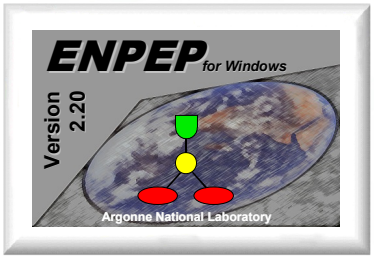
Developing an Energy Supply and Demand Network: Calculating Network Inputs and Network Exercise

ENPEP-BALANCE Training Course
Singapore
December 5-9, 2011



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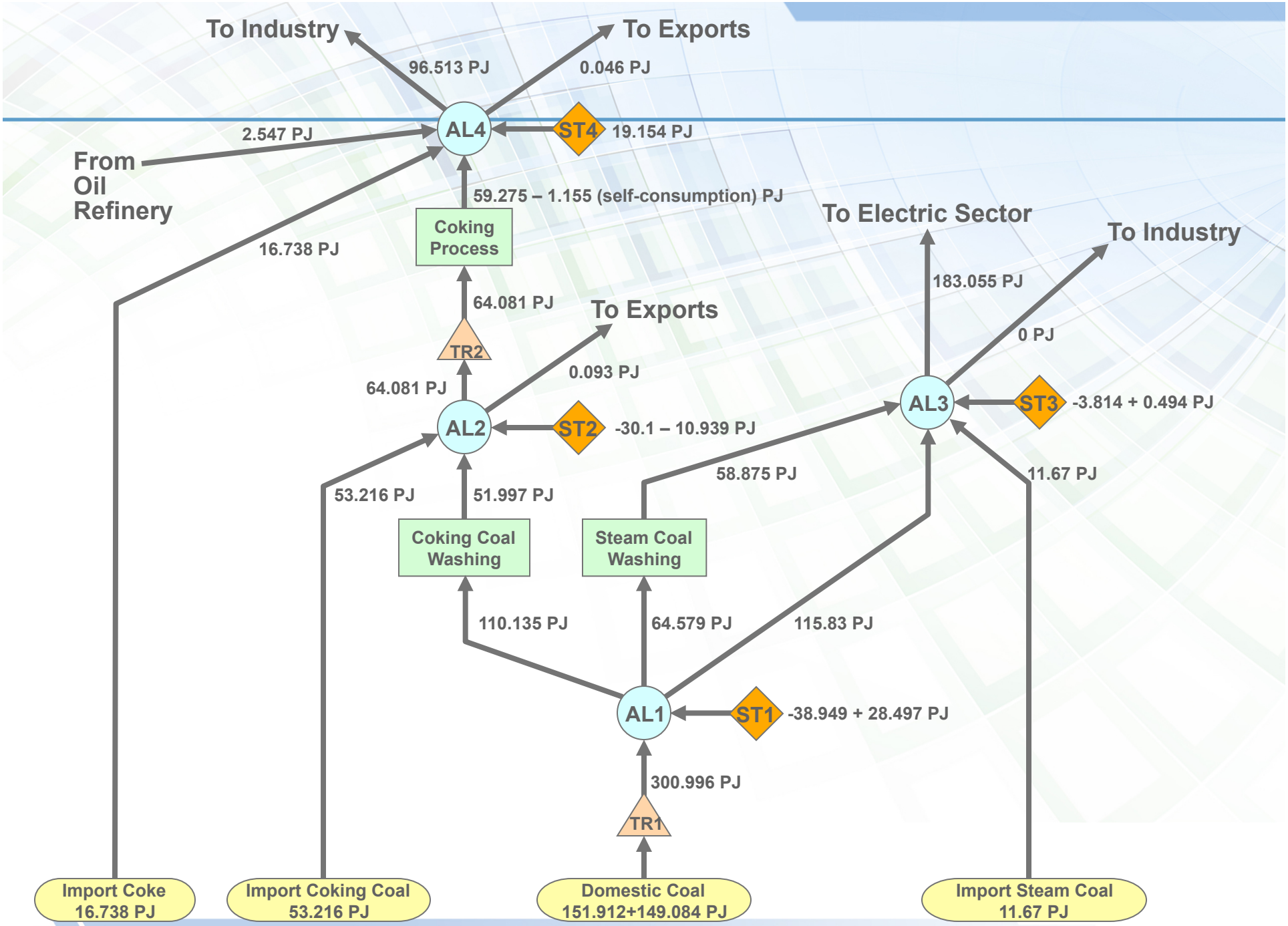
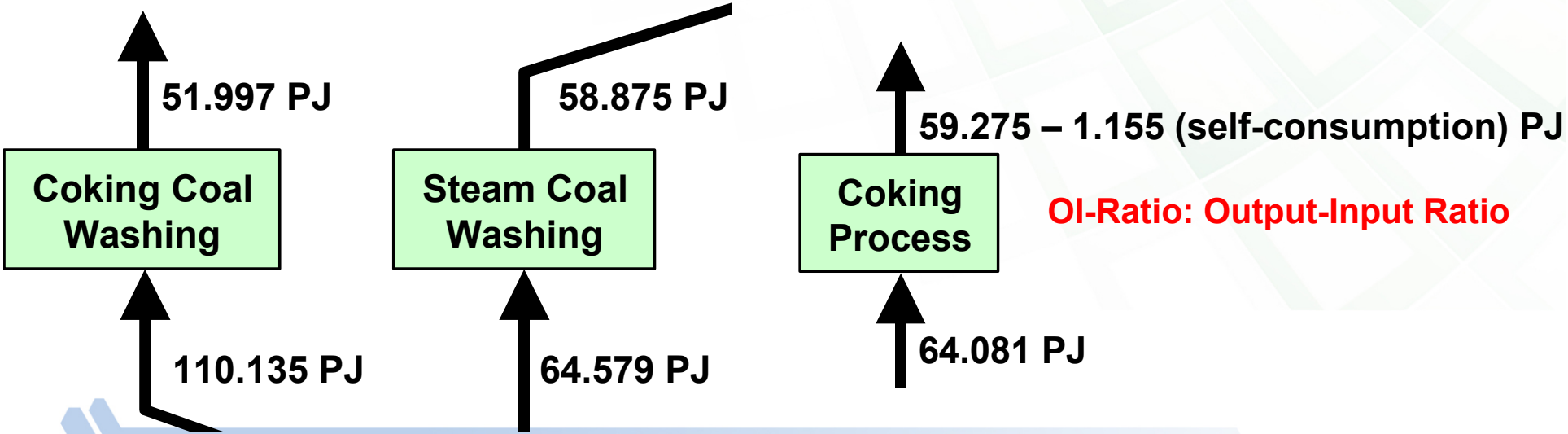

