Transmission Connection Charges Principles

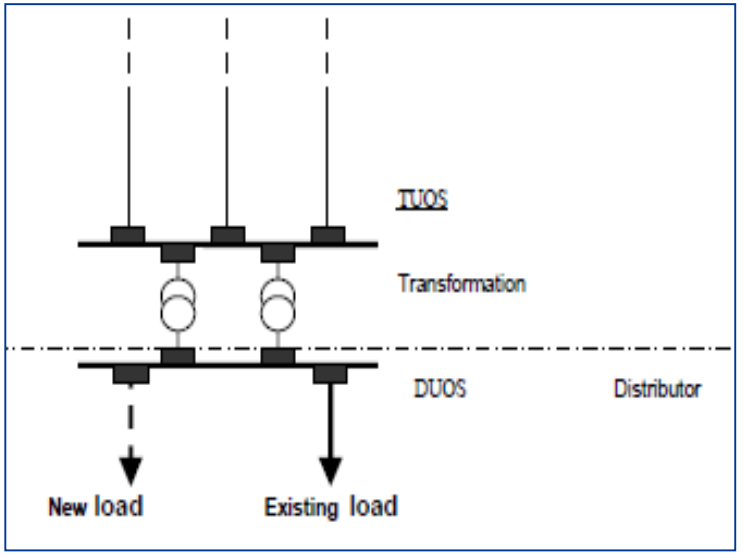
Date: 02 June 2016

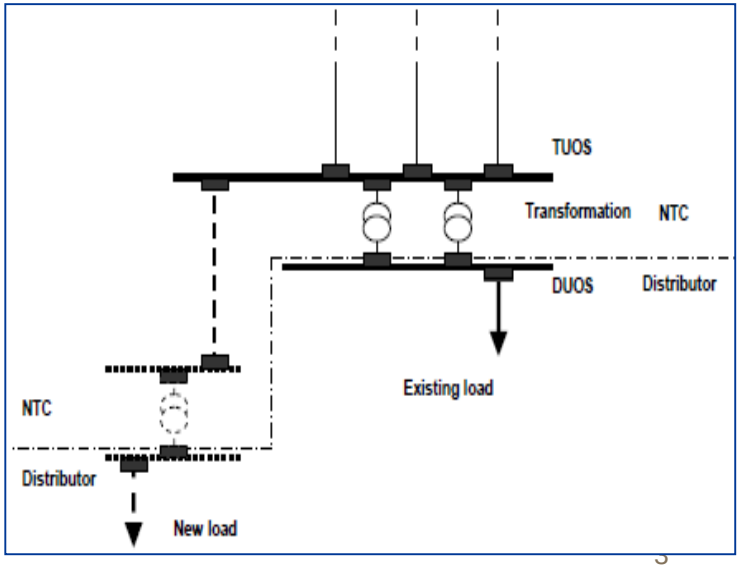
Presentation outline

- Background
- Connection and use of system assets boundary
- Connection charges principles
- Allocation rules for connection charges
- Examples

Background

- In the earlier versions of the Grid Code:
  - Connection charge are either customer-specific or for a group;
  - Proration was allowed for a group; and
  - Rebates/ refund are also allowed.
- In 2007, the Nersa Guidelines on Transmission Connection Charges introduced:
  - Standard and premium connection charges allocation rules; and
  - The concept of Transformation charges.
- The 2013 GCAC workgroup and DoE introduced the following:
  - No windfall profits; and
  - There should be no free-riders.
- Nersa approved the connection charges rules in March 2014.

