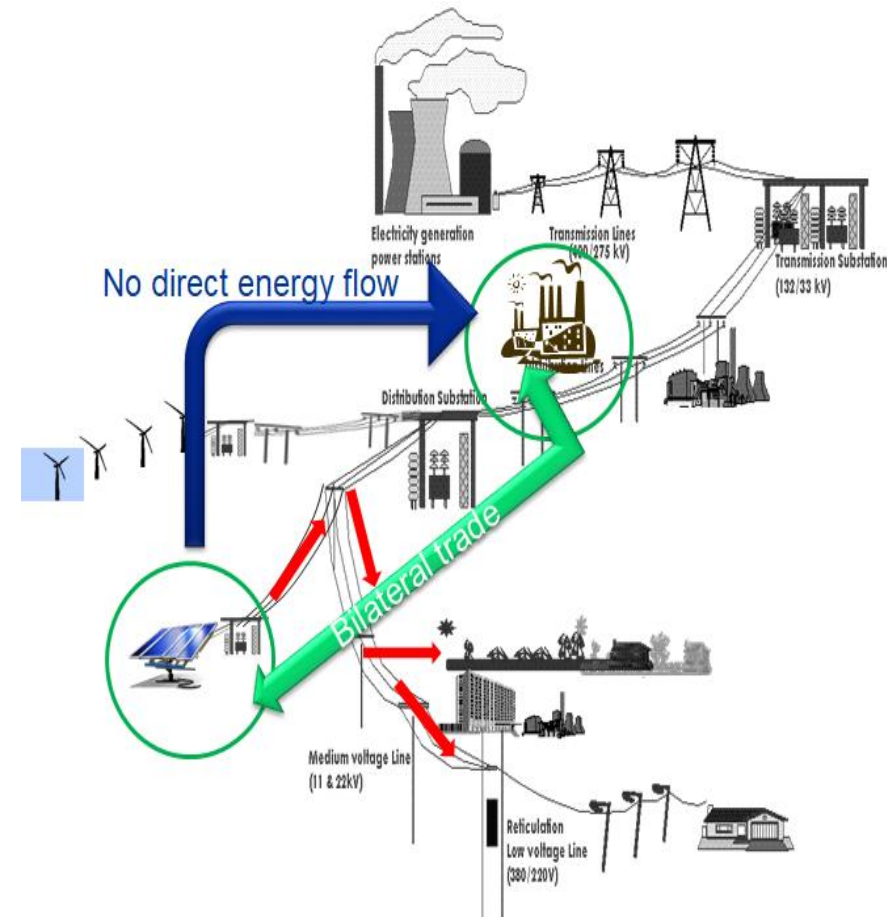
A decorative graphic on the left side of the slide, consisting of three overlapping circles. The top circle shows a close-up of a wind turbine's blades. The middle circle shows a solar panel array. The bottom circle shows a red, abstract sculpture in the foreground with a power line and tower in the background.

Use-of-system charges Wheeling of energy Offset (net-billing) of energy Banking of excess energy

July 2021

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- All customers (Transmission and Distribution) are provided non-discriminatory access under the following:
 - Standard tariff charges applicable to loads and generators
 - Facilitation of the reconciliation of energy exported onto the grid due to wheeling, offset (net-billing) and banking of energy
 - Policies and tariffs that accommodate the above.
 - Wheeling is happening in SA and Eskom has had an approved policy since 2009



- Use-of-system charges are also referred to as wheeling charges
- All energy delivered to a customer is wheeled over a network and these charges related to grid usage are not avoided when energy is not supplied by Eskom
- These charges are payable equally by all customers, whether supplied by Eskom or by a third party
- Generators pay use of system for energy exported onto the grid (Gen DUoS tariffs) and these are currently under review
- Loads pay use of system charges for energy consumed from the grid (standard load tariffs)
- Only energy not supplied by Eskom is credited on a customer's account as wheeled energy – there is no credit for use-of-system related charges

- Use-of-system charges are tariff structures and rates that recover the costs associated with the delivery of energy and making capacity available on an electricity network.
- These are payable by generators and loads
- In addition connection charges are raised and are recovered upfront for costs not recovered through use-of-system charges.

Use-of-system tariffs and charges



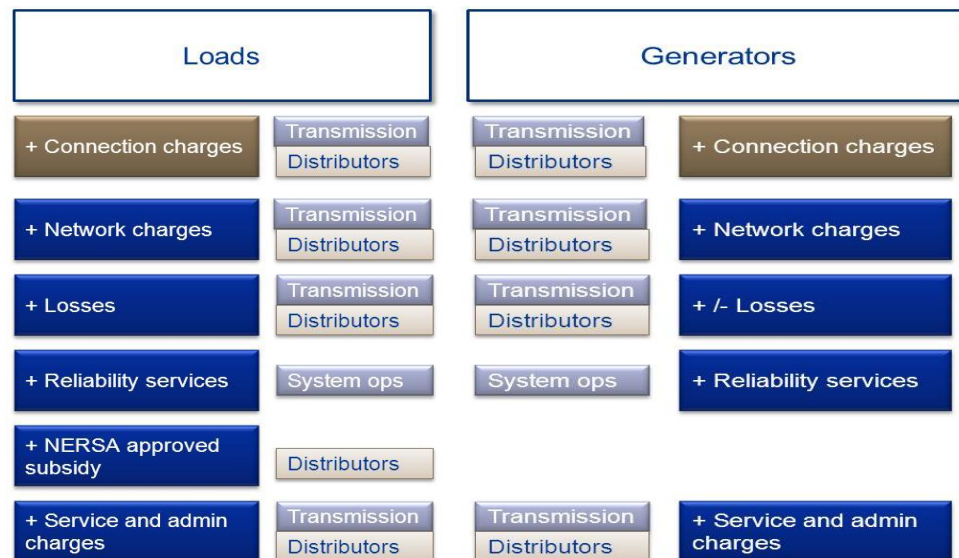
Loads

- Standard tariff TUoS, DUoS and ETUoS network charges are based on voltage and urban/rural differentiation and tariff
- Ancillary service charge
- Losses
- Contribution to subsidies
- Service and administration

Generators (Gen-DUoS and Gen-TUoS)

- Use-of-system network charges for generators are currently raised only for high-voltage ($\geq 22\text{kV}$) connections.
 - A network losses charge (positive or negative) based on the approved loss factors, the amount of energy produced on a TOU basis and the wholesale energy rate (also under review)
 - There is currently no Gen-DUoS network charges for generators connected at 22 kV or less (this is currently under review)
- An ancillary service charge (same charge as for loads)
- An administration charge (same charge as for loads) based on MEC (maximum export capacity)
- A service charge, if applicable (same charge as for loads) based on MEC

- Use-of-system charges are tariff structures and rates that recover the costs associated with the delivery of energy and making capacity available on an electricity network.
- These are payable by generators and loads
- In addition connection charges are raised and are recovered upfront for costs not recovered through use-of-system charges.



Tariffs for use-of-system charges only

Tariff name	Tariff rate components structure
Gen-DUOS urban	Service charge + admin charge + DUOS network charge for generators +/- losses charges + Ancillary service charge
Gen-DUOS rural	Service charge + admin charge + DUOS network charge for generators +/- losses charges + Ancillary service charge
Gen-TUOS	Service charge + admin charge + TUoS network charge for generators +/- losses charges + Ancillary service charge

For loads, the use of system charges are the network related charges contained in each tariff

Gen-DUoS TUoS (extract from 2021/22 schedule of standard prices)

38. Gen-DUoS urban

A use of system tariff for Urban, Distribution connected generator customers with the following charges:

1. the R/kWh/month **Distribution network capacity charge** (generators) based on the voltage of the supply and the **maximum export capacity** measured at the POD applicable during all time periods; less
2. a **distribution losses charge** based on **loss factors**, which shall rebate the **network capacity charge**, but not beyond extinction;
3. a c/kWh **ancillary service charge** applied on the total active energy produced in the month based on the voltage of the supply applicable during all time periods ;
4. a R/account/day **service charge** based on the **monthly maximum exported capacity** of all points of supply/points of delivery linked to an account;
5. a R/day **administration charge** based on the **monthly maximum exported capacity** of each POD/point of supply/service agreement linked to an account; and
6. additional charges in the event of an **MEC** exceedance in accordance with the **NMD** and **MEC** rules.

The structure is given in the table below:

Table 43: Gen DUoS Urban structure

Charge	Rate
DUoS network capacity charge	Table 37: DUoS network charge for Distribution connected generators (Energy in each TOU period x WEPS rate excluding losses in each TOU period x (Distribution loss factor x Transmission loss factor (for loads) - 1), not beyond extinction
Losses charge	Refer to WEPS energy rate excluding losses in paragraph 11, Paragraph 35 and paragraphs 25.1 and 25.2
Ancillary service charge	Table 32: Ancillary service charge for Distribution connected generators and loads (Urban)
Service charge	Table 38: Urban Service and administration charges
Administration charge	Table 38: Urban Service and administration charges

39. Gen-DUoS rural

A use of system tariff for Rural, Distribution connected generator customers with the following charges:

1. a c/kWh **ancillary service charge** applied on the total active energy produced in the month based on the voltage of the supply applicable during all time periods;
2. a R/account/day **service charge** based on the **monthly maximum exported capacity** of all points of supply/points of delivery linked to an account;
3. a R/day **administration charge** based on the **monthly maximum exported capacity** of each POD/point of supply/service agreement linked to an account; and
4. additional charges in the event of an **MEC** exceedance in accordance with the **NMD** and **MEC** rules.

