Energy Analysis – Your tasks:

Team A

Prepare one pot (0.5l) of hot water (100 °C)

- Using the coffee machine with plate
- Keep pot warm (coffee machine with plate) for 10 min.
- Using the blue coffee machine

Measure:

- kWh consumption
- kW peak
- duration

Calculate:

- The efficiency of the process (theoretic heat to heat 0.5 l of water from 10 to 100 °C is 0.057 kWh)
- The cost for consumption per year
    - production of 3 pots of hot water 3 times per day
- The cost for power per year
    - production of 3 pots of hot water, one after the other (serial) 3 times per day
    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day
- The energy cost per year assuming
    - production of 3 pots of hot water, one after the other (serial) 3 times per day
    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day
- The energy cost per year per pot of hot water assuming
    - production of 3 pots of hot water, one after the other (serial) 3 times per day
    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

The price of 1 kWh is 4.6 PHP , the price of 1 kW is 120 PHP per year

Energy example

Team A

Measure				
		coffee machine with plate	**Keep warm**	**Blue coffee machine**
power	[kW]			
consumption	[kWh]			
time	[min]		**10 min**	

Calculation					
			coffee machine with plate	**Keep warm for 1 hour**	**Blue coffee machine**
1. Efficiency	[0,053/ consumption]				
2. cost for consumption per year	[PHP/a] {4.6 PHP per kWh}				
3. cost for power per year	[PHP/a] {120 PHP per kW}	serial			
		parallel			
4. total cost per year	[PHP/a]	serial			
		parallel			
5. cost of one pot	[PHP/-]	serial			
		parallel			

remark: Please notice the consumption of keeping warm
Please notice the different power need

Energy Analysis – Your tasks:

Team B

Prepare one pot (0.5l) of hot water (100 °C)

- Using stove (cold) and big pot with lid

- Using stove (hot) and big pot without lid

- Using stove (hot) and small pot

Measure:

- kWh consumption

- kW peak

- duration

Calculate:

- The efficiency of the process (theoretic heat to heat 0.5 l of water from 10 to 100 °C is 0.057 kWh)

- The cost for consumption per year

    - production of 3 pots of hot water 3 times per day

- The cost for power per year

    - production of 3 pots of hot water, one after the other (serial) 3 times per day

    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

- The energy cost per year assuming

    - production of 3 pots of hot water, one after the other (serial) 3 times per day

    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

- The energy cost per year per pot of hot water assuming

    - production of 3 pots of hot water, one after the other (serial) 3 times per day

    - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

The price of 1 kWh is 4.6 PHP , the price of 1 kW is 120 PHP per year

Energy example		working sheet
	Team B	

Measure				
		stove (cold) and big pot with lid	**stove (hot) and big pot without lid**	**stove (hot) and small pot**
power	[kW]			
consumption	[kWh]			
time	[min]			

Calculation					
			stove (cold) and big pot with lid	**stove (hot) and big pot without lid**	**stove (hot) and small pot**
1. Efficiency	[0,053/ consumption]				
2. cost for consumption per year	[PHP/a] {4.6 PHP per kWh}				
3. cost for power per year	[PHP/a]	serial			
	{120 PHP per kW}	parallel			
4. total cost per year	[PHP/a]	serial			
		parallel			
5. cost of one pot	[PHP/-]	serial			
		parallel			

remark:

Energy Analysis – Your tasks:

Team C

Prepare one pot (0.5 l) of hot water (100 °C)

- Using black water boiler

- Using the white water boiler

- Using immersion heater

Measure:

- kWh consumption

- kW peak

- duration

Calculate:

- The efficiency of the process (theoretic heat to heat 0.5 l of water from 10 to 100 °C is 0.057 kWh)

- The cost for consumption per year

  - production of 3 pots of hot water 3 times per day

- The cost for power per year

  - production of 3 pots of hot water, one after the other (serial) 3 times per day

  - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

- The energy cost per year assuming

  - production of 3 pots of hot water, one after the other (serial) 3 times per day

  - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

- The energy cost per year per pot of hot water assuming

  - production of 3 pots of hot water, one after the other (serial) 3 times per day

  - production of 3 pots of hot water, simultaneous (parallel) 3 times per day

The price of 1 kWh is 4.6 PHP , the price of 1 kW is 120 PHP per year

Energy example		working sheet
	Team C	

Measure				
		black water boiler	**white water boiler**	**immersion heater**
power	[kW]			
consumption	[kWh]			
time	[min]			

Calculation					
			black water heater	**white water heater**	**immersion heater**
1. Efficiency	[0,053/ consumption]				
2. cost for consumption per year	[PHP/a] {4.6 PHP per kWh}				
3. cost for power per year	[PHP/a]	serial			
	{120 PHP per kW}	parallel			
4. total cost per year	[PHP/a]	serial			
		parallel			
5. cost of one pot	[PHP/-]	serial			
		parallel			

remark: Please notice the difference with respect to deactivation between black and white water heater

Results of coffee making

Machine	kW	kWh	Efficiency [%]	Cost per pot (serial)	Cost per pot (parallel)
coffee machine with plate					
Keep warm for 1 hour					
Blue coffee machine					
Stove (cold) and big pot with lid					
Stove (hot) and big pot without lid					
Stove and small pot					
Black water heater					
White water heater					
Immersion heater					