IESO
Settlement Principles

Use of TLFs Clarified

28 Feb 2005

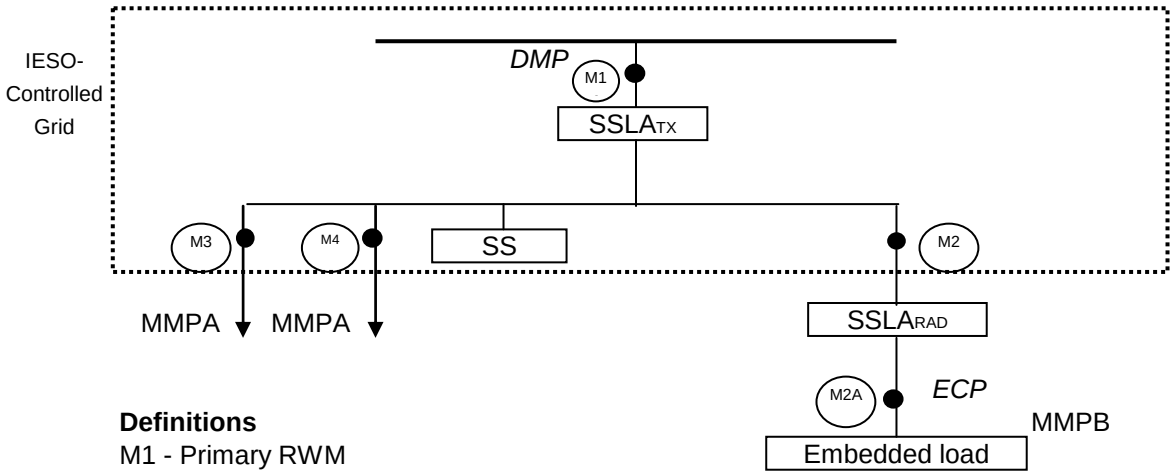
Principles

1. A metered market participant is either embedded or directly connected, not both.
2. An embedded participant is defined as per the Market Rules i.e. not directly connected to the IESO-controlled grid but is instead embedded within a distribution system.
3. An embedded participant has a TLF applied but no station service load or transmission charge.
4. The transmission connection agreement defines whether a participant is directly connected and subject to transmission charges.
5. Directly connected LDCs:
   - do not have a TLF applied,
   - do have a share of site specific losses,
   - do have a share of station service load (where applicable),
   - and they are a TT customer.

Principles (continued)

6. TLF is used for settling both the energy consumed and the transmission charges.
7. TLF includes the station service load.
8. Ownership is used as the basis of establishing TLFs. For example a HONI TLF is applied where HONI the distributor owns the feeder, of any length, between an LDC and the HONI transmitter.
9. If the LDC does not have an approved TLF for embedded distributors, none is applied. NB: a customer class TLF does not apply!
10. There is no balancing DP. The contributors are added as is.

A. General Arrangement - Note Variations of Layout Used in all Cases



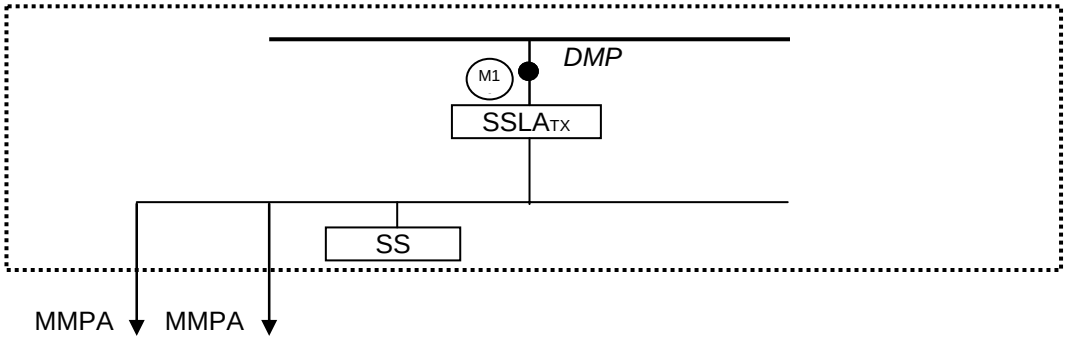
Definitions

M1 - Primary RWM
M2A - Embedded RWM
M2, M3 & M4 - RWM
● defines the CT location (the point of measurement)
SS - station service (note location may vary)
$SSLA_{TX}$ - site specific loss adjustment in kWh - transformer
$SSLA_{RAD}$ - site specific loss adjustment in kWh - radial line loss
where there is sharing of losses and station service, MMPA share Y, MMPB share Z, then
$SSLA_{TX} = SSLAY + SSLAZ$
$SS = SSY + SSZ$
ECP - embedded connection point
DLF - distribution loss factor (per OEB)
TLF - total loss factor (per OEB)
DMP - defined meter point
TT - transmission tariff
Total energy - the energy flowing at the DMP
Agreement - means an $SSLA_{TX}$ and SS allocation agreement between MMPs
No agreement - means Market Rules Ch 9 default values for $SSLA_{TX}$ and SS
MMP - metered market participant, may be A, B etc
Tap - means a physical line tap for load, whether temporary, or permanent, or emergency