The structure is given in the table below:

Table 44: Gen DUoS rural structure

Charge	Rate
DUoS network capacity charge	NA
Losses charge	NA
Ancillary service charge	Table 32: Ancillary service charge for Distribution connected generators and loads (Rural)
Service charge	Table 39: Rural service and administration charges
Administration charge	Table 39: Rural service and administration charges

40. Gen-TUoS

A use of system tariff for Transmission connected generator customers with the following charges:

1. the R/kWh/month **Transmission network charge** (generators) based on the voltage of the supply and the **maximum export capacity** measured at the POD applicable during all time periods; less
2. a **Transmission losses charge** based on **loss factors** (may be positive or negative);
3. a c/kWh **ancillary service charge** applied on the total active energy produced in the month based on the voltage of the supply applicable during all time periods ;
4. a R/account/day **service charge** based on the **monthly maximum exported capacity** of all points of supply/points of delivery linked to an account;
5. a R/day **administration charge** based on the **monthly maximum exported capacity** of each POD/point of supply/service agreement linked to an account; and
6. additional charges in the event of an **MEC** exceedance in accordance with the **NMD** and **MEC** rules.

The structure is given in the table below:

Table 45: Gen TUoS structure

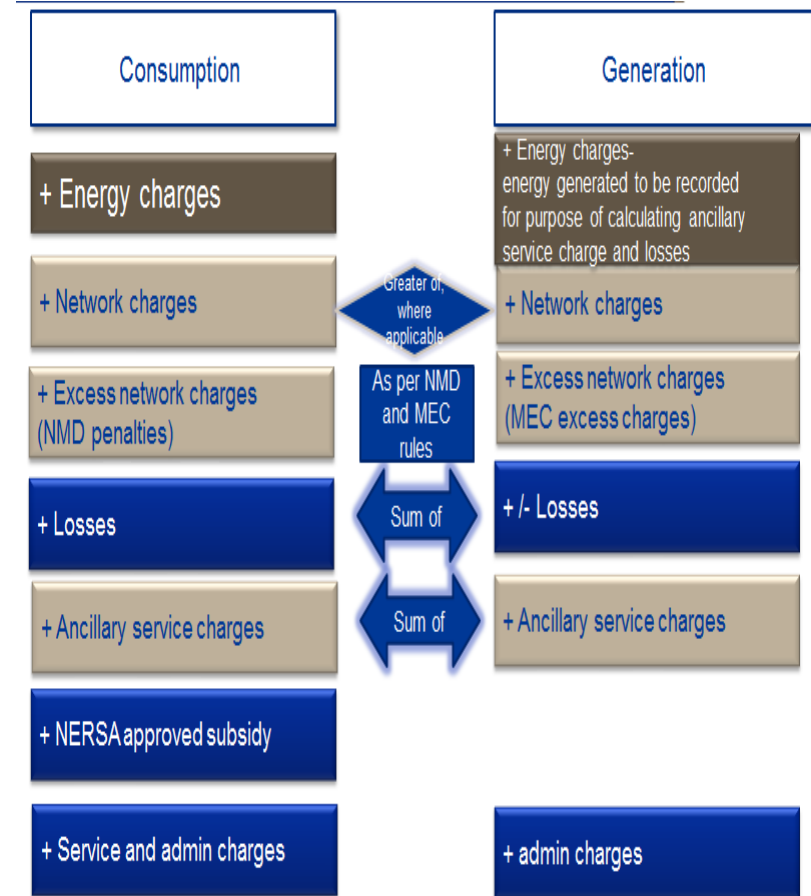
Charge	Rate
TUoS network charge	Table 30: TUoS network charge for Transmission connected generators (Energy in each TOU period x WEPS rate excluding losses in each TOU period) x (Transmission loss factor-1)/Transmission loss factor for generators
Losses charge	Refer to WEPS energy rate excluding losses in paragraph 11, paragraph 25.2 and paragraph 25.4
Ancillary service charge	Table 31: Ancillary service charge for Transmission connected generators and loads
Service charge	Table 38: Urban Service and administration charges
Administration charge	Table 38: Urban Service and administration charges

Please refer to Eskom website www.eskom.co.za/tariffs for Eskom latest schedule of standard prices

Please note: Eskom may from time to time amend the its tariffs subject to Nersa approval

Megaflex/Ruraflex Gen (combined tariffs for consumption and export)

- Where there is a generation facility, irrespective of whether the customer is predominantly a generator or a load, there may be both consumption and generation of energy at the same point of supply.
- The same network assets are used for the purposes of generating (transporting energy into the grid) and for consumption (importing energy from the grid).
- In order to avoid network charges being charged on both import and export, customers can select this tariff (or remain on the standard TOU load tariff + Gen-DUoS/TUoS)
 - TOU tariffs are mandatory for consumption where there is grid-tied generation.
- Tariff based on Megaflex/Ruraflex and generator use-of-system charges depending on whether the customer is urban, rural, Distribution or Transmission connected.



Megaflex Gen(extract from 2021/22 schedule of standard prices)

15. Megaflex Gen tariff

An electricity tariff for Urban_h customers connected at medium voltage, high voltage and Transmission voltages that consume energy (importers of energy from the Transmission and Distribution System) and generate energy (exporters of energy to the Transmission and Distribution System) at the same point of supply (or metering point).

The following charges shall apply for the consumption and generation of energy:

- seasonally and time-of-use differentiated c/kWh active energy charges including losses, based on the voltage of supply and the Transmission zone for energy supplied at the POD;
- three time-of-use periods namely peak, standard and off-peak, as specified in paragraph 3.2;
- the treatment of public holidays for the raising of the active energy charge and the network demand charge shall be as specified in paragraph 10;
- a R/account per day service charge based on the higher of the sum of the monthly utilised capacity or the sum of the monthly maximum exported capacity of all points of supply/points of delivery linked to an account;
- a R/per day administration charge based on monthly utilised capacity and monthly maximum exported capacity of each POD/point of supply/service agreement/ linked to an account;
- for Transmission connected supplies, the higher of the value of :
 - a the R/kVA/month Transmission network charge (loads) payable each month based on the voltage of the supply, the Transmission zone and the annual utilised capacity measured at the POD applicable during all time periods; or
 - the R/kW/month Transmission network charge (generators) payable each month for transmission-connected generators based on the Transmission zone for generators and the maximum export capacity applicable during all time periods for each premise;
- for Distribution supplies connected supplies, the higher of the value of :
 - the R/kW/month Distribution network capacity charge for generators based on the voltage of the supply and the maximum export capacity measured at the POD applicable during all time periods; less
 - a distribution losses charge rebating the network capacity charge, based on loss factors specified in paragraphs 25.1 and 25.2, using the following formula:
energy produced in each TOU period x WEPS rates excluding losses in each TOU period x (Distribution loss factor x Transmission loss factor (for loads)-1) measured at each point of supply, but not beyond extinction); or the sum of
 - a R/kVA/month Transmission network charge (for loads) based on the voltage of the supply, the Transmission zone and the annual utilised capacity measured at the POD applicable during all time periods; and
 - the R/kW/month Distribution network capacity charge for loads based on the voltage of the supply and annual utilised capacity measured at the POD applicable during all time periods; and
 - a R/kVA/month Distribution network demand charge based on the voltage of the supply and the chargeable demand at the POD measured during peak and standard periods;
- for Transmission connected generators a losses charge based on loss factors specified in paragraph 25.3 at each point of supply is applied, using the following formula (refer to paragraph 25.4);
 - energy produced in each TOU period x WEPS rates excluding losses in each TOU period x (Transmission loss factor (for generators)-1/Transmission loss factor (for generators));
- a R/kVA urban low voltage subsidy charge based on the voltage of the supply and charged on the annual utilised capacity measured at the POD applicable during all time periods;
- a c/kWh ancillary service charge applied on the total active energy supplied and produced in the month based on the voltage of the supply applicable during all time periods;
- a c/kWh reactive energy charge supplied in excess of 30% (0,96 power factor or less) of the kWh recorded during the peak and standard periods. The excess reactive energy is determined per 30-minute integrating period and accumulated for the month and will only be applicable during the high-demand season;
- a c/kWh electrification and rural subsidy applied to the total active energy consumed in the month;
- a c/kWh affordability subsidy charge applied to the total active energy consumed in the month; and
- an excess network capacity charge shall be payable in the event of an NMD or MEC exceedance in accordance with the NMD and MEC rules and as set out for NMD exceedances in Table 41 and Table 42 for the relevant tariff.

Notes:

- A comparison is made on a monthly basis to determine the higher (in rand value) of the network charges as a consumer and as a generator located at the same point of supply/ metering point and these rand values will be used for billing purposes.
- The network charges, losses charges, ancillary service charges as well as administration charges and service charge applicable for generators will depend on whether the generator is Transmission connected or Distribution connected.

