Namibia Market Structure

MSB: Draft Wheeling Framework

SEPTEMBER 2019

ELECTRICITY CONTROL BOARD

NEW Energy

The purpose of this presentation:

1. Present the salient points from the draft Wheeling Framework
2. Use examples to demonstrate how to use and interpret the spreadsheet models
3. Gather comments to steer the finalisation of the Wheeling Framework

WHEELING FRAMEWORK

INTRODUCTION

Key Definitions:

- Wheeling: The act of transporting of electricity across an electrical network
- Wheeling Charges: A family of charges to recover the cost of transporting electricity across an electrical network

Purpose of the Wheeling Framework:

- Provide a transparent, fair and practical framework for the determination and implementation of wheeling services and charges for the use of Namibia's transmission and distribution networks in support of the MSB market.

Principles of Wheeling Framework:

1. Economic Efficiency: The framework strives to achieve economic efficiency to promote optimum operational and investment decisions
2. Revenue Neutrality: The framework aims protect the regulatory allowed revenue requirement of network operators
3. Fairness: The framework aims to treat all Bilateral Transactions in a consistent and fair manner.
4. Non-discriminatory: The framework aims to avoid discrimination between Bilateral Transactions and between Bilateral Transactions and purchases from the utility. In practise this means that similar transactions will attract similar charges.

Principles of Wheeling Framework:

5. Transparency: The wheeling methodology and charges are open and transparent which means it can be followed and if needed replicated by any interested party. A copy of the latest revision can be obtained from the ECB's web portal.
6. Simplicity: Avoid overly complex calculations and methodologies
7. Ease of implementation: Where possible the wheeling framework builds on existing tariff methodologies and charges. In addition, the MO will publish detailed reports which will facilitate invoicing at transmission and distribution level.

Challenges in Developing a Wheeling Framework for Namibia:

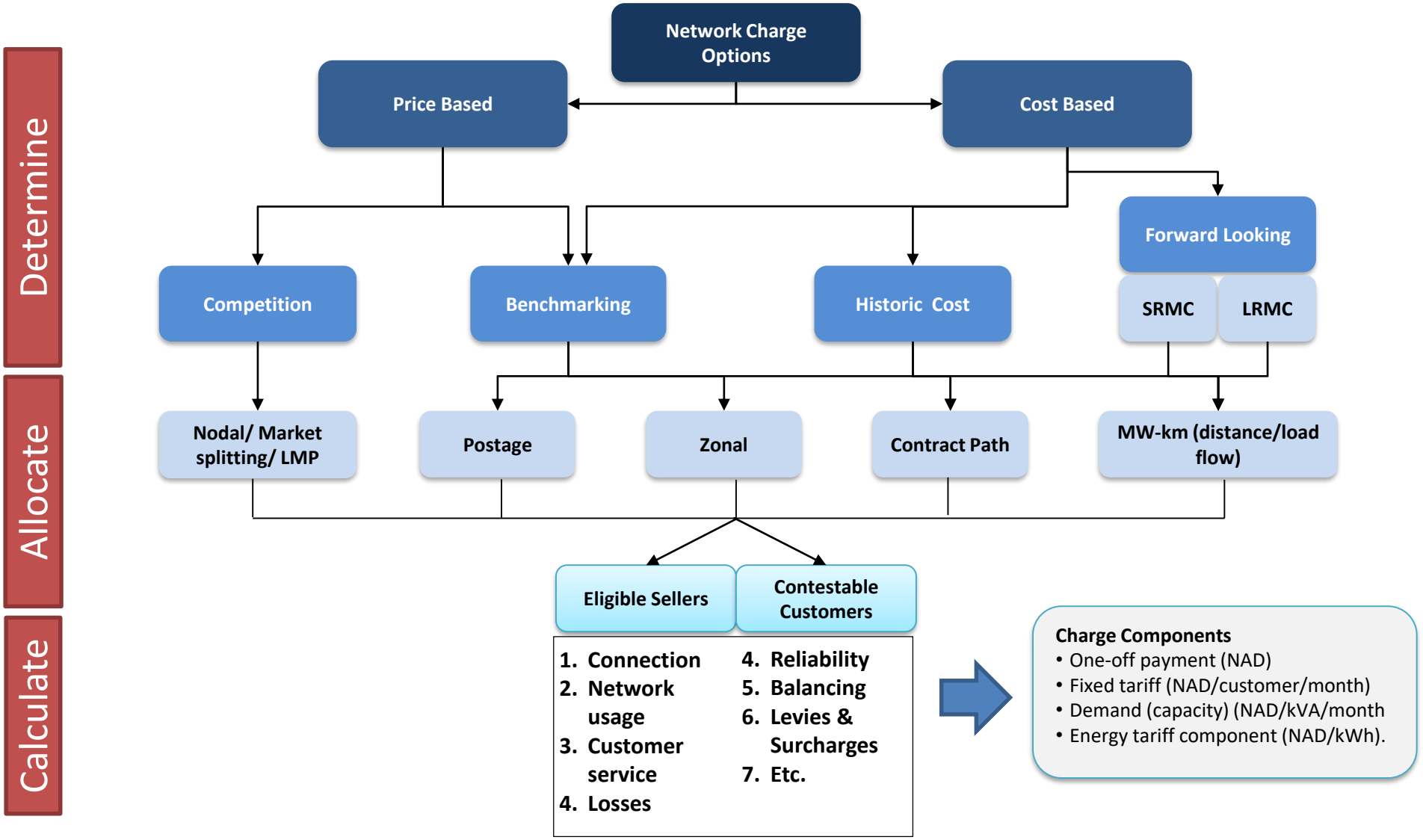
1. Some principles and objectives are in conflict which require trade-offs
2. The following specific challenges are noted:
    a) Currently, most charges are based on average costs which means that some customers will pay more and some less than the true cost of supply.
    b) Utilities want to recover their investment cost (which is a sunk cost). This interferes with efficient pricing signals in which sunk costs are ignored. Challenge is to find a way that minimises the influence of sunk cost charges on investments decisions.
    c) Network costs are “lumpy” resulting in cycles of large investments followed by periods of excess capacity and no investments.
    d) Network flows are dynamic making it difficult to accurately forecast network usage
    e) Commercial energy “flows” in an agreement are different from technical energy “flows” in the network

