

Wheeling of energy- enabling mechanism's in the current environment



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This article explores wheeling and discusses the framework used by Eskom to enable wheeling.

1. Introduction

Wheeling of energy occurs when a non-utility owned generator sells the energy it produces directly to a third party consumer and not to the utility. There is no physical network connection between the buyer and the seller, so electrical energy is not directly transmitted between the two parties.

For various reasons, such as the potential in future for energy conservation penalties, security of supply, wanting green accreditation, enabling growth in the current capacity situation, it has become attractive for consumers to want to build own generation or procure energy from private generators. In cases where the generator is not located on the same site as the consumer, this would require the wheeling of energy between the generator and the buyer/consumer of the energy.

The decision whether a generator may wheel energy for own use or third party sales, is related to licensing and is not a decision that a network provider may or should make.

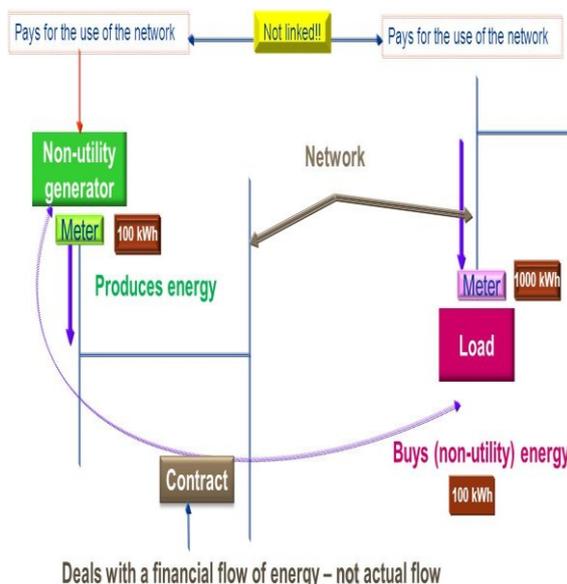
This article explores wheeling and the Eskom framework being used to facilitate wheeling.

It is to be noted that the National Energy Regulator of South Africa (NERSA) is currently developing a national framework on use-of-system charges and its possible that the approach set out in this document may change, depending on NERSA's decision in this regard.

2. How does wheeling work?

Wheeling is providing access between a private generator and a third party to facilitate the bi-lateral trade of energy between the parties.

Wheeling is about dealing with the financial flow of energy – not the electrical flow. Wheeling transactions must consider the use-of-system charges associated with the export of energy onto the network by a generator, the use-of-system charges for the delivery of energy to the buyer of the energy and how the deduction of the wheeled energy is done on the buyer's electricity bill.



3. Does Eskom allow wheeling?

Eskom allows wheeling based on the principle of non-discriminatory access to the grid, but this permission is subject to the following conditions:

- The generator must have obtained a licence from NERSA including an approval for the wheeling transaction.
- The generator must have complied with Eskom's requirements for the grid connection and have signed a connection and use-of-system agreement. All generators that synchronise with the grid are required to apply for a grid connection and sign a connection and use-of-system agreement – as is required by the SA Grid Code and the Distribution Code.
- Either the buyer or the seller must be an Eskom customer. Eskom will not need to be involved where there is wheeling between a generator and buyer situated within one or between two municipal networks.
- Where one of the parties are located within a municipal network, the municipality would have to agree to allow the wheeling transaction as this would mean an adjustment of the municipal bill by Eskom to deal with the wheeling transaction.

4. Charge payable for wheeling

There are no “wheeling charges” as such. All generators and loads, whether wheeling or not, are required to pay the NERSA approved standard tariff use-of-system related charges.

There is, however, often confusion around what must be paid by either party when there is a wheeling transaction and this confusion stems from trying to directly link the generator and the buyer, for example, “the generator is reducing demand and losses on the network and therefore there should be some special deal for the buyer because of wheeling.”

In order to avoid complexity and to ensure that all users of the network pay fair and equitable charges for the use of the network, Eskom has adopted an approach where all customers, whether wheeling or not, pay the NERSA approved standard use-of-system related tariff charges. Regarding the use of the network, Eskom also does not link the generator and the consumer, but treats them independently from any wheeling transactions.

