

# **Lesson Study: Cross-Border Learning for Developing International Perspectives**

Task Development on Energy Efficiency

SEAMEO RECSAM



# Purpose

- The purpose of the programme is to provide a platform for exchanging ideas of pupils from both Malaysia and Philippines.
- This is also to expose them in the learning culture of Education in the two economies which focuses on EE.
- It is hoped that the pupils could benefit from the lesson demonstration and discussions on the sample exercise given to them.



# Objectives

- Communicate and exchange ideas with fellow pupils from another country.
- Apply their knowledge and skills in currency conversion, graph interpretation, and average.
- Identify the different sources of energy and ways on how to efficiently conserve energy.
- Develop pupils mathematical thinking and appreciation of the importance of energy efficiency and conservation.



# Information

- **Target group**
- **Grade Level:**
  - Grade 7 in Malaysia
  - Grade 5 in Philippines
- **Number of Pupils:**
  - 17 in Malaysia
  - 32 in Philippines
- **Date & Venue**
- **Date:** 29 September 2016
- **Duration:** 60 minutes



# Mechanism

- The symposium was held in a form of teleconferencing between demo teachers conducting a lesson to Malaysian and the Philippino pupils.
- The pupils were given task before the lesson (hands-on activities and problems to solve).
- There was communication and exchange of ideas between pupils.
- The answers of the exercises were compared among the two groups.
- There was a reflection of the lesson at the end of the programme



# Roles of the Teachers:

- Give guidance to pupils to ask questions based on the electric bills and related to Math concepts such as currency conversion, graph interpretation and average.
- Rephrase the questions given by pupils.
- Take note on the board for important answers from the questions of the pupils leading to the understanding of conservation of energy.
- Identify the sequence of pupils who ask questions based on the relatedness of the questions and the expected answers.
- Ask questions toward the objectives of the lesson.





## Materials:

- Electric bills of a typical household in Malaysia and in Philippines
- Graphs of a year-round electric bill consumption of a typical household in Malaysia and in Philippines



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Tarikh Bil  
**14 Jan 2016**

	Amaun	Bayar Sebelum
Tunggakan	RM 0.00	Terima Kasih
Caj Semasa	RM 355.39	13.02.2016
Penghapapan	RM 0.01	
Jumlah Bil	RM 355.40	
	Amaun	Tanah
Bil Terdahulu	RM 314.60	16.12.2015
Bayaran Akhir	RM 314.60	11.01.2016

Jenis Bacaan      Bacaan Sebenar

Tempoh Bil	Tarif	Faktor Prorata	
16.12.2015 - 14.01.2016 (29 Hari)	0 - 021 (Kuarasi I)	1.00	
Blok Tarif (kWh)	Blok Prorata (kWh)	Kadar (RM)	Amaun (RM)
≤ 200	200	0.435	07.00
>200	535	0.509	272.32
Jumlah	735		359.32

Keterangan	Tidak Kena GST	Kena GST	Jumlah
Kegunaan kWh	kWh	0	735
Kegunaan ICPT (RM @ 0.0152)	RM	0.00	359.32
	RM	0.00	-14.14
Kegunaan Bulan Semasa	RM	0.00	345.18
6% GST (6% x RM 345.18)	RM		28.71
KWTBB (1.6%)	RM		5.79
Kredit / Debit	RM		-16.25
Caj Semasa	RM		355.39

No Meter	Bacaan Meter Dahulu	Bacaan Meter Semasa	Kegunaan	Unit

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Jumlah Perlu Dibayar RM 525.70

Tarikh Bil  
**15 Feb 2016**

	Amaun	Bayar Sebelum
Tunggakan	RM 0.00	Terima Kasih
Caj Semasa	RM 525.60	16.03.2016
Penghapapan	RM 0.02	
Jumlah Bil	RM 525.70	
	Amaun	Tanah
Bil Terdahulu	RM 355.40	14.01.2016
Bayaran Akhir	RM 355.40	26.01.2016

Jenis Bacaan      Bacaan Sebenar

Tempoh Bil	Tarif	Faktor Prorata	
14.01.2016 - 13.02.2016 (32 Hari)	0 - 021 (Kuarasi I)	1.00	
Blok Tarif (kWh)	Blok Prorata (kWh)	Kadar (RM)	Amaun (RM)
≤ 200	221	0.435	96.14
>200	001	0.509	407.71
Jumlah	1022		503.85