To Industry
To Exports
96.513 PJ
0.046 PJ
AL4
ST4
19.154 PJ
2.547 PJ
From
Oil
Refinery
59.275 – 1.155 (self-consumption) PJ
Coking
Process
16.738 PJ
64.081 PJ
To Exports
TR2
0.093 PJ
64.081 PJ
AL2
ST2
-30.1 – 10.939 PJ
To Electric Sector
To Industry
183.055 PJ
0 PJ
AL3
ST3
-3.814 + 0.494 PJ
58.875 PJ
11.67 PJ
53.216 PJ
51.997 PJ
Coking Coal
Washing
Steam Coal
Washing
110.135 PJ
64.579 PJ
115.83 PJ
AL1
ST1
-38.949 + 28.497 PJ
300.996 PJ
TR1
Import Coke
16.738 PJ
Import Coking Coal
53.216 PJ
Domestic Coal
151.912+149.084 PJ
Import Steam Coal
11.67 PJ

Conversion Process Nodes

$$\text{OI-Ratio}_{\text{Coking Coal Washing}} = \frac{51.997}{110.135} = 0.4721$$

$$\text{OI-Ratio}_{\text{Steam Coal Washing}} = \frac{58.875}{64.579} = 0.9117$$

$$\text{OI-Ratio}_{\text{Coking Process}} = \frac{59.275 - 1.155}{64.081} = 0.9070$$



