



# EBS & MAED

## Hands-on 2: EBS Mauritius Case Study

### Learning outcomes

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By the end of this exercise, you will be able to:

- 1) Use an official Energy Statistics publication to compile basic energy statistics in EBS
- 2) Identify energy forms and energy flows (from primary energy requirements)
- 3) Identify appropriate data and input them into EBS
- 4) Produce an Energy Balance

### Preparation

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To complete this exercise, you must have available:

- EBS
- the Mauritius Demo Case – empty.ebsz
- the pdf “Mauritius Energy Statistics”

Download the Demo Case and Energy Statistics from the following link:

<https://zenodo.org/records/1497551>

The objective of this exercise is to use real data on energy production, import/export, and consumption to demonstrate use of the EBS tool for energy balance compilation. To do this, we will conduct a real case example, based on the annual Digest of Energy and Water Statistics published by the Central Statistics Office of the Ministry of Finance and Economic Empowerment of the Republic of Mauritius.

We will use 2008 data because there are fewer fuels to enter compared to the more recent balances.

In this exercise the publication is used to compile basic energy statistics using EBS and check whether energy balance corresponds to the published energy balance. The United Nations Statistical Division questionnaire is referred to at points throughout this hands-on exercise as the UNSD questionnaire.



The steps are as follows:

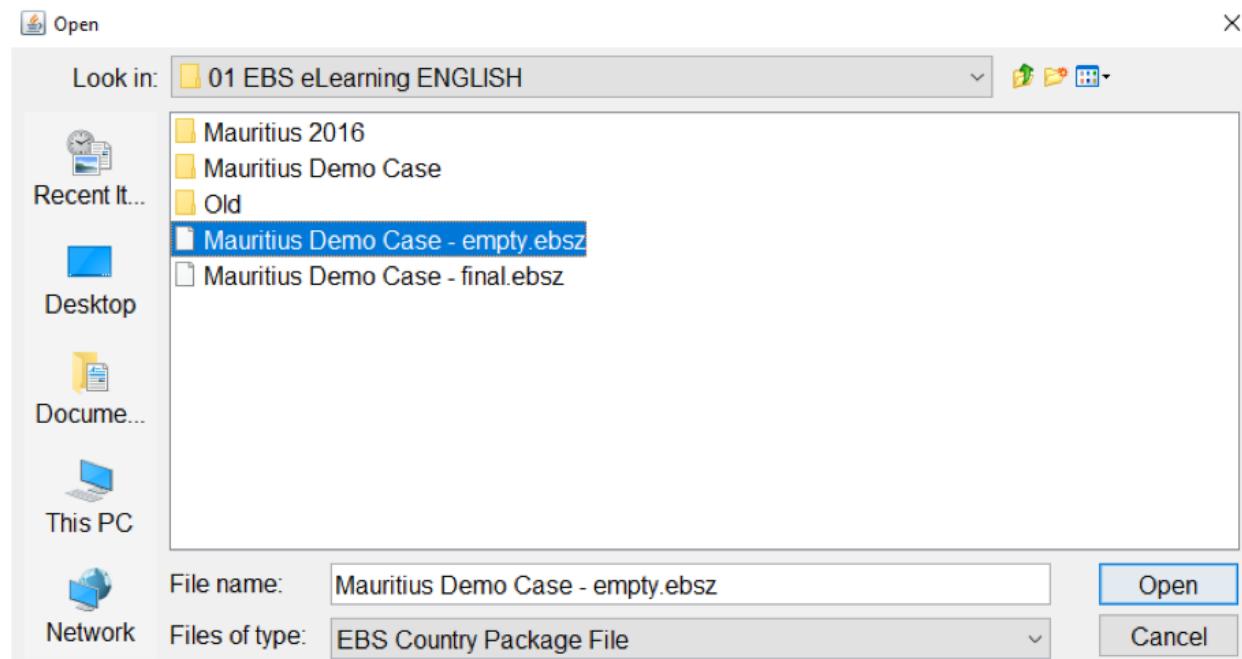
- Check the different sections in the energy section of the publication
  - Energy Balance (to be used for checking our results at the end of the exercise)
  - Primary energy requirements
  - Transformation of energy
  - Final energy consumption
- Identify energy forms and energy flows (from primary energy requirements)
- Use specific energy coefficients (if available)
- Identify appropriate data and input them into EBS
- Check the energy balance (i.e., compare EBS results to the publication)
- Save your work

## Open the empty case study

For the exercise, again go to “File” and click “Open”. Change “Files of type” to “EBS Country Package File”.

Select: Mauritius Demo Case – empty.ebsz

Press “Open”



EBS is laid out as follows:

The Country name is in the top bar



IAEA - UN DESA - Energy Balances Studio Mauritius (480)

File Edit View Tools Help

E.Quest. E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor						Hide
CL	Hard Coal	Metric tons, thousand (WSR)	25.8						<input checked="" type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7						<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2						<input type="checkbox"/>
OB	Other bituminous coal	Metric tons, thousand (WSR)	25.8						<input type="checkbox"/>
Item	Label	2011	2012	2013	2014	2015	2016		
CL01	Production								
CL022	Receipts from other sources								
CL03	Imports								
CL04	Exports								
CL051	International marine bunkers								
CL06	Stock changes								
CLGA	Total energy supply	0	0	0	0	0	0	0	
CLSD	Statistical differences	0	0	0	0	0	0	0	
CL08	Transformation	0	0	0	0	0	0	0	
CL088	Transformation in electricity, CHP and heat plants								
CL08811	Electricity plants - Main activity producers								
CL08812	Electricity plants - Autoproducers								
CL08821	CHP plants - Main activity producers								
CL08822	CHP plants - Autoproducers								
CL08831	Heat plants - Main activity producers								

Hard coal SIEC code: 01 - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous...