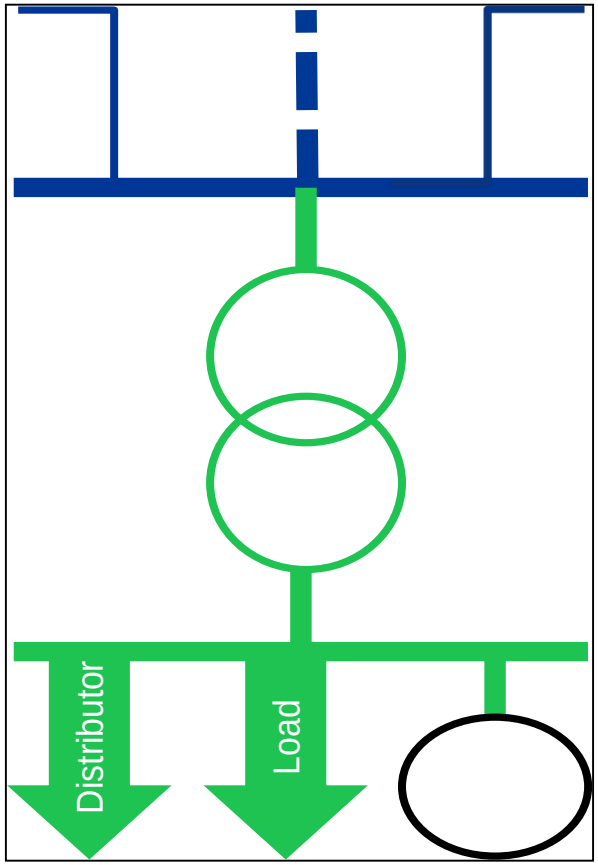


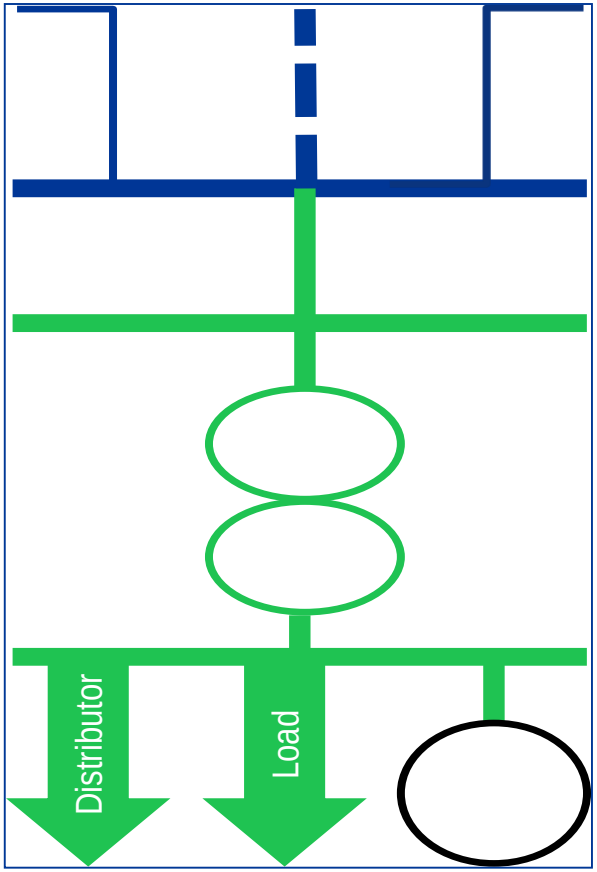


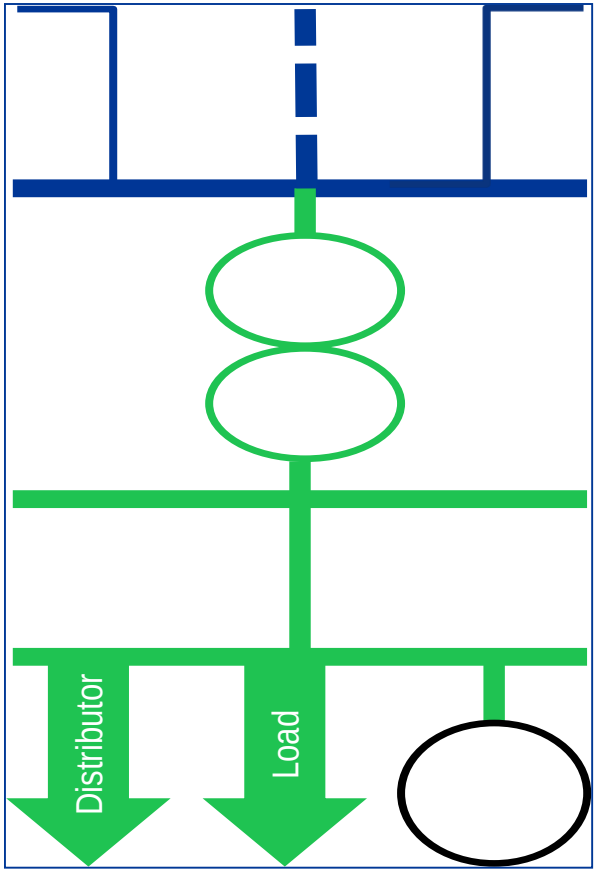
TUoS and connection assets boundary

The first step in setting connection charges is to define a boundary between connection and transmission system infrastructure assets.

- Tx Assets = Use of System Assets (Deep) + Connection Assets (Dedicated)
- Tx Costs = Use of System charges + Connection Charges
- Connection Assets = generally for the unique benefit of a specific customer or specific group of customers







Principles for connection charges as set out in the code

The connection charging methodology shall ensure that:

- The TNSP **recovers** the costs involved in providing the assets which afford the customer a connection to the TS;
- The connection charges **encourage users to share** connection sites, as this promotes efficiencies in the provision of assets and other costs which can be realised and shared between users;
- The TNSP **does not discriminate** between any users connecting onto the TS

The connection charging solution for shared assets shall:

- Ensure **equitable** treatment between all connecting customers.
- Ensure that **no windfall profits** for customers.
- Ensure that there are **no free-riders**.
- **Facilitate competition** in the electricity supply industry.
- Should as far as possible **avoid creating barriers to entry**.

Types of connections

- **Standard Connections** are connections that **attract the minimum investment** that will meet the requirements as prescribed in the Grid Code. Minimum investment is based on a **least cost solution**.

- The strengthening and expansion of the existing grid to make available a standard connection does not form part of the connection assets and form part of the system assets.

- The strengthening and expansion costs are recovered through Transmission use of system (TUoS) charges. The customer therefore only pays for the connection assets.

