

# Exercise – Construct a supply and use table for energy

The purpose of this exercise is to populate the simplified supply and use table for energy. Unit is PetaJoules (PJ).

# PSUT - energy

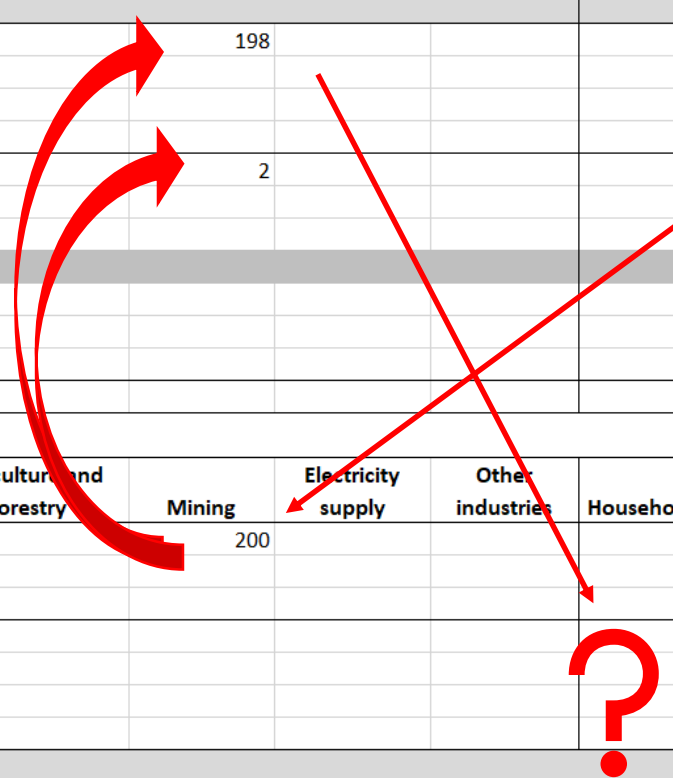
SUPPLY TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
<b>Energy from natural inputs</b>					Energy inputs from the environment	Total supply of energy from natural inputs
<b>Energy products</b>	Output			Imports		Total supply of energy products
<b>Energy Residuals</b>	Energy residuals generated by industry	Energy residuals generated by household consumption	Energy residuals from accumulation	Energy residuals received from the rest of the world	Energy residuals recovered from the environment	Total supply of energy residuals
USE TABLE						
	Industries	Households	Accumulation	Rest of the World	Environment	Totals
<b>Energy from natural inputs</b>	Extraction of energy from natural inputs					Total use of energy from natural inputs
<b>Energy products</b>	Intermediate consumption	Household consumption	Changes in inventories	Exports		Total use of energy products
<b>Energy residuals</b>	Collection & treatment of energy residuals		Accumulation of energy residuals	Energy residuals sent to the rest of the world	Energy residual flows direct to environment	Total use of energy residuals



The National Geological Survey has estimated that that during the year 8 million tonnes of coal has been extracted from domestic deposits. (One million tonnes of coal equals 25 PJ.) However, after extraction 1 per cent of the coal was lost for various reasons.

<b>SUPPLY TABLE</b>										
	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills									
	Wood									
<b>Products</b>	Coal		198							
	Gasoline									
	Electricity									
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)		2							
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
	electricity									
fuel wood										
<b>Total supply of energy</b>										