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The Upper part of the screen shows the list of fuels organized by:

- Fuel ID
- Fuel Name
- Unit (standard metric unit)
- Standard Conversion Factor

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File Edit View Tools Help

E.Quest. E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor						Hide
CL	Hard Coal	Metric tons, thousand (WSR)	25.8						<input checked="" type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7						<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2						<input type="checkbox"/>
OB	Other bituminous coal	Metric tons, thousand (WSR)	25.8						<input type="checkbox"/>
Item	Label	2011	2012	2013	2014	2015	2016		
CL01	Production								
CL022	Receipts from other sources								
CL03	Imports								
CL04	Exports								
CL051	International marine bunkers								
CL06	Stock changes								
CLGA	Total energy supply	0	0	0	0	0	0	0	
CLSD	Statistical differences	0	0	0	0	0	0	0	
CL08	Transformation	0	0	0	0	0	0	0	
CL088	Transformation in electricity, CHP and heat plants								
CL08811	Electricity plants - Main activity producers								
CL08812	Electricity plants - Autoproducers								
CL08821	CHP plants - Main activity producers								
CL08822	CHP plants - Autoproducers								
CL08831	Heat plants - Main activity producers								

Hard coal SIEC code: 01 - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous...

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You may hide fuels that are not of interest to your country.



E.Quest. E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor					
CL	Hard Coal	Metric tons, thousand (WSR)	25.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OB	Other bituminous coal	Metric tons, thousand (WSR)	25.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item	Label	2011	2012	2013	2014	2015	2016	
CL01	Production							
CL022	Receipts from other sources							
CL03	Imports							
CL04	Exports							
CL051	International marine bunkers							
CL06	Stock changes							
CLGA	Total energy supply	0	0	0	0	0	0	0
CLSD	Statistical differences	0	0	0	0	0	0	0
CL08	Transformation	0	0	0	0	0	0	0
CL088	Transformation in electricity, CHP and heat plants							
CL08811	Electricity plants - Main activity producers							
CL08812	Electricity plants - Autoproducers							
CL08821	CHP plants - Main activity producers							
CL08822	CHP plants - Autoproducers							
CL08831	Heat plants - Main activity producers							

Hard coal SIEC code: 01 - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous...

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## Energy Balances Studio

Energy flows for selected fuels are visible on the left of the screen. Each fuel has an ID consisting of fuel ID and row number.

E.Quest. E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor					
CL	Hard Coal	Metric tons, thousand (WSR)	25.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OB	Other bituminous coal	Metric tons, thousand (WSR)	25.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item	Label	2011	2012	2013	2014	2015	2016	
CL01	Production							
CL022	Receipts from other sources							
CL03	Imports							
CL04	Exports							
CL051	International marine bunkers							
CL06	Stock changes							
CLGA	Total energy supply	0	0	0	0	0	0	0
CLSD	Statistical differences	0	0	0	0	0	0	0
CL08	Transformation	0	0	0	0	0	0	0
CL088	Transformation in electricity, CHP and heat plants							
CL08811	Electricity plants - Main activity producers							
CL08812	Electricity plants - Autoproducers							
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CL08822	CHP plants - Autoproducers							
CL08831	Heat plants - Main activity producers							

Hard coal SIEC code: 01 - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous...

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The right side of the screen shows editable cells, with one column for each year. Cells in green can be edited, those in yellow are calculated.



File Edit View Tools Help

E.Quest E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor						Hide
CL	Hard Coal	Metric tons, thousand (WSR)	25.8						<input checked="" type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7						<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2						<input type="checkbox"/>
OB	Other bituminous coal	Metric tons, thousand (WSR)	25.8						<input type="checkbox"/>

Item	Label	2011	2012	2013	2014	2015	2016
CL01	Production						
CL022	Receipts from other sources						
CL03	Imports						
CL04	Exports						
CL051	International marine bunkers						
CL06	Stock changes						
CLGA	Total energy supply	0	0	0	0	0	0
CLSD	Statistical differences	0	0	0	0	0	0
CL08	Transformation	0	0	0	0	0	0
CL088	Transformation in electricity, CHP and heat plants						
CL08811	Electricity plants - Main activity producers						
CL08812	Electricity plants - Autoproducers						
CL08821	CHP plants - Main activity producers						
CL08822	CHP plants - Autoproducers						
CL08831	Heat plants - Main activity producers						

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The lower part of the screen shows the fuel description. On the right side there is a field to provide notes as needed.

File Edit View Tools Help

E.Quest E.Balance 2011 E.Balance 2012 E.Balance 2013 E.Balance 2014 E.Balance 2015 E.Balance 2016 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor						Hide
CL	Hard Coal	Metric tons, thousand (WSR)	25.8						<input checked="" type="checkbox"/>
AT	Anthracite	Metric tons, thousand (WSR)	26.7						<input type="checkbox"/>
CC	Coking coal	Metric tons, thousand (WSR)	28.2						<input type="checkbox"/>
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Item	Label	2011	2012	2013	2014	2015	2016
CL01	Production						
CL022	Receipts from other sources						
CL03	Imports						
CL04	Exports						
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CL06	Stock changes						
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CLSD	Statistical differences	0	0	0	0	0	0
CL08	Transformation	0	0	0	0	0	0
CL088	Transformation in electricity, CHP and heat plants						
CL08811	Electricity plants - Main activity producers						
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CL08831	Heat plants - Main activity producers						

Hard coal SIEC code: 01 - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous...

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Note that some energy forms are not available in the list (e.g., wind, solar) – this will be explained later.

Note that fuel names may differ from the Standard International Energy Product Classification (SIEC) names.

Note that the years you will see on your screen will differ.

Before you start, you must organize your workspace by hiding unused energy forms.

In order to hide unused energy forms, it is possible to use "hide" checkbox and "revert" selection from the View menu, as follows.