Table 9: Megaflex Gen tariff

Megaflex Gen - Non-local authority											
Transmission zone	Voltage	Active energy charge for loads [c/kWh]						Low demand season [Sep - Mar]			Transmission network charges [R/kVA/m]
		Peak	Standard	Off Peak	Peak	Standard	Off Peak	Peak	Standard	Off Peak	
≤ 300km	≤ 500V	417.38	470.96	126.98	146.03	69.34	79.74	134.47	157.77	94.30	R 11.94
	≥ 500V & ≤ 66kV	410.81	472.43	124.45	142.12	67.59	77.73	133.99	154.09	92.24	R 10.91
	≥ 66kV & ≤ 132kV	397.80	457.47	120.56	138.58	65.45	75.27	129.78	149.25	89.30	R 10.62
> 300km and ≤ 600km	≤ 500V	374.91	431.15	113.56	130.59	61.68	70.83	123.33	142.68	84.17	R 11.43
	≥ 500V & ≤ 66kV	420.76	483.87	127.49	146.81	69.22	79.60	137.27	157.86	94.51	R 12.02
	≥ 66kV & ≤ 132kV	414.91	477.15	125.68	144.53	68.25	78.49	135.37	155.68	93.15	R 11.01
> 600km and ≤ 900km	≤ 500V	401.71	461.97	121.68	139.93	66.86	75.87	131.09	150.66	90.18	R 10.79
	≥ 500V & ≤ 66kV	376.67	435.47	114.73	131.94	62.26	71.60	123.51	142.04	84.99	R 11.55
	≥ 66kV & ≤ 132kV	424.95	486.68	128.73	148.04	69.88	80.26	138.82	159.41	95.42	R 12.16
> 900km	≤ 500V	419.08	481.84	126.97	146.02	68.94	79.28	136.78	157.21	94.10	R 11.51
	≥ 500V & ≤ 66kV	405.81	466.68	122.84	141.38	66.75	76.76	132.37	152.23	91.12	R 10.79
	≥ 66kV & ≤ 132kV	382.48	439.85	115.85	133.23	62.95	72.39	124.76	143.47	85.86	R 11.75
> 900km	≤ 500V	429.23	493.67	130.06	149.59	70.60	81.19	140.83	161.62	96.56	R 12.24
	≥ 500V & ≤ 66kV	423.25	486.74	128.59	147.43	69.59	80.03	138.84	159.12	94.99	R 11.24
	≥ 66kV & ≤ 132kV	409.88	471.36	124.15	142.77	67.41	77.52	133.89	153.74	92.02	R 10.87
WEPS energy rate excluding losses	≤ 500V	386.21	444.14	117.84	134.50	63.59	73.13	126.96	144.87	86.80	R 11.85
	≥ 500V & ≤ 66kV	373.94	426.58	112.36	129.21	61.93	70.18	121.83	139.19	83.38	R 11.53
	≥ 66kV & ≤ 132kV	350.21	402.58	107.84	124.50	59.59	68.13	117.84	134.50	80.80	R 11.24

Distribution network charges for loads					
Voltage	Network capacity charge [R/kVA/m]		Network demand charge [R/kVA/m]		Urban low voltage subsidy charge [R/kVA/m]
	Peak	Standard	Peak	Standard	
≤ 500V	R 23.73	R 27.29	R 44.59	R 51.74	R 0.00
≥ 500V & ≤ 66kV	R 21.76	R 25.02	R 41.27	R 47.48	R 0.00
≥ 66kV & ≤ 132kV	R 21.77	R 24.94	R 41.39	R 47.55	R 22.09
≥ 132kV / Transmission connected	R 9.00	R 9.00	R 9.00	R 9.00	R 15.17

Customer categories (kVA or MW or generators)			
Customer category	Service charge [R/account/m]		Administration charge [R/POD/day]
	Peak	Standard	
≤ 100 kVA/ kW	R 19.38	R 22.30	R 4.26
> 100 kVA/ kW & ≤ 500 kVA/ kW	R 88.53	R 101.81	R 24.83
> 500 kVA/ kW & ≤ 1 MVA/ MW	R 272.39	R 313.25	R 49.30
> 1 MVA/ MW	R 272.39	R 313.25	R 122.76
Key customers or Transmission connected generators	R 5 337.66	R 6 139.54	R 170.47

Applicable to loads			
Electrification and rural network subsidy charge [c/kWh]	Affordability subsidy charge [c/kWh]		Reactive energy charge [c/kWh] (loads)
	Peak	Standard	
10.61	4.98	5.73	19.19

Losses charge for generators			
Distribution connected generators		Transmission connected generators	
Formula Distribution = ((Energy produced x WEPS rate excluding losses) x (Distribution loss factor x Transmission loss factor - 1) in each TOU period		Formula Transmission = ((Energy produced x WEPS rate excluding losses) x (Transmission loss factor x Transmission loss factor - 1) in each TOU period	
Transmission loss factors for Distribution connected		Generator loss factor	
Distance from Johannesburg		Voltage	
≤ 300km		≤ 500V	
> 300km & ≤ 600km		≥ 500V & ≤ 66kV	
> 600km & ≤ 900km		≥ 66kV & ≤ 132kV	
> 900km		≥ 132kV	
1.0107		1.1111	
1.0208		1.0867	
1.0310		1.0611	
1.0413		1.0360	
1.0515		1.0110	
1.0617		0.9860	
1.0719		0.9610	
1.0821		0.9360	
1.0923		0.9110	
1.1025		0.8860	
1.1127		0.8610	
1.1229		0.8360	
1.1331		0.8110	
1.1433		0.7860	
1.1535		0.7610	
1.1637		0.7360	
1.1739		0.7110	
1.1841		0.6860	
1.1943		0.6610	
1.2045		0.6360	
1.2147		0.6110	
1.2249		0.5860	
1.2351		0.5610	
1.2453		0.5360	
1.2555		0.5110	
1.2657		0.4860	
1.2759		0.4610	
1.2861		0.4360	
1.2963		0.4110	
1.3065		0.3860	
1.3167		0.3610	
1.3269		0.3360	
1.3371		0.3110	
1.3473		0.2860	
1.3575		0.2610	
1.3677		0.2360	
1.3779		0.2110	
1.3881		0.1860	
1.3983		0.1610	
1.4085		0.1360	
1.4187		0.1110	
1.4289		0.0860	
1.4391		0.0610	
1.4493		0.0360	
1.4595		0.0110	
1.4697		0.0000	
1.4799		0.0000	
1.4901		0.0000	
1.5003		0.0000	
1.5105		0.0000	
1.5207		0.0000	
1.5309		0.0000	
1.5411		0.0000	
1.5513		0.0000	
1.5615		0.0000	
1.5717		0.0000	
1.5819		0.0000	
1.5921		0.0000	
1.6023		0.0000	
1.6125		0.0000	
1.6227		0.0000	
1.6329		0.0000	
1.6431		0.0000	
1.6533		0.0000	
1.6635		0.0000	
1.6737		0.0000	
1.6839		0.0000	
1.6941		0.0000	
1.7043		0.0000	
1.7145		0.0000	
1.7247		0.0000	
1.7349		0.0000	
1.7451		0.0000	
1.7553		0.0000	
1.7655		0.0000	
1.7757		0.0000	
1.7859		0.0000	
1.7961		0.0000	
1.8063		0.0000	
1.8165		0.0000	
1.8267		0.0000	
1.8369		0.0000	
1.8471		0.0000	
1.8573		0.0000	
1.8675		0.0000	
1.8777		0.0000	
1.8879		0.0000	
1.8981		0.0000	
1.9083		0.0000	
1.9185		0.0000	
1.9287		0.0000	
1.9389		0.0000	
1.9491		0.0000	
1.9593		0.0000	

Ruraflex Gen(extract from 2021/22 schedule of standard prices)

23. Ruraflex Gen tariff

An electricity tariff for Rural_o customers consuming energy (importers of energy from the Eskom System) and generating energy (exporters of energy to the Eskom System) at the same point of supply (or metering point). The following charges shall apply for the consumption and generation of energy:

1. seasonally and time-of-use differentiated c/kWh active energy charges including losses, based on the voltage of supply and the Transmission zone;
2. three time-of-use periods namely peak, standard and off-peak, as specified in paragraph 3.2;
3. the treatment of public holidays for the raising of the active energy charge and the network demand charge shall be as specified in paragraph 10;
4. a R/kVA/month network capacity charge combining the Transmission and Distribution network capacity charges based on the voltage of the supply, the Transmission zone and the annual utilised capacity measured at the POD applicable during all time periods;
5. a c/kWh Distribution network demand charge based on the voltage of the supply and the energy measured at the POD during the all TOU periods;
6. a c/kWh ancillary service charge applied on the total active energy supplied and produced in the month based on the voltage of the supply applicable during all time periods;
7. a R/account per day service charge based on the higher of the sum of the monthly utilised capacity(s) or the sum of the monthly maximum exported capacity(s) of all PODs/points of supply linked to an account..
8. a R/per day administration charge based on the monthly utilised capacity and the monthly maximum exported capacity of each POD/point of supply/service agreement/ linked to an account;
9. a c/kvarh reactive energy charge supplied in excess of 30% (0,98 PF) of the kWh recorded during the entire billing period. The excess reactive energy is determined using the billing period totals and will only be applicable during the high-demand season; and
10. an excess network capacity charge shall be payable in the event of an NMD exceedance as specified in paragraph 4.1 in accordance with the NMD rules and as set out in Table 41 and Table 42 for the relevant tariff.