Notes:
1. SSLAY and SSLAZ are loss component values (kWh) calculated from application of Y & Z to the loss code for each interval and represents their share of the losses.
2. SSY and SSZ is the application of the ratios of Y and Z to the total station service load, also in kWh
3. The ECP is equivalent to the DMP for an embedded facility. ECP is used for simplicity.
4. The transmission tariffs are strictly based on the OEB Ontario Transmission Rate Schedules Issued April 30, 2002.
5. The assumption is the TLF includes the station service load
6. An embedded particpant has a TLF but no station service load or transmission charge.
7. Directly connected to a HONI Transformer Station (TS) means the LDC feeder is directly connected to the TS bus inside the fence - no TLF, and HONI is the TT customer
8. An embedded participant is as per the Market Rules and is everything not directly connected
9. A participant is either embedded or directly connected, not both.

1. High Side Meter

Assumption: MMPA is the only participant

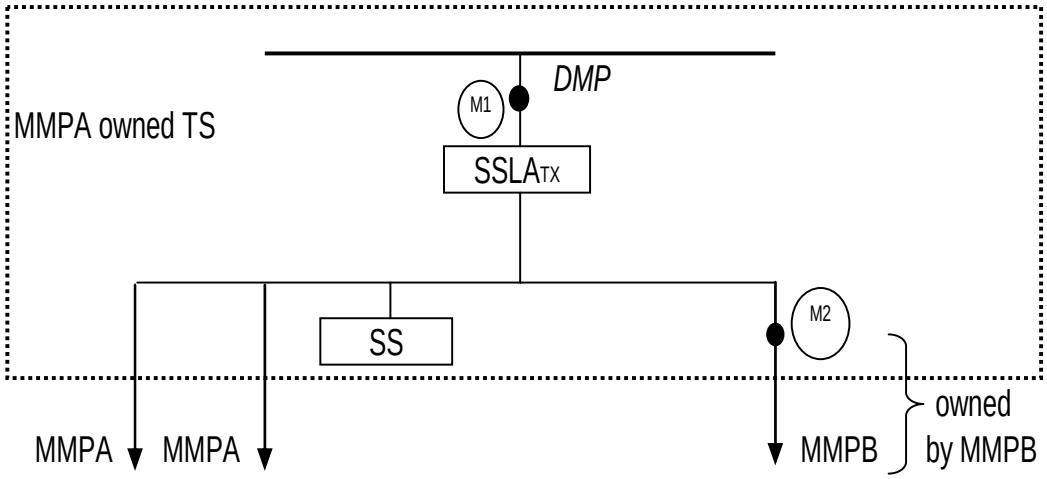


1.1 Total $_{energy}$ = M1 M1 captures all losses and station service

MMPA$_{energy}$ = M1

MMPA$_{TT}$ = M1

2. High Side Meter + MMPB Directly Connected to the TS bus with feeder meter



MMPA and MMPB are directly connected to the TS bus inside the fence
MMPA and MMPB are transmission customers

2.1 Agreement on losses

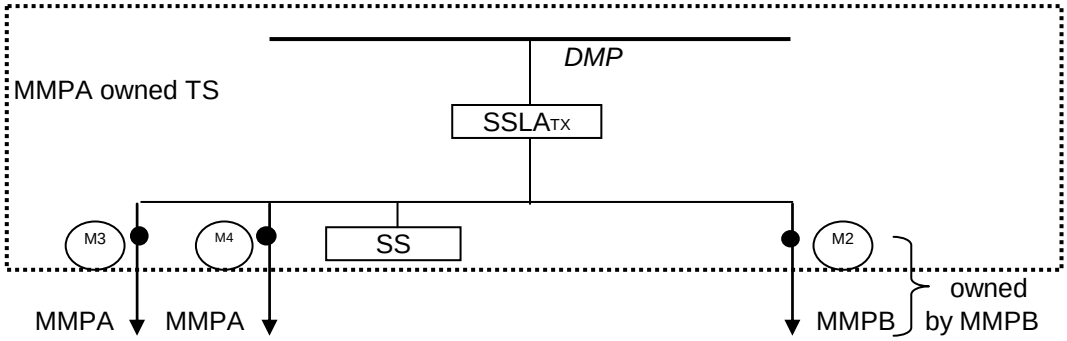
$MMPA_{energy}$ = M1-(M2+SSZ+SSLAZ)
$MMPA_{TT}$ = M1-(M2+SSZ+SSLAZ)
$MMPB_{energy}$ = M2+SSZ+SSLAZ
$MMPA_{TT}$ = M2+SSZ+SSLAZ

2.2 No Agreement on losses (MMPB gets zero losses)

SSZ=0, SSLAZ=0
$MMPA_{energy}$ = M1-M2
$MMPA_{TT}$ = M1-M2
$MMPB_{energy}$ = M2
$MMPA_{TT}$ = M2

Notes: 1. MMPB provides the loss calculation
2. MMPA responsible for station service metering

3. Feeder Meters - MMPA and MMPB Directly Connected to TS bus



MMPA and MMPB are directly connected to the TS bus inside the fence
MMPA and MMPB are transmission customers