Allocation Nodes And Stockpile

$$QuantRemBY_{ST1} = -38.949 + 28.497 = -10.452$$

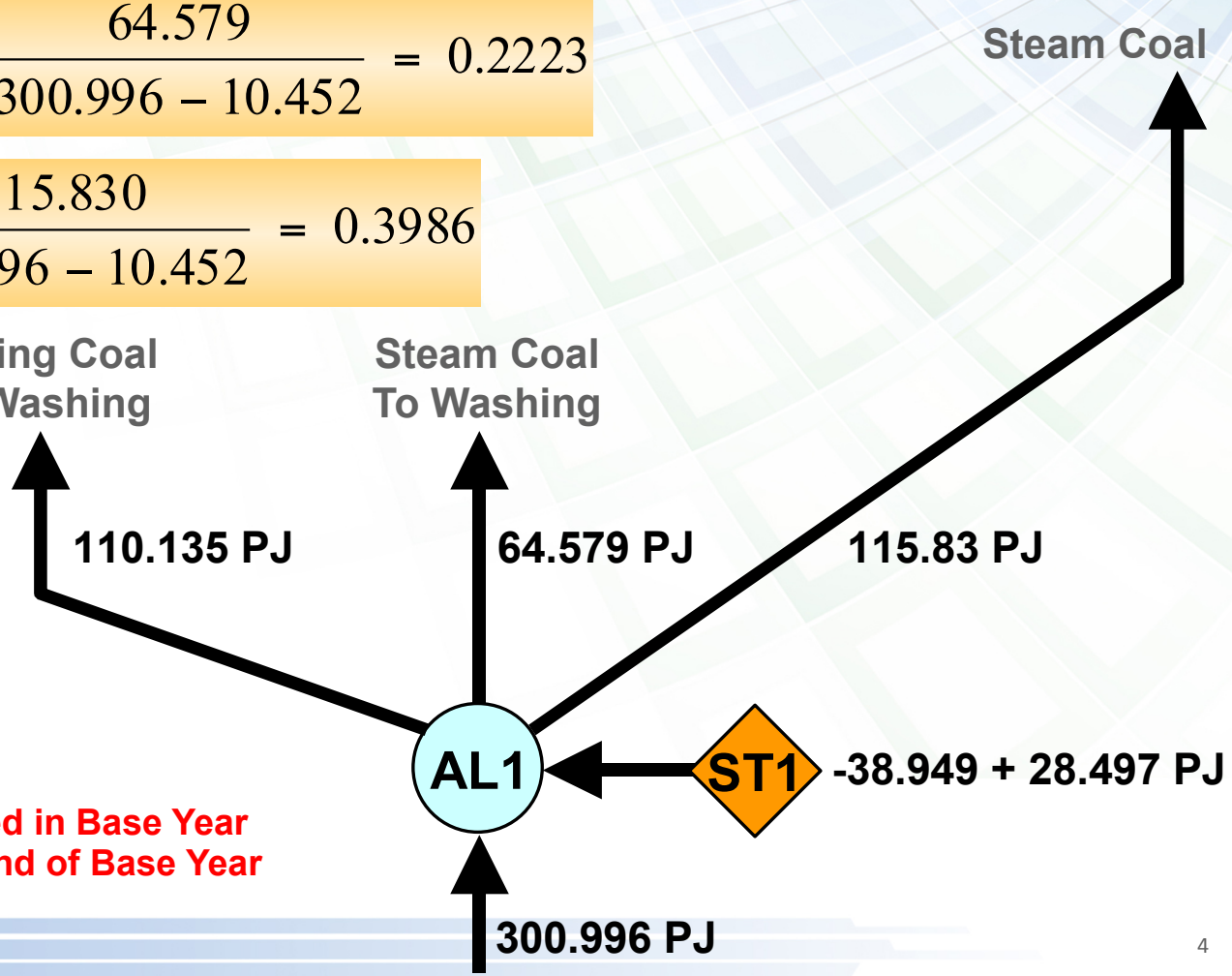
$$QuantEndBY_{ST1} = 10.452(?)$$

$$BYSplit_{AL1\,Coking\,Coal\,Washing} = \frac{110.135}{300.996 - 10.452} = 0.3791$$