WHEELING FRAMEWORK

METHODOLOGY

WHEELING FRAMEWORK

Network Charge Methodology Options



1. Currently, NamPower and the Distributors follow a similar approach:
    1. For large customer the Connection Charges are based on what upgrades now and into the future are needed. This is essentially a forward looking LRMC method
    2. Postage Stamp method is used all other costs. In other words customers in same tariff category pay the same charge irrespective of distance or location.
    3. Customers pay for all network costs, generators only pay for Connection

WHEELING FRAMEWORK

Methodology Options Summary

Methodology	Brief Description	Key Attributes
Postage Stamp	• All users pay the same charge irrespective of distance or location	• Simple and easy but does not send good investment signals
Zonal	• Similar to postage stamp but region is divided into zones (same charges within a zone but different charges between zones)	• Sends better investment signal than Postage Stamp but also more complex
Contract Path	• Specific charges are determined based on a specific start and end points	• Suitable if specific costs must be recovered from only some customers.
MW-km	• Charges are based on the distance between start and end points drives the cost	• Fairly popular but discriminates sometimes unfairly against long-haul transactions.
Short-run Marginal Cost	• Annualised charges to reflect the SRMC of the network usually consisting of forward looking losses and variable O&M, etc	• Economically efficient but not does not recover full revenue requirement of the utility
Long-run Marginal Cost	• Annualised charges to reflect LRMC of the network usually consisting of forward looking investments, O&M, staff, losses, etc.	• Requires complex modelling • Good investment decision signal • Meets future cost but ignores historic cost
Nodal	• Prices are determined following market splitting due to congestion	• Complex and is more suited for a competitive market

1. Namibia's wheeling methodology is a combination of different methods including:
    a) LRMC to send a good investment decision for cost recovery of specific assets (e.g. Connection / Contract Path)
    b) Postage Stamp approach to recover regulatory allowed historic cost (simple, non-discriminatory but not efficient)
    c) Benchmarks (where above two approaches will either be too complex or undermine economic efficiency)