Table 23: Ruraflex Gen tariff

Ruraflex Gen - Non-Local Authority

		Active energy charge for loads [c/kWh]										Network capacity charges [R/kVA/m]			
Transmission zone	Voltage	High demand season (Jun - Aug)				Low demand season (Sep - May)									
		Peak	Standard	Off Peak		Peak	Standard	Off Peak							
		VAT incl	VAT incl	VAT incl		VAT incl	VAT incl	VAT incl		VAT incl					
≤ 300km	< 500V	432.14	496.96	130.92	150.56	71.11	81.78	140.97	162.12	97.01	111.56	61.55	70.78	R 24.96	R 28.70
	≥ 500V & ≤ 22kV	427.87	492.05	129.63	149.07	70.38	80.94	139.59	160.53	96.05	110.46	60.91	70.05	R 22.87	R 26.30
> 300km and ≤ 600km	< 500V	436.48	501.95	132.23	152.06	71.81	82.58	142.38	163.74	98.00	112.70	62.18	71.51	R 25.03	R 28.78
	≥ 500V & ≤ 22kV	432.13	496.95	130.90	150.54	71.11	81.78	140.97	162.12	97.00	111.55	61.55	70.78	R 23.01	R 26.46
> 600km and ≤ 900km	< 500V	440.86	506.98	133.56	153.59	72.52	83.40	143.81	165.38	98.96	113.80	62.80	72.22	R 25.16	R 28.93
	≥ 500V & ≤ 22kV	436.46	501.93	132.20	152.03	71.81	82.58	142.38	163.74	98.00	112.70	62.18	71.51	R 23.12	R 26.59
	< 500V	445.25	512.04	134.88	155.11	73.24	84.23	145.19	166.97	99.95	114.94	63.42	72.93	R 25.27	R 29.06
> 900km	≥ 500V & ≤ 22kV	440.84	506.97	133.56	153.59	72.52	83.40	143.81	165.38	98.96	113.80	62.80	72.22	R 23.13	R 26.60

Customer categories [kVA or MVA = loads] [kW or MW = generators]	Service charge [R/account/day]		Administration charge [R/POD/day]	
	VAT incl		VAT incl	
≤ 100 kVA/kW	R 24.55	R 28.23	R 6.97	R 8.02
> 100 kVA/kW & ≤ 500 kVA/kW	R 83.72	R 96.28	R 38.82	R 44.64
> 500 kVA/kW & ≤ 1 MVA/MW	R 257.56	R 296.19	R 59.58	R 68.52
> 1 MVA/MW	R 257.56	R 296.19	R 110.55	R 127.13
Key customers	R 5 047.97	R 5 805.17	R 110.55	R 127.13

Voltage	Ancillary service charge for loads and generators [c/kWh]		Network demand charge [c/kWh] for loads in all time-of- use periods	
	VAT incl		VAT incl	
< 500V	0.55	0.63	35.53	40.85
≥ 500V & < 22kV	0.55	0.63	31.15	35.82

Reactive energy charge [c/kVAh]			
High season		Low season	
VAT incl		VAT incl	
12.00	13.80	0.00	0.00

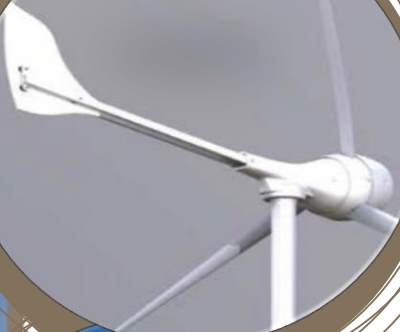
Please refer to Eskom website

www.eskom.co.za/tariff

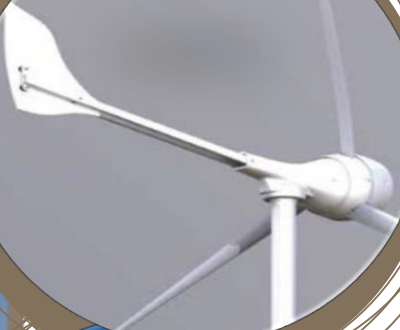
for Eskom latest schedule of standard prices


Please note: Eskom may from time to time amend the its tariffs subject to Nersa approval

Reconciliation of accounts for Eskom customers receiving energy from non- Eskom generators



Wheeling of energy





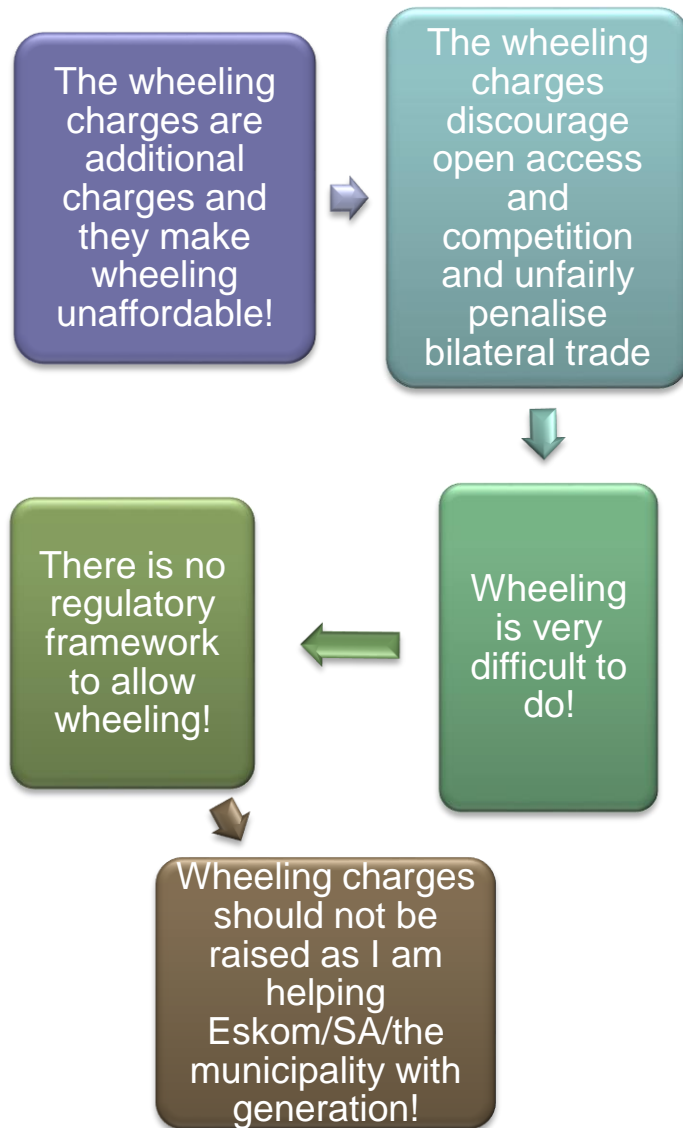
Wheeling is the delivery of energy over a network, and this happens for all energy whether supplied by Eskom or a third party.

When a non-utility owned generator sells the energy it produces to a buyer/offtaker not located at the generator's site, this energy needs to be delivered from the generator to the buyer/offtaker through the grid

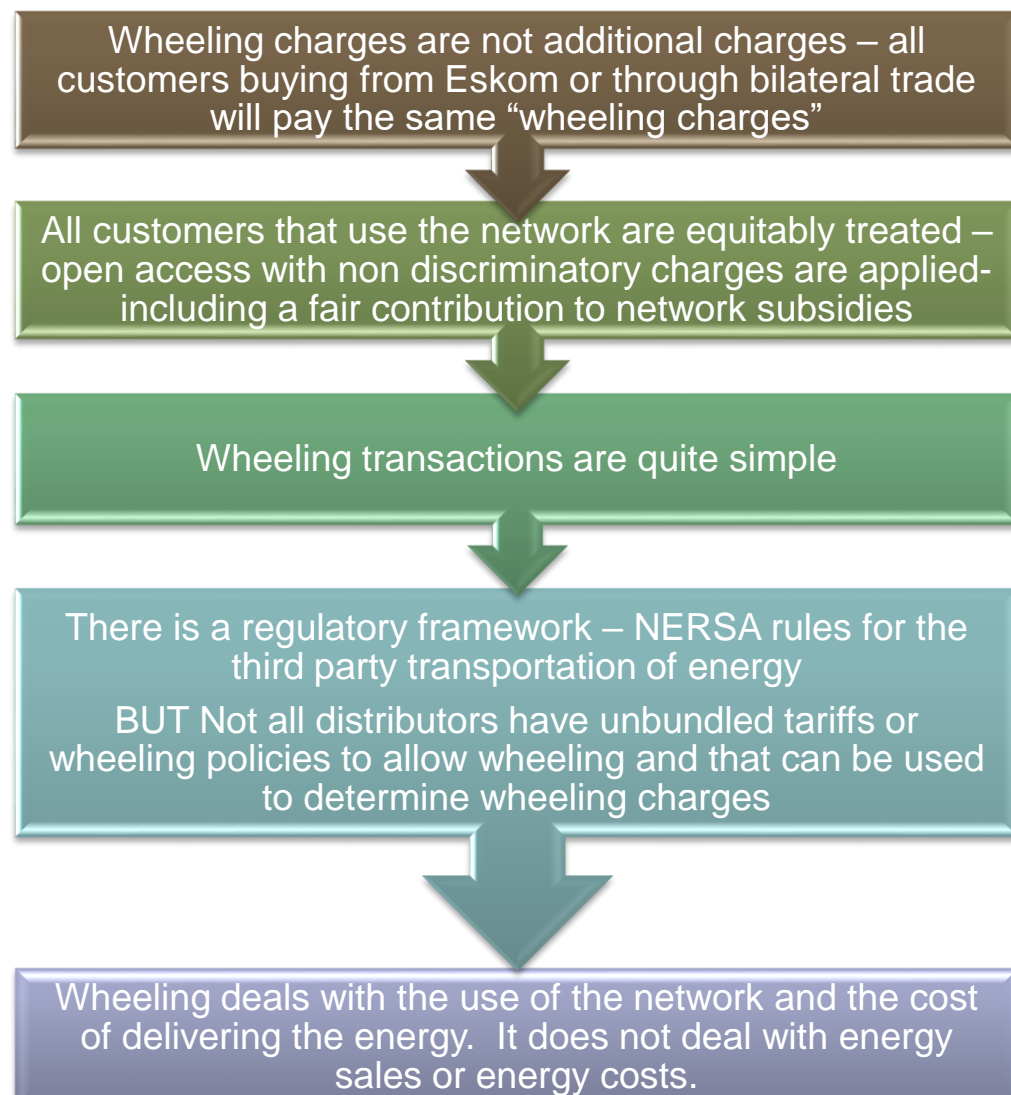
This is typically what is referred to as third party access or wheeling

Charges will still need to be raised for the delivery of the energy

Misconceptions



Facts



Eskom allows wheeling based on the principle of non-discriminatory access to the grid, subject to the buyer being connected at MV or higher and being on a TOU tariff and:

The generator having a licence/ Registration from NERSA to generate and for the wheeling transaction.

