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Asset Accounts

(Application: Valuation)

SEEA Training Seminar for ESCAP

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Chiba, Japan

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Statistics Canada

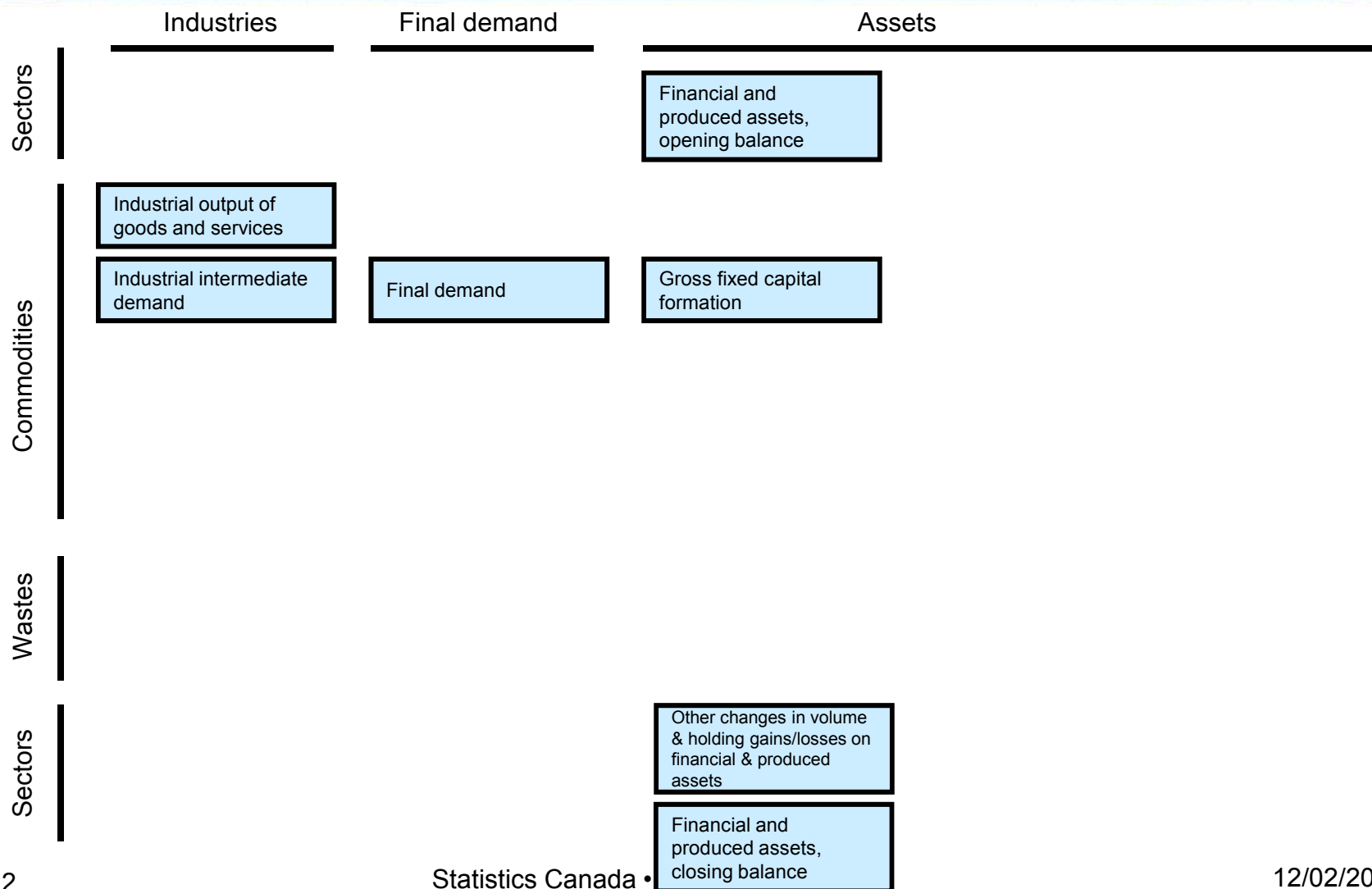


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SNA view



SEEA view

	Industries	Final demand	Assets		
Sectors			Financial and produced assets, opening balance	Natural resource assets, opening balance	Natural resource assets, opening balance
Commodities	Industrial output of goods and services				
	Industrial intermediate demand Environmental protection expenditures	Final demand Environmental protection expenditures	Gross fixed capital formation Capital expenditures for environmental protection		
	Resource production by industries Resource use by industries	Resource production by households/gov't Resource use by households/gov't			
Wastes	Waste consumption by industries Waste output by industries	Waste consumption by households/gov't Waste output by households/gov't			
Sectors			Other changes in volume & holding gains/losses on financial & produced assets	Changes in and holding gains/losses on natural resource assets	Changes in natural resource assets
			Financial and produced assets, closing balance	Natural resource assets, closing balance	Natural resource assets, closing balance

Physical stock accounts: an example for crude bitumen

Table 153-0122 [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#)

Selected natural resource reserves
annual (data in thousands)

Data table

Add/Remove data

Manipulate

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The data below is a part of CANSIM table 153-0122. Use the [Add/Remove data](#) tab to customize your table.

Selected items [[Add/Remove data](#)]

Geography = Canada ⁸

Asset type = Established crude bitumen reserves (cubic metres) ¹⁰

Stock	2005	2006	2007
Opening stock	1,660,000	1,620,000	3,340,000
Additions	17,258	1,785,707	237,000
Depletion	57,258	65,707	77,000
Closing stock	1,620,000	3,340,000	3,500,000

