



IEMOP

INDEPENDENT ELECTRICITY MARKET OPERATOR  
PHILIPPINES

**HARMONIZATION OF NSS  
MANUAL WITH  
ERC RESOLUTION NO. 7  
SERIES OF 2019**  
*Illustration and Sample  
Calculations*

*Illustration and sample calculations for IEMOP's  
proposal Harmonization of NSS Manual With ERC  
Resolution No. 7 Series of 2019 (Amended NSS Rules)*

*Disclaimer: For illustration purposes only, examples and calculations  
in the slides were simplified*

# NSS DISAGGREGATION

Current

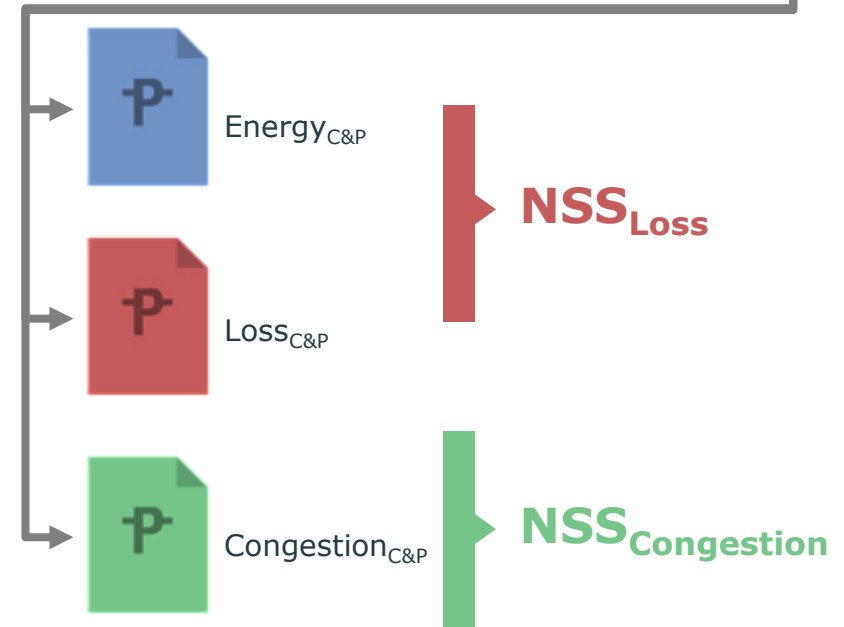
Amended\*

\*ERC Resolution No. 7 Series of 2019

$$NSS = \sum \text{Collectibles less Payables}$$

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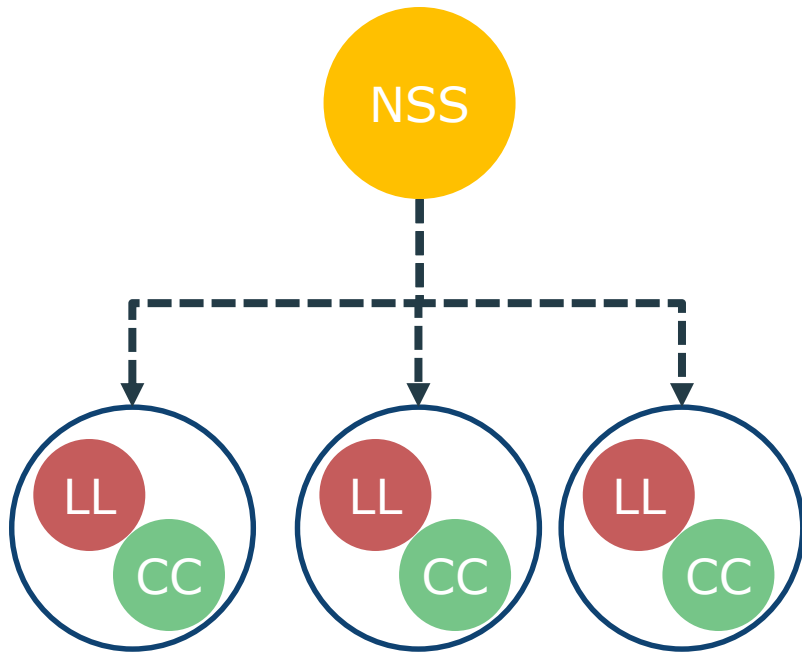
$$= \sum \text{Collectibles less Payables}$$