Hide used energy forms:

• First select all fuels that are used:

- Hard Coal (CL) – Coal
- Motor Gasoline (MO) – Gasolene
- Jet Fuel (JF) – Jet Fuel
- Kerosene (KR) – Kerosene
- Gas Diesel (DL) – Diesel
- Residual Fuel Oil (RF) – Fuel oil
- Liquefied Petroleum Gas (LP) – LPG
- Electricity Net Install (EC)
- Electricity (EL)
- Fuelwood (FW) – Fuelwood
- Charcoal (CH) – Charcoal
- Bagasse (BG) - Bagasse

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File Edit View Tools Help

Questionair | E Balance 2003 | E Balance 2004 | E Balance 2005 | E Balance 2006 | E Balance 2007 | E Balance 2008 | Electricity Statistics

Fuel Id Fuel Name Unit Standard Conversion Factor Hide

CL Hard Coal Metric tons, 23.7

LB Lignite/Brown Coal Metric tons, 11.9

PT Peat (for fuel use) Metric tons, 9.76

OS Oil Shale Metric tons, 3.9

OK Coke Oven Coke Metric tons, 23.2

GK Gas Coke Metric tons, 23.2

BK Brown Coal Coke Metric tons, 20.7

BC Hard Coal Briquettes Metric tons, 20.7

BB Lignite-Brown Coal Briquettes Metric tons, 20.7

BP Peat Briquettes Metric tons, thousand (WSR) 9.76

CR Crude Petroleum Metric tons, thousand (WSR) 2.3

GR Total Refinery Output Metric tons, thousand (WSR) 1.0

AV Aviation Gasoline Metric tons, thousand (WSR) 4.3

MO Motor Gasoline Metric tons, thousand (WSR) 4.3

NT Natural Gasoline Metric tons, thousand (WSR) 44.892

JF Jet Fuel Metric tons, thousand (WSR) 4.1

KR Kerosene Metric tons, thousand (WSR) 4.8

DL Gas Diesel Metric tons, thousand (WSR) 3.0

BD Biodiesel Metric Tons (WSO) 3.8

RF Residual Fuel Oil Metric tons, thousand (WSR) 3.0

Item Label 2003 2004 2005 2006 2007 2008

**Bagasse** - The fuel obtained from the fibre which remains after juice extraction in sugar cane processing.

• When desired fuels are selected go to menu View and select option "Revert filter selection"

Revert selection from View menu:

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File Edit View Tools Help

View Tools Help

Filter questionnaire  
Revert filter selection

- English commodity description
- French commodity description
- TJ
- toe
- ktoe
- MWrr

Unit Standard Conversion Factor Hide

Item	Label	Unit	Standard Conversion Factor	Hide
GK	Gas Coke		29.7	<input checked="" type="checkbox"/>
BK	Brown Coal		11.9	<input type="checkbox"/>
BC	Hard Coal B		9.76	<input type="checkbox"/>
BB	Lignite-Brown Coal		8.9	<input type="checkbox"/>
BP	Peat Briquettes	Metric tons, thousand (WSR)	28.2	<input type="checkbox"/>
CR	Crude Petroleum	Metric tons, thousand (WSR)	28.2	<input type="checkbox"/>
GR	Total Refinery Output	Metric tons, thousand (WSR)	20.7	<input type="checkbox"/>
AV	Aviation Gasoline	Metric tons, thousand (WSR)	20.7	<input type="checkbox"/>
MO	Motor Gasoline	Metric tons, thousand (WSR)	20.7	<input type="checkbox"/>
NT	Natural Gasoline	Metric tons, thousand (WSR)	44.8992	<input type="checkbox"/>
JF	Jet Fuel	Metric tons, thousand (WSR)	44.1	<input checked="" type="checkbox"/>
KR	Kerosene	Metric tons, thousand (WSR)	44.8	<input checked="" type="checkbox"/>
DL	Gas Diesel	Metric tons, thousand (WSR)	43.0	<input type="checkbox"/>
BD	Biodiesel	Metric Tons (WSO)	36.8	<input type="checkbox"/>
RF	Residual Fuel Oil	Metric tons, thousand (WSR)	43.0	<input checked="" type="checkbox"/>

Item Label 2003 2004 2005 2006 2007 2008

**Bagasse** - The fuel obtained from the fibre which remains after juice extraction in sugar cane processing.

- After selection is reverted, all previously selected energy forms will be deselected, and unused forms will be selected

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Activate filter from View menu

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File Edit View Tools Help

View Tools Help

Questionair E Balance 2003 E Balance 2004 E Balance 2005 E Balance 2006 E Balance 2007 E Balance 2008 E Balance 2008 Electricity Statistics

