EGEDA
under EWG-APEC

APEC
Asia-Pacific
Economic Cooperation

IRENA
International Renewable Energy Agency

Traditional solid biofuels (fuelwood and charcoal)

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Outline

1. What is fuelwood?
2. What is charcoal?
3. Exercise 3:Estimating and conversion with Japan’s data -traditional solid fuels(fuelwood and charcoal)
4. Exercise 3:Estimating and conversion with your economy data

1. What is fuelwood?

- **Fuelwood** is various forms of wood that used as fuel for cooking, heating or to drive steam-powered engines or turbines for electricity generation(source: Safeopedia).
- Examples are log, brushwood, pellet or chip form) obtained from natural or managed forests or isolated trees. Also included are wood residues used as fuel and in which the original composition of wood is retained. Charcoal and black liquor are excluded.

2. What is charcoal?

- **Charcoal** is solid residue from the carbonisation of wood or other vegetal matter through slow pyrolysis.

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Work on the exercise by using Japan's data.

Energy balance wood fuel and charcoal

The table below shows the production, imports and exports of wood energy commodities in 2018, as reported by the Food and Agriculture Organisation (FAO – FAOSTAT). Use this data to complete the three columns of the energy balance for your country, noting that:

- One cubic metre of wood fuel = 0.75 tonnes of wood fuel.
- Six cubic metres of wood fuel will make one tonne of charcoal.

Use your own knowledge to identify the end-use sectors where these products are consumed.

Wood energy data for 2018, as reported in FAOSTAT

	Wood fuel (m3)			Charcoal (tonnes)		
	Production	Imports	Exports	Production	Imports	Exports
Japan	6,248,000	4,982	1,005	15,000	144,462	442
Australia	4,090,897	331	23,142	24,000	20,302	235
Brunei Darussalam	11,643	-		328	340	60
Canada	1,173,756	163	35,320		45,777	1,365
Chile	16,121,789	-	-	241,838	40,697	-
Hong Kong, China	75,489			12,045	3,940	276
China	162,918,654	-	251	1,623,733	298,037	60,647
Chinese Taipei	5,831	773	516		34,487	133
Indonesia	42,278,669	106	845	664,000	523	511,022
Malaysia	2,454,887	1,160	1,626	29,378	50,153	50,349

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Collect data of production, imports and exports of both Wood fuel and Charcoal from "FAOSTAT data" and input on the chart.

Renewable Energy Statistics Training

Energy balance wood fuel and charcoal

The table below shows the production, imports and exports of wood energy commodities in 2018, as reported by the Food and Agriculture Organisation (FAO – FAOSTAT). Use this data to complete the three columns of the energy balance for your country, noting that:

- One cubic metre of wood fuel = 0.75 tonnes of wood fuel.
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	Production	Imports	Exports	Production	Imports	Exports
Japan	6,248,000	4,982	1,005	15,000	144,462	442

Area	Element	Item	Year	Unit	Value
Japan	Production	Wood fuel, coniferous	2018	m3	0
Japan	Production	Wood fuel, non-coniferous	2018	m3	6,248,000
					6,248,000
Japan	Import Quantity	Wood fuel, coniferous	2018	m3	1,871
Japan	Import Quantity	Wood fuel, non-coniferous	2018	m3	3,111
					4,982
Japan	Export Quantity	Wood fuel, coniferous	2018	m3	513
Japan	Export Quantity	Wood fuel, non-coniferous	2018	m3	492
					1,005
Japan	Production	Wood charcoal	2018	tonnes	15,000
Japan	Import Quantity	Wood charcoal	2018	tonnes	144,462
Japan	Export Quantity	Wood charcoal	2018	tonnes	442

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Transfer these data on the chart to "Answer sheet". Take note that Wood Fuel production, imports and exports from FAOSTAT x 0.75 to convert into tonnes and Charcoal taken directly from FAOSTAT.

Wood energy data for 2018, as reported in FAOSTAT

	Wood fuel (m3)			Charcoal (tonnes)		
	Production	Imports	Exports	Production	Imports	Exports
Japan	6,248,000	4,982	1,005	15,000	144,462	442

Answer sheet:

Supply and consumption		Wood Fuel	Biomass pellets and briquettes	Charcoal
2018		Tonnes	Tonnes	Tonnes
Production	(+)	4,686,000		15,000
Imports	(+)	3,736.5		144,462
Exports	(-)	753.75		442
Stock changes	(+)			
International Bunkers	(-)			
Domestic supply	(=)	**4,690,490.25**		**159,904**
Transfers				
Statistical Differences				
Power plants				
CHP plants				
Commercial heat plants				
Charcoal production				
Biomass pellet and briquette production				
Other transformation				
Energy sector and own use				
Distribution losses				
Total final consumption				
Industry sector				
Transport sector				
of which road transport				
Commercial and public services				
Residential				
of which traditional uses				
Other				
Net calorific value (MJ/t)		15,120	16,920	30,800

Example: Wood Fuel conversion m3 into tonnes

Production(m3) x 0.75 = production(tonnes)

If inputting values,

6,248,000(m3) x 0.75 = 4,686,000(tonnes)

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Calculate charcoal production by taking note "Wood Fuel to charcoal transformation = charcoal production x 6".