- **Premium Connections** are connections where additional investments have to be made, **over and above that of Standard Connections**, at the request of the customer in order to meet specific quality or reliability criteria of the customer and where such investment cannot be justified in terms of the Grid Code.

- The cost of strengthening of the existing grid will be recovered as premium connection charges only to the extent that this cost exceeds the cost that would have been incurred for a standard connection.

Early termination guarantee (ETG)

- Where Eskom invests in deep asset to enable connection to the grid:
  - Strengthening and expansion costs are **not raised from customers** but an early termination guarantee is raised instead.
  - Early termination guarantee (ETG) is required to cover any actual costs not included in the connection charge in the event of early termination by the customer.
  - The early termination guarantee shall be not higher than 50% of the fair share of the strengthening and expansion costs and shall decrease by 1/10th (one tenth) per year, starting four (4) years after the date of connection.

Distributor connections

- Standard connection investments for the benefit of the distributor in general **and not for a specific customer or group of customers embedded within the distributor** shall form part of the rate base with the exception of feeder/line bays.

- **Premium connection investments** for the benefit of the distributor shall attract connection charges for all assets above the standard connection investment.

- Standard and premium connection investments for the benefit of a single customer or group of customers **embedded within the Distributor shall be regarded as dedicated investments** and shall attract a connection charge.

Allocation of connection costs for shared assets

- Where a number of customers jointly make use of connection assets, each user will be charged a proportion of the cost of the shared connection assets, calculated based on the ratio of the customer's maximum capacity to the installed capacity of the connection equipment (referred to as per MW share).