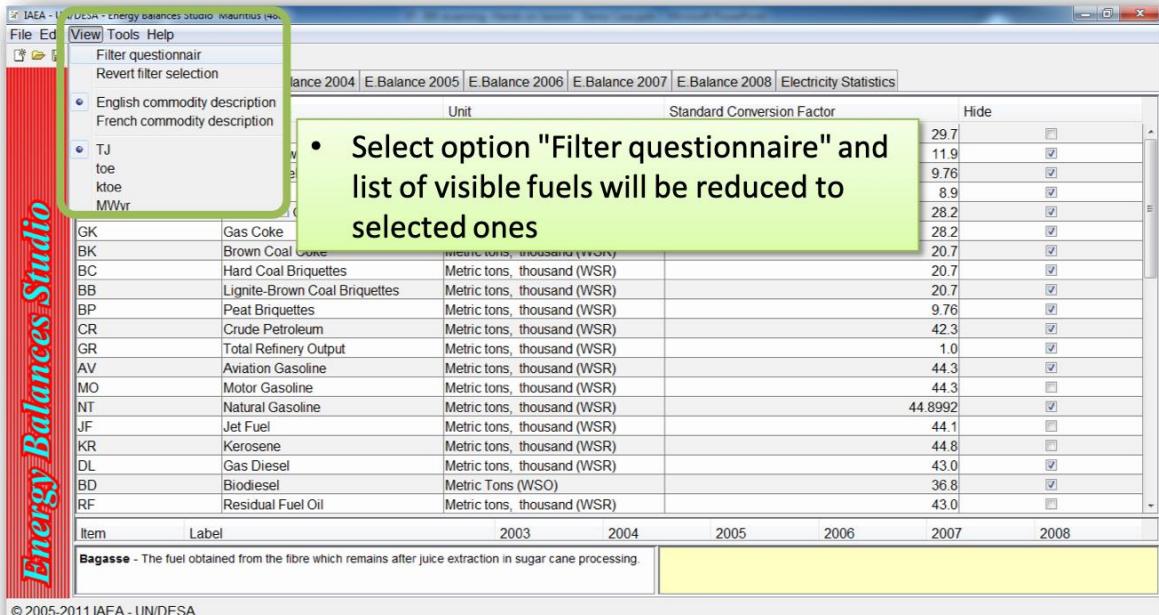
FuelId	Fuel Name	Unit	Standard Conversion Factor	Hide
CL	Hard Coal	Metric tons, thousand (WSR)	29.7	<input type="checkbox"/>
LB	Lignite/Brown Coal			<input checked="" type="checkbox"/>
PT	Peat (for fuel use)			<input checked="" type="checkbox"/>
OS	Oil Shale			<input checked="" type="checkbox"/>
OK	Coke Oven Coke			<input checked="" type="checkbox"/>
GK	Gas Coke			<input checked="" type="checkbox"/>
BK	Brown Coal Coke			<input checked="" type="checkbox"/>
BC	Hard Coal Briquette			<input checked="" type="checkbox"/>
BB	Lignite-Brown Coal			<input checked="" type="checkbox"/>
BP	Peat Briquettes			<input checked="" type="checkbox"/>
CR	Crude Petroleum			<input checked="" type="checkbox"/>
GR	Total Refinery Output	Metric tons, thousand (WSR)	1.0	<input checked="" type="checkbox"/>
AV	Aviation Gasoline	Metric tons, thousand (WSR)	44.3	<input checked="" type="checkbox"/>
MO	Motor Gasoline	Metric tons, thousand (WSR)	44.3	<input type="checkbox"/>
NT	Natural Gasoline	Metric tons, thousand (WSR)	44.8992	<input type="checkbox"/>
JF	Jet Fuel	Metric tons, thousand (WSR)	44.1	<input type="checkbox"/>
KR	Kerosene	Metric tons, thousand (WSR)	44.8	<input type="checkbox"/>
DL	Gas Diesel	Metric tons, thousand (WSR)	43.0	<input checked="" type="checkbox"/>
BD	Biodiesel	Metric Tons (WSO)	36.8	<input checked="" type="checkbox"/>
RF	Residual Fuel Oil	Metric tons, thousand (WSR)	43.0	<input type="checkbox"/>

Item Label 2003 2004 2005 2006 2007 2008

**Bagasse** - The fuel obtained from the fibre which remains after juice extraction in sugar cane processing.

- Note that selection is now inverted
- Go to menu View and select option "Filter questionnaire"

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• Select option "Filter questionnaire" and list of visible fuels will be reduced to selected ones

Item	Label	2003	2004	2005	2006	2007	2008
Bagasse - The fuel obtained from the fibre which remains after juice extraction in sugar cane processing.							

## How to enter data

All inputs into questionnaire should be in natural units. To input the data, you must:

1. Select the appropriate fuel under Questionnaire view.
2. Provide specific conversion data if available.
3. Enter data for different energy flows.
4. Repeat these actions for all fuels.

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File Edit View Tools Help

Questionnaire E Balance 2005 E Balance 2006 E Balance 2007 E Balance 2008 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor	Hide
CL	Hard Coal	Metric tons, thousand (WSR)	29.7	<input type="checkbox"/>
MO	Motor Gasoline	Metric tons, thousand (WSR)	44.3	<input type="checkbox"/>
JF	Jet Fuel	Metric tons, thousand (WSR)	44.1	<input type="checkbox"/>
KR	Kerosene	Metric tons, thousand (WSR)	44.8	<input type="checkbox"/>
EL	Total Electricity	Kilowatt-hours, million (HWU)	3.6	<input type="checkbox"/>
FW	Fuelwood	Cubic metres, thousand (CSR)	9.768	<input type="checkbox"/>
CH	Charcoal	Metric tons, thousand (WSR)	29.5	<input type="checkbox"/>
BS	Bagasse	Metric tons, thousand (WSR)	7.7221	<input type="checkbox"/>

Item	Label	2003	2004	2005	2006	2007	2008
CL01	Gross production						
CL03	Imports						606.5
CL04	Exports						
CL05	Bunkers (International)						
CL06	Changes in stocks						
CLGA	Gross inland availability	0	0	0	0	0	606.5
CL08	Conversion to other forms of energy	0	0	0	0	0	609.745

1. Select the fuel – blue highlight

2. Locate appropriate row and enter values under 2008 columns

3. Hint – type data and then press <ENTER>

Edit specific conversions where data are available.

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File Edit View Tools Help

Edit specific conversion factors ... Change specific conversion factors ... E Balance 2005 E Balance 2006 E Balance 2007 E Balance 2008 Electricity Statistics

Fuel Id	Fuel Name	Unit	Standard Conversion Factor	Hide
CL	Hard Coal	Metric tons, thousand (WSR)	29.7	<input type="checkbox"/>
MO	Motor Gasoline	Metric tons, thousand (WSR)	44.3	<input type="checkbox"/>
JF	Jet Fuel	Metric tons, thousand (WSR)	44.1	<input type="checkbox"/>
KR	Kerosene	Metric tons, thousand (WSR)	44.8	<input type="checkbox"/>
RF	Residual Fuel Oil	Metric tons, thousand (WSR)	43.0	<input type="checkbox"/>
LP	Liquefied Petroleum Gas	Metric tons, thousand (WSR)	47.3	<input type="checkbox"/>
EC	Electricity, net installed capacity of ...	Kilowatts, thousand (ESR)	1.0	<input type="checkbox"/>
EL	Total Electricity	Kilowatt-hours, million (HWU)	3.6	<input type="checkbox"/>
FW	Fuelwood	Cubic metres, thousand (CSR)	9.768	<input type="checkbox"/>
CH	Charcoal	Metric tons, thousand (WSR)	29.5	<input type="checkbox"/>
BS	Bagasse	Metric tons, thousand (WSR)	7.7221	<input type="checkbox"/>

Item	Label	2003	2004	2005	2006	2007	2008
CL01	Gross production						
CL03	Imports						606.5
CL04	Exports						
CL05	Bunkers (International)						
CL06	Changes in stocks						
CLGA	Gross inland availability	0	0	0	0	0	606.5
CL08	Conversion to other forms of energy	0	0	0	0	0	609.745
CL08.1	In coke ovens						

Hard coal - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous coals.

