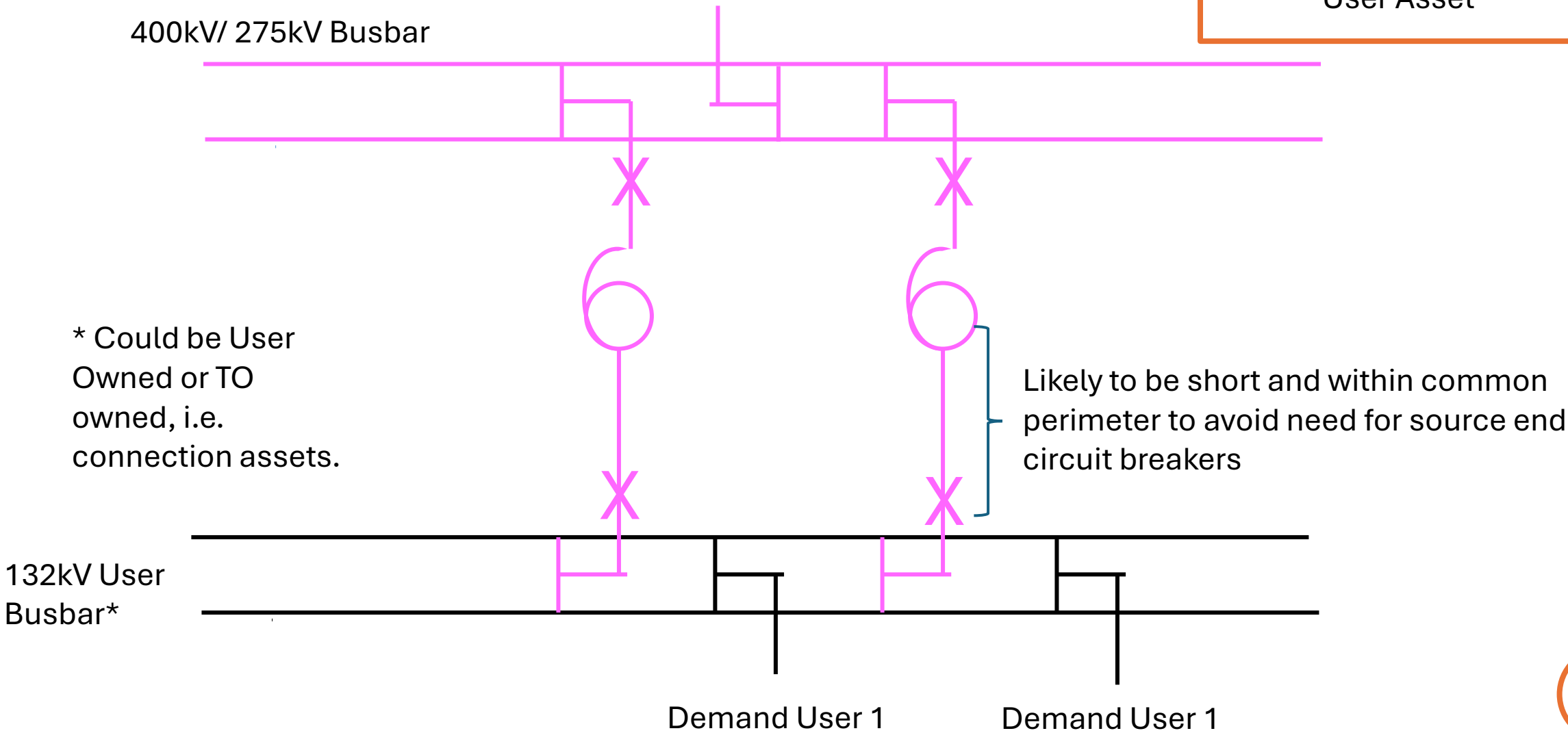
Multiple Grid Park Users



Single Directly Connected Final Demand User Common Location