- For example, if the installed capacity is 100MW and the connection generator's Maximum Export Capacity is 25MW, then the generator would pay 25/100ths of the cost of the connection assets. The remainder is recovered through the rate base.

- Standard connection charges for connection assets that **will not be shared** will be recovered fully from the connection customer. For example, dedicated feeder bays.

- For new customers sharing the existing connection assets, the connection charges will be paid to the TNSP based on the principles described above.

Funding for connection assets

- Where funding has been approved and is available for the project:
  - Proration will be applied to connection assets.
- Where there are no funds available, or project funding has been approved for later years and the customer wants to bring forward the connection date, connection charges will be based on the following principles:
  - Connection charges for all standard connection assets will be funded fully by the customer.
  - In instances where a new customer makes use of connection assets that were fully funded by another customer due to unavailability of funds, the customer will pay a **pro-rata share** of the costs of the shared connection assets.
  - However this payment will be made to the TNSP and not refunded to the initial customer.

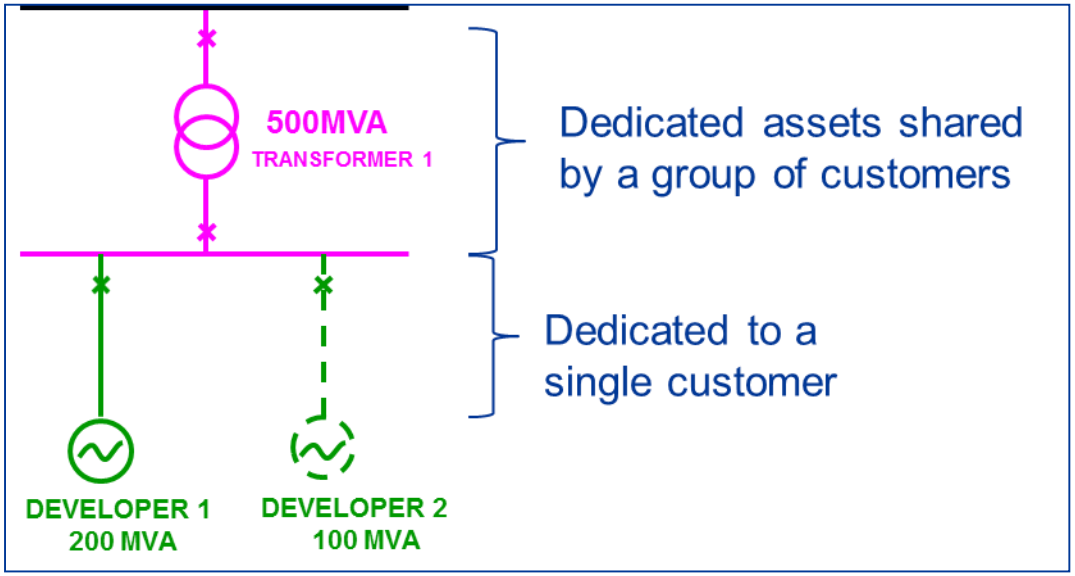
Examples of typical connections

These examples are not exhaustive and are intended as a guide only.

They cover the principles that will apply to typical connections.

The examples shown here do not account for all connections.