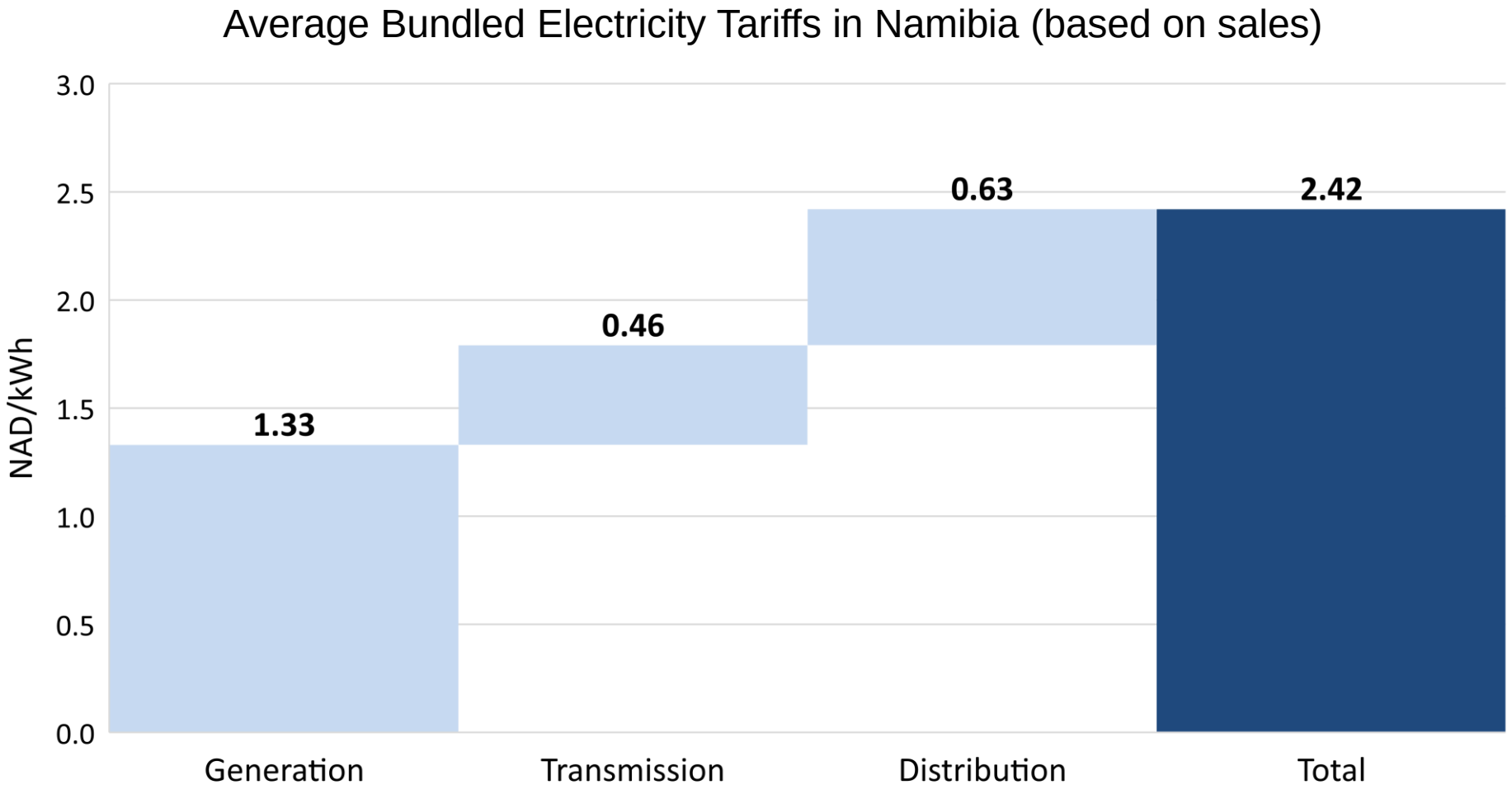
Notable Features of the Namibia Wheeling Framework … 1

1. Energy Reconciliation at the relevant metering points are needed to adjust for differences between commercial and technical energy "flows".
2. Where possible CC's will pay for the use of the network including losses. This approach has the following advantages:
   a) It is consistent with the current approach
   b) It avoids discrimination between energy purchased from a utility or energy purchased from and IPP.
   c) It reduces the number of network charges payable by an ESs and therefore lowers wheeling price risk to an ES.

Notable Features of the Namibia Wheeling Framework … 2

3. Ignoring the EG's incremental impact on losses, market participants don't pay any additional charges for the wheeling of power, except under the following instances:
   a) When a Tx connected EG exports power (via an Exporter) from Namibia. In this instance a Tx Network Export charge will apply.
   b) When Dx connected EG sells power to a CC in another network. In this instance a Dx Network Export charge will apply.
   c) If the ES requires deemed energy payment a Network Capacity Reserve charge (optional)
   d) Note: In case a Dx connected EG exports power from Namibia both the Dx and Tx Network Export charges will apply.
4. The wheeling framework takes into account the EG's incremental impact losses (increase or decrease) into account. However, any claim of a loss increase or decrease must be supported by an appropriate technical study by a reputable organisation and accepted by the network licensee

