





Traditional solid biofuels (fuelwood and charcoal)

18th APEC Workshop on Energy Statistics Joint APEC-IRENA Workshop on Renewable Energy Statistics Tokyo, 15-17 December 2020

Nobuhiro SAWAMURA, ESTO/APERC



Outline

- 1. What is fuelwood?
- 2. What is charcoal?
- 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 wo	od fuel and	charcoal			
The table below shows the production, i Agriculture Organisation (FAO – FAOSTAT noting that:	mports and exports of). Use this data to cor	wood energy	y commoditie ree columns	es in 2018, as r of the energy	eported by th balance for y	e Food and our country
- One cubic metre of wood fuel = 0.75 tonnes of we	ood fuel.					
- Six cubic metres of wood fuel will make	one tonne of charcoal.					
Use your own knowledge to identify the en	nd-use sectors where t	hese products	s are consum	ed.		
	Wood energy data for 20	18, as reported	in FAOSTAT			
	We	ood fuel (m3)	0	Cha	rcoal (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	0 0		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
Malavaia	0 454 007	4 460	4 606	00.070	50 450	50.240

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.

Rer	newable Energ	y Statistics	Training			1
Ener	gy balance wo	od fuel and	l charcoal			
The table below shows the production, imports Agriculture Organisation (FAO – FAOSTAT). Use noting that:	and exports of this data to co	f wood energ mplete the t	y commoditi hree columns	es in 2018, as i s of the energy	eported by t balance for	he Food and your country,
- One cubic metre of wood fuel = 0.75 tonnes of wood fuel.						
 Six cubic metres of wood fuel will make one tor 	nne of charcoal.					
Use your own knowledge to identify the end-use	sectors where t	hese produc	ts are consum	ned.		
Wood e	energy data for 20)18, as reporte	d in FAOSTAT			
	W	ood fuel (m3))	Cha	rcoal (tonne	s)
	Production	Imports	Exports	Production	Imports	Exports
Japan	6,248,000	4,982	1,005	15,000	144,462	442
Australia	4 000 007	224	00 440	04.000	00 200	005

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.

	Woo	d energy data	a for 2018, as	s reported	in FAOSTAT				
			Wood fr	rel (m3)		Cha	rcoal (tonne	s)	
		Produc	tion Im	ports	Exports	Production	Imports	Exports	
·		6 2 4 8	000	4 982	1 005	15 000	144 462	442	-
lie		4,000	007	224	00.440	04,000	00.000	005	
Answer sheet:역		ਦ Wood Fuelਵ	Biomass	Charc	oale e				
Supply and consumption ^{₄⊐}	Ę	\bigcirc	pellets and briquettes	3					
2018↩	¢	(Tonnes	Tonnes↩	Tonn	ies 🖓 🤟				
Production⇔	(+)∻	4,686,000	4	1	5,000€				
Imports ⁽²⁾	(+)↔	3,736.54	4	14	4,462∉∻				
Exports↩	(-)←	753.75	₽		442←←				
Stock changes↩	(+)∻	4	4	¢	÷				
International Bunkers⇔	(-)↩				÷			V	
Domestic supply은	(=)∻	4,690,490.25	Ą	15	9,904 ~ ~	Fxami	ole [.] Woo	nd Fuel c	onversion m3 into tonnes
Transfers↩	¢				÷	Exam			
Statistical Differences↩		4	4	Ą	÷				
Power plants₽	¢	4	¢	¢	÷	Produ	uction(m	$3) \times 0.75$	= production(toppes)
CHP plants←	<₽	¢	¢	¢	÷	riouu		5) X 0.15	
Commercial heat plants←	4	Ċ,	4	4	÷				
Charcoal production	4	ت	4		÷	If inni	itting va	مايتمد	
Biomass pellet and briquette production	4				÷	n mpc			
Other transformation	4	₽	4	4	÷		6,248,00)U(m3) x (0.75 = 4,686,000(tonnes)
Energy sector and own use⇔	4	¢7	4	4	÷				
Distribution losses	ų	⊂>	4	Ą	÷				
Total final consumption	4	ل ې	4	4	÷				
Industry sector	4		4	4	÷				
Transport sector	4		4	4	÷				
of which road transport	4		4	4	÷				
Commercial and public services€	4		4	4	÷				
Residential <i></i> ↩	4		4	4	÷				
of which traditional uses↩	¢			¢	÷				-
Other↩	¢	⊂,	<₽	¢	÷				
Net calorific value (MJ/t)↩	<⊐	15,120	16,920)√ 3	0,800€€				

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

Answer sheet:∉

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

x 6″.

Supply and consumption ^{(그}	Ę	Wood Fuel	Biomass pellets and briquettes↩	Charcoal	
2018↩	Ę	Tonnes↩	Tonnes↩	Tennes	
Production₽	(+)↔	4,686,000	⊂>	15,000	
Imports₽	(+)∻	3,736.54	<₽	144,4624	
Exports⊄	(-)↩	753.754	<⊐	442<	
Stock changes↩	(+)↔	₽	4	ت ے	
International Bunkers⇔	(-)↩				
Domestic supply↩	(=)↔	4,690,490.25	4	159,904	
Transfers₽	Ę				
Statistical Differences↩		ب	4	с р	
Power plants₽	¢	¢-	4	€	
CHP plants⇔	¢	¢.	4	¢	
Commercial heat plants⇔	¢	4	4	¢7	
Charcoal production∉	ę	67,500			
Biomass pellet and briquette production 4	¢				
Other transformation [↩]	¢	¢	4	₽	
Energy sector and own use⇔	¢	¢	4	ل ې	
Distribution losses↩	¢	4	4	4	
Total final consumption↩	¢	¢	с >	4	
Industry sector₽	¢		4	4	
Transport sector은	¢		¢7	Ę	
of which road transport리	¢		¢⊐	¢	
Commercial and public services₽	¢		€7	⊂,	
Residential⇔	¢		چ	Ę	
of which traditional uses↩	ų			تې	
Other	Ę	⊂,	₽	4	
Net calorific value (MJ/t)↩	¢	15,1204	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".