The generator must apply to Eskom for grid connection and pay the applicable cost estimate fee for the cost estimate letter to be issued, then pay the quotation fee to request the budget quote and pay the connection charges quoted in the budget quote.

The account(s) where the energy will be wheeled to, must sign an amendment agreement to have the account adjusted based on the Gen-wheeling tariffs

The generator must sign the connection and use of system agreement and the amendment agreement to nominate the off-taker/s.

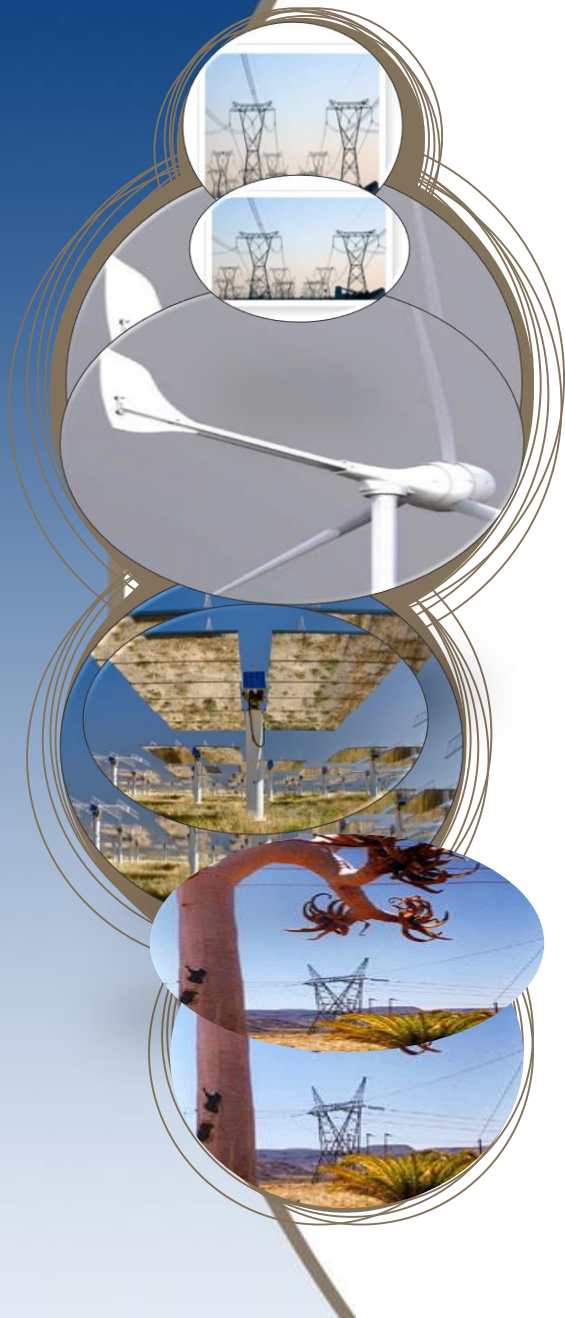
The generator must be legally connected to the Eskom grid.

The buyer/off-taker can be another Eskom customer, a municipality or a customer within a municipality network.

Where one of the parties buying the energy are located within a municipal network, the municipality would have to agree to allow the wheeling transaction.

Wheeling is not applicable to generators/loads connected at low-voltage (<1 kV)

Wheeling of energy – how its done on the bill



How wheeling is done

Generators

- Generators pay for use-of-system charges under the Gen-DUoS or Gen-TUoS tariff
- The charges that are not raised on the wheeled energy are the service charge and the affordability subsidy charge on the wheeled energy
- Customers that wheel energy are not exempted from load shedding
- Banking (carry over to the next month) is currently only allowed for customers $\leq 1\text{MW}$
- Wheeling is not allowed for generators and loads connected at low voltage
- Generators can nominate more than one buyer/offtaker (subject to the required agreements being in place), but Eskom may reserve the right to limit the numbers
- No deemed energy contracts for private IPPs sale, but if there are network constraints for the loads, banking may be allowed on a case-by-case base
- Eskom contracts only with the Eskom customers (generator and offtaker), not with a trader.

Loads

- For loads, standard tariff charges are payable for all energy (consumption and demand) that flows through the customer meter based on the standard TOU tariff (mandatory).
- There is no netting of wheeled energy
 - A separate service agreement/tariff called Gen-wheeling is loaded on the bill
 - The Gen-wheeling tariff then provides a credit for the wheeled energy on a TOU basis equal to the energy charge less losses (WEPS less losses)
 - Standard loss factors are applied for the wheeled energy – the same as for energy purchased from Eskom, hence the credit rate applied excludes losses
 - Energy is credited in the same TOU periods as what is generated e.g. there is no swapping of energy produced say in standard periods for energy consumed in off-peak.
 - An administration charge is also raised on the Gen-wheeling tariff for the cost of administration of the wheeled energy

Illustration of a wheeling transaction

Contracts - generator

- Budget Quote
- Connection and use of system agreement (CUOSA) with wheeling annexure to nominate the buyer/s (receiver of the energy)

Contracts - receiver of the energy (load)

- Electricity Supply Agreement (ESA)
- Gen wheeling Amendment Agreement

Meter 2
100 kWh

2

**Generator
(seller)**

Gen- DUOS tariff
Admin charge + use of system charges +/- losses charge + ancillary service charges on the energy exported in c/kWh

Eskom

- 1) The energy produced by the generator is measured on a time-of-use at Meter 2
- 2) The customer consumes energy at Meter 1
- 3) The energy produced by the Generator at Meter 2 is then subtracted on the bill of the customer at meter 1 through the Gen-wheeling SA.

Meter 1
1 000 kWh

1

**Consumer
(buyer/offtaker)**

Consumption
Customer is billed for total consumption (energy supplied by Eskom and energy wheeled from Gen A) – All charges under the Megaflex tariff are raised



Gen-Wheeling tariff– For wheeled Energy

Admin charges + credit for the energy wheeled per TOU period at the energy rate less technical losses. The customer pays therefore the technical losses incurred by Eskom in delivering the energy from 2 to 1

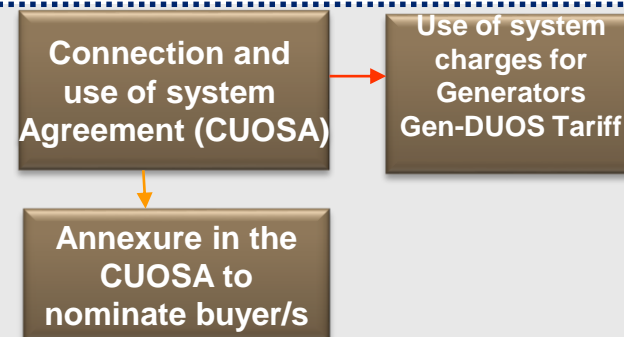
PPA

Note: There will always be a charge on the account as the energy credits only offsets the energy consumption, never beyond zero and does not reduce the fixed monthly charges raised for the account, that is, the account will never be zero rand or negative (go into credit).

Contracts required to facilitate wheeling

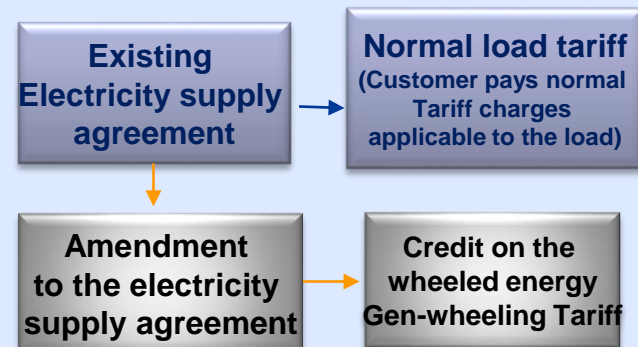
For the generator (must be connected to the Eskom network):

- The generator will contract with Eskom (the network provider) to provide network services.
- This is done through a connection and use of system agreement (CUOSA). Eskom will raise charges for the use of the system based on the maximum export capacity (MEC) under the Gen DUOS tariff.
- The generator will also sign an Annexure to the CUOSA, where the nominated party(ies) is listed (the Eskom customer(s) to whom the energy must be delivered)
- There is no separate “wheeling agreement”



For the receiver of the energy (not a Trader but the existing Eskom customer to whom the energy is wheeled)

- The nominated party (buyer/offtaker) to whom the energy is to be delivered will need to sign the Gen-wheeling amendment agreement to the Electricity Supply Agreement, where Eskom applies the Gen-wheeling tariff to credit the wheeled energy.
- This is a separate contract dealing only with the adjustment on the account to credit the customer for the wheeled energy. The customer will pay the standard tariffs on the normal load tariff (e.g. Megaflex, Miniflex, Ruraflex tariff etc).