Answer sheet:

Supply and consumption		Wood Fuel	Biomass pellets and briquettes	Charcoal
2018		Tonnes	Tonnes	Tonnes
Production	(+)	4,686,000		15,000
Imports	(+)	3,736.5		144,462
Exports	(-)	753.75		442
Stock changes	(+)			
International Bunkers	(-)			
Domestic supply	(=)	**4,690,490.25**		**159,904**
Transfers				
Statistical Differences				
Power plants				
CHP plants				
Commercial heat plants				
Charcoal production		67,500		
Biomass pellet and briquette production				
Other transformation				
Energy sector and own use				
Distribution losses				
Total final consumption				
Industry sector				
Transport sector				
of which road transport				
Commercial and public services				
Residential				
of which traditional uses				
Other				
Net calorific value (MJ/t)		15,120	16,920	30,800

Calculation

Wood Fuel to charcoal transformation = charcoal production(tonnes) x 6

= 15,000 x 6 = 90,000(wood fuel(tonnes))

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Calculate Total final consumption by taking note, "Total final consumption = Domestic supply, less anything used in transformation".

Answer sheet:

Supply and consumption		Wood Fuel	Biomass pellets and briquettes	Charcoal
2018		Tonnes	Tonnes	Tonnes
Production	(+)	4,686,000		15,000
Imports	(+)	3,736.5		144,462
Exports	(-)	753.75		442
Stock changes	(+)			
International Bunkers	(-)			
Domestic supply	(=)	**4,690,490.25**		**159,904**
Transfers				
Statistical Differences				
Power plants				
CHP plants				
Commercial heat plants				
Charcoal production		67,500		
Biomass pellet and briquette production				
Other transformation				
Energy sector and own use				
Distribution losses				
Total final consumption		**4,622,990.25**		**159,904**
Industry sector				
Transport sector				
of which road transport				
Commercial and public services				
Residential				
of which traditional uses				
Other				
Net calorific value (MJ/t)		15,120	16,920	30,800

Calculation

Total final consumption(wood fuel) = Domestic supply, less anything used in transformation

= 4,690,490.25 – 90,000

= 4,600,490.25

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Research and check your economy's Total final consumption attributed to end-use sectors based on local knowledge.

e.g. Japan's assumption: 90% Industry, 5% commercial and public, 5% Residential of which traditional uses for wood fuel.

: 100% commercial and public for charcoal.

Answer sheet:

Supply and consumption		Wood Fuel	Biomass pellets and briquettes	Charcoal
2018		Tonnes	Tonnes	Tonnes
Production	(+)	4,686,000		15,000
Imports	(+)	3,736.5		144,462
Exports	(-)	753.75		442
Stock changes	(+)			
International Bunkers	(-)			
Domestic supply	(=)	**4,690,490.25**		**159,904**
Transfers				
Statistical Differences				
Power plants				
CHP plants				
Commercial heat plants				
Charcoal production		67,500		
Biomass pellet and briquette production				
Other transformation				
Energy sector and own use				
Distribution losses				
Total final consumption		**4,622,990.25**		**159,904**
Industry sector		90%		
Transport sector				
of which road transport				
Commercial and public services		5%		100%
Residential				
of which traditional uses		5%		
Other				
Net calorific value (MJ/t)		15,120	16,920	30,800

3. Exercise 3:Estimating and conversion with Japan's data -traditional solid fuels(fuelwood and charcoal)

Calculate Total final consumption attributed to end-use sectors based on local knowledge.

e.g. Japan's assumption: 90% Industry, 5% commercial and public, 5% Residential of which traditional uses for wood fuel. : 100% commercial and public for charcoal.

Answer sheet:

Supply and consumption		Wood Fuel	Biomass pellets and briquettes	Charcoal
2018		Tonnes	Tonnes	Tonnes
Production	(+)	4,686,000		15,000
Imports	(+)	3,736.5		144,462
Exports	(-)	753.75		442
Stock changes	(+)			
International Bunkers	(-)			
Domestic supply	(=)	**4,690,490.25**		**159,904**
Transfers				
Statistical Differences				
Power plants				
CHP plants				
Commercial heat plants				
Charcoal production		67,500		
Biomass pellet and briquette production				
Other transformation				
Energy sector and own use				
Distribution losses				
Total final consumption		**4,622,990.25**		**159,904**
Industry sector		4,160,691.25		
Transport sector				
of which road transport				
Commercial and public services		231,149.5		159,904
Residential				
of which traditional uses		231,149.5		
Other				
Net calorific value (MJ/t)		15,120	16,920	30,800

Calculation

Industry sector(wood fuel)= 4,600,490.25 (Total final consumption) x 90%

= 4,140,441.23

4. Work on Exercise 3

with your economy data!

Thank you for your kind attention

https://www.egeda.ewg.apec.org/