What does this mean? Well simply put, a generator, whether Eskom owned, selling to Eskom or selling to a third party will pay equitable generator related use-of-system charges based on each generator's location and capacity. So if a generator is in a location where there are high losses, the generator receives the benefit of reducing the losses and

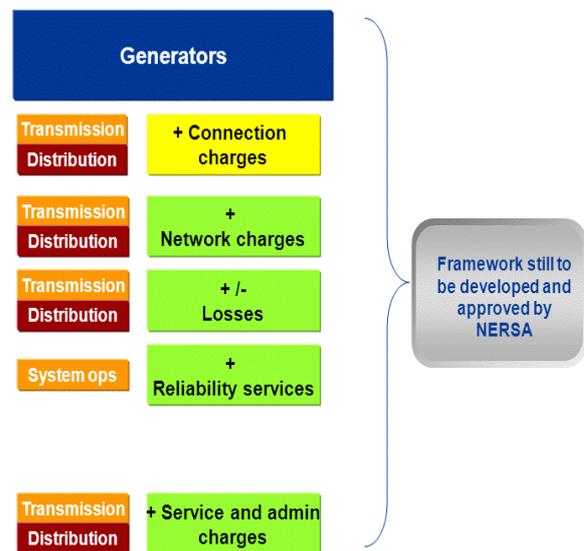
this benefit should be built into the generator's own costs and selling price.

The buyer or load will also pay use-of-system charges based on its use of the network. The charges payable are also not linked to any purchasing arrangement, so whether purchasing energy from Eskom or a private generator, the charges payable for the use of the network will be the same. Unless the generator is located on site, a wheeling transaction does not reduce the buyer's network cost i.e. the network and its capacity exists to deliver the customer's demand irrespective from whom the energy is bought.

Therefore all generators, whether wheeling or not, will be required to pay NERSA approved use-of-system charges and service and administration charges.

- The charges payable by the buyer or consumer are the current published standard tariff rates for loads.
- The charges payable by the generator will be the published standard tariff rates for generators, but these charges are not yet approved as the framework for generator use-of-system charges is currently under development by NERSA.

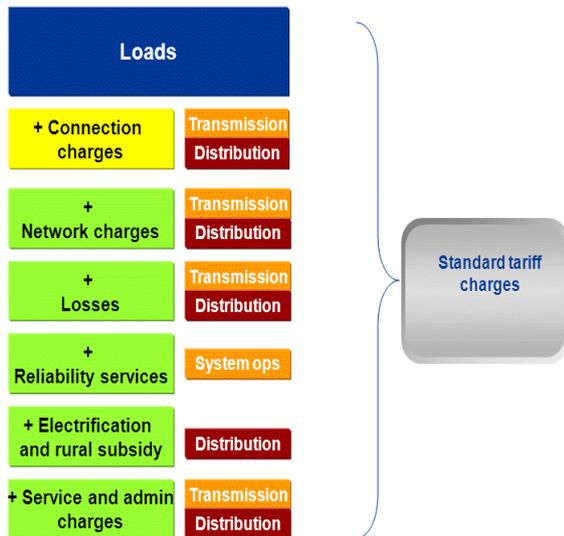
All customers, whether wheeling or not, will be required to pay NERSA approved use-of-system charges. The charges for generators would be (subject to NERSA's framework):



The charges payable by loads are:

- Although the generator provides the electrical energy, the network is still being used to deliver the energy to the buyer and therefore a wheeling arrangement does not directly reduce the capacity required on the network.

- The buyer receiving the wheeled energy will pay the same tariff charges for the use of the network as a customer that purchases all its energy from Eskom.
- All energy is supplied through the Eskom meter and the energy costs associated with the wheeled energy is deducted on the bill for the non-Eskom supplied energy.
- The charges payable for the use of the network are:

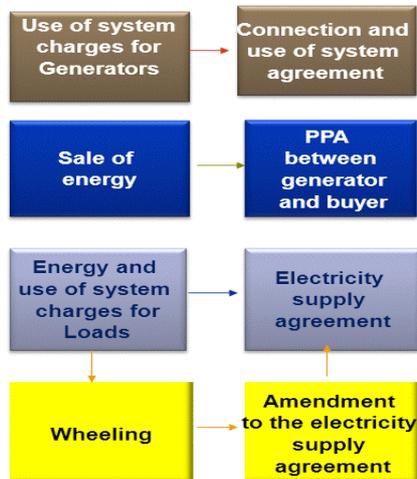


It is to be noted that the contribution to subsidies is not avoided by a wheeling arrangement.

The above charges will be the regulated NERSA approved published charges payable for the use of the network. There are no additional charges for wheeling of energy.