- The generator will contract with the entity purchasing the energy through a PPA and this may be with Eskom, a third party or for own generation.



Gen-Wheeling (extract from 2021/22 schedule of standard prices)

41. Gen-wheeling tariff

A reconciliation electricity tariff for local and non-local electricity customers connected at >1kV on Urban_p or Rural_p networks on the Megaflex, Megaflex Gen, Miniflex, Ruraflex or Ruraflex Gen TOU electricity tariffs that have entered into a wheeling transaction with a generator

1. A credit raised on the total wheeled energy and seasonally and time-of-use differentiated c/kWh **active energy charges** excluding losses and based on whether the main account is a local authority or non-local authority account;
2. three time-of-use periods namely **peak, standard and off-peak**, as specified in paragraph 3.2;
3. the treatment of **public holidays** for the raising of the credit active energy charge shall be as specified in paragraph 10;
4. a R/POD/day **administration charge** based on the **monthly utilised capacity** of each Gen-wheeling **service agreement** linked to an account; and
5. a credit raised on the total wheeled energy and the c/kWh **affordability subsidy charge** (applicable to non-local authority tariffs only.)

Below is the summary of the charges:

Table 46: Gen-wheeling tariff structure

Tariff name	Type of charge	Rate
Gen-wheeling non Munic urban	Energy charge (credit)	Table 1: WEPS non-local authority tariff - energy rates excluding losses
	Affordability subsidy charge (credit)	Table 1: WEPS non-local authority tariff - affordability subsidy charge
	Administration charge	Table 1: WEPS non-local authority tariff - administration charge
	All other tariff charges	NA
Gen-wheeling non Munic rural	Energy charge (credit)	Table 1: WEPS non-local authority tariff - energy rates excluding losses
	Administration charge	Table 21: Ruraflex non-local authority tariff - administration charge
	All other tariff charges	NA
Gen-wheeling Munic urban	Energy charge (credit)	Table 2: WEPS local authority tariff - energy rates excluding losses
	Administration charge	Table 2: WEPS local authority tariff - administration charge
	All other tariff charges	NA
Gen-wheeling Munic rural	Energy charge (credit)	Table 2: WEPS local authority tariff - energy rates excluding losses
	Administration charge	Table 22: Ruraflex local authority tariff -administration charge
	All other tariff charges	NA

Please refer to Eskom website www.eskom.co.za/tariffs for Eskom latest schedule of standard prices
Please note: Eskom may from time to time amend its tariffs subject to NERSA approval



Offset (net-billing) and Banking of energy

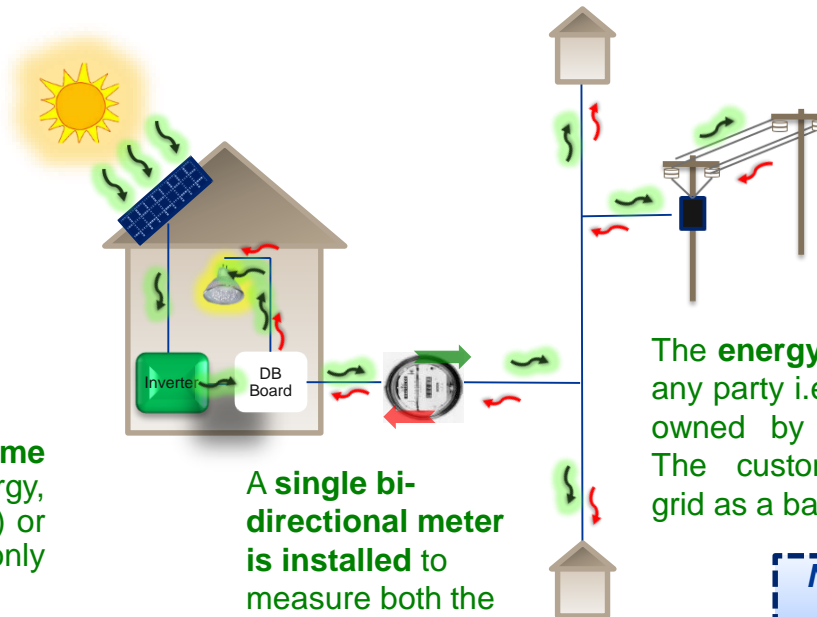
What is net billing (offset)

The customer owns and operates an electrical generating device and this is operated in parallel with the utility's system (grid-tied).

Net billing is where the customer gets a **credit on the electricity bill for surplus energy** produced that is not consumed immediately.

The **credit is either at the same rate** the utility pays for energy, cost of fuel (the avoided cost) or a rate lower than the energy only charge.

For Eskom, currently the credit is at the same energy rate but this might change in the future.



A **single bi-directional meter is installed** to measure both the usage and any exported energy.

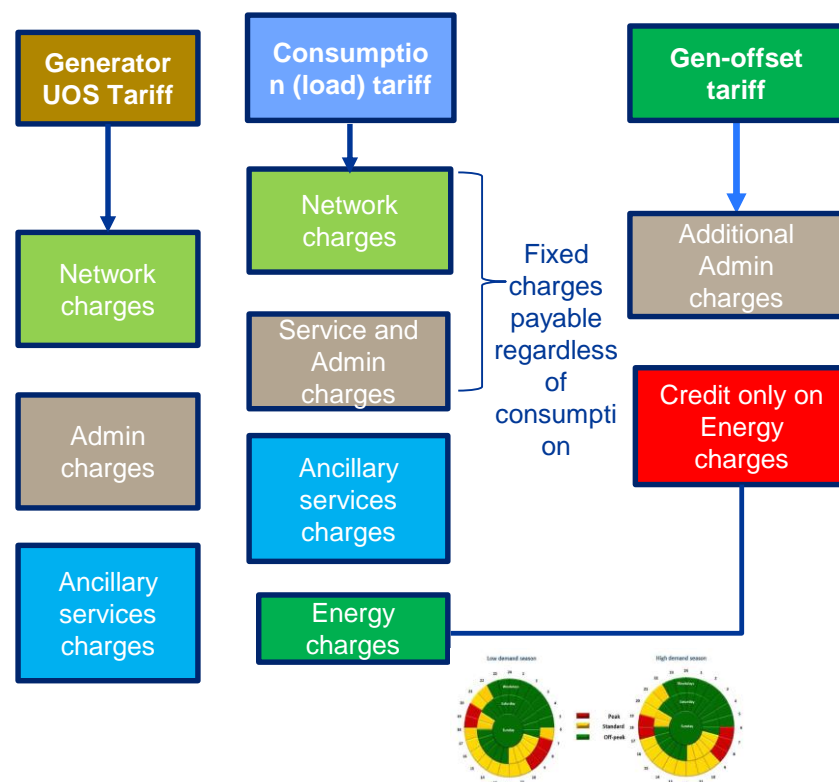
For Eskom, the customer must be on a TOU tariff

The **energy is not sold** to any party i.e. this energy is owned by the customer. The customer uses the grid as a battery.

Net billing (not net-metering) is the term used in Eskom – the netting is done on the customer's bill through separate import and export measurements – there is no netting of energy!

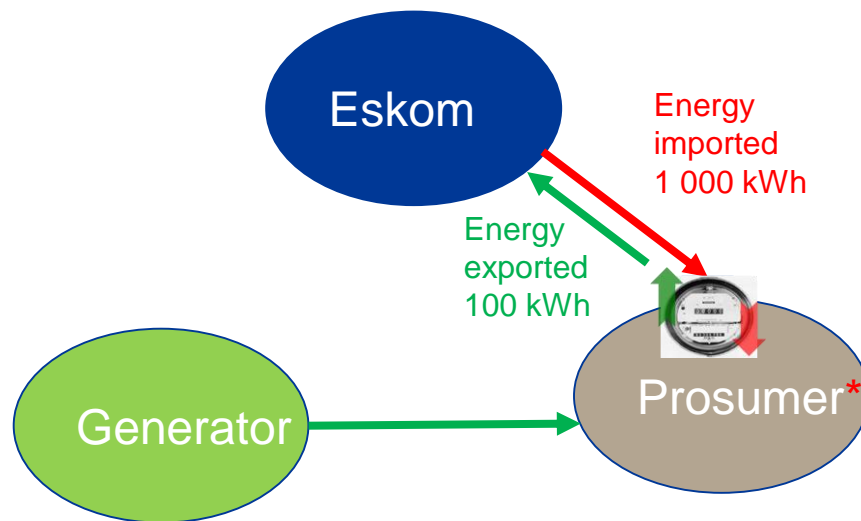
How offset (net-billing) is done on the bill

- Standard tariff charges will be raised for consumption (load tariffs) and export (generation tariffs)
- An offset transaction is in addition to the above
- Offset is done for energy exported (kWh) per TOU period only @ the Gen-offset tariff – all other charges are payable
 - There is no netting of exported energy against consumed energy - A separate service agreement/tariff called Gen-offset is loaded on the bill
 - In a month, any offset energy that is greater than that consumed shall be ignored - unless banking approved
 - Banking (carry over to the next month) is currently only allowed for customers < 1MW (additional admin charge for this)
 - Offset (Net-billing) is allowed for all customers including those connected at low voltage
 - Energy exported under Gen-offset tariff is **credited in the same TOU periods** as what is generated e.g. there is no swapping of energy produced say in standard periods for energy consumed in off-peak
- Additional charges for offset**
 - An administration will be raised for offset to cover the cost of administration of the exported energy.