**Disaggregation of total NSS to NSS due to losses ( $NSS_{loss}$ ) and NSS due to congestion ( $NSS_{congestion}$ )**

# SEPARATE ALLOCATION

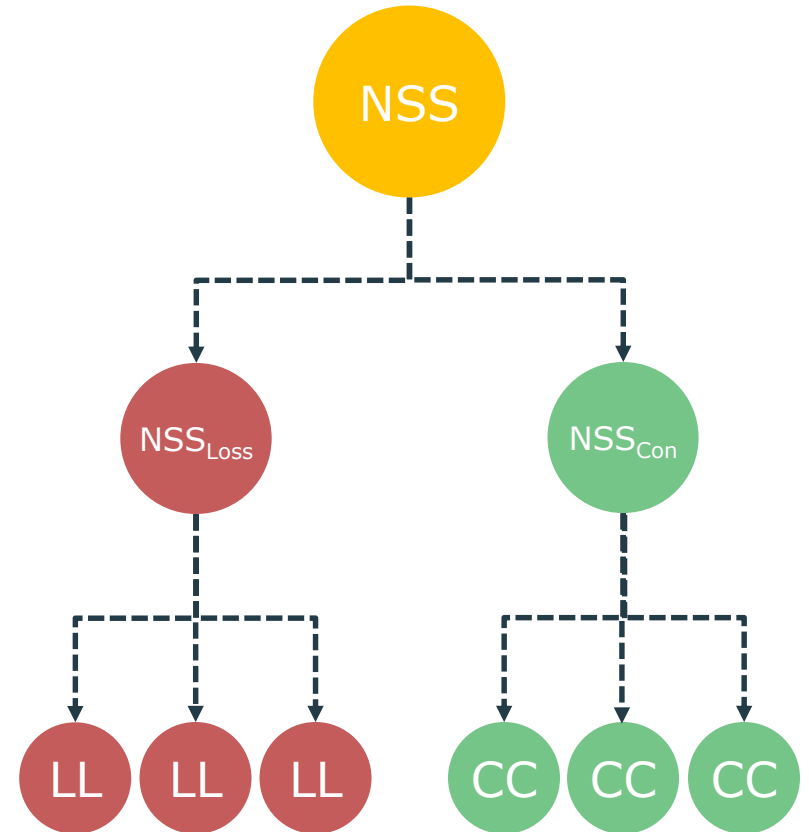
Current



*Allocate total NSS based on line loss and congestion charge (LLCC) payments*

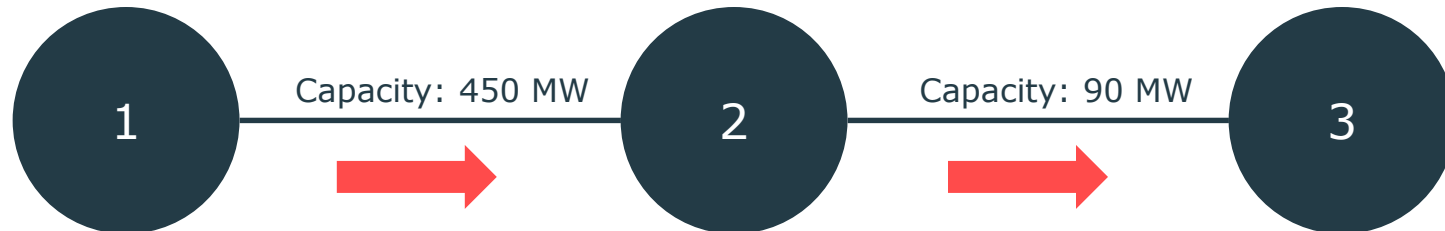
Amended\*

*\*ERC Resolution No. 7 Series of 2019*

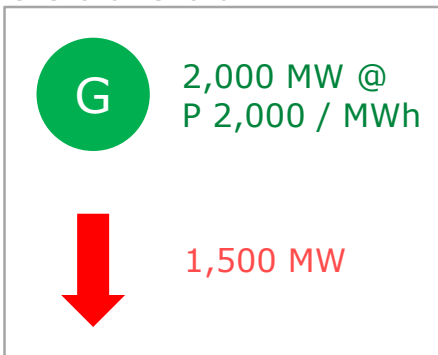