3.1 <u>Agreement on losses</u>

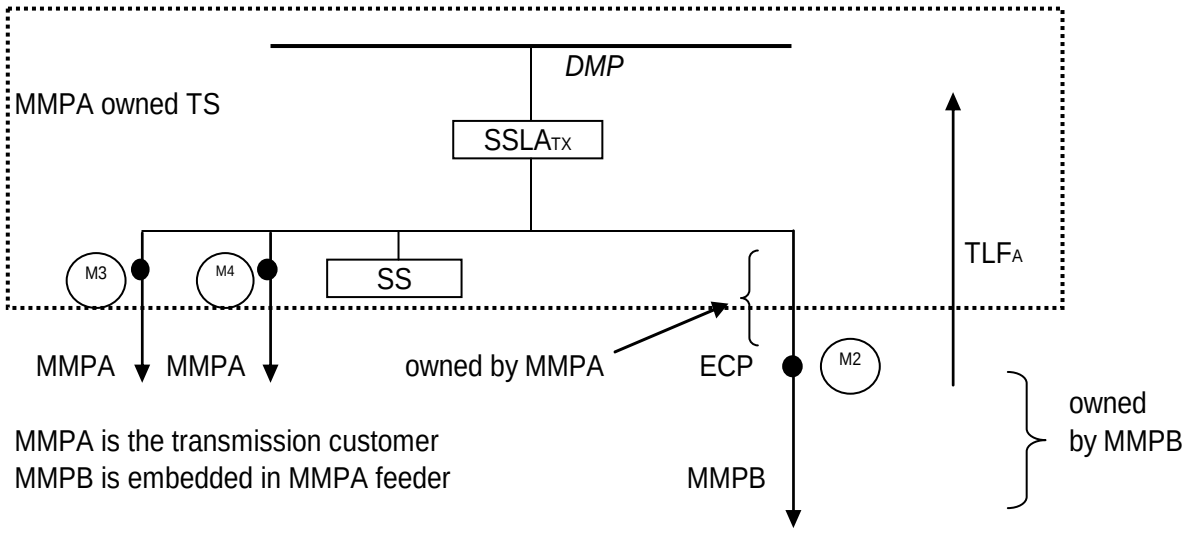
$MMPA_{energy}$ =	M3+M4+SSY+SSLAY
$MMPA_{TT}$ =	M3+M4+SSY+SSLAY
$MMPB_{energy}$ =	M2+SSZ+SSLAZ
$MMPB_{TT}$ =	M2+SSZ+SSLAZ

3.2 <u>No Agreement on losses</u>

Based on breaker count of 3 breakers
same as above (with agreement) except losses calculated using
Y = 2/3
Z = 1/3

Notes: 1. MMPA provides the loss calcuation
2. MMPA responsible for station service metering

4. Feeder Meters - MMPB Directly Connected to MMPA Feeder



4.1 No agreement on losses required

$MMPA_{energy}$ = M3+M4+SSY+SSLAY

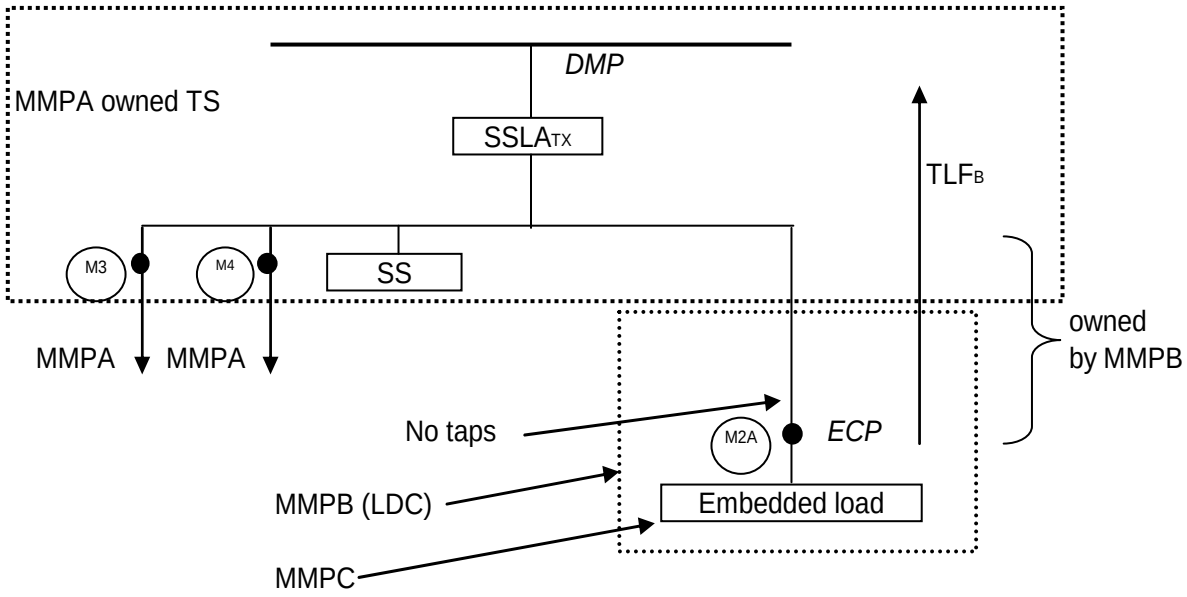
$MMPA_{TT}$ = M3+M4+SSY+SSLAY+ M2A.TLF_A