- Bill can never go negative because fixed charges remain payable and only energy is credited.
- This credit is not purchase of energy – Eskom uses it and gives it back to customers at the end of the month.
- There will be no compensation for energy exported (wheeling, offset and for banking) without the required registration or licensing, and agreements being signed.

Illustration of an Offset of Energy (Net-Billing) Transaction



*Prosumer – a customer that consumes and generates at the same point of supply

1) Generator supplies portion of its energy directly to its customer(Prosumer)

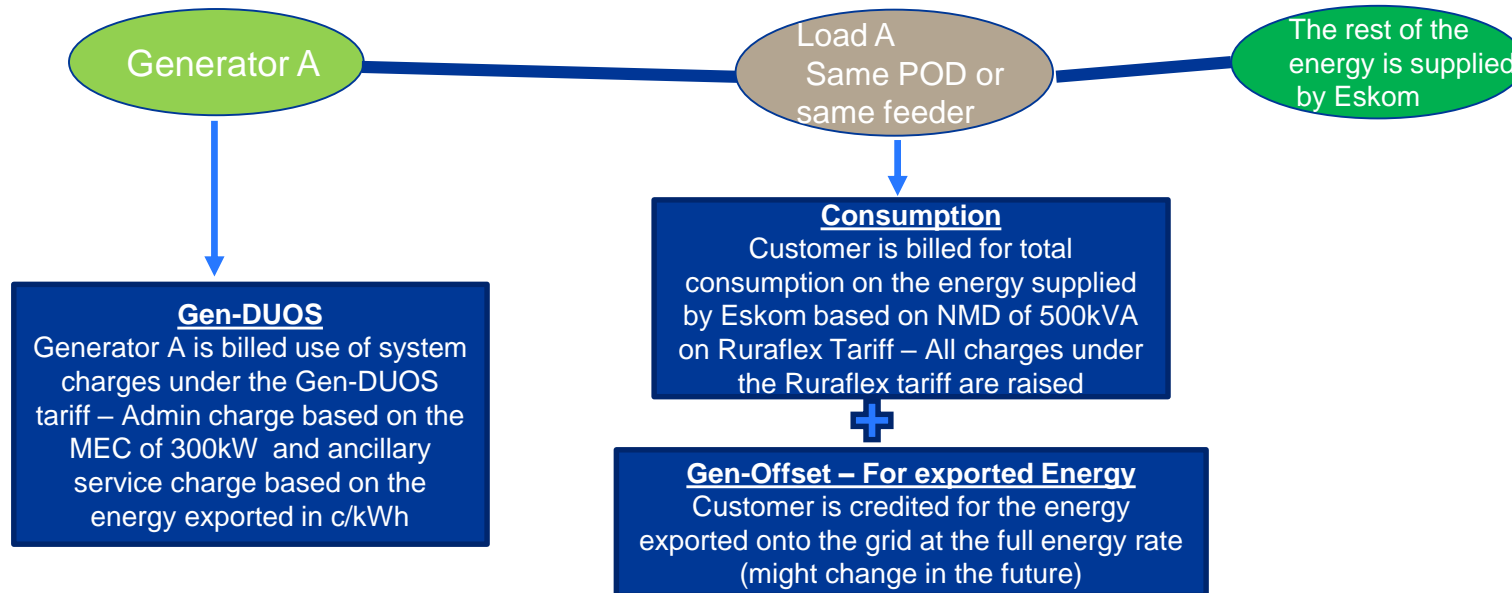
2) The energy exported by the generator is measured on a time-of-use through a bidirectional meter.

3) The energy consumed is also measured on a time-of-use through a bidirectional meter.

4) The energy produced by the generator is then credited on the bill of the customer under a Gen-offset SA.

Example of Offset - customer is consuming and generating at the same POD

Example: Customer A on an existing Ruraflex tariff with NMD of 500kVA has a Generator A with an MEC of 300kW and export at the same point of delivery .



Note: There will always be a charge on the account as the energy credits only offsets the energy consumption, never beyond zero and cannot decrease the fixed monthly charges raised for the account. The account will never be zero rands nor go negative (credit).

Gen-offset (extract from 2021/22 schedule of standard prices)

42. Gen-offset tariff

A reconciliation electricity tariff for non-local authority electricity customers connected to Urban_p or Rural_p networks on the Megaflex, Megaflex Gen, Miniflex, Ruraflex or Ruraflex Gen TOU tariffs where there is a net-metering/offset transaction:

1. A credit raised on the total active energy exported and seasonally and time-of-use differentiated **active energy charges** including losses based on the voltage of supply and the **Transmission zone**;
2. three time-of-use periods namely **peak, standard and off-peak**, as specified in paragraph 3.2;
3. the treatment of **public holidays** for the raising of the credit active energy charge shall be as specified in paragraph 10;
4. a credit raised on **total active energy** exported and the **ancillary service charge**, based on the voltage of the supply;
5. a R/POD/day **administration charge** based on the **monthly utilised capacity** of each Gen-offset **service agreement** linked to an account; and
6. a credit raised on the **total active energy** exported and the **affordability subsidy charge** (applicable to non-local authority tariffs only.)

Table 47: Gen-offset tariff structure

Tariff name	Type of charge	Rate
Gen-offset urban	Energy charge (credit)	Table 1: WEPS non-local authority tariff - energy rates per Transmission Zone and voltage inclusive of losses
	Ancillary service charge (credit)	Table 1: WEPS non-local authority tariff - ancillary service charge
	Affordability subsidy charge (credit)	Table 1: WEPS non-local authority tariff - affordability subsidy charge
	Administration charge	Table 1: WEPS non-local authority tariff - administration charge
	All other tariff charges	NA
Gen-offset rural	Energy charge (credit)	Table 21: Ruraflex non-local authority tariff - energy rates per Transmission Zone and voltage
	Ancillary service charge (credit)	Table 21: Ruraflex non-local authority tariff -ancillary service charge
	Administration charge	Table 21: Ruraflex non-local authority tariff -administration charge
	All other tariff charges	NA

Please refer to Eskom website www.eskom.co.za/tariffs for Eskom latest schedule of standard prices

Please note: Eskom may from time to time amend its tariffs subject to Nersa approval



Banking of Excess Energy

- Banking is defined as the treatment and carrying over of Banked Energy into the Eskom system, recorded within a specific TOU period and month, which the customer is not able to consume within that month for whatever reason.
 - Banking is an add-on when there is wheeling or offset
 - E.g -the customer imports (consumes) say 100 kWh, exports 120 kWh in a month
 - 100 kWh is offset (credited on the bill), and 20 kWh is banked (carried over to the next month) and then added to the next month exported energy – this is done per TOU period
- The consumer/buyer of the energy will bank the energy and not the generator.
- Banking is provided at Eskom's discretion and in terms of the Eskom Banking Policy

The main concepts of the banking policy are:

- That Eskom will compensate customers for energy exported that is used by Eskom, but belongs to the customer. This compensation will be at a Nersa approved rate.
- Banking is only allowed for supplies up to 1MW, unless otherwise approved by the Pricing committee.
- Banking is only allowed where it does not cause system or network constraints.
- Banking is done on kWh and not R values and Eskom never goes into credit with banking.
- The tariff applies in which month the Banked energy is offset and not generated.
- Customers are required to be on a TOU tariff.

- The banked energy (energy exported in excess of the offset energy) shall be treated as follows;
 - Banking shall be applied over a banking cycle of 12 months starting from the 1 April of each Eskom financial year (the banking year)
 - the banked energy per TOU period recorded in a month shall accumulate and be carried over to the following month as a banked energy balance until the end of that banking year;
 - in a billing month, no financial credit will be received on the customer's account for the banked energy in that month;
 - the sum of the offset energy (the energy exported in that month) together with the banked energy balance up until a value no greater than the active energy, shall be converted to a financial credit (the offset credit);
 - if the sum of the offset energy and the banked energy is greater than the active energy, then such exceedance shall be added to the banked energy balance;
 - the banked energy balance shall reduce to the extent included in the offset credit, per TOU period in any month, and the reduced banked energy balances, together with any banked energy in the month shall be carried over to the following month ;
 - at the end of the banking year any remaining banked energy and banked energy balance shall be forfeited and not be carried over to following month; and
 - the total banked energy per TOU period may not exceed the total active energy per TOU period in that banking year ('the banked energy limit'); in which case the exceeded exported energy shall be forfeited
- Banking is not applicable to Independent Power Producers (IPP) selling energy in terms of government procurement programmes or to Generators greater than 1 MW (unless otherwise approved in terms of the Banking policy).
- Where banking has not been applied for, not agreed to by Eskom, no banking amendment agreement has been signed by both parties, or the customer has breached any of the conditions set out in the banking policy, all energy exported that is greater than energy consumed per TOU period in a billing month, shall be forfeited.
- If the MEC is exceeded, all exported energy for the month shall be forfeited, unless permission to do so has been provided by Eskom.