$$BYSplit_{AL1\,Steam\,Coal\,Washing} = \frac{64.579}{300.996 - 10.452} = 0.2223$$

$$BYSplit_{AL1\,Steam\,Coal} = \frac{115.830}{300.996 - 10.452} = 0.3986$$

$$\sum_{i=1}^{n} BYSplit = 1.0$$



QuantRemBY: Quantity Removed in Base Year
QuantEndBY: Quantity at the End of Base Year
BYSplit: Base Year Split

Allocation Nodes And Stockpile

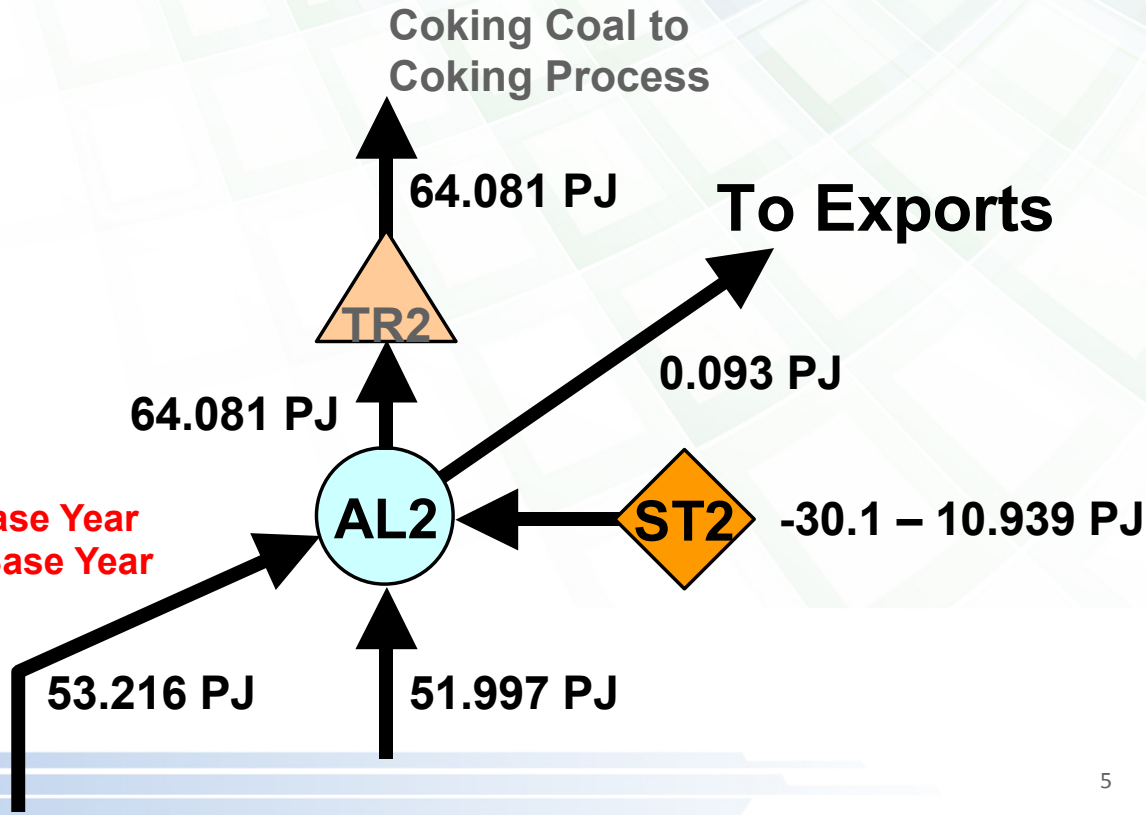
$$QuantRemBY_{ST2} = -30.1 - 10.939 = -41.039$$