*Separate allocation of NSS due to losses ( $NSS_{loss}$ ) and NSS due to congestion ( $NSS_{congestion}$ )*

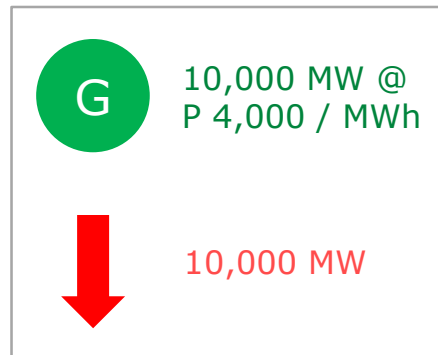
# SAMPLE CALCULATIONS



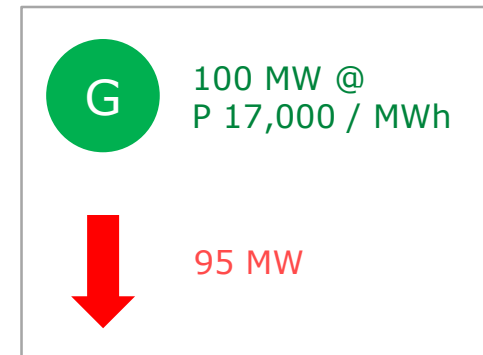
Offer and Demand:



#1

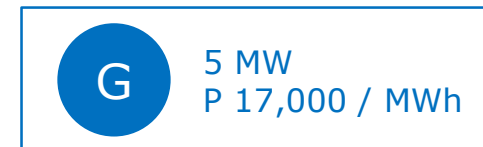
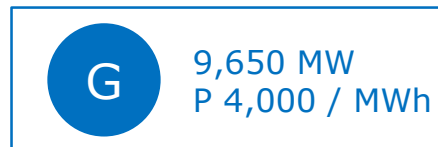
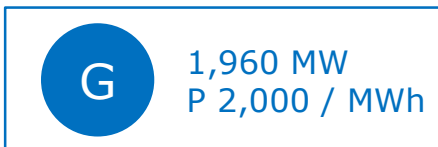


#2

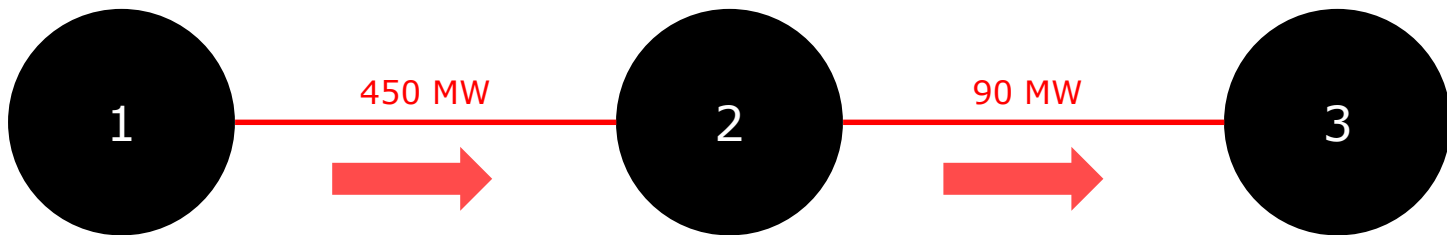


#3

Schedule and Price:



# SAMPLE CALCULATIONS



	Gen	Load
MWh	1,960	(1,500)
P/MWh	2,000	
P	3.92M	(3.00M)

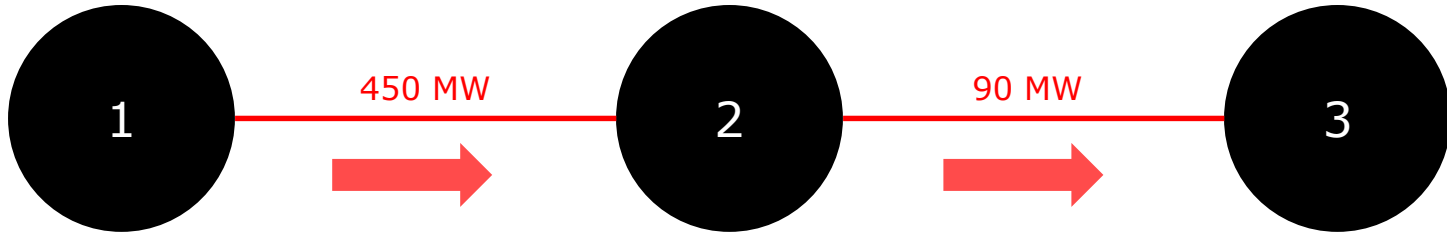
	Gen	Load
MWh	9,650	(10,000)
P/MWh	4,000	
P	38.60M	(40.00M)

	Gen	Load
MWh	5	(95)
P/MWh	17,000	
P	0.085M	(1.62M)

$$\begin{aligned}
 &\text{Settlement surplus (NSS)} \\
 &= (-3.00\text{M} + -40.00\text{M} + -1.62\text{M}) + (3.92\text{M} + 38.60\text{M} + 0.085\text{M}) \\
 &= \textbf{(P 2.01M)}
 \end{aligned}$$

# SAMPLE CALCULATIONS

## Current NSS Flowback Mechanism



	Gen	Load
MWh	1,960	(1,500)
P/MWh	2,000	
P	3.92M	(3.00M)

	Gen	Load
MWh	9,650	(10,000)
P/MWh	4,000	
P	38.60M	(40.00M)

	Gen	Load
MWh	5	(95)
P/MWh	17,000	
P	0.085M	(1.62M)

Settlement surplus (NSS)

$$= (-3.00M + -40.00M + -1.62M) + (3.92M + 38.60M + 0.085M) = (\mathbf{P\ 2.01M})$$

	Load 1	Load 2	Load 3
LLCC	0	-20,000,000	-1,425,000
NSS Allocation	0	1,876,313	133,687

Where:

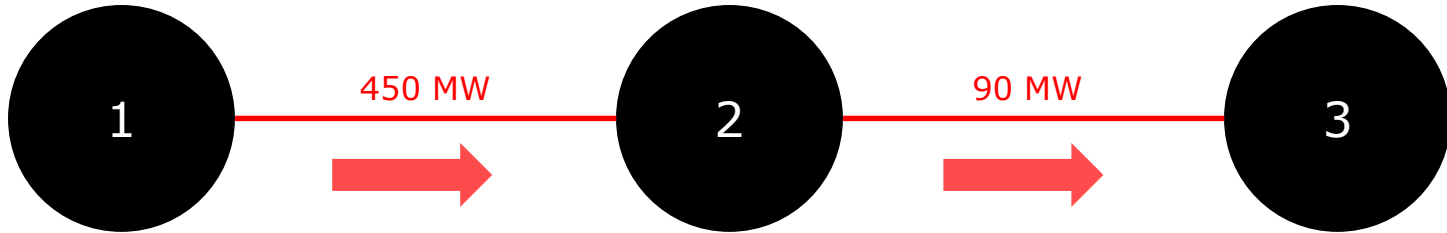
$$LLCC = LLC P_{RTD} \times (EAQ - BCQ) + LLC P_{RTX} \times (MQ - EAQ) + \text{Line Rental}$$