Example 1: Allocation of connection costs for shared connection assets



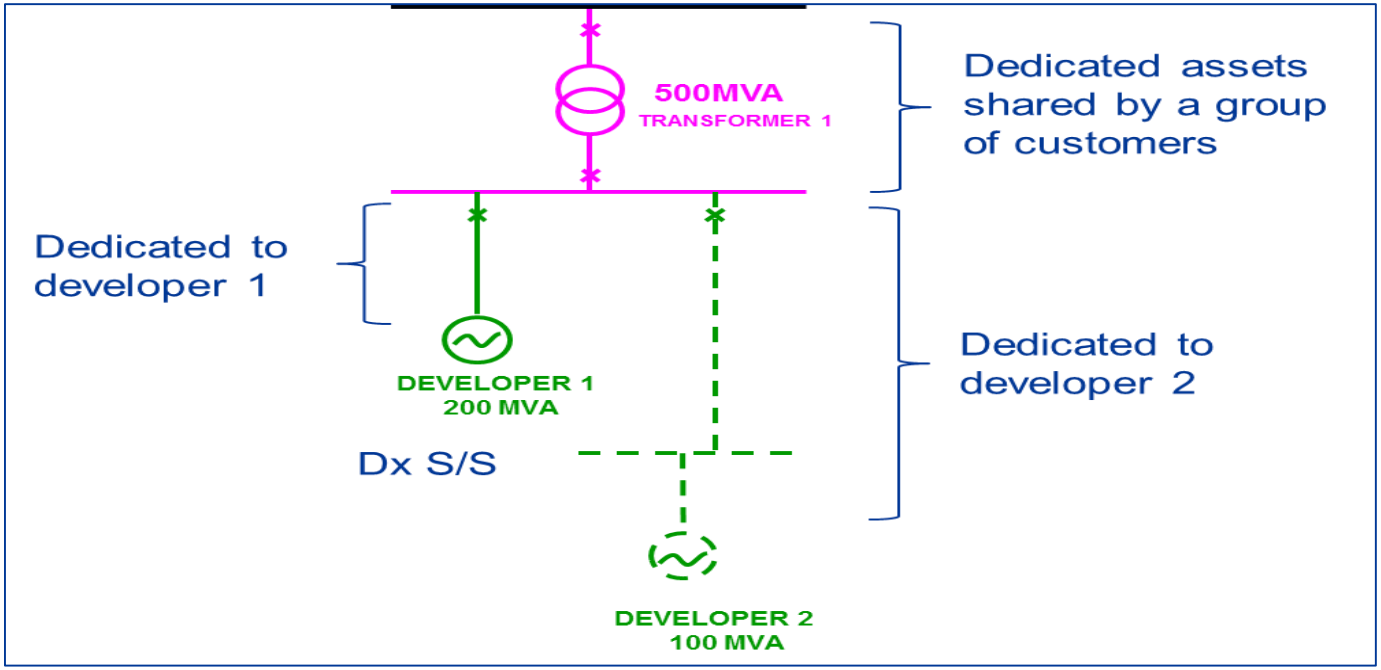
A new customer connects to the system, the network provider installs a bigger transformer than the customer requires for the benefit of future customers.

- The initial customer (Developer1) will pay:
  - full costs for the assets dedicated solely for their use, e.g. the feeder bay, plus
  - a pro-rata share of the costs of the shared dedicated assets, in this case the transformer.
- The subsequent customers will pay full costs for the assets dedicated solely for their use, e.g. the feeder bay, plus a pro-rata share of the shared dedicated assets

Example 1: Allocation of connection costs for shared connection assets

- **This connection solution achieves the following criteria as set out in the code:**
- **Ensures equitable treatment between all connecting customers.**
- Developer 1 and 2 are connecting to the same part of the network and share connection assets. To ensure equitable treatment, they are charged an amount that is representative of their usage of the connection assets.
- **Facilitates competition in the electricity supply industry.**
- By charging developer 2 in the same manner as developer1, equal access to the grid is provided and a level playing field is created. This in turn facilitates competition.
- **Avoid creating barriers to entry**
- If developer 1 had to meet all the costs of the connection assets that are intended for sharing in addition to their own costs, a barrier to entry is created due to the high cost imposed. This has been avoided by pro-rating the cost of the said assets.
- **Ensure that there are no free riders**
- If developer 1 had to meet all the costs of the connection assets that are intended for sharing in addition to their own costs, and developer 2 not contribute to the costs of the shared assets, developer 2 would be a free rider. Pro rating of the costs of the shared assets avoided this problem.

Example 2: Distribution embedded customer



The customer (developer 2) applies for a connection to the Distribution network. The capacity of an existing transmission substation is required to enable the connection. There are no new assets needed to increase capacity at the Transmission substation for this customer.