Keterangan	Tidak Kena GST	Kena GST	Jumlah
Kegunaan kWh	kWh	0	1022
Kegunaan ICPT (RM @ 0.0152)	RM	0.00	503.85
	RM	0.00	-15.53
Kegunaan Bulan Semasa	RM	0.00	488.32
6% GST (6% x RM 488.32)	RM		29.30
KWTBB (1.6%)	RM		8.06
Caj Semasa	RM		525.68

No Meter	Bacaan Meter Dahulu	Bacaan Meter Semasa	Kegunaan	Unit
991007453	72567	73529	1022	kWh



Southern  
 Region



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CUSTOMER TIN:

**ELECTRIC BILL**

EB Invoice No. 2326090061846

**Account Summary for Account Number 032189193-9**

Balance From Previous Billing		Current Charges		Total Amount Due
		Amount Due	Due Date	
₱ 0.00	Thank you	₱ 2,442.50	09/15/2016	₱ 2,442.50

Payments made after 09/06/2016 will be reflected on your next billing statement.

**Service Info**

Service ID Number	: 351309090101
Rate	: Residential
Contract in the name of	: GABRIEL, ERNESTO M
Service Address	: 1210 ME POOK HERNANDEZ POOK HERNANDEZ U. METRO MANILA

**Billing Info**

Bill Date	: 06 Sep 2016
Meter Reading Date	: 06 Sep 2016
Bill Period	: 07 Aug 2016 to 06 Sep 2016
Due Date	: <b>15 Sep 2016</b>
Total KWH	: 278
Total current amount	: <b>₱ 2,442.50</b>
Next Meter Reading	: 06 Oct 2016

**BREAKDOWN OF ELECTRICITY CHARGES**

BILL SUBGROUP	SUBTOTAL	PERCENTAGE
Generation	1,096.40	44.89 %
Transmission	228.49	9.35 %
System Loss	116.43	4.77 %
Distribution (Meralco)	623.46	25.53 %
Subsidies	19.91	0.82 %
Government Taxes	225.36	9.23 %
Universal Charges	97.98	4.01 %
FIT-All (Renewable)	34.47	1.41 %
Other Charges	0.00	0.00 %

Please be informed that MERALCO may conduct a routine maintenance/inspection of our customer metering facilities within your area this quarter.



Thumbs up for the app  
 that will help manage  
 your electricity costs.



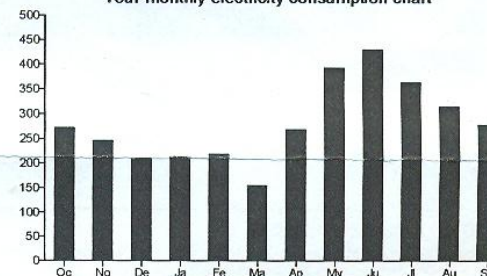
Meralco Virtual Engine  
 MoVE

DOWNLOAD THE MoVE APP NOW!



Cost of electricity consumption may vary based on appliance's model and usage.

**Your monthly electricity consumption chart**



Average usage for 12 months  
 280 kWh/month

For authorized collecting agents

ATM / Phone Reference No.	Meralco Reference No.	Total Amount Due
0 032189193 9 0906 4	0 032189193 9 160906 4 160921 0 0	₱ 2,442.50