TARIFF UNBUNDLING

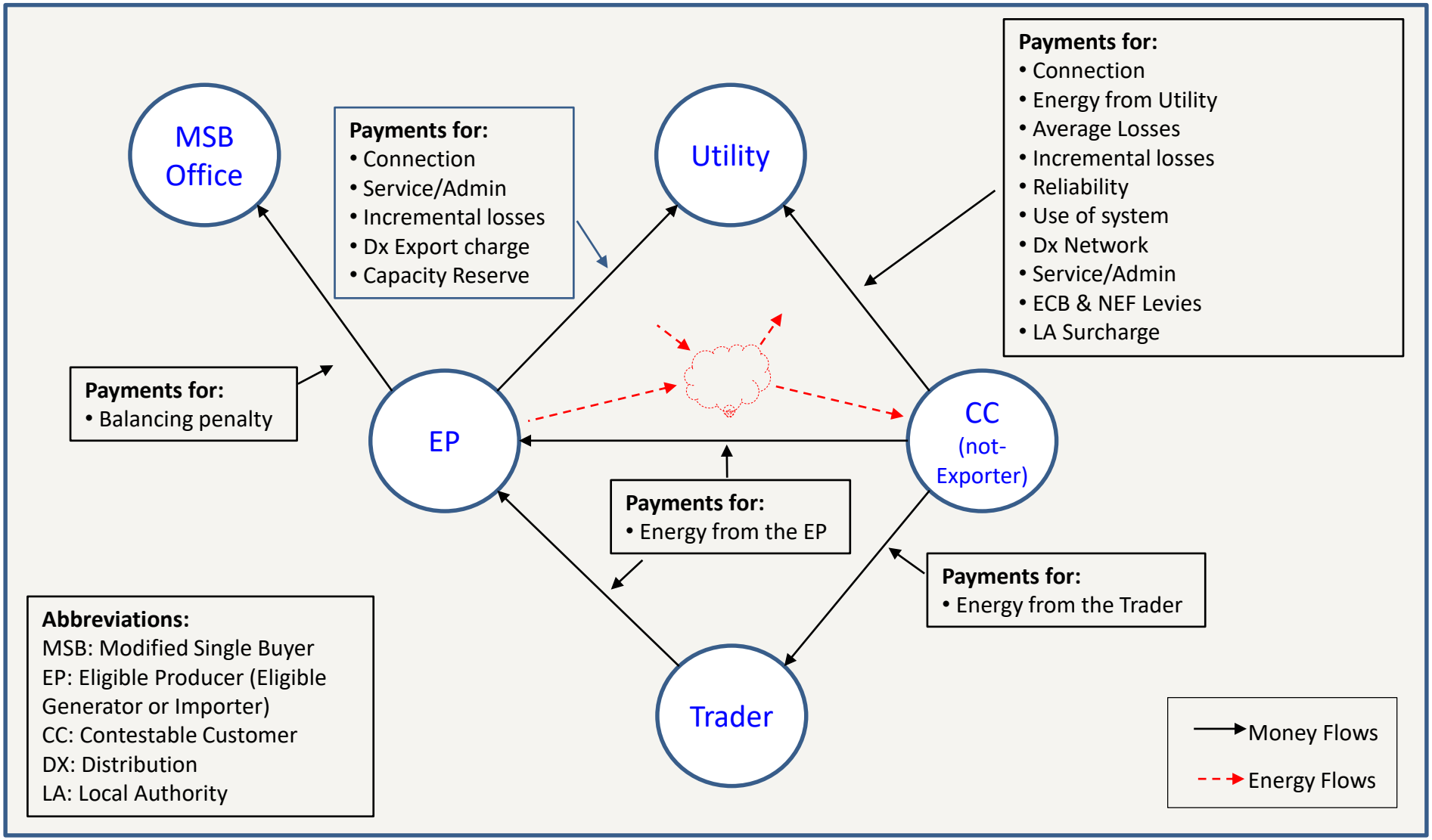

Average Bundled Electricity Tariffs in Namibia (based on sales)
NAD/kWh
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1.33
0.46
0.63
2.42
Generation
Transmission
Distribution
Total

Tariff Unbundling

1. To ensure the wheeling framework meets its objective it is essential to unbundle transmission and distribution tariffs.
2. Unbundling is required to ensure that customers pay for the services they use and are not able to escape certain energy related charges, due to either behind the meter supply or a bilateral transactions.
3. NamPower have already unbundled their tariff
4. More work is needed to unbundle distribution tariffs further.