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EBS - Edit specific conversion factors

FuelId	FuelName	Unit	Standard Conversion Factor					
Type	Used for conversion of ...		2003	2004	2005	2006	2007	2008
CL	Hard Coal	Metric tons, thousand (WSR)		29.7				
LB	Lignite/Brown Coal	Metric tons, thousand (WSR)			11.9			
PT	Peat (for fuel use)	Metric tons, thousand (WSR)			9.76			
OS	Oil Shale	Metric tons, thousand (WSR)			8.9			

**• Upper part shows list of all fuels (note that unused/hidden fuels are also visible here)**  
**• Values for default conversion factors are given**

**Hard coal** - Coals with a gross calorific value (moist, ash-free basis) which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous coals.

**OK**

EBS - Edit specific conversion factors

Fuel Id	Fuel Name	Unit	Standard Conversion Factor					
CL	Hard Coal	Metric tons, thousand (WSR)	29.7					
LB	Lignite/Brown Coal	Metric tons, thousand (WSR)	11.9					
PT	Peat (for fuel use)	Metric tons, thousand (WSR)	9.76					
OS	Oil Shale	Metric tons, thousand (WSR)	8.9					
Type	Used for conversion of ...	2003	2004	2005	2006	2007	2008	
A	production, exports and stock change data							
B	import data							
C	all data other than production, imports, exports and stock cha...							
	all data							

• Lower part shows a table to edit specific conversion factor for fuel  
 • Conversion factor can change from year to year and can differ between different groups of fuel flows  
 • In this example we will use specific conversion factor for all energy flows (row "all data")

OK

which is less than 24 MJ/kg provided that it is anthracite and bituminous coals.

EBS - Edit specific conversion factors

Fuel Id	Fuel Name	Unit	Standard Conversion Factor					
CL	Hard Coal	Metric tons, thousand (WSR)	* 29.7					
LB	Lignite/Brown Coal	Metric tons, thousand (WSR)	11.9					
PT	Peat (for fuel use)	Metric tons, thousand (WSR)	9.76					
OS	Oil Shale	Metric tons, thousand (WSR)	8.9					
Type	Used for conversion of ...	2003	2004	2005	2006	2007	2008	
A	production, exports and stock change data							
B	import data							
C	all data other than production, imports, exports and stock cha...						25.958	
	all data							

**Hard coal** - Coals with a gross calorific value of 20 MJ/kg or more. Hard coal is defined as the coal has a vitrinite mean random reflectance greater than or equal to 0.6 per cent. Hard coal comprises anthracite and bituminous coals.

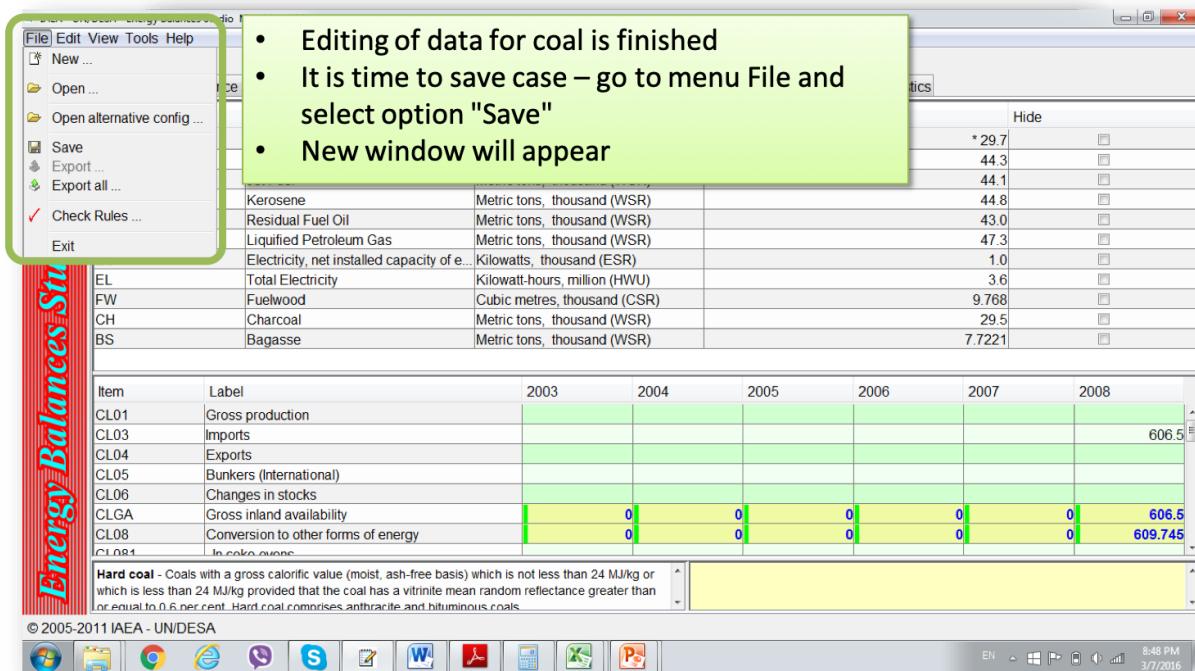
• Enter specific conversion factor for year 2008 in row "all data"  
 • At the same time, in the upper part a star "\*" will appear next to standard conversion factor for coal.  
 • Press "OK" to return to the main screen

After editing specific conversion factors, you should save the case.