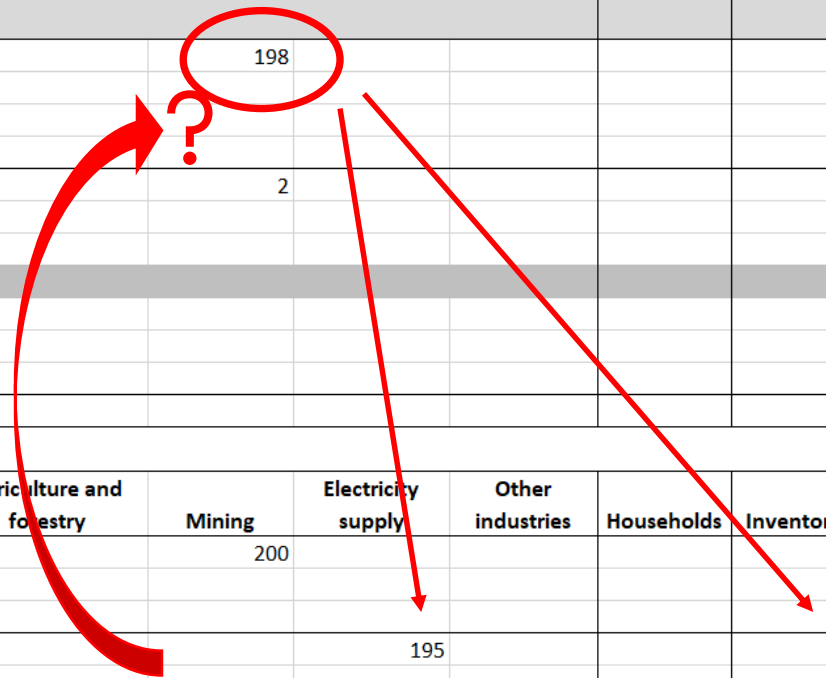
<b>USE TABLE</b>										
	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
<b>Natural inputs</b>	Extraction of coal		200							200
	Electricity form solar panels and wind mills									
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<b>Products</b>	Coal									
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<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
	electricity									
fuel wood										
<b>Total use of energy</b>										



The coal is used domestically only for production of electricity from coal-fired power plants. However, during the year in focus, 3 PJ of coal is put on stocks/inventories for use in subsequent years

<b>SUPPLY TABLE</b>		Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
	UNIT: Petajoule (10 <sup>15</sup> )									
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills									
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<b>Products</b>	Coal		198							
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	Electricity									
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<b>Residuals</b>	Losses during extraction (coal)		2							
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	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total supply of energy</b>										

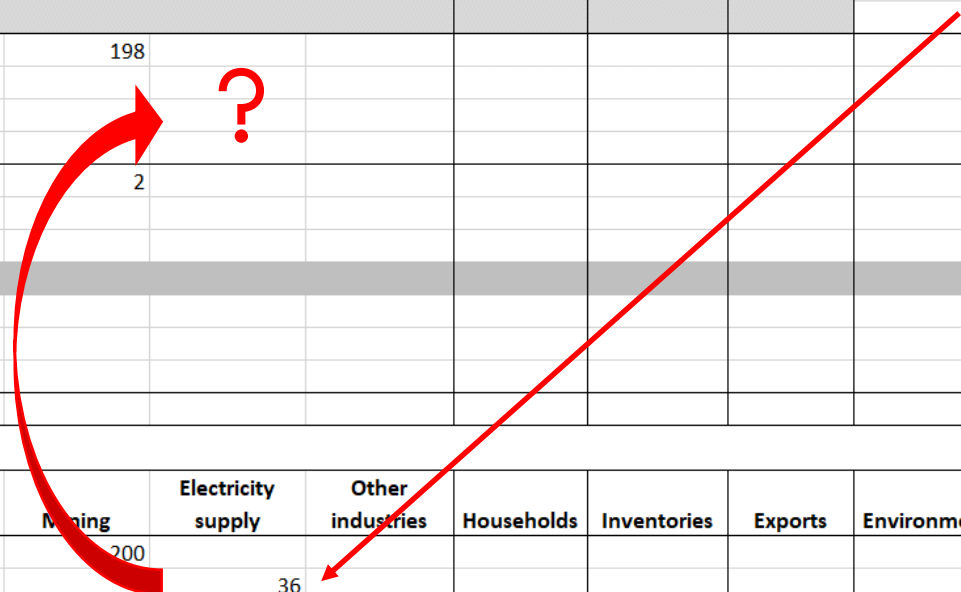
<b>USE TABLE</b>		Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
	UNIT: Petajoule (10 <sup>15</sup> )									
<b>Natural inputs</b>	Extraction of coal		200							200
	Electricity from solar panels and wind mills									
	Wood									
<b>Products</b>	Coal			195			3			
	Gasoline									
	Electricity									
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total use of energy</b>										



- Besides being produced by coal fired power plants electricity is produced by capturing energy from nature through solar panels and windmills. In total 36 PJ of electricity is captured in this way.