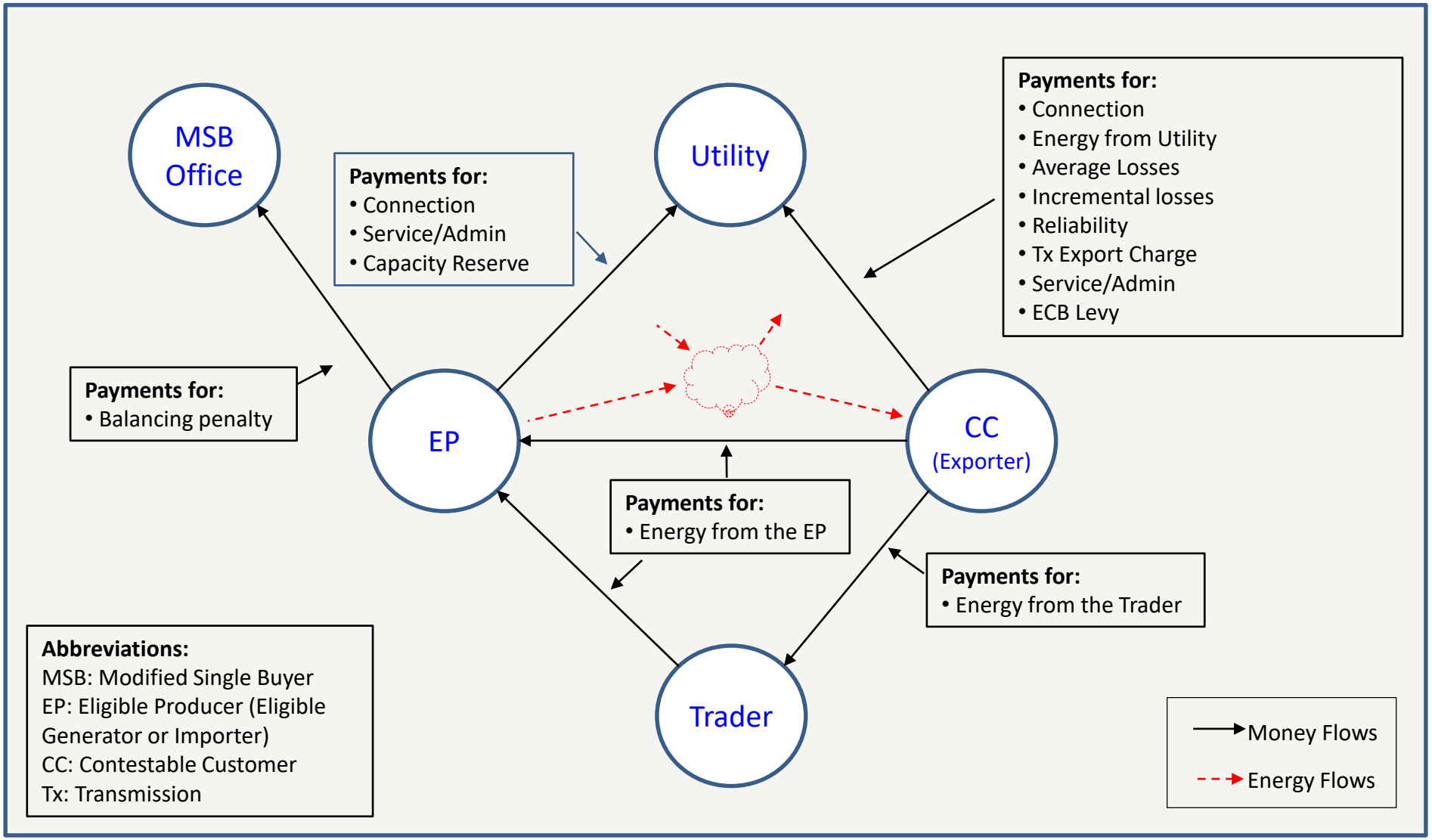
WHEELING FRAMEWORK

Who Invoices Whom for What if CC is not an Exporter



WHEELING FRAMEWORK

Who Invoices Whom for What if CC is Exporter

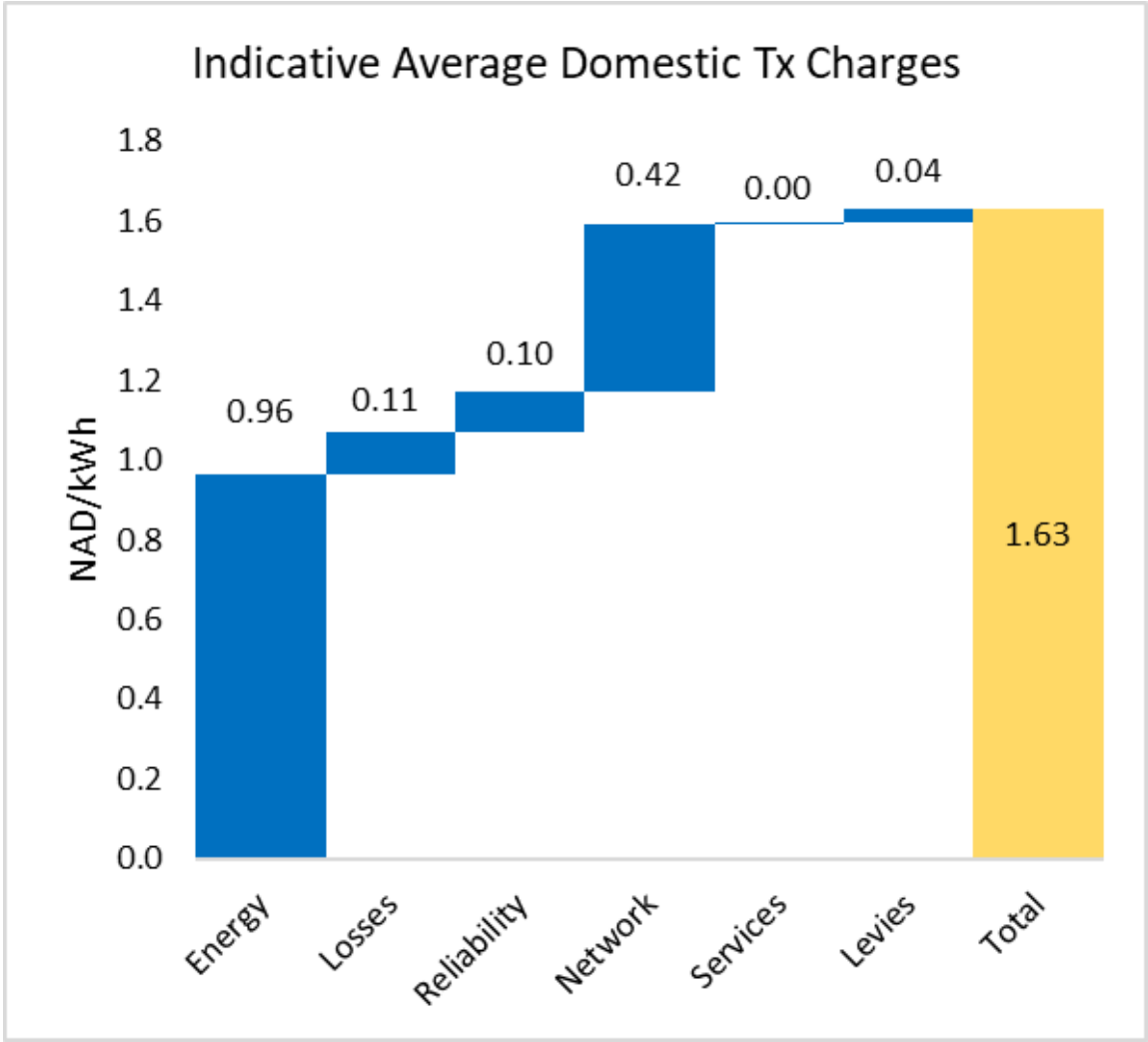


WHEELING FRAMEWORK

Indicative Transmission Wheeling Charges

(based on transmission sales)

Indicative Average Transmission Charges			
Unbundled Service	**Applies to Tx**		**Indicative Charge**
	CC	**ES**	
Connection charges	✓	✓	Specific
Energy from NP	✓		0.96
Tx losses charge	✓		0.11
Reliability charge	✓		0.10
Use of System charges	✓		0.42
Service charges	✓	✓	0.00
Levies (ECB, NEF)	✓		0.04
EG incremental Tx losses charge/rebate	✓		Specific
Network Export charge		✓	TBD
Network Capacity Reserve charge		✓	Specific
Balancing penalty		✓	Based on NP Energy rate
Energy from EG	✓		Negotiated