$MMPB_{energy}$ = M2.TLF_A

Notes:

1. The TLF may have more than one value depending on the OEB approved rate - for example it may have a smaller value for an ECP close to the TS, and larger values further away from the TS e.g. HONI TLF
2. MMPA provides the loss calcuation
3. MMPA responsible for station service metering
4. Loss share Y = 2/3 based on breaker count used by MMPA

7. MMPA and MMPB Directly Connected, MMPC Embedded in MMPB



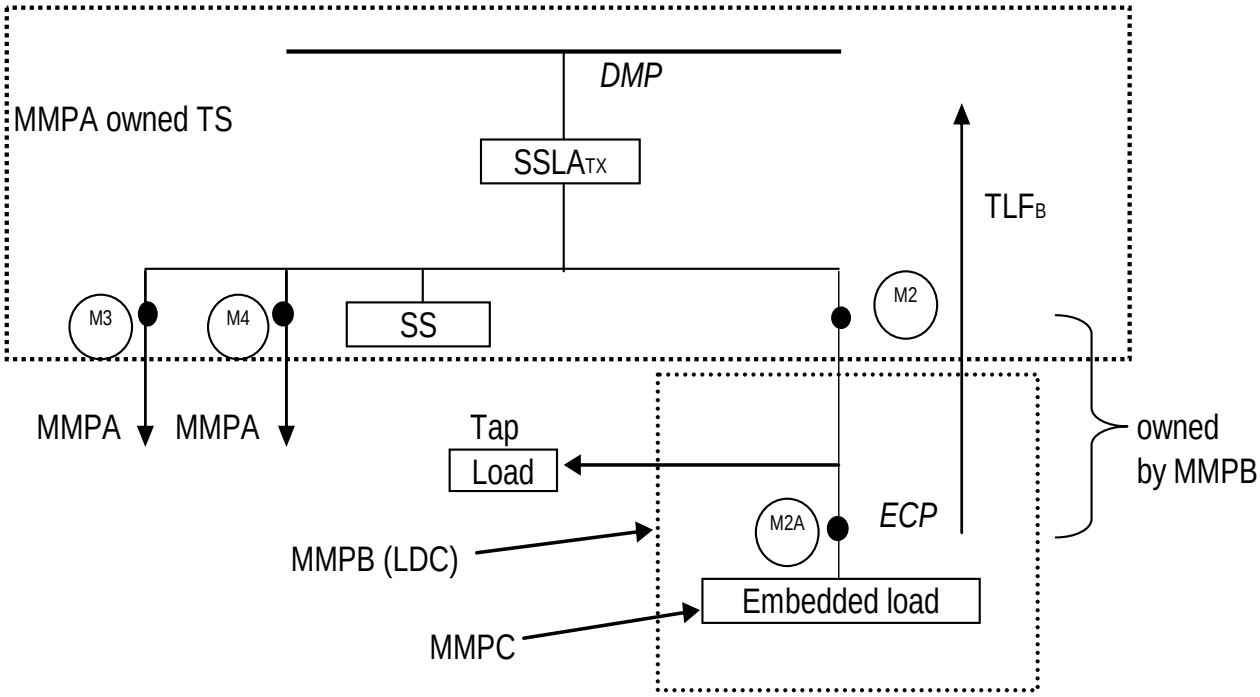
MMPA and MMPB are directly connected to the TS bus inside the fence
MMPA and MMPB are transmission customers

7.1 <u>No agreement on losses required</u>

$MMPA_{energy}$ =	M3+M4+SSY+SSLAY	
$MMPA_{TT}$ =	M3+M4+SSY+SSLAY	
$MMPB_{TT}$ =	$M2A.TLF_B$	
$MMPC_{energy}$ =	$M2A.TLF_B$	per OEB instructions

Notes:
1. MMPA provides the loss calculation
2. MMPA responsible for station service metering
3. Loss share Y=2/3 based on breaker count used by MMPA

8 a). MMPA and MMPB Directly Connected, MMPC Embedded in MMPB - Feeder meters



MMPA and MMPB are directly connected to the TS bus inside the fence
MMPA & the MMPB are both transmission customers
MMPA & the MMPB are the two parties that have to agree on losses