Key

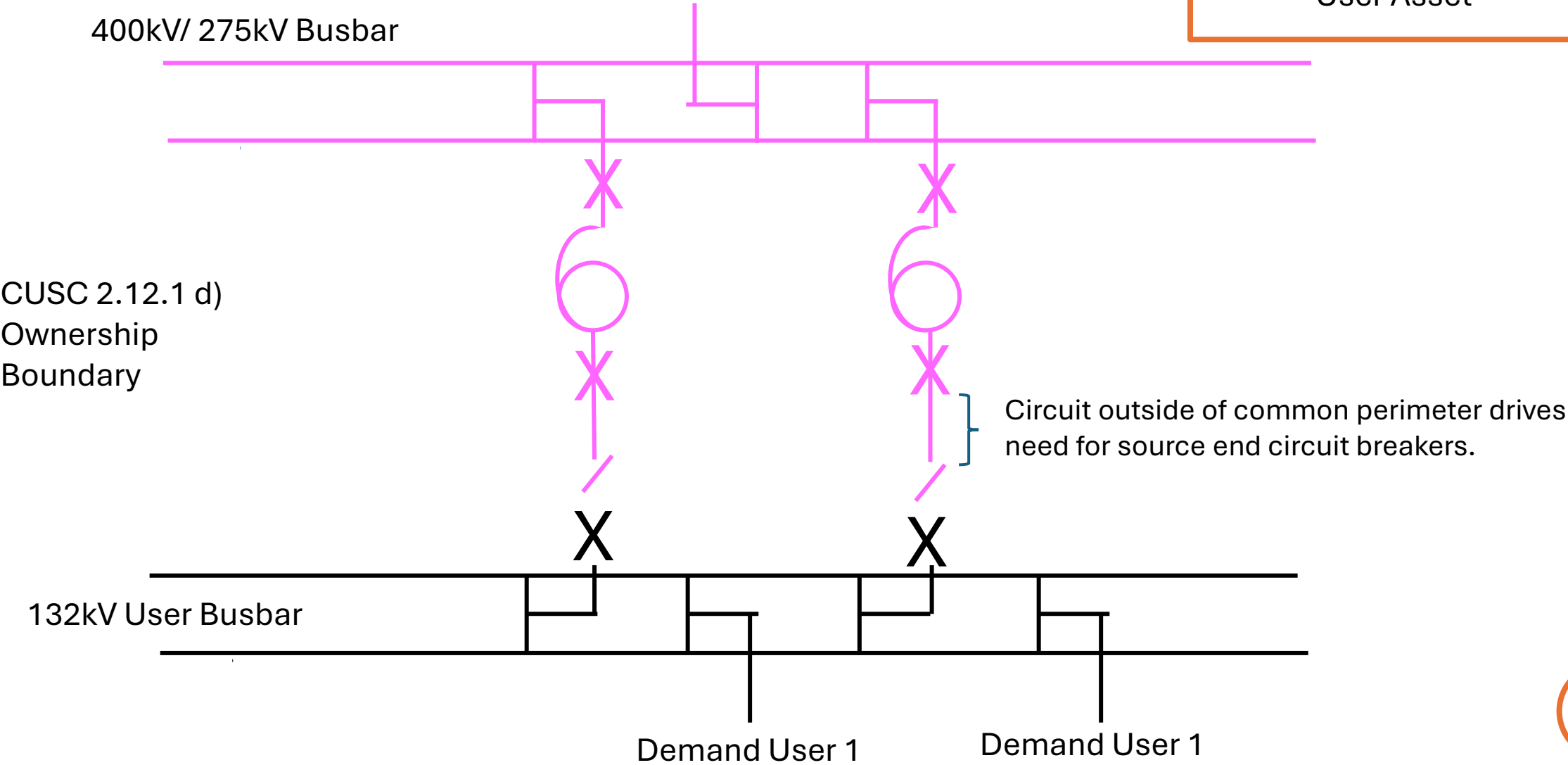
- Infrastructure Asset
- Connection Asset
- User Asset