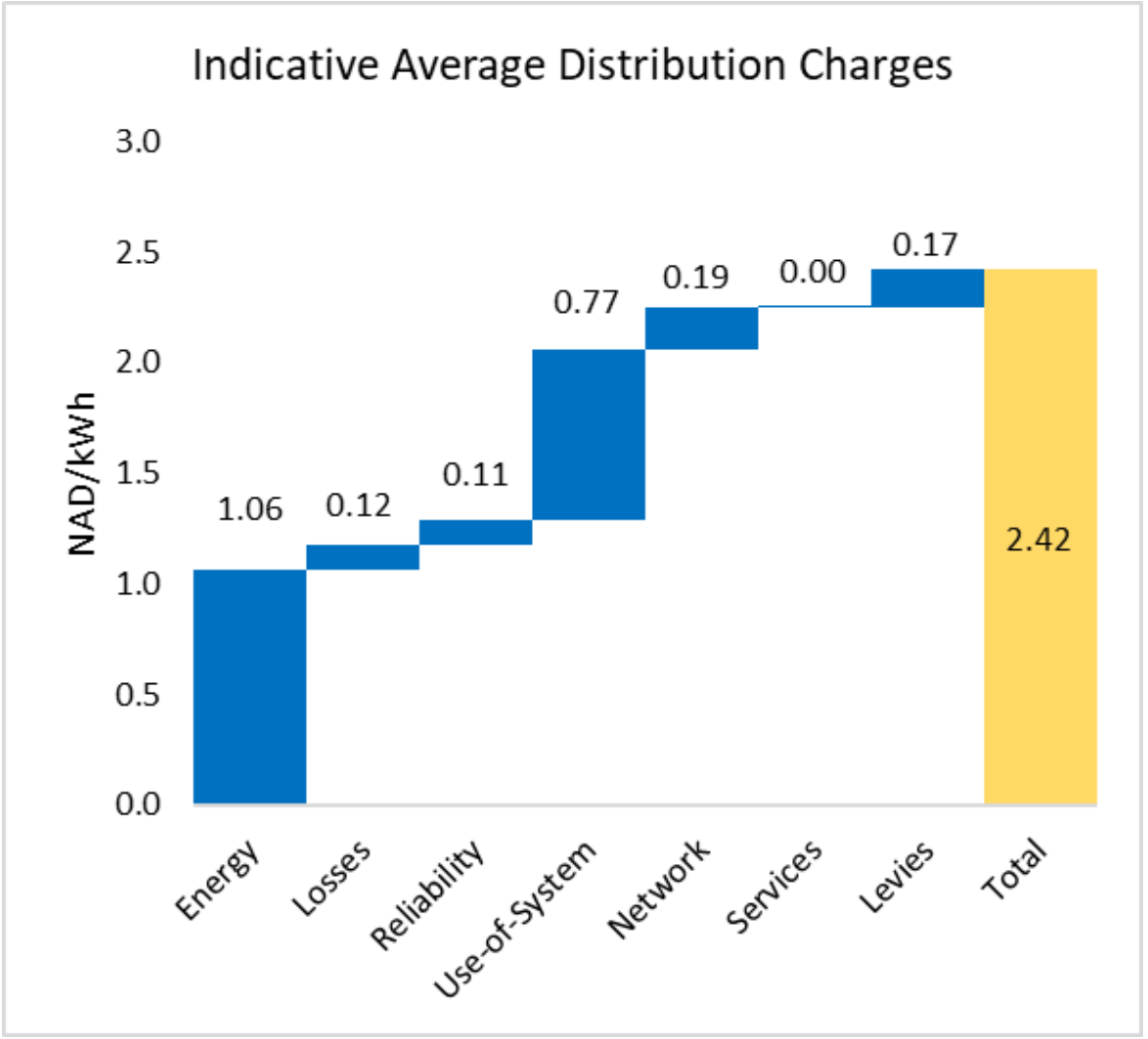


WHEELING FRAMEWORK

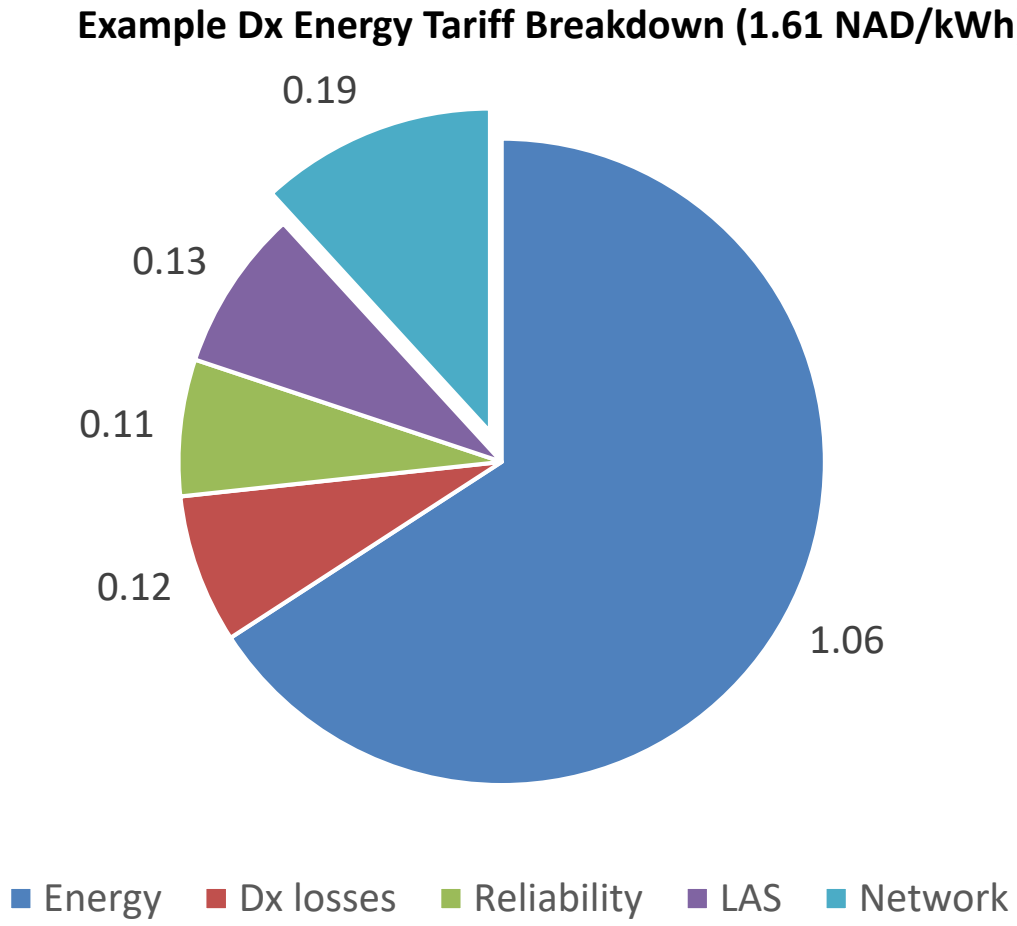
Indicative Distribution Unbundled Charges

(based on distribution sales)

Indicative Average Distribution Charges			
Unbundled Service	Applies to connected		Indicative Charge
	CC	ES	
Connection charges	✓	✓	Specific
Energy from Utility	✓		1.06
Dx losses charge	✓		0.12
Reliability charge	✓		0.11
Use of System charges	✓		0.77
Network charge	✓		0.19
Service charges	✓	✓	0.00
Levies (ECB, NEF, LAS)	✓		0.17
EG incremental losses charge/rebate	✓		Specific
Network Export charge		✓	0.22
Network Capacity Reserve charge		✓	Specific
Balancing penalty		✓	Based on NP energy rate
Energy from EG	✓		Negotiated



Unbundling of Distribution Charges



1. Energy tariff = NP's unbundled energy tariff + NP's losses
2. Dx Losses = Energy tariff x distributor's approved loss factor
3. Reliability = NP's Reliability charge x distributor's approved loss factor
4. Network charge = Retail energy tariff – (1) – (2) – (3)

Network Export Charge

The Network Export charge requires a careful trade-off between efficiency and simplicity:

1. View CC as if a customer at the border with similar charges (charges put to EG)
    a) Charge based on historic cost
    b) Sends the wrong investment decisions especially when it “de-congest” the network
2. Adopt a “deep connection” cost approach:
    a) Due to lumpiness it could be expensive for the “first comer” with potentially complex “rebate” arrangements for “late-comers”
3. Adopt a Contract Path method
    a) Charge based on forward costing (LRMC) for developing “network corridors” and charged a pro-rate basis for the use of the capacity
    b) Not practical if there are many options/transactions/corridors. Could work in case of “Export” corridors for NamPower. Expect to be lower than current average Tx network charge of 0.46 NAD/kWh

Network Export Charge (Distribution)

1. Adopt a benchmark charge

   a) Not as problematic and complex as “deep connection” and “Contract Path and send a better but not perfect investment decisions. It is easy and provides certainty.

   b) Recommended approach for Dx Network Export charge

   c) Set at maximum 0.22 NAD/kWh to recover Dx infrastructure costs (Depreciation return and O&M). Licensee may decide to charge less depending on size, location and flows.

1. No additional wheeling charges except for incremental losses (could also be rebate) and “export”.
2. Dx “export” charges are capped to incentivise usage of the network
3. Tx “export” charges will be linked to specific evacuation corridors to recover the cost and the fair to the Namibian electricity consumer.

THE END