- Standard charges are payable for consumption and export and are not reduced by banking
- The Gen-offset or Gen-wheeling tariff is applied to credit the energy per TOU period limited to the amount consumed
- An energy in excess of amount consumed in a month, is then carried over to the next month under a separate banking agreement
- An administration charge will be payable to recover the costs of administering the banking process
 - This is in addition to the consumption related administration charges and the Offset/wheeling administration charge.
 - This administration charge will be the charge set out in the Gen-wheeling or Gen offset schedule of standard prices.

Example of Offset with Banking

- Exported energy is greater than that consumed. The Offset energy credit is capped to the energy consumed (100kWh).
- Therefore the remaining energy is banked and roll over to the next month.

Assume Price = R1/kWh		Consumption	Export	Offset	Banked	Payable
Month 1	kWh	100	120	100	20	
	Charges/Credits	R100		-R100		R0
Month 2	kWh	100	60	(60+20)	0	
	Charges/Credits	R100		-R80		R20

The Offset credit is done in rand per TOU periods by multiplying the offset energy with the offset energy rate per TOU period

- The previous month banked energy is added to the current month exported energy to determine the Offset energy $(20+60) = 80\text{kWh}$.
- This Offset energy kWh is then used to calculate the Offset credit – $80\text{kWh} \times \text{R1/kWh} = \text{R80}$

A reconciliation of energy model can be used for a detailed analysis and estimations.

Example of Offset with Banking (illustration per TOU)

Month 1	Peak (kWh)	Standard (kWh)	Off Peak (kWh)
Consumption	200	450	300
Export	50	550	-
Offset	50	450	-
Bank	-	100	-

- Exported energy is greater than energy consumed
- The Offset credit is capped to the energy consumed

- The remainder of the export energy is then banked and rolled over to the next month

Month 2	Peak (kWh)	Standard (kWh)	Off Peak (kWh)
Consumption	250	500	370
Export	100	300	-
Offset	100	400	-
Bank	-	-	-

The Offset credit is done in rands per TOU period by multiplying the offset energy with the offset energy rate per TOU period

- The previous month banked energy is added to the current month exported energy to determine the Offset energy ($100 + 300 = 400\text{kWh}$).
- The customer will therefore receive offset credit of 400kWh (due to the banked energy from the previous month) even though the export was only 300kWh for the current month.

Illustration of a bill layout with a Gen-Offset with Banking tariff

CONSUMPTION DETAILS (2019-05-01 - 2019-05-31)		
PREMISE ID NUMBER	123456789	TARIFF NAME: Gen-Offset Rural (With Banking)
Customer name		
Administration Charge (Gen-Offset Rural) @ R31.02 per day for 31 days	R	961.62
Administration Charge (Banking of Energy) @ R31.02 per day for 31 days	R	961.62
Peak Offset Credit -1,793.33 kWh @ R3.4878 /kWh	R	-6,254.78
Standard Offset Credit -21,936.82 kWh @ R1.0565 /kWh	R	-23,176.25
Off Peak Offset Credit -13,688.07 kWh @ R0.5738 /kWh	R	-7,854.21
		0.00
Energy Banked Peak 12,974.46 kWh	R	
Energy Banked Standard 38,040.9 kWh	R	0.00
Energy Banked Off Peak 3,893.97 kWh	R	0.00

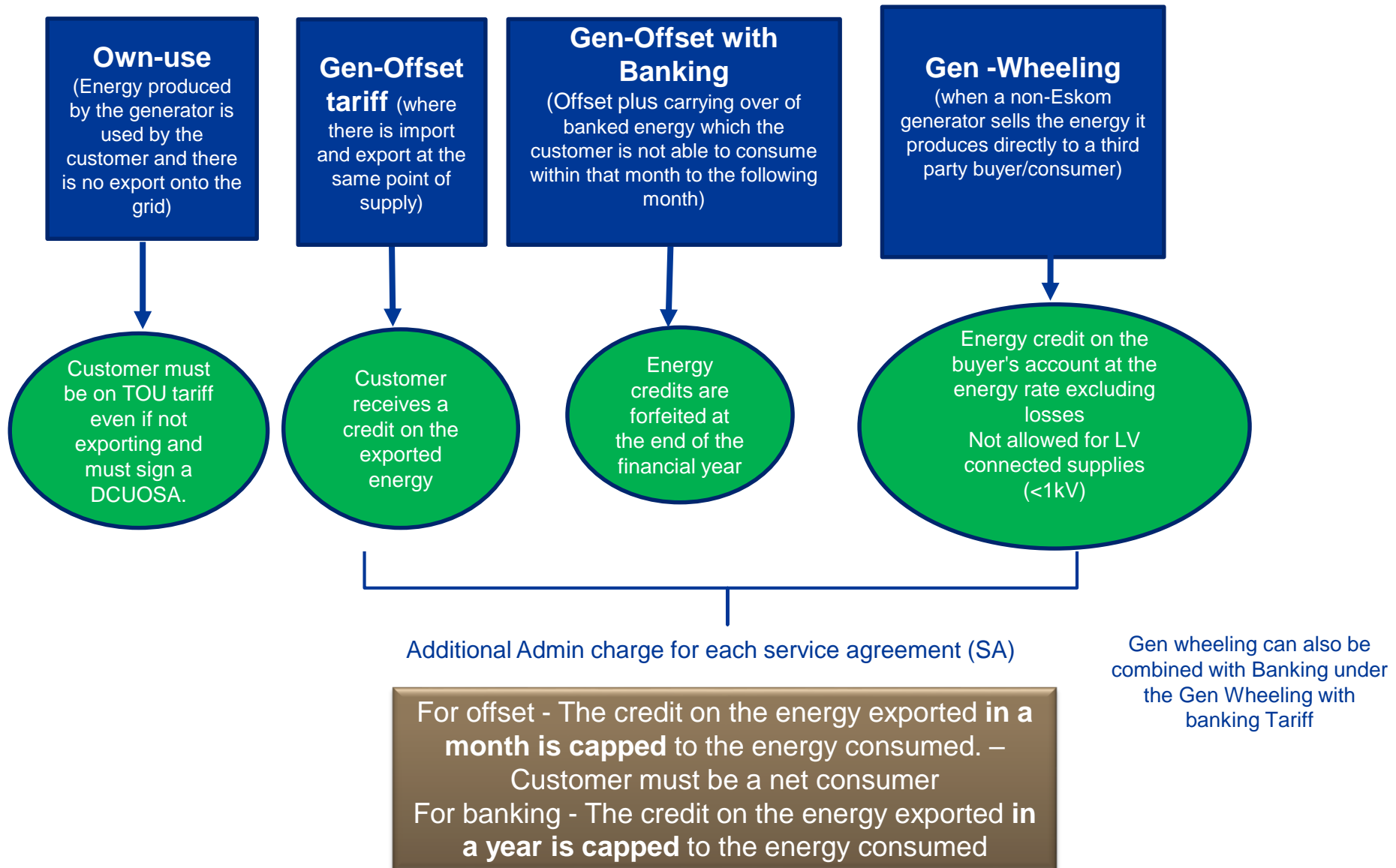
2 Admin charges raised for Offset and the other for Banking

Offset credits for the energy exported per TOU

Banked energy per TOU in kWh which will be credited in the following Month. No Rand amounts because the energy is banked in kWh and not in Rands

Summary of the options for generators

(Reconciliation of Exported Energy For Rural & Urban Customers)



The connection for own use:

- Budget Quote
- Electricity Supply Agreement (ESA)
- Connection and use of system agreement (CUOSA) with an MEC of zero

The connection with offset (net billing):

- Budget Quote
- Electricity Supply Agreement (ESA)
- Connection and use of system agreement (CUOSA)
- Gen Recon Amendment Agreement

The connection with Offset plus Banking:

- Budget Quote
- Electricity Supply Agreement (ESA)
- Connection and use of system agreement (CUOSA)
- Gen Recon Amendment Agreement (this has a Banking annexure):

The connection with wheeling:

For the Generator:

- Budget Quote
- Connection and use of system agreement (CUOSA) with wheeling annexure to nominate the buyer/s (receiver of the energy)

For the receiver of the energy (load)

- Electricity Supply Agreement (ESA)
- Gen wheeling Amendment Agreement

For small scale embedded generators (SSEG) a simplified version of the CUOSA called the supplementary agreement is required.

Future developments in tariffs that may impact generators and wheeling and offset transactions (all subject to NERSA approval) to be noted

Wheeling and offset

- Eskom energy tariffs currently are volumetric only, that is, recover the cost of energy and generation capacity through c/kWh charges only and therefore do not reflect the cost of providing generation standby costs in an unbundled way.
- In order to reflect the cost of providing capacity, the energy charges will be unbundled into a TOU volumetric charges and into a demand related capacity charge.
 - This will result in lower energy related charges due to the addition of a capacity charge
 - The intent is to introduce this in 2023
- This means the credit for energy wheeled and offset will be reduced
- At the same time Eskom is attempting to restructure its tariffs to reflect energy, network and retail costs more accurately and this will have the effect of increasing the energy charges and reducing the other charges

Generators – balancing mechanism

- Most new generating plant will not be dispatchable by the system operator, and therefore there needs to be a mechanism introduced to ensure that there is optimal dispatch.
- This will require all generators (above a certain size), whether private or Eskom-owned to provide a day-ahead forecast, and that consequences are introduced for not meeting the forecast.
- Initially, the thoughts are that a standard balancing charge is to be applied only to generators (independent as well as Eskom) to incentivise the generation part of the industry to support system integrity.
- These rules around balancing need to be watertight and fully understood by the industry to enable optimal dispatch (not a free for all).

Thank You