Supply and consumption ^{←]}	ion ^ਦ ਦ		Biomass pellets and briquettes↩	Charcoal↩	
2018↩	¢	Tonnes↩	Tonnes↩	Tonnes↩	
Production	(+)∻	4,686,000	¢	15,000	
Imports↩	(+)↔	3,736.5	⊂,	144,462	
Exports₽	(-)↩	753.75	€7	442	
Stock changes≓	(+)↔	Ę	¢	4	
International Bunkers↩	(-)↩				
Domestic supply [∠]	(=)∻	4,690,490.25	Ç (159,904	
Transfers⇔	Ą				
Statistical Differences은		¢7	4	2	
Power plants [∠]	Ę	¢7	¢	4	
CHP plants⇔	¢	47	4	4	
Commercial heat plants⇔	¢	4 7	4	4	
Charcoal production	¢	67,500)¢ ²		
Biomass pellet and briquette production	¢				
Other transformation↩	¢	4	€	4	
Energy sector and own use⇔	¢	₽	4	4	
Distribution losses↩	¢	47	ت	4	
Total final consumption↩	¢	4,622,990.25	تە (159,904	
Industry sector	¢		¢	Ą	
Transport sector	¢		4	€ ³	
of which road transport↩	¢		4	Ę	
Commercial and public services⇔	¢		4	¢	
Residential⇔	¢		4	¢	
of which traditional uses⇔	¢			4	
Other⇔	¢	47	4	€ ³	
Net calorific value (MJ/t)↩	¢	15,120	16,920	30,800	

Calculation

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

= 4,600,490.25

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.

Supply and consumption ⁽⁻⁾	Ę	Wood Fuel≮ ³	Biomass pellets and briquettes↩	Charcoal≮⊐
2018↩	¢	Tonnes↩	Tonnes↩	Tonnes↩
Production	(+)∻	4,686,000	4	15,000
Imports₽	(+)↔	3,736.5	⇔	144,462
Exports₽	(-)←	753.75∉	€	442
Stock changes⇔	(+)∻	¢7	4	¢7
International Bunkers↩	(-)↩			
Domestic supply↩	(=)↔	4,690,490.25	4	159,904
Transfers₽	Ą			
Statistical Differences은		<i>₽</i>	4	4
Power plants⇔	¢	€ ¹	4	4
CHP plants↩	¢	¢7	4	4
Commercial heat plants↩	¢	€ ²	4	4
Charcoal production₽	¢	67,500	4	
Biomass pellet and briquette production 🖨	¢			
Other transformation∉	¢	¢	4	4
Energy sector and own use⇔	¢	<i>€</i> 7	4	4
Distribution losses쉬	¢	⊂,	₽	₽
Total final consumption↩	¢	4,622,990.25↩	4	159,904
Industry sector⇔	¢	90%	<i>چ</i>	₽
Transport sector₽	¢		4	₽
of which road transport₽	¢		⇔	¢7
Commercial and public services↩	¢	5%	⊂	100%
Residential←	¢		¢	⊂,
of which traditional uses↩	¢	5%		<⊃
Other₽	Ę	⊂,	4	ب
Net calorific value (MJ/t)⇔	¢	15,1204	16,920	30,8004

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.

Supply and consumption	Ę	Wood Fuel≮ ³	Biomass pellets and briquettes↩	Charcoal
2018⊂⊐	₽	Tonnes↩	Tonnes	Tonnes⇔
Production↩	(+)↔	4,686,000	⊂>	15,000
Imports₽	(+)∻	3,736.54	<⊐	144,462
Exports←	(-)↩	753.75	<⊐	442
Stock changes↩	(+)↔	4	¢	4
International Bunkers⇔	(-)↩			
Domestic supply↩	(=)↔	4,690,490.25	4	159,904
Transfers₽	Ą			
Statistical Differences↩		¢⊐	₽	ب
Power plants⇔	¢	⊂>	₽	¢-
CHP plants⇔	¢	ب	4	<i>₽</i>
Commercial heat plants⇔	¢	с,	¢⊐	4
Charcoal production∉	¢	67,500	¢	
Biomass pellet and briquette production \leftarrow	¢			
Other transformation↩	¢	ب	¢	2
Energy sector and own use⇔	¢	¢⊐	¢⊐	4
Distribution losses↩	¢	<i>ب</i>	4	4
Total final consumption↩	¢	4,622,990.25↩	Ċ.	159,904
Industry sector₽	¢	4,160,691.25	4	4
Transport sector₽	¢		4	4
of which road transport	¢		¢	¢
Commercial and public services₽	¢	231,149.5	4	159,904
Residential	¢		4	Ą
of which traditional uses₽	Ę	231,149.5		Ą
Other⇔	¢	⊂>	Ą	چ
Net calorific value (MJ/t)↩	¢	15,1204	16,920	30,800

Calculation

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



4. Work on Exercise 3 with your economy data!



Thank you for your kind attention

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