- Developer 2 will pay:
  - The connection charge for the distribution portion of the project,
  - A proportion of the costs of the assets at the transmission substation.

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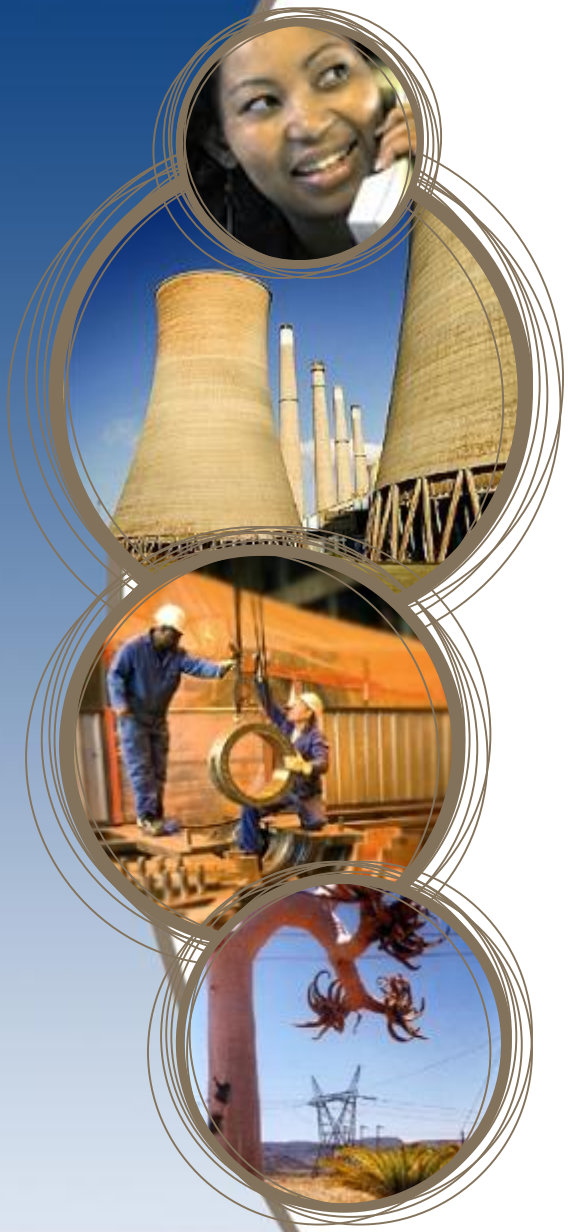