8 a).1 <u>Agreement on losses</u>

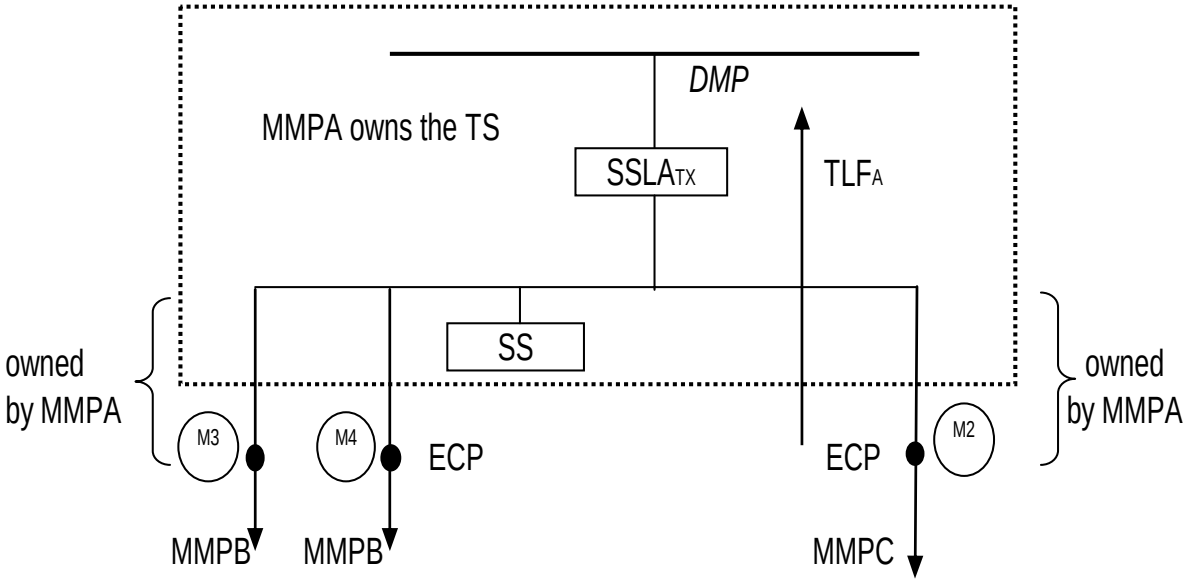
$MMPA_{energy}$ =	M3+M4+SSY+SSLAY	
$MMPA_{TT}$ =	M3+M4+SSY+SSLAY	
$MMPB_{energy}$ =	M2+SSZ+SSLAZ - M2A.TLF_B	
$MMPB_{TT}$ =	M2+SSZ+SSLAZ	
$MMPC_{energy}$ =	M2A.TLF_B	per OEB

8 a).2 <u>No agreement on losses</u>

Same as above except A's loss factor is based on 2/3 and B's on 1/3

Notes: 1. MMPA provides the loss calculation
2. MMPA responsible for station service metering

8 b). MMPA owns the TS, MMPB and MMPC Embedded



MMPB and MMPC have moved outside the fence
MMPB and MMPC are both embedded in MMPA feeders
MMPA is the transmission customer

8 b).1 <u>No requirement for agreement on losses</u>

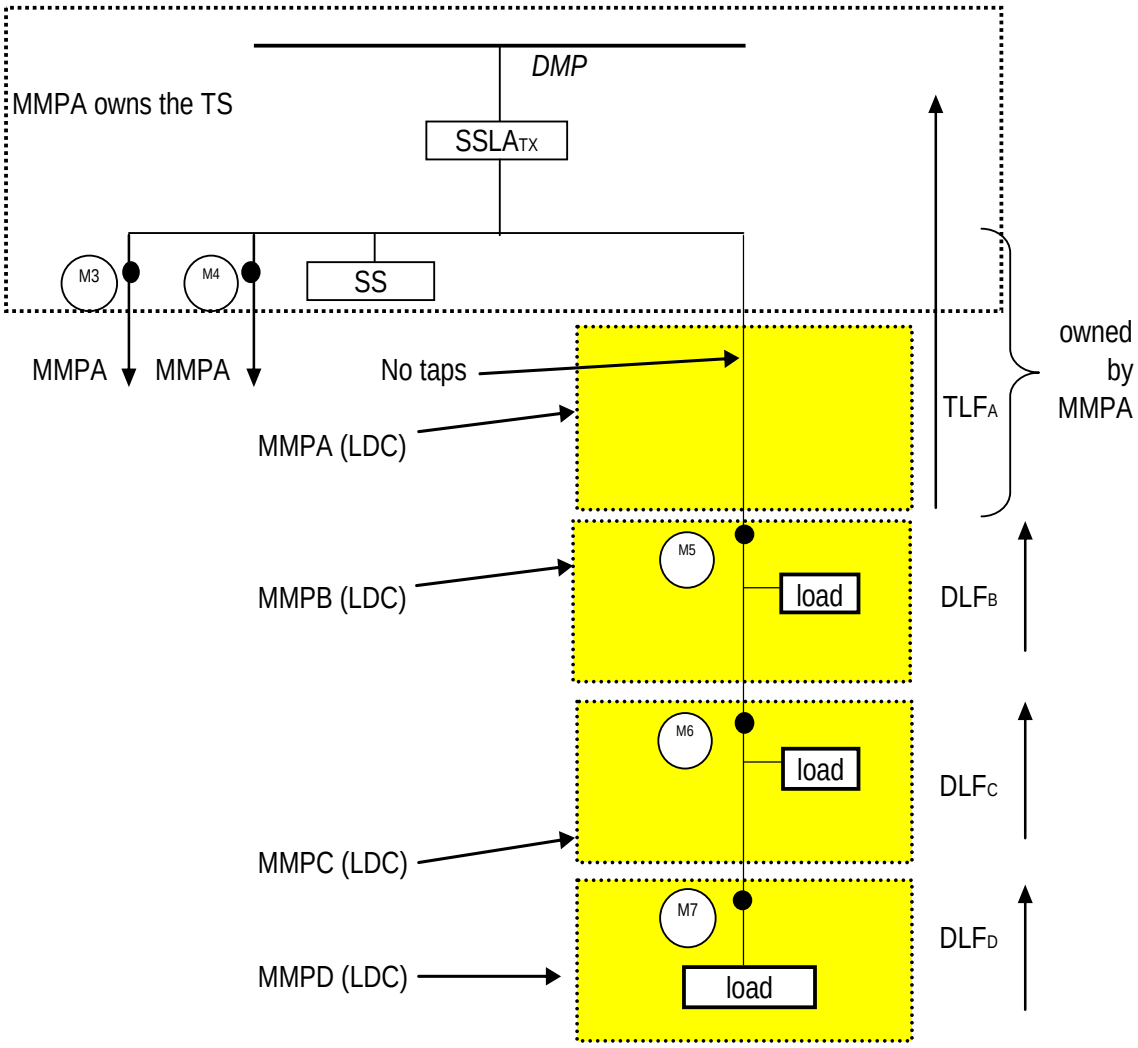
$MMPA_{TT}$ = $M3.TLF_A + M4.TLF_A + M2.TLF_A$