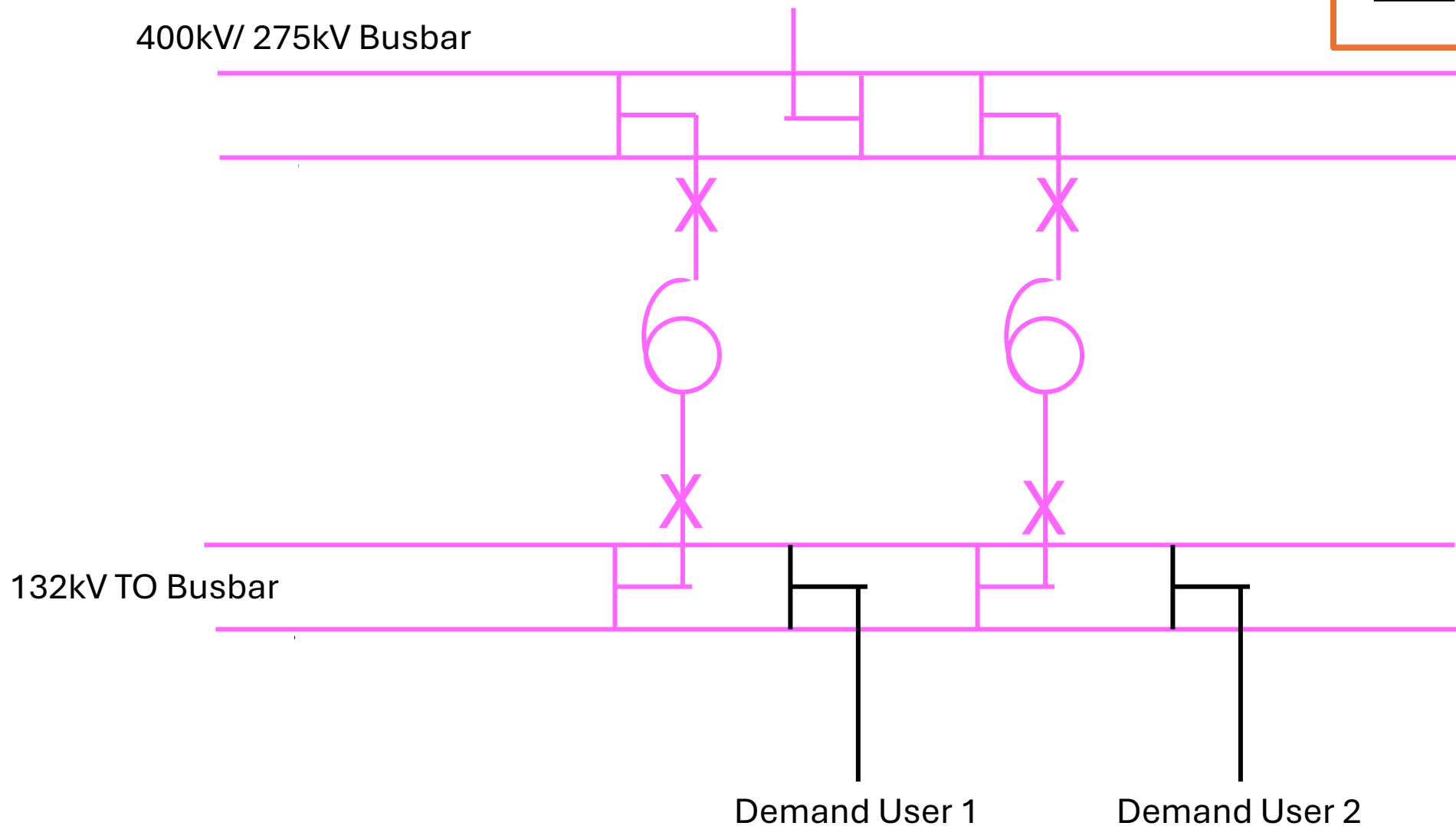
Single Directly Connected Final Demand User Remote Location