Thank you

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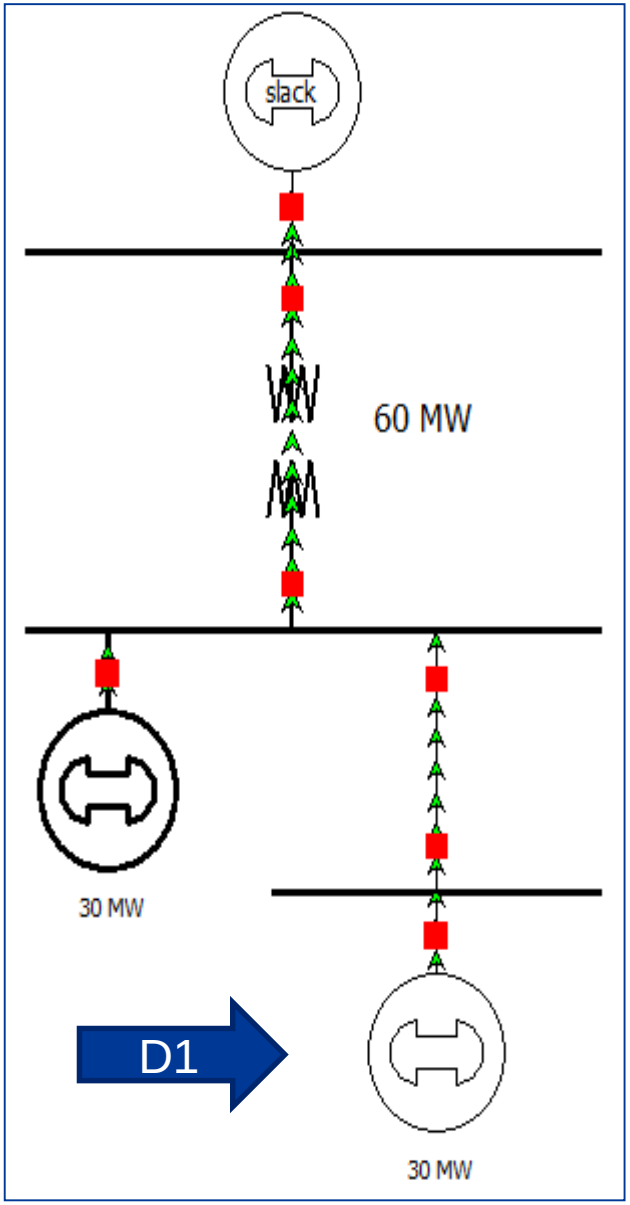
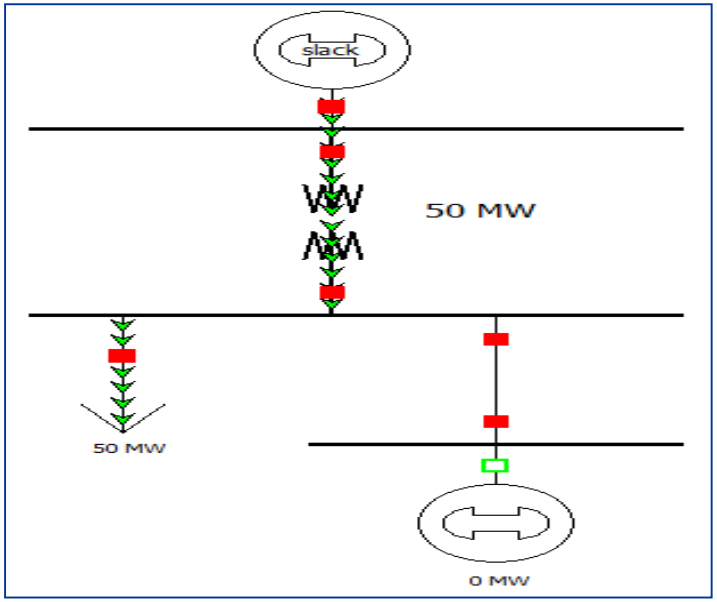
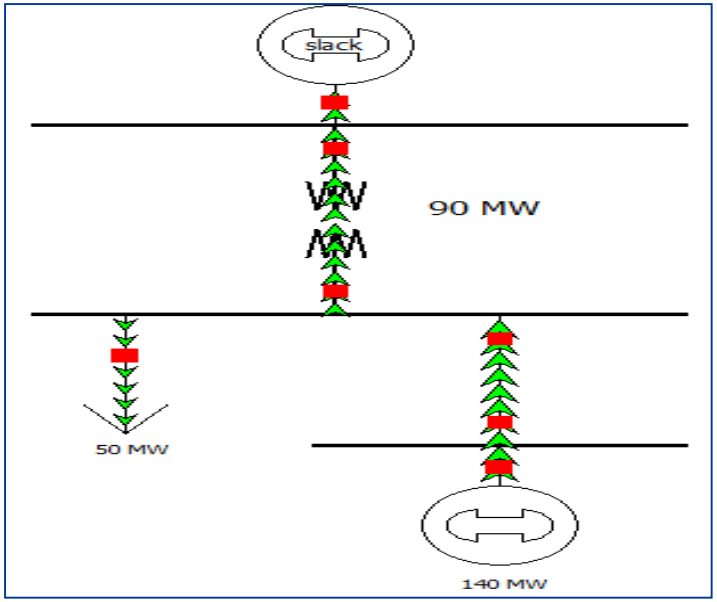
Connection charges principles