$$QuantEndBY_{ST2} = 41.039(?)$$

$$BYSplit_{AL2\,Coking\,Coal\,Exports} = \frac{0.093}{53.216 + 51.997 - 41.039} = 0.0014$$

$$BYSplit_{AL2\,Coking\,Coal\,to\,Coking\,Process} = \frac{64.081}{53.216 + 51.997 - 41.039} = 0.9986$$

$$\sum_{i=1}^{n} BYSplit = 1.0$$



QuantRemBY: Quantity Removed in Base Year
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BYSplit: Base Year Split

Allocation Nodes And Stockpile

$$QuantRemBY_{ST3} = -3.814 + 0.494 = -3.320$$

$$QuantEndBY_{ST2} = 3.320(?)$$

$$BYSplit_{AL3\,Steam\,Coal\,to\,Industry} = \frac{0}{58.875 + 115.83 + 11.67 - 3.32} = 0$$

$$BYSplit_{AL3\,Steam\,Coal\,to\,Electric\,Sector} = \frac{183.055}{58.875 + 115.83 + 11.67 - 3.32} = 1.0$$

$$\sum_{i=1}^{n} BYSplit = 1.0$$

QuantRemBY: Quantity Removed in Base Year
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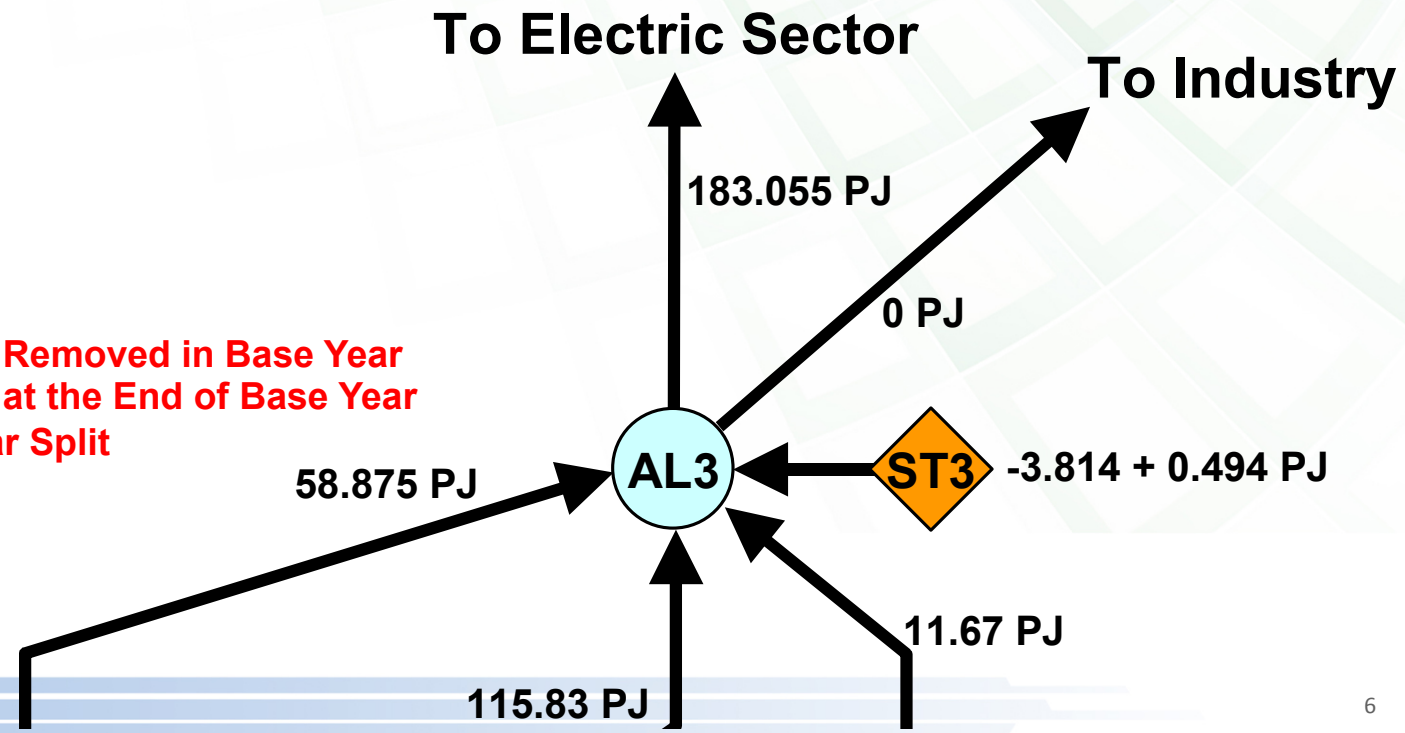
BYSplit: Base Year Split