SUPPLY TABLE										
	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills								36	36
	Wood									
<b>Products</b>	Coal		198							
	Gasoline									
	Electricity									
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)		2							
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total supply of energy</b>										

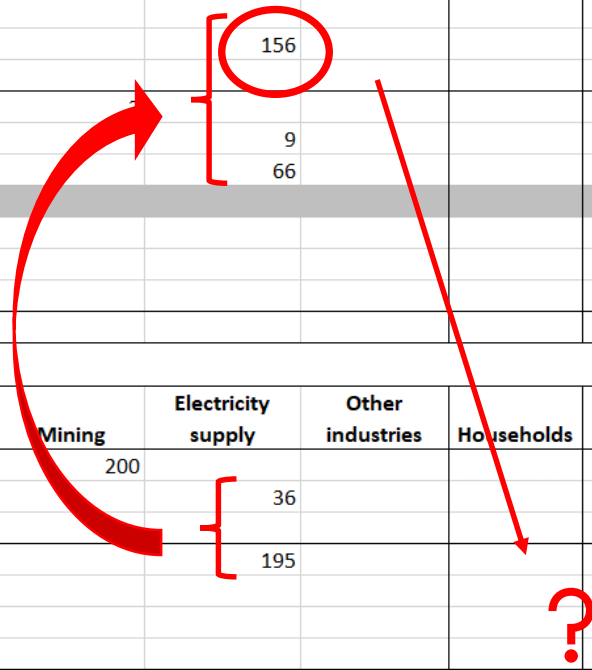
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	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
<b>Natural inputs</b>	Extraction of coal		200							200
	Electricity form solar panels and wind mills			36						36
	Wood									
<b>Products</b>	Coal			195			3			
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	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total use of energy</b>										



According to the energy statistics the total output of electricity based on coal and renewable energy (solar and wind) is 165 PJ. All production of electricity is distributed to users via the grid owned by the electricity supply industry. During the distribution there are some transmission losses and thefts of electricity amounting to 9 PJ.

<b>SUPPLY TABLE</b>										
	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills								36	36
	Wood									
<b>Products</b>	Coal		198							
	Gasoline									
	Electricity			156						
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)			9						
	Losses during transformation			66						
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total supply of energy</b>										

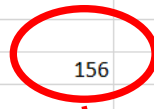
<b>USE TABLE</b>										
	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
<b>Natural inputs</b>	Extraction of coal		200							200
	Electricity from solar panels and wind mills			36						36
	Wood									
<b>Products</b>	Coal			195						
	Gasoline									
	Electricity									
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total use of energy</b>										



- Based on the same energy statistics it can be assumed that 4 PJ of electricity is used by *Agriculture and forestry*, 5 PJ by the *Mining industry* and 77 PJ by *Other industries*. 46 PJ of electricity is exported and 24 PJ is used by households.