- D1 builds/funds a substation and HV line.
- D1 faces a steep **barrier to market entry** by funding the connection assets if D2 does. **This does not ensure equitable treatment between all connecting customers.**
- A **free rider problem** is created if D2 does not contribute to the assets provided by D1. Furthermore D2 does not face all **locational signals**.
- D2 may be required to make a part contribution towards the connection assets.
- Refunding D1 one results in **windfall profits** since all costs are covered in the bidding tariff.
- These challenges are addressed by spreading the cost of connection (for approved projects) to all connection customers on a per MW basis.
- Subsequent connecting customer pay a connection charge refund to the TNSP's regulatory clearing account.

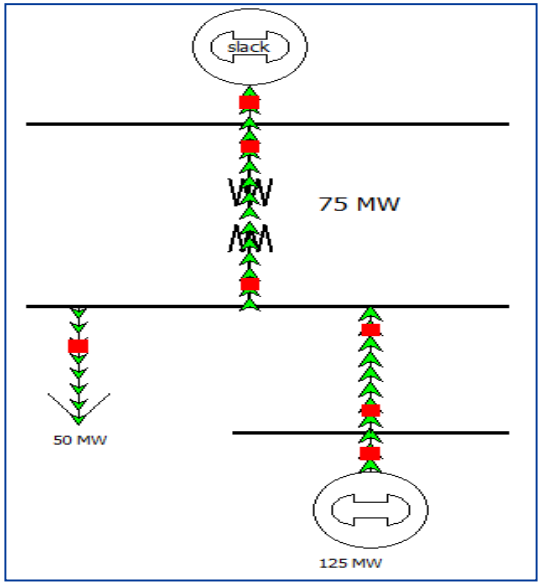
Contribution towards existing assets

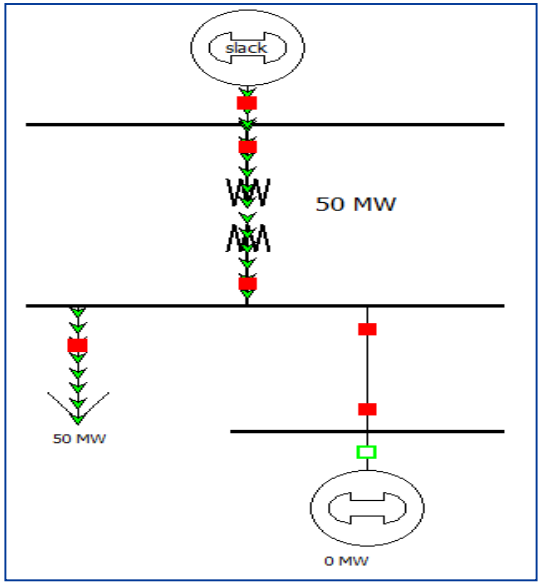




- A generators applies to connect to an existing substation.
- Existing could be year =1 to N
- The substation (connection assets) has been funded by either:
  - A load customer, or
  - Rate base if the load is a distributor, in other words, funded by the NTC.
- No free-riders, equitable treatment between all connecting customers, and preservation of locational signals - requires
  - that the generator contributes to the existing substation (connection assets)
- The generator will pay for the existing assets as if they were new, because these assets are provided for the lifetime of the connection agreement i.e. the benefits that the new customer gets are no different whether or not the assets are new.

Contribution towards existing assets





- An intermittent plant (e.g. CSP or wind) apply to connect at the MTS as shown.
  - On the left MEC > load
  - On the right MEC < load
- There are instances (shown on the left by the intermittency of generation and on the right by the variability of load) where the transformation is required to transfer MEC or supply load.
- To ensure that the NTC does not discriminate between customers connecting, under these kinds of scenarios, both generators and load should be charged for transformer usage.