$MMPB_{energy}$ = $M3.TLF_A + M4.TLF_A$

$MMPC_{energy}$ = $M2.TLF_A$

Notes: 1. No SSLA calcuation required
2. No station service metering required

9 a). Multiple Embedded Distributors with taps



MMPA is directly connected to the bus inside the fence
MMPB, MMPC, and MMPD are embedded
MMPA is the transmission customer

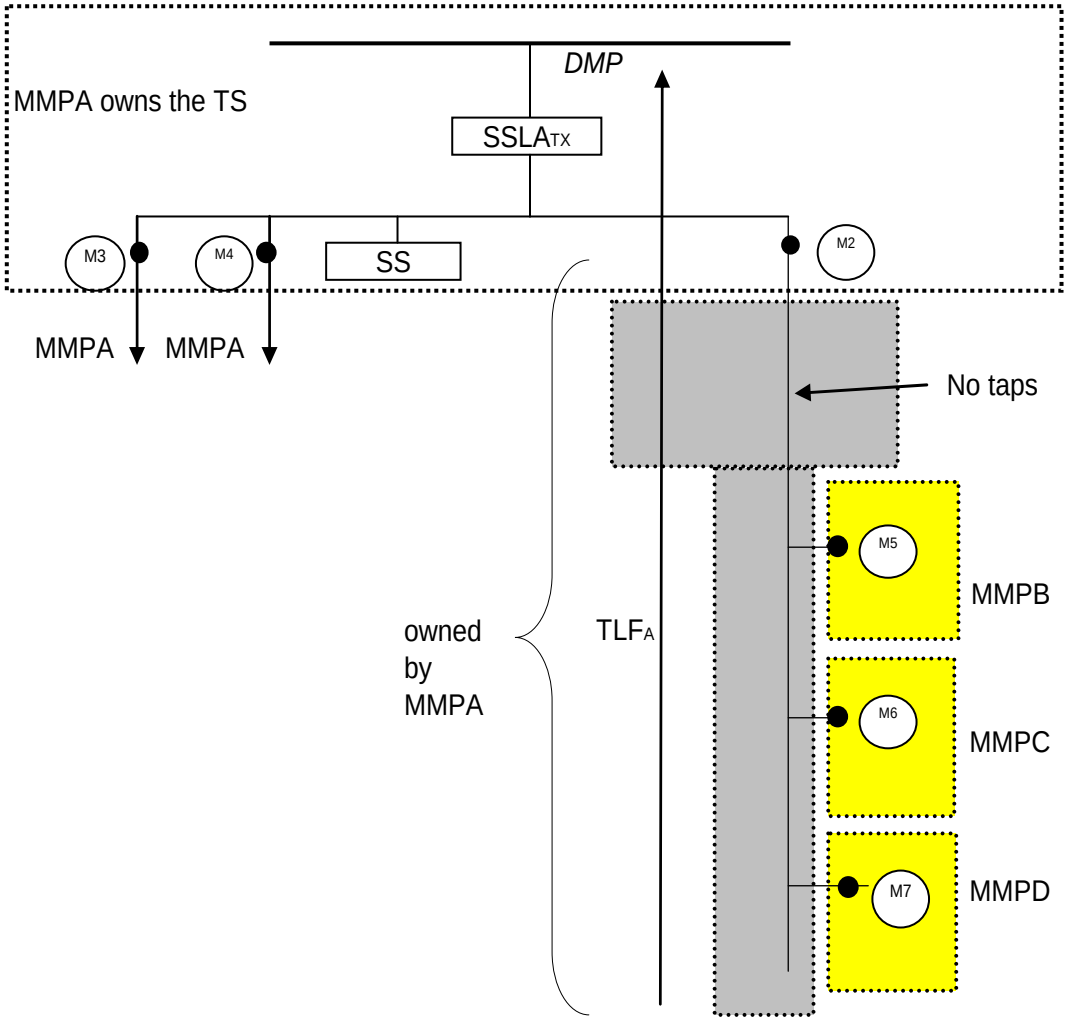
9 a)1. <u>No agreement on losses is required</u>