• Editing of data for coal is finished

• It is time to save case – go to menu File and select option "Save"

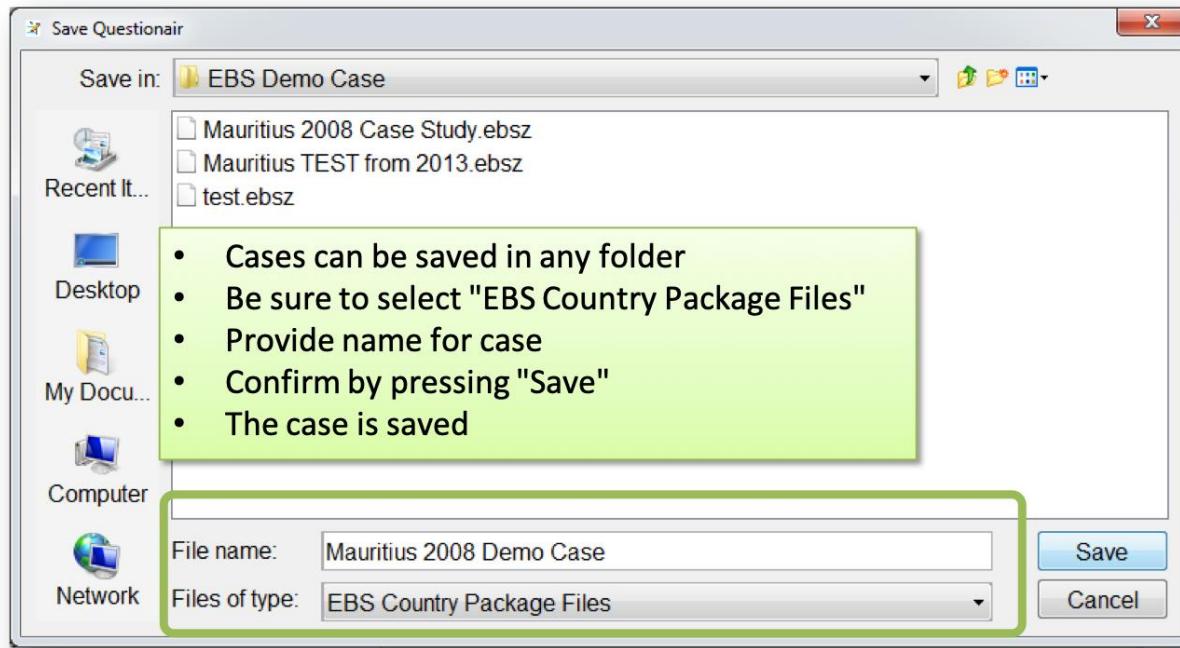
• New window will appear



Each time you want to save the case, the option to provide case name will appear. You will have to select from the list of cases and confirm by pressing "Save".

The model will not warn you if you have by mistake selected the wrong case name, so pay attention.

It is advisable to select ".ebsz" file type, especially if specific conversion factors are provided.



In this case study, the following must be considered for certain fuel types.

### Coal

For coal, the natural unit is thousands of metric tons. Coal is imported; therefore, it is assumed it belongs to Hard Coal type. (High calorific coals are traded internationally, while low calorific coals such as lignite are usually extracted and consumed locally)

The specific conversion factor for coal is on p. 12 of the Mauritius Energy Statistics

- 0.62 toe/ton; this value must be recalculated to have the units TJ/thousand tons
- 1 toe = 0.041868 TJ
- $1000 \text{ ton} = 1000 * 0.62 \text{ toe} = 620 * 0.041868 \text{ TJ} = 25.95816 \text{ TJ}$
- Therefore, the specific conversion factor is 25.95816 TJ/thousand ton

Imports – p. 26, Table 2.2

- Value for 2008 is 606.5 [thousand tons]
- Value to be entered into row CL03

Use for electricity generation – p. 39, Table 3.7

- Value for 2008 is 609.745 [thousand tons]
- Value to be entered into row CL088

Use in final consumption – p. 43, Table 4.3

- Used in Manufacturing (Industry)

- Value for 2008 is 41.672 [thousand tons]

Value to be entered into row CL1214

## Independent Data Input

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For all subsequent energy forms, you need to enter data independently. Try to research and understand the publication.

### Wood

This is a locally produced energy form. The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 0.38 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it must be recalculated into TJ.
- 1 toe = 0.041868 TJ
- $1000 \text{ tons} = 1000 * 0.38 \text{ toe} = 380 * 0.041868 \text{ TJ} = 15.90984 \text{ TJ}$
- Therefore, the specific conversion factor is 15.90984 TJ/thousand tons

Production – p. 24, Table 2.1

- Production is given in thousand tons, while in the UNSD questionnaire the required unit is cubic meters [ $\text{m}^3$ ]
- For the time being, the assumption is that we provide data in thousand tons and the specific conversion factor in TJ/thousand ton (the final calculation of the energy balance will be correct as the conversion factor is also adjusted)
- Fuel wood production has to be entered in row FW01 – value 20.8 thousand tons

Final consumption – p. 43, Table 4.3

- Fuel wood is used in industry (it is not specified in which industry). Industrial consumption is therefore entered into FW1214, value 1.425 thousand tons
- Fuel wood is used in household sector. Household consumption is therefore entered into FW1231, value 16.726 thousand tons

### Bagasse

Domestic primary fuel. Bagasse is a by-product of sugar production, but it is treated as a primary energy form.

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 0.16 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- $1000 \text{ tons} = 1000 * 0.16 \text{ toe} = 160 * 0.041868 \text{ TJ} = 6.699 \text{ TJ}$
- Therefore, the specific conversion factor is 6.699 TJ/thousand tons



## Production

- p. 24, Table 2.1 (values are estimated) – Row BS01 – value 1540.2
- p. 39, Table 3.7 – IPP (sugar factory) – Row BS088 – value 1300.939 thousand tons

## Final consumption

- p. 43, Table 4.3 – only in industry

Note, it is not clear for which purposes it is used in industry.

## Charcoal (Secondary)

Charcoal is secondary (transformed) energy form and can be produced locally (from fuel wood) or it can be imported.

There are no data on import of charcoal (p. 26, Table 2.2).

Transformation of energy – there are no data on charcoal production (i.e., no data on transformation of fuel wood to charcoal).

Energy balance (p. 19, Table 1.1) shows transformation data – fuel wood in Other transformation – (822) toe and respective production of charcoal – 400 toe.