$$LLC P_{RTD/RTX} = LMP_{RTD/RTX} - MCP_{Lowest}$$

$$NSS\ Allocation = NSS \times (LLCC / \sum LLCC)$$

# SAMPLE CALCULATIONS

## Amended NSS Flowback Mechanism



	Gen	Load
MWh	1,960	(1,500)
LMP	2,000	
SMP	4,000	
MTLP	-270	
MCP	-1,730	
TA <sub>E+L</sub>	7.31M	-5.60M
TA <sub>C</sub>	-3.39M	2.60M

	Gen	Load
MWh	9,650	(10,000)
LMP	4,000	
SMP	4,000	
MTLP	0	
MCP	0	
TA <sub>E+L</sub>	38.60M	-40.00M
TA <sub>C</sub>	0	0

	Gen	Load
MWh	5	(95)
LMP	17,000	
SMP	4,000	
MTLP	95	
MCP	12,906	
TA <sub>E+L</sub>	0.02M	-0.39M
TA <sub>C</sub>	0.06M	-1.23M

$$NSS_{Loss} = \sum TA_{E+L} = P\ 52,750$$

$$NSS_{Congestion} = \sum TA_C = P\ 1,957,340$$

$$NSS_{Total} = P\ 2.01M$$



# SAMPLE CALCULATIONS

## Amended NSS Flowback Mechanism

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- $NSS_{loss}$  will be allocated on pro-rata basis depending on line loss payments ( $LL_{Spot} + LL_{LR}$ ) where:

$$LL_{Spot} = [MAX(EAQ, BCQ) - BCQ] \times (MTLP_{RTD} - GWAMTLP_{RTD}) + (MQ - EAQ) \times (MTLP_{RTX} - GWAMTLP_{RTX})$$

$$LL_{LR} = BCQ \times [MTLP_{RTD} - MAX(GWAMTLP_{RTD}, MTLP_{RTD,s})]$$

- $NSS_{Congestion}$  will be pro-rated based on congestion cost payments ( $CC_{Spot} + CC_{LR}$ ) where:

$$CC_{Spot} = [MAX(EAQ, BCQ) - BCQ] \times (MCP_{RTD} - GWAMCP_{RTD}) + (MQ - EAQ) \times (MCP_{RTX} - GWAMCP_{RTX})$$

$$CC_{LR} = BCQ \times [MCP_{RTD} - MAX(GWAMCP_{RTD}, MCP_{RTD,s})]$$

# SAMPLE CALCULATIONS

## Amended NSS Flowback Mechanism

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- Sample LL and CC calculations, for Load 2:

$$\begin{aligned}
 LL_{\text{Spot}} &= [\text{MAX}(\text{EAQ}, \text{BCQ}) - \text{BCQ}] \times (\text{MTLP}_{\text{RTD}} - \text{GWAMTLP}_{\text{RTD}}) \\
 &\quad + (\text{MQ} - \text{EAQ}) \times (\text{MTLP}_{\text{RTX}} - \text{GWAMTLP}_{\text{RTX}}) \\
 &= -1 * [(10,000 - 0) \times (0 - -45.52) + 0] \\
 &= \mathbf{-455,209}
 \end{aligned}$$

$$\begin{aligned}
 LL_{\text{LR}} &= \text{BCQ} \times [\text{MTLP}_{\text{RTD}} - \text{MAX}(\text{GWAMTLP}_{\text{RTD}}, \text{MTLP}_{\text{RTD},s})] \\
 &= 0
 \end{aligned}$$