**SUPPLY TABLE**

	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	<b>200</b>
	Electricity from solar panels and wind mills								36	<b>36</b>
	Wood									
<b>Products</b>	Coal			198						
	Gasoline									
	Electricity									
	Fuel wood									
<b>Residuals</b>	Losses during extraction (coal)			2						<b>2</b>
	Losses during distribution (electricity)				9					<b>9</b>
	Losses during transformation				66					<b>66</b>
	Other losses (due to end use)									
	gasoline									
electricity										
fuel wood										
<b>Total supply of energy</b>										



**USE TABLE**

	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total	
<b>Natural inputs</b>	Extraction of coal			200						<b>200</b>	
	Electricity form solar panels and wind mills				36					<b>36</b>	
	Wood										
<b>Products</b>	Coal				195			3			<b>198</b>
	Gasoline										
	Electricity	4	5		77	24		46			<b>156</b>
	Fuel wood										
<b>Residuals</b>	Losses during extraction (coal)										
	Losses during distribution (electricity)										
	Losses during transformation										
	Other losses (due to end use)										
	gasoline										
electricity											
fuel wood											
<b>Total use of energy</b>											



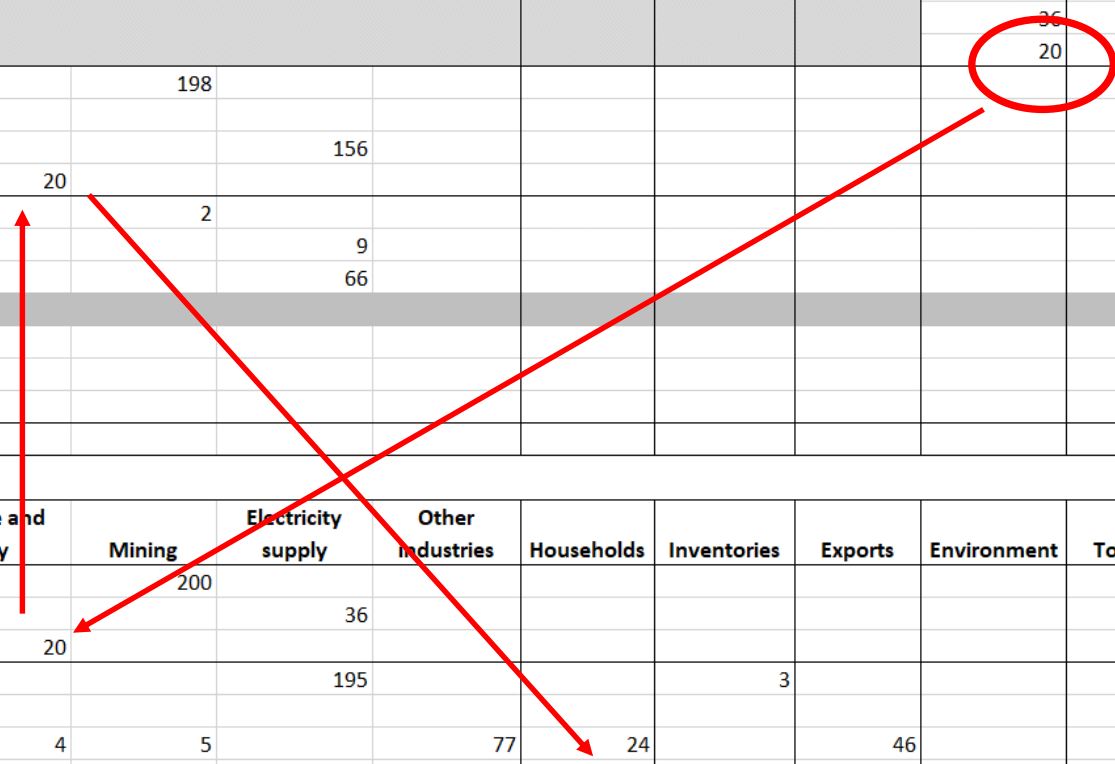
- A substantial amount, 20 PJ, of fuel wood is used by households. The fuel wood comes from the domestic environment. The felling activities, etc. involved in preparing the fuel wood are regarded as an economic activity carried out by the *Agriculture and forestry* industry.