5. The various transactions involved in a bilateral trade

The following diagram shows the various transactions and the required contracts involved when there is a bi-lateral trade.



Even though all the energy will be delivered to the buyer over the Eskom network, the electricity account has to be adjusted by the amount of energy bought from the generator.

This means that the electricity supply agreement will have to be amended to deal with the bilateral trade and this amendment will set out the conditions and how the reconciliation of energy takes place for the wheeled energy.

6. How the reconciliation of energy is done for a wheeling transaction

- 1) The energy produced by the generator is measured at the generators' point of connection on a time of use basis. The generator allocates through its connection and use-of-system agreement the names of buyer(s) of the energy and the amount of energy to be allocated.
- 2) The buyer of the energy will have to sign the amendment agreement to the supply agreement.
- 3) The amount of energy allocated by the generator is shown as an adjustment on the customer's bill. This adjustment is on a consolidated monthly time-of-use basis at the Megaflex (Eskom most unbundled tariff) time-of-use energy rates, but excludes losses and reliability service charges.
- 4) Losses and reliability service charges are excluded as these are use-of-system charges. The impact on network losses associated with the Generator is not linked for adjustments made to the buyer's bill as it is associated with the generator and not the buyer of non-Eskom energy.

Eskom will supply the Eskom customer any energy not provided by the Generator, in terms of the supply agreement signed with Eskom.

In future there may be a balancing mechanism introduced to ensure effective and fair day-ahead scheduling by all generators by the System Operator.

7. The buyer of energy will pay:

- The cost of the energy contracted to be supplied by Eskom at standard tariff rates.
- The cost of providing reliability services for the total energy delivered over the Eskom network and as supplied by the generator and by Eskom. Reliability service charges recover the cost of providing ancillary services by the System Operator and this

cost is payable by all users of the network – generators and consumers alike.

- The Electrification and Rural Subsidy (ERS) on all energy delivered over the Eskom network as a wheeling transaction does not avoid the contribution to subsidies.
- Network charges on all energy delivered to over the Eskom network based on the customer's full utilised capacity and maximum demand as the wheeling arrangement does not reduce the capacity required on the network. There is no "special deal" for wheeled energy. These network charges are:
 - Transmission network charge and Distribution network access charge on highest of NMD or maximum demand for energy transmitted over the Eskom network.
 - Network demand charge on monthly demand on peak and standard periods.
- The cost of losses for all energy delivered over the Eskom network i.e. the total energy delivered charged using the standard tariff loss factors (as the financial credit is given at the energy rate at excluding losses) at the TOU rates applicable to the voltage of the supply and the transmission zone.
 - Technical losses are a network related costs
 - The buyer will pay for losses at the published loss factors for all the energy delivered.
 - Eskom will not calculate the actual cost of losses from the generator to the consumer. Firstly because there is usually not actual flow between the parties and therefore it's not possible to measure and secondly it's impractical and would require unique loss factors for each transaction and this in turn would require NERSA approval. So instead, all users of the network pay equitable amounts for losses at the standard published tariff loss factors are used, irrespective of whether they buy energy from Eskom or not.
 - The benefit or cost of losses due to the generator (as applicable) will accrue to the generator – not the load.
- Service and administration charges based on the size of supply of the consumer.

- Reactive energy charges on all energy delivered.
- Note that the environmental levy charge is not a use-of-system charge and this charge is payable to Eskom based only Eskom owned energy and not on the wheeled energy. Any payment by the generator to SARS is between the generator and SARS.

In summary the buyer purchasing energy from a non-Eskom generator will not be treated differently from a load purchasing energy from Eskom, except for the adjustment for energy purchased from the generator.

8. Purchasing/trade of energy:

- Eskom is not involved in the trading agreement between the parties.
- Eskom will need, however, need to be informed of the parties involved and will need to ensure that the consumer has entered into an agreement that deals with the conditions of the settlement before a wheeling arrangement is allowed.

9. Conclusion

Wheeling encourages private generation in situations where the energy is not able to be bought by Eskom acting as the Single Buyer. Encouraging wheeling has an overall benefit to South Africa, but this needs to be done within accepted rules and in a framework that protects the whole integrated power system.

The Eskom method is simple to apply, uses the standard tariff loss factors and there are no "special" rates applicable – all users will pay the standard tariffs the same as any other customer.

About the author:

Shirley Salvoldi has worked for Eskom for 30 years. She currently responsible for tariff design and electricity pricing policies at Eskom

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