$MMPA_{energy}$ = M3+M4 - M5.TLF_A+ SSY+SSLAY
$MMPA_{TT}$ = M3+M4 + M5.TLF_A+SSY+SSLAY
$MMPB_{energy}$ = M5.TLF_A - M6.DLF_B.TLF_A
$MMPC_{energy}$ = M6.DLF_B.TLF_A - M7.DLF_C.DLF_B.TLF_A
$MMPD_{energy}$= M7.DLF_C.DLF_B.TLF_A

NB. DLF_C and DLF_B must be specifically approved for use on embedded distributors (not embedded customers), otherwise a loss factor of 1.0 will be used.

Notes: 1. MMPA provides the loss calculation
2. MMPA responsible for station service metering

9 b). Embedded Distributors in Parallel



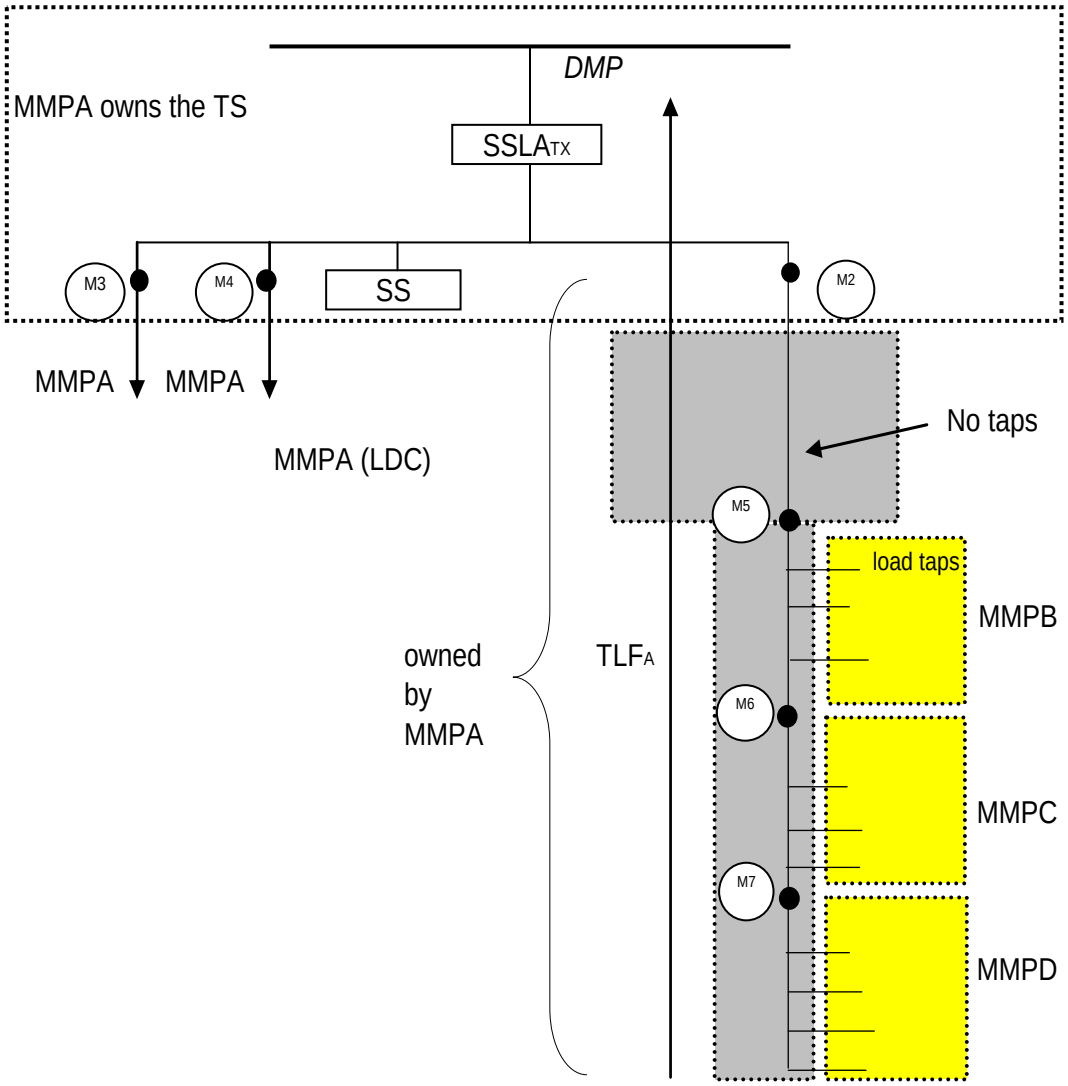
MMPA is directly connected
MMPA is the transmission customer
MMPB, MMPC and MMPD are embedded.