**SUPPLY TABLE**

	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills								36	36
	Wood								20	20
<b>Products</b>	Coal		198							198
	Gasoline									
	Electricity			156						156
	Fuel wood	20								20
<b>Residuals</b>	Losses during extraction (coal)		2							2
	Losses during distribution (electricity)			9						9
	Losses during transformation			66						66
	Other losses (due to end use)									
	gasoline									
	electricity									
	fuel wood									
<b>Total supply of energy</b>										

**USE TABLE**

	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
<b>Natural inputs</b>	Extraction of coal		200							200
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	Wood	20								20
<b>Products</b>	Coal			195			3			198
	Gasoline									
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	Fuel wood					20				20
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
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	electricity									
	fuel wood									
<b>Total use of energy</b>										



Gasoline is used for cars by all industries and households. The use is as follows. Agriculture and forestry: 15 PJ, Mining: 3 PJ, Electricity supply: 1 PJ, Other industries: 14 PJ, Households: 12 PJ. There is no domestic production of gasoline. However, 40 PJ of gasoline is imported from abroad this year. Further, there is some withdrawal of gasoline from inventories, since gasoline was stockpiled in previous years.

**SUPPLY TABLE**

	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
<b>Natural inputs</b>	Extraction of coal								200	200
	Electricity from solar panels and wind mills								36	36
	Wood								20	20
<b>Products</b>	Coal		198							198
	Gasoline							40		40
	Electricity			156						156
	Fuel wood	20								20
<b>Residuals</b>	Losses during extraction (coal)		2							2
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	Other losses (due to end use)									
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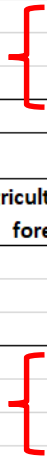
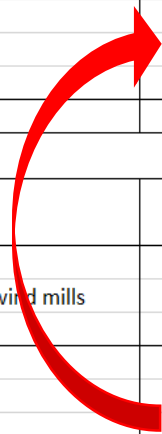
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	UNIT: Petajoule (10 <sup>15</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Exports	Environment	Total
<b>Natural inputs</b>	Extraction of coal		200							200
	Electricity from solar panels and wind mills			36						36
	Wood	20								20
<b>Products</b>	Coal			195			3			198
	Gasoline	15	3	1	14	12	-5			40
	Electricity	4	5		77	24		46		156
	Fuel wood					20				20
<b>Residuals</b>	Losses during extraction (coal)									
	Losses during distribution (electricity)									
	Losses during transformation									
	Other losses (due to end use)									
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	electricity									
	fuel wood									
<b>Total use of energy</b>										

Use of energy generates residuals – not explicitly mentioned in the exercise, but needed to balance the PSUT.

<b>SUPPLY TABLE</b>										
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	Electricity from solar panels and wind mills								36	36
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<b>Products</b>	Coal		198							198
	Gasoline							40		40
	Electricity			156						156
	Fuel wood	20								20
<b>Residuals</b>	Losses during extraction (coal)		2							2
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	Losses during transformation			66						66
	Other losses (due to end use)									
	gasoline	15	3	1	14	12				45
	electricity	4	5		77	24				110
	fuel wood					20				20
<b>Total supply of energy</b>		<b>39</b>	<b>208</b>	<b>232</b>	<b>91</b>	<b>56</b>	<b>0</b>	<b>40</b>	<b>256</b>	<b>922</b>

<b>USE TABLE</b>										
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	Losses during transformation									
	Other losses (due to end use)									
	gasoline									
	electricity									
	fuel wood									
<b>Total use of energy</b>										



# Energy residuals flow to the environment.

<b>SUPPLY TABLE</b>										
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	Other losses (due to end use)									
	gasoline									45
	electricity									110
	fuel wood									20
<b>Total use of energy</b>		<b>39</b>	<b>208</b>	<b>232</b>	<b>91</b>	<b>56</b>	<b>-2</b>	<b>46</b>	<b>252</b>	<b>922</b>

<b>SUPPLY TABLE</b>										
	UNIT: Petajoule (10 <sup>25</sup> )	Agriculture and forestry	Mining	Electricity supply	Other industries	Households	Inventories	Imports	Environment	Total
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	Electricity from solar panels and wind mills								36	36
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