$$\begin{aligned}
 CC_{\text{Spot}} &= [\text{MAX}(\text{EAQ}, \text{BCQ}) - \text{BCQ}] \times (\text{MCP}_{\text{RTD}} - \text{GWAMCP}_{\text{RTD}}) \\
 &\quad + (\text{MQ} - \text{EAQ}) \times (\text{MCP}_{\text{RTX}} - \text{GWAMCP}_{\text{RTX}}) \\
 &= -1 * [(10,000 - 0) \times (0 - -286.38) + 0] \\
 &= \mathbf{-2,863,771}
 \end{aligned}$$

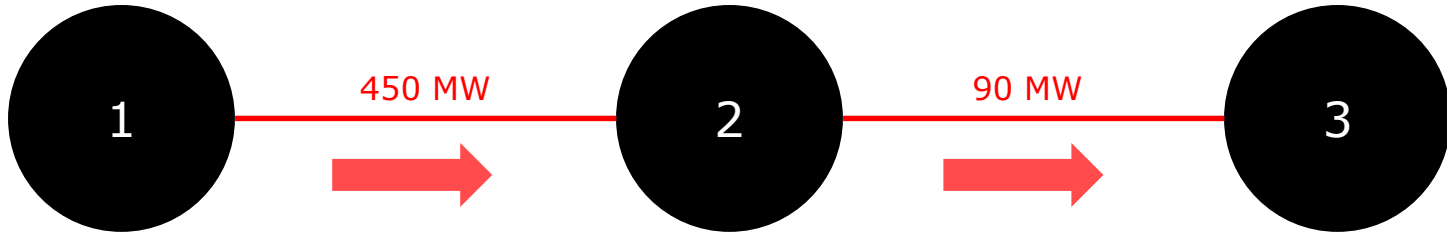
$$\begin{aligned}
 CC_{\text{LR}} &= \text{BCQ} \times [\text{MCP}_{\text{RTD}} - \text{MAX}(\text{GWAMCP}_{\text{RTD}}, \text{MCP}_{\text{RTD},s})] \\
 &= 0
 \end{aligned}$$

*\*Assumptions (simplification):*

- RTD run only
- MQ=EAQ
- No BCQ

# SAMPLE CALCULATIONS

## Amended NSS Flowback Mechanism



	Load 1	Load 2	Load 3
$LL_{Spot}$	0.00	-455,209	-13,349
$LL_{LR}$	0.00	0.00	0.00
$NSS_{Loss}$	0.00	51,247	1,503
$CC_{Spot}$	0.00	-2,863,771	-1,253,276
$CC_{LR}$	0.00	0.00	0.00
$NSS_{Congestion}$	0.00	1,361,503	595,837
$NSS_{Total}$	<b>0.00</b>	<b>1,412,751</b>	<b>597,339</b>

*\*If the calculated LL/CC is positive, set to zero (0)  
(note: positive LL/CC does not reflect surplus payment)*

# SAMPLE CALCULATIONS

## Summary (Current vs. Amended)

	Load 1	Load 2	Load 3
<b>LLCC (Current)</b>	0	-20,000,000	-1,425,000
<b>LLCC (Amended)</b>	0	-3,318,980	-1,266,625
LL	0	-455,209	-13,349
CC	0	-2,863,771	-1,253,276
<b>NSS (Current)</b>	<b>0</b>	<b>1,876,313</b>	<b>133,687</b>
<b>NSS (Amended)</b>	<b>0</b>	<b>1,412,751</b>	<b>597,339</b>
NSS due to loss	0	51,247	1,503
NSS due to congestion	0	1,361,503	595,837
<b>NSS (Difference)</b>	<b>0</b>	<b>-463,562</b>	<b>+463,652</b>



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**END OF  
PRESENTATION**

(+632) 318-9376 | [www.iemop.ph](http://www.iemop.ph)