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 0.74 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- $1000 \text{ tons} = 1000 * 0.74 \text{ toe} = 740 * 0.041868 \text{ TJ} = 30.98 \text{ TJ}$
- Therefore, the specific conversion factor is 30.98 TJ/thousand tons

According to the energy balance table, it was assumed that production is equal to consumption (consumption data most probably estimated) and statistical difference is zero.

- Therefore, there is a need to assess consumption of fuel wood for charcoal production and charcoal production.
- For our demo case we assume the same: availability (in this case assumption is that charcoal is imported) equals consumption – Row CH01 – value 0.543 thousand tons.

## Final consumption

- p. 43, Table 4.3 – commercial sector – Row CH1234 (other) – value 0.422 thousand tons;
- residential (household) sector – Row CH1231 – value 0.119 thousand tones

## Motor Gasoline

The assumption is that gasoline is motor gasoline according to the UNSD questionnaire.



The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 1.08 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- 1000 tons =  $1000 * 1.08$  toe =  $1080 * 0.041868$  TJ = 45.22 TJ
- Therefore, specific conversion factor is 45.22 TJ/thousand tons

There is no data on stock changes.

No export. It is an imported fuel:

- p. 26, Table 2.2 – Row MO03 – value 108.5 thousand tons

Final consumption:

- p. 43, Table 4.3 (transport only, assume road) – Row MO1221 – value 101.406 thousand tons

### **Dual Purpose Kerosene (S) – Jet fuel**

The assumption is that it is kerosene-type jet fuel (JF) and other kerosene (KR) according to the UNSD questionnaire. Jet fuel is used for aircrafts, kerosene mainly for households

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 1.04 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- 1000 tons =  $1000 * 1.04$  toe =  $1040 * 0.041868$  TJ = 43.54 TJ
- Therefore, the specific conversion factor is 43.54 TJ/thousand tons

Imported fuel:

- p. 26, Table 2.2 – Row JF03 – value 262.2 thousand tons

No data on stock changes.

International bunkers:

- p. 29, Table 2.6 – re-export to international (aviation) bunkers – Row JF052 – value 125.5 thousand tons

Final consumption:

- p. 43, Table 4.3 (domestic aviation) – Row JF1223 – value 131.631 thousand tons

### **Dual Purpose Kerosene (S) – Kerosene**

Imported fuel.



Specific conversion factor (the same as for Jet Fuel) – p. 12

Import

- p. 26, Table 2.2 – Row KRO3 – value 5.9 thousand tons

No export.

No stock changes.

Transformation:

- For electricity generation (transformation in electricity) – p. 39, Table 3.7 – Row KR088 – value 2.059 thousand tons

Final consumption:

- In households – p. 43, Table 4.3 – Row KR1231 – value 1.772 thousand tons

## Diesel

Gas diesel in UNSD Questionnaire. Imported fuel.

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 1.01 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- 1000 tons =  $1000 * 1.01 \text{ toe} = 1010 * 0.041868 \text{ TJ} = 42.29 \text{ TJ}$
- Therefore, the specific conversion factor is 42.29 TJ/thousand tons

Import:

- p. 26, Table 2.2 – Row DL03 – value 328.5 thousand tons

International (marine) bunkers:

- p. 29, Table 2.6 – Row DL051 – value 117.3 thousand tons

Transformation:

- Electricity generation (transformation), p. 39, Table 37 (both islands) – Row DL088 – value 1.580 thousand tons

Final consumption (p. 43, Table 4.3)

- Industry – Row DL124 – value 46.301 thousand tons
- Transport (not indicated mode of transport – assume road, but can be also boats) – Row DL1221 – value 152.910 thousand tons
- Agriculture – p. 43, Table 4.3 – Row DL1232 – value 2.241 thousand tons



## Fuel Oil (Secondary)

Residual fuel oil (RF) in UNSD Questionnaire. Imported fuel.

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 0.96 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- 1000 tons =  $1000 * 0.96 \text{ toe} = 960 * 0.041868 \text{ TJ} = 40.2 \text{ TJ}$
- Therefore, specific conversion factor is 40.2 TJ/thousand tons

Import:

- p. 26, Table 2.2 – Row RF03 – value 291.0 thousand tons

International (marine) bunkers:

- p. 29, Table 2.6 – Row RF051 – value 96.2 thousand tons

Transformation:

- Electricity generation – p. 39, Table 3.7 (for both islands) – Row RF088 – value 167.547 thousand tons

Final consumption:

- Industry, p. 43, Table 4.3 – Row RF1214 – value 54.639 thousand tons

## LPG (Secondary)

Imported fuel

The specific conversion factor is on p. 12 of the Mauritius Energy Statistics.

- 1 ton = 1.08 toe (tons of oil equivalent)
- For use in EBS (i.e. in UNSD questionnaire), it has to be recalculated into TJ
- 1 toe = 0.041868 TJ
- 1000 tons =  $1000 * 1.08 \text{ toe} = 1080 * 0.041868 \text{ TJ} = 45.22 \text{ TJ}$
- Therefore, the specific conversion factor is 45.22 TJ/thousand tons

No stock changes

Import

- p. 26, Table 2.2 – Row LP03 – value 63.1 thousand tons

Final consumption (p. 43, Table 4.3)

- Industry (other) – Row LP1214 – value 4.92 thousand tons
- Transport (assuming road) – Row LP1221 – value 5.184 thousand tons



- Commercial – Row LP1235 – value 10.094 thousand tons
- Residential – Row LP1231 – value 42.394 thousand tons

## Hydro and Wind (Primary)

In the UNSD Questionnaire there is a separate part for electricity. Here, generation must be given by primary type of production (public, auto-producers...). The unit in the questionnaire is million kWh (i.e. GWh).

Hydro and wind are used to produce electricity; therefore, they appear in commodity balances as domestic electricity production.

On p. 24, Table 2.1 – electricity production is given in GWh.

On p. 36, Table 3.3 – electricity production is given by primary source, location, and company (two islands, public, IPP...)

Hydro and wind are under CEB (the national electricity company) and the assumption is that those are public generation plants.