Allocation Nodes And Stockpile

$$QuantRemBY_{ST4} = 19.154$$

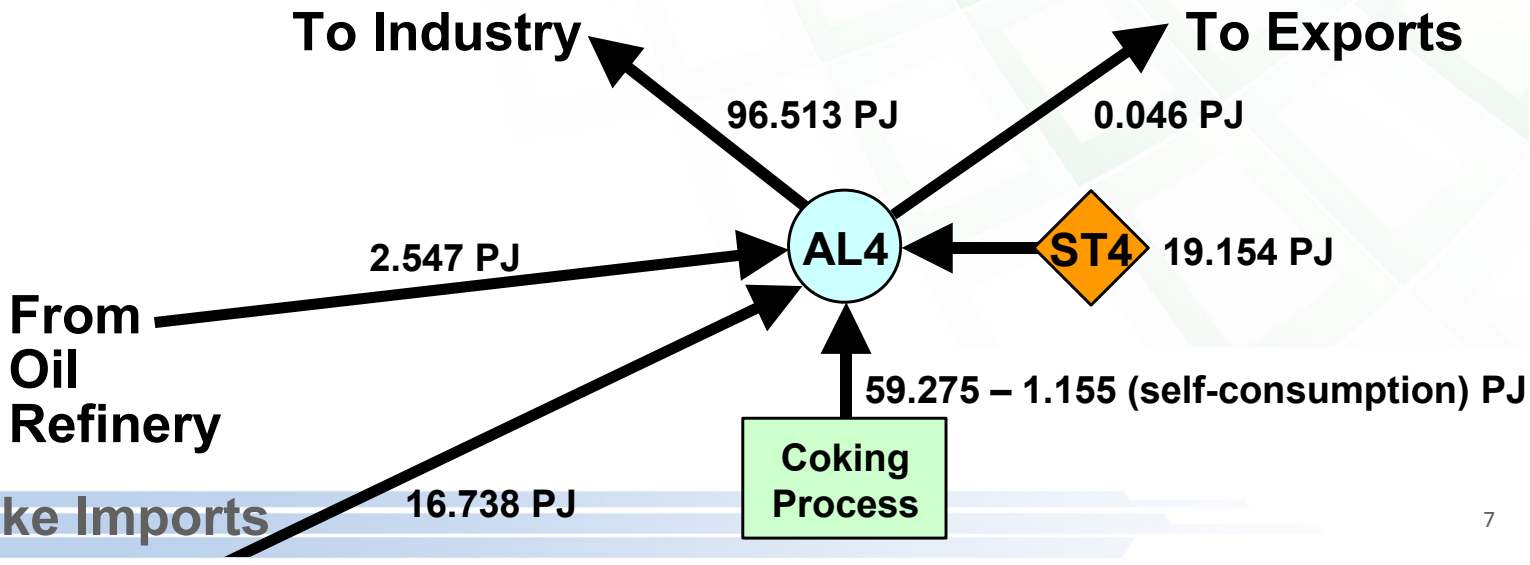
$$QuantEndBY_{ST2} = 0\ (?)$$

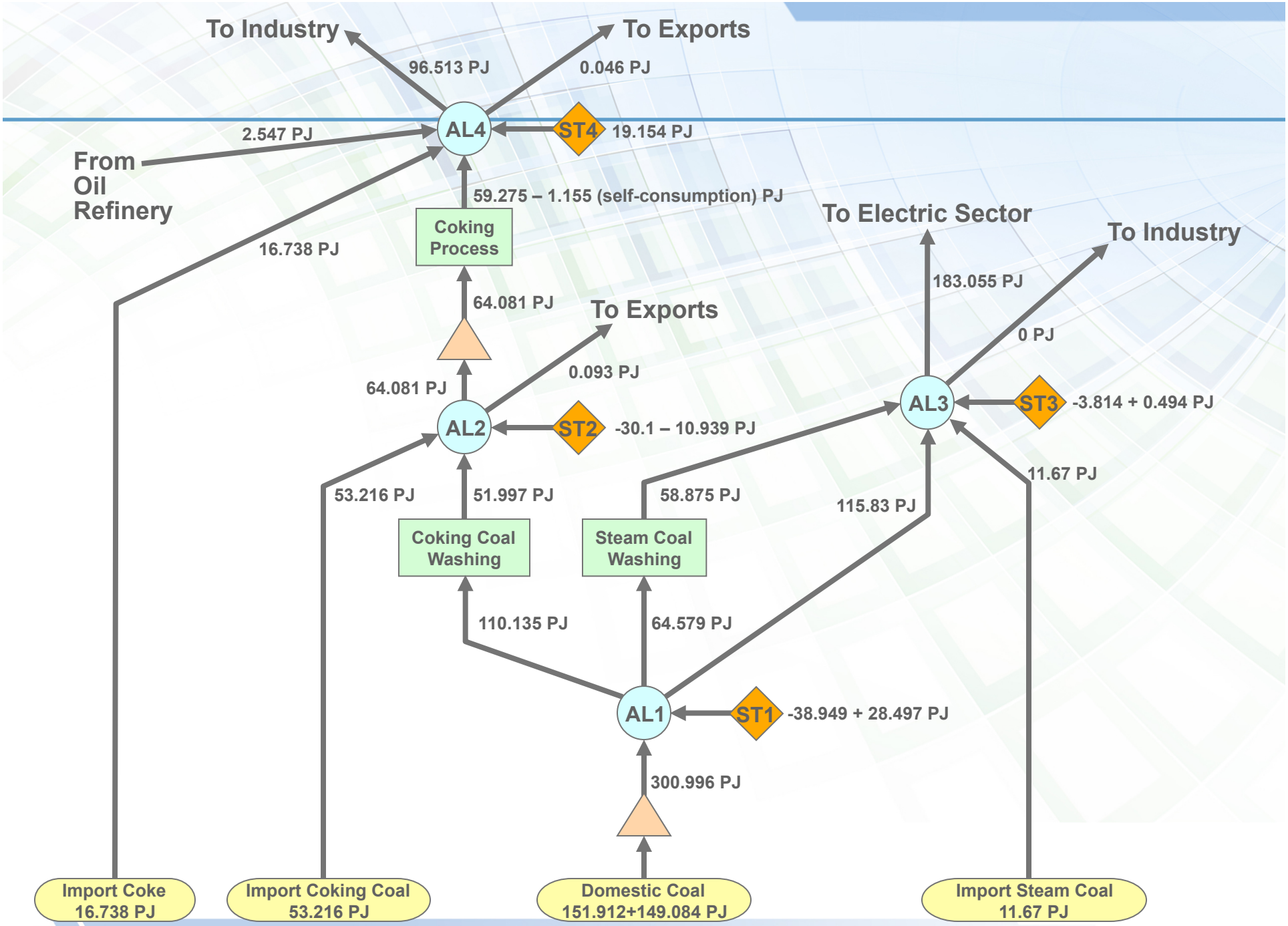
$$BYSplit_{AL4\ Coke\ to\ Industry} = \frac{96.513}{2.547 + 16.738 + (59.275 - 1.155) + 19.154} = 0.9995$$

$$BYSplit_{AL4\ Coke\ Exports} = \frac{0.046}{2.547 + 16.738 + (59.275 - 1.155) + 19.154} = 0.0005$$

$$\sum_{i=1}^{n} BYSplit = 1.0$$

QuantRemBY: Quantity Removed in Base Year
QuantEndBY: Quantity at the End of Base Year
BYSplit: Base Year Split