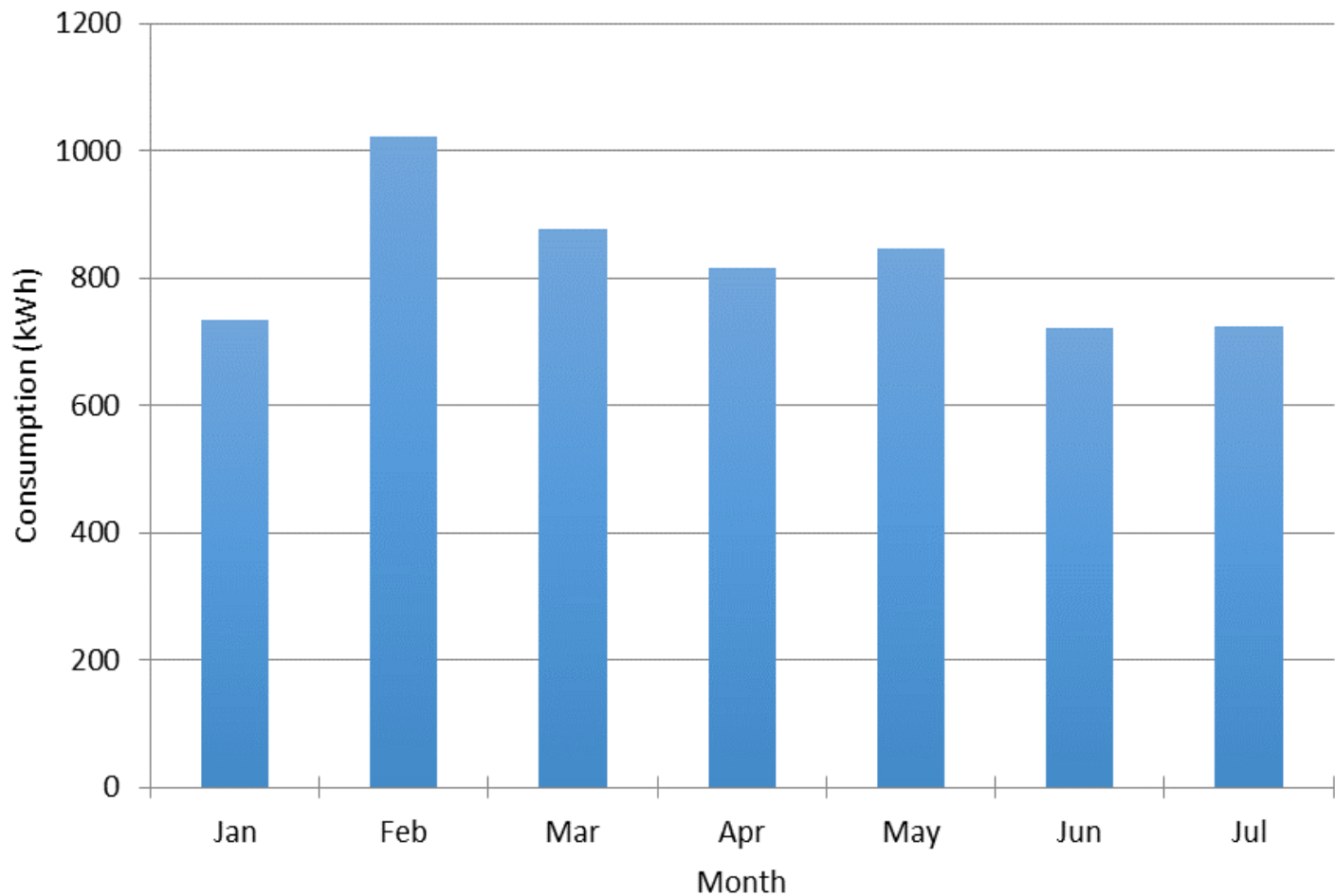
B2 - C4 - T4



Please pay at any Meralco Business Center or through any accredited payment center on or before the due date.



## Typical Monthly Electricity Consumption (one household)(January - July 2016)



# Expected exchange of questions in Discussion 1:

- Why is the cost of electricity cheaper in Malaysia than in Philippines?
- What are the sources of energy in Malaysia?
- What are the sources of energy in Philippines?





# Expected exchange of questions in Discussion 2:

- Why is the consumption in the month of \_ lower than other months?
- What are the activities in that month?
- How is the climate in that month?
- Why is the consumption in the month of \_ higher than other months?
- What are the activities in that month?
- How is the climate in that month?
- How many persons live in the Malaysian household (owner of the bill)?
- How many persons live in the Filipino household (owner of the bill)?



# Expected exchange of questions in Discussion 3:

- How do Filipinos conserve energy?
- How do Malaysians conserve energy?



# The Lesson Implementation (Malaysia)





# The Lesson Implementation (Philippines)



Total energy used (7 months)

$$= 5742 \text{ kWh}$$

Average energy used

$$\frac{5742}{7} = 820.3 \text{ kWh/month}$$

In the Phillipines :  $2857 \text{ kWh/month}$



# Expected Outcomes

- Students' engagement despite language barrier
- Students learn:
  - Cost of electricity in Malaysia and the partnering school
  - The source of energy in each country
  - Natural resources in each country
  - Other matters such as subsidy etc.
  - Important roles in quantifying the energy utilization to qualify the term efficiency in the context of energy conservation and scientific concepts on energy transformation
  - Differences in the curriculum



# Findings

- Students and teachers found out that online (video conferencing) system is a potential learning platforms across countries, through this approach students were able to communicate and learn ideas and facts about energy generation and utilization across horizons
- It was learnt that, in the Philippines the cost of one KWH is expensive compare to Malaysia
- Malaysian government has a cost / subsidy to all consumer but in the Philippines none.
- In the Philippines, they depend much on the energy supply based on coal and geothermal but Malaysia produces on its own electricity through the rich natural resources of energy.
- Numbers played important roles in quantifying the energy utilization to qualify the term efficiency in the context of energy conservation and scientific concepts on energy transformation.



- Lesson plan
- Video