9 b)1. <u>No agreement on losses is required</u>

$MMPA_{energy}$ =	M3+M4+M2+SS+$SSLA_{TX}$ - M5.TLF_A - M6.TLF_A - M7.TLF_A	
$MMPA_{TT}$ =	M3+M4+M2+SS+$SSLA_{TX}$	
$MMPB_{energy}$ =	M5.TLF_A	per OEB
$MMPC_{energy}$ =	M6.TLF_A	per OEB
$MMPD_{energy}$=	M7.TLF_A	per OEB

Notes: 1. MMPA provides the loss calculation
2. MMPA responsible for station service metering

9 c). Embedded Distributors in Parallel (Meters Located between LDC Taps)



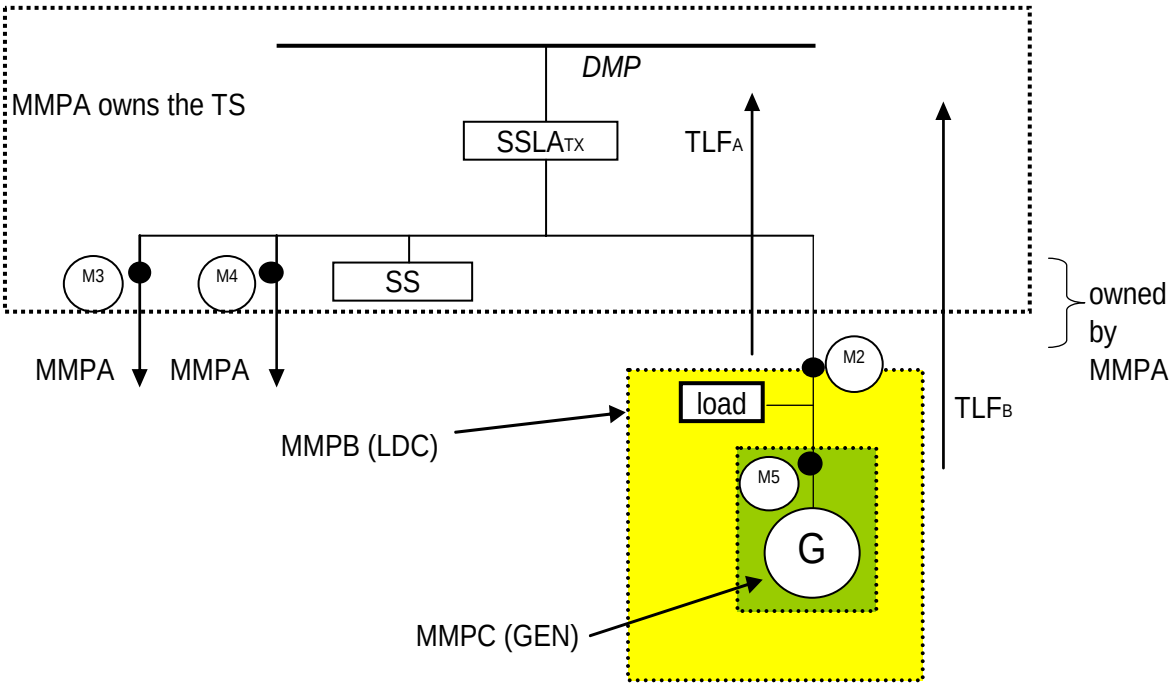
MMPA is directly connected
MMPA is the transmission customer
MMPB, MMPC and MMPD are embedded.

9 c)1. <u>No agreement on losses is required</u>

$MMPA_{energy}$ =	M3+M4+M2+SS+$SSLA_{TX}$ - M5.TLF_A	
$MMPA_{TT}$ =	M3+M4+M2+SS+$SSLA_{TX}$	
$MMPB_{energy}$ =	M5.TLF_A - M6.TLF_A	per OEB
$MMPC_{energy}$ =	M6.TLF_A - M7.TLF_A	per OEB
$MMPD_{energy}$=	M7.TLF_A	per OEB

Notes: 1. MMPA provides the loss calculation
2. MMPA responsible for station service metering

10 a). Embedded Generator in an Embedded Distributor



MMPA is directly connected
MMPA is the transmission customer
MMPB and MMPC are embedded

10 a)1. <u>No agreement is required</u>

$MMPA_{energy}$ =	M3+M4+SSY+SSLAY		
$MMPA_{TT}$ =	Check the appropriate transmission rate schedule for details		
$MMPB_{energy}$ =	$M2.TLF_A$ - ($M5C12.TLF_B$ + M5C34.LF)		see note 3.
$MMPC_{energy}$ =	$M5_{1,2}.TLF_B$ (for delivered channels 1 & 2)	= $M5C12.TLF_B$	per OEB
	$M5_{3,4}$. LF. (for received channels 3 & 4)	= M5C34.LF	see note 2.
	= $M5C12.TLF_B$ + M5C34.LF		

Note: 1. The embedded generator is an energy market participant
2. A loss factor (LF) default value of 1.0 will be used where not specified and agreed to by all parties
3. M5C12 and M5C34 are direction dependent
4. MMPA provides the loss calculations
5. MMPA responsible for station service metering

Example of transmission tariff settlement:
Using HydroOne transmission rate schedule and assuming a new generator > 1 MW
$MMPA_{TT}$ network = M3+M4+SSY+SSLAY + M2.TLFA
$MMPA_{TT}$ connection = M3+M4+SSY+SSLAY + M2.TLFA + M5C34.LF