Monetary stock accounts: an example for crude bitumen

Table 153-0121 ^{1, 2}

Value of selected natural resource reserves
annual (dollars x 1,000,000)

Data table

Add/Remove data

Manipulate

Download

Related information

Help

The data below is a part of CANSIM table 153-0121. Use the [Add/Remove data](#) tab to customize your table.

Selected items [[Add/Remove data](#)]

Geography = Canada

Asset type = Established crude bitumen reserves

Stock	2008	2009	2010	2011
Reconciliation account opening stock ^a	191,145.4	476,744.1	182,194.4	336,498.2
Reconciliation account additions ^a	97,122.8	103.7	611.1	3,244.6
Reconciliation account depletion ^a	8,426.2	3,733.8	7,618.1	10,571.1
Reconciliation account revaluation ^a	196,902.1	-290,919.7	161,310.8	95,764.8
Reconciliation account closing stock ^a	476,744.1	182,194.4	336,498.2	424,936.5

Valuation exercise

Asset account for Crude Bitumen: Quantity and value																	
Crude Bitumen - 211114																	
thousand m3																	
	Opening stock	Additions	Depletion	Closing stock													
2010																	
2011																	
2012																	
										Reserves under active development							
										Physical accounts							
<i>GEOMETRIC</i>																	
Year	Total revenues	Total production costs	Depreciation	Net capital stock	Rate of return	Return to capital	Total extraction costs	Resource rent	Opening Stock	Additions / Revisions	Depletion / Quantity of	Closing Stock	Reserve life	Discount factor	Net Present Value		
	\$ '000	\$ '000	\$ '000	\$ '000		\$ '000	\$ '000	\$ '000	'000m ³	'000m ³	'000m ³	'000m ³	years	4%	\$ '000 '000		
	CAPP ¹	CAPP ²	CANSIM 031-0002 ³		Rate of return tab	(E*F)	(C+D+G)	(B-H)	(Mt-I)	(M-J+L)	AER ST98 ⁴	AER ST98 ⁴	(M/L)	(PV(NS2,N##,-1/N##))	(I*N*O)/1000		
sample	10000	1000	100	10000	1.00%	100	1200	8800	..	100000	1000	99900	100	0.2453	216		
2010																	
2011																	
2012																	
million dollars																	
	Opening stock	Additions	Depletion	Revaluation	Closing stock												
2011																	
2012																	