Hydro generation should be entered under electricity (EL), row EL015HY – value 108.0 GWh

Wind generation should be entered under electricity (EL), row EL015W – value 0.4 GWh

## Electricity

Under the electricity form in the questionnaire only one thermal category exists. Therefore, all thermal power generation must be included as thermal power plants.

The national electricity company is CEB. IPPs produce electricity and sell it to CEB, and part of it is consumed for their own uses (i.e., in this case in sugar factories). Therefore, this generation is placed under auto-producers

- –Row ET015C – value 833.7 GWh
- –Row ET016C – value 1615.1 GWh

There are values for losses and energy sector own use/consumption in the energy balance (p. 19, Table 1.1, electricity losses are 18.545 ktoe), but not in the rest of the document. There are some data on other consumption and losses (p. 44, Table 4.4) but with no indication of the fuel type.

The electricity sector's own use is also visible only in the energy balance (p. 19, Table 1.1, own use is 3.263 ktoe) and in Table 4.8 there is one part of consumption assigned to CEB (the electricity company).

On p. 48, Table 4.7 there are data on sale to consumers. The same table shows data on electricity sale to industrial consumers which are "different" from the previously given final consumption (probably because of auto-producers)

Electricity consumption – p 48. Table 4.7 (On p. 50, Table 4.8 indicates further division of sales by consumer)

- Domestic – Row EL1231, value 652.2 GWh
- Commercial – Row EL1235, value 672.7 GWh
- Other – Row EL1234, value 40.0 GWh
- Industry
  - The assumption is that the difference between IPP generation and sale to CEB is consumed in the sugar factories (industrial consumption) – value 250 GWh (other industry).
  - Industry reported in Table 4.7 is added, so Row EL1214 is 250+688.7 GWh = 938.7 GWh

Note that plants' own consumption is not reported (therefore we cannot fill it in). As this row is calculated in EBS (row EL0927), we enter a value for the net production to have self-consumption of 0.

- Net Production – EL019, value 2557.2

## Checking the results

At this point the energy balance studio outputs can be compared to those of the Mauritius Energy Statistics.

It is possible to change the units if needed.

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File Edit View Tools Help

E Quest E Balance 2008 E Balance 2009 E Balance 2010 E Balance 2011 E Balance 2012 E Balance 2013 Electricity Statistics

Unit: Mtoe

Item	Primary Coal & Peat	Coal & peat products	Primary oil	Oil Products	Natural gas	Biofuels & waste	Nuclear	Electricity	Heat	Total Energy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
01 Primary production	-	-	-	-	-	-	-	-	-	-
02 Imports	376.030			1,075.363		254.340		9.321		1,451,793.02
03 Exports										03 Exports
04 International marine bunkers					-210.850					-210,850.04
05 International aviation bunkers					-130.512					-130,512.05
06 Other trades										Other trades
07 Total energy supply	376.030			734.001		254.740		9.321		1,374,092.07
08 Statistical differences	-27.849			-10,893.6		1,404		21,806		-10,898.08
09 Transfers										09 Transfers
10 Transformation	-378.042			-164.609		-208.154		210.559		-540,246.10
11 Electric plants										11 Electric pla
12 CHP plants										12 CHP plants
13 Other										13 Other
14 Coke ovens										14 Coke ovens
15 Briquetting plants										15 Briquetting
16 Liquefaction plants										16 Liquefactio
17 Gas works										17 Gas works
18 Blast furnaces										18 Blast furna
19 NG plants and gas blends										19 NG plants
20 Oil refineries										20 Oil refin
21 Other transformation										21 Other trans
22 Energy industries own use										22 Energy indust
23 Losses										23 Losses
24 Final consumption										24 Final consum
25 Final energy consumption										25 Final energ
26 Manufacturing, const., mining										26 Manufactur
27 Iron and steel										27 Iron and ste
28 Chemical and petrochemical										28 Chemical

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• Energy balance unit can be changed – right click and choose other unit

Once you have checked the results, you may wish to export them. Click File > Export or Export all.



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File Edit View Tools Help

New ...

Open ...

Open alternative config ...

Save

Export...

Export all...

Check Rules ...

Exit

2008 E Balance 2009 E Balance 2010 E Balance 2011 E Balance 2012 E Balance 2013 Electricity Statistics

	Primary Coal & Peat	Coal & peat products	Primary oil	Oil Products	Natural gas	Biofuels & waste	Nuclear	Electricity	Heat	Total Energy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
03 Exports	376,030			1,075,363		254,340	9,321	263,681	1,451,793	02 Imports
04 International marine bunkers				-210,850					103 Exports	
05 International aviation bunkers				-130,512					-210,850	04 International m...
06 Statistical differences									-130,512	05 International a...
07 Total energy supply	376,030			734,001		254,740	9,321	1,374,092	07 Total energy s...	
08 Statistical differences				-27,849		-10,893,6...	1,404	21,806	-10,898	08 Statistical diff...
09 Transfers										09 Transfers
10 Transformation	-378,042			-164,609		-208,154	210,559	-540,246	10 Transformatic...	
11 Electric plants									11 Electric pla...	
12 CHP plants									12 CHP plants	
13 Heat plants									13 Heat plants	
14 Coke ovens									14 Coke ovens	
15 Briquetting plants									15 Briquetting	
16 Liquefaction plants									16 Liquefactio...	
17 Gas works									17 Gas works	
18 Biogas plants									18 Biogas plants	
19 NGL plants and gas blend...									19 NGL plants	
20 Oil refineries									20 Oil refineries	
21 Other transformation									21 Other trans...	
22 Energy industries own use									22 Energy industr...	
23 Losses									23 Losses	
24 Final consumption	25,837			11,463,039		45,182	198,074	11,732	24 Final consum...	
25 Final energy consumption	25,837			11,463,039		45,182	198,074	11,732	25 Final energ...	
26 Manufacturing, const., mining	25,837			104,544		38,826	60,714	249,921	26 Manufacturin...	
27 Iron and steel									27 Iron and ste...	
28 Chemical and petrochemical									28 Chemical and p...	

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