Key

- Infrastructure Asset
- Connection Asset
- User Asset



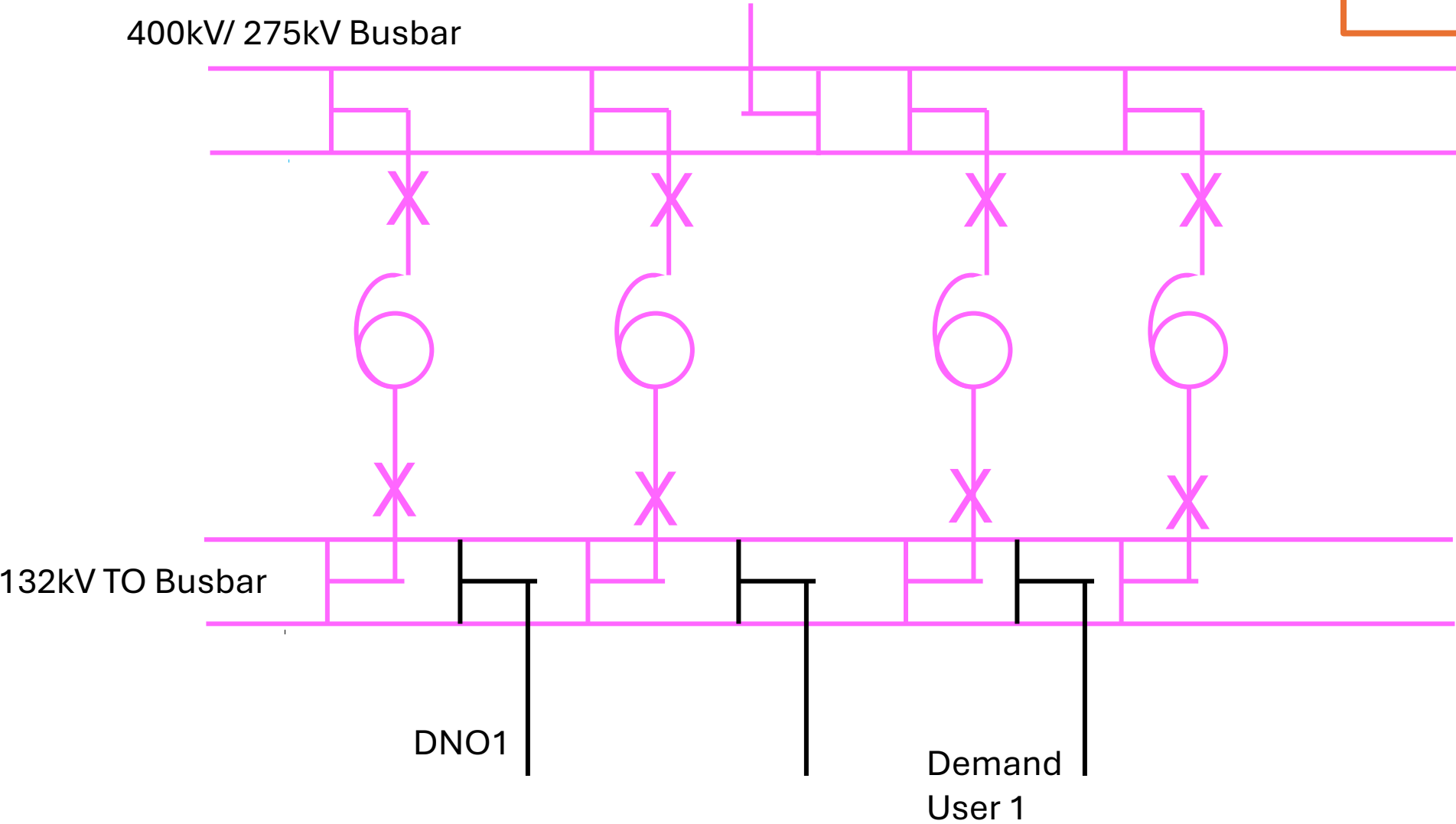
Multiple Directly Connected Final Demand Users Common Location



DNO and Directly (Transmission) Connected Final Demand User with a Shared 132kV Substation

Key

- Infrastructure Asset
- Connection Asset
- User Asset



DNO and Directly (Transmission) Connected Final Demand User with separate 132kV Substations