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Developing General Network Using National Energy Balance Table for Mexico for 2000

- Find spreadsheet fil (Building_Network_Example_Mexico.xls) under ENPEP_Course_Material\06-Others

Table 15a. Mexico National Energy Balance , 2000 (in petajoules)

		Primary Energy											
		Coal	Crude Oil	Natural Gas Condensates	NatGas Non-Associated	NatGas Associated	Nuclear Energy	Hydro Energy	Geothermal Energy	Wind Energy	Biomass Bagasse	Wood	Total Primary Energy
Supply	Production	226.702	6,619.787	130.705	435.265	1,410.855	90.331	344.220	61.413	0.083	88.037	253.868	9,661.266
	Imports	64.886	------	------	------	------	------	------	------	------	------	------	64.886
	Stock Changes	-33.914	-1.415	-0.006	-0.034	-6.386	------	------	------	------	------	------	-41.755
	Total Supply	257.674	6,618.372	130.699	435.231	1,404.469	90.331	344.220	61.413	0.083	88.037	253.868	9,684.397
	Exports 1	-0.093	-3,631.109	------	------	------	------	------	------	------	------	------	-3,631.202
	Unaccounted	------	-0.003	------	------	-187.825	------	------	------	------	-0.961	------	-188.789
	Exports 2	------	-229.015	------	------	------	------	------	------	------	------	------	-229.015
	Total domestic supply	257.581	2,758.245	130.699	435.231	1,216.644	90.331	344.220	61.413	0.083	87.076	253.868	5,635.391
Transformation	Total transformation	-247.136	-2,775.712	-131.160	-170.226	-1,301.583	-90.331	-344.220	-61.413	-0.083	------	------	-5,121.864
	Coking	-64.081	------	------	------	------	------	------	------	------	------	------	-64.081
	Refineries	------	-2,775.712	-6.515	------	------	------	------	------	------	------	------	-2,782.227
	Natural Gas Processing Plants	------	------	-124.645	-170.226	-1,301.583	------	------	------	------	------	------	-1,596.454
	Central Power Stations	-183.055	------	------	------	------	-90.331	-344.220	-61.413	-0.083	------	------	-679.102
	Self consumption of sector	------	------	------	-12.731	-61.440	------	------	------	------	------	------	-74.171
	Statistical differences	-10.445	49.558	0.461	-0.488	146.379	------	------	------	------	------	------	185.465
	Losses (transportation, distribution)	------	-32.091	------	------	------	------	------	------	------	------	------	-32.091
Final Consumption	Total final consumption	------	------	------	251.786	------	------	------	------	------	87.076	253.868	592.730
	Final consumption non-energy	------	------	------	17.294	------	------	------	------	------	4.486	------	21.780
	Petrochemicals	------	------	------	17.294	------	------	------	------	------	------	------	17.294
	Other non-energy applications	------	------	------	------	------	------	------	------	------	4.486	------	4.486
	Final consumption energetic	------	------	------	234.492	------	------	------	------	------	82.590	253.868	570.950
	Households	------	------	------	14.622	------	------	------	------	------	------	253.868	268.490
	Transport	------	------	------	0.104	------	------	------	------	------	------	------	0.104
	Agriculture/Fisheries	------	------	------	------	------	------	------	------	------	------	------	------
	Industry	------	------	------	219.766	------	------	------	------	------	82.590	------	302.356
	Pemex Oil Company	------	------	------	47.554	------	------	------	------	------	------	------	47.554
	Other Industries	------	------	------	172.212	------	------	------	------	------	82.590	------	254.802
									Gross production of secondary energy				