¹ Canadian Association of Petroleum Producers, Statistical Handbook, Table 04-25B

<http://www.capp.ca/library/statistics/handbook/pages/statisticalTables.aspx?sectionNo=4>

² Canadian Association of Petroleum Producers, Statistical Handbook, Table 04-16B (Operating costs in-situ + mining + upgraders = Operating column)

<http://www.capp.ca/library/statistics/handbook/pages/statisticalTables.aspx?sectionNo=4>

³ Statistics Canada: CANSIM Table 031-0002 (Current prices, Non-conventional oil extraction, Total Assets, Geometric)

<http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0310002&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=>

⁴ Alberta Energy Regulator: ST98: Alberta's Energy Reserves & Supply/Demand Outlook

<http://www.aer.ca/data-and-publications/statistical-reports/st98>

Steps to value a resource stock

- Estimate the physical stock
- Calculate the resource rent
- Calculate the net present value

Valuation – Estimate the stock

Year	Total revenues \$ '000	Total production costs \$ '000	Depreciation \$ '000	Net capital stock \$ '000	Rate of return %	Return to capital \$ '000	Total extraction costs \$ '000	Resource rent \$ '000	Opening Stock '000 m ³	Additions / Revisions '000 m ³	Depletion / Quantity of production '000 m ³	Closing Stock '000 m ³	Reserve life years	Discount factor %	Net Present Value \$'000 000
	CAPP ¹	CAPP ²	GEOMETRIC CANSIM 031-0002 ³		Rate of return folder	(E*F)	(C+D+G)	(B-H)	(Mt-1)	(M-J+L)	AER ST98 ⁴	AER ST98 ⁴	(M/L)	(PV(NS2,N##,-1/N##))	(I*N*O)/1000
1	10,000.00	4,000.00	100.00	10,000.00	0.02	200.00	4,300.00	5,700.00	..	100,000	1,000	99,900	99.90	0.25	139.67

Reserves under active development			
Physical accounts			
Opening Stock	Additions / Revisions	Depletion / Quantity of production	Closing Stock
'000 m ³	'000 m ³	'000 m ³	'000 m ³
(Mt-1)	(M-J+L)	AER ST98 ⁴	AER ST98 ⁴
..	100000	1000	99900

Valuation – Estimate the rent

Year	Total revenues \$ '000	Total production costs \$ '000	Depreciation \$ '000	Net capital stock \$ '000	Rate of return %	Return to capital \$ '000	Total extraction costs \$ '000	Resource rent \$ '000	Opening Stock '000 m ³	Additions / Revisions '000 m ³	Depletion / Quantity of production '000 m ³	Closing Stock '000 m ³	Reserve life years	Discount factor %	Net Present Value \$'000 000
1	10,000.00	4,000.00	100.00	10,000.00	0.02	200.00	4,300.00	5,700.00	..	100,000	1,000	99,900	99.90	0.25	139.67

Year	Total revenues \$ '000	Total production costs \$ '000	GEOMETRIC		Rate of return	Return to capital \$ '000	Total extraction costs \$ '000	Resource rent \$ '000
			Depreciation \$ '000	Net capital stock \$ '000				
	CAPP ¹	CAPP ²	CANSIM 031-0002 ³		Rate of return tab	(E*F)	(C+D+G)	(B-H)
sample	10000	1000	100	10000	1.00%	100	1200	8800

$$RR_t = TR - C - (r_c K + \delta) \quad \text{where:}$$

RR = resource rent (annual)

TR = total annual revenue

C = annual non-capital extraction cost (excluding taxes)

δ = annual depreciation

$r_c K$ = return to produced capital

Valuation – Numerical example

Year	Total revenues	Total production costs	GEOMETRIC		Rate of return	Return to capital	Total extraction costs	Resource rent	Physical accounts				Closing stock	Reserve life	Discount factor	Net Present Value
	\$ '000	\$ '000	Depreciation	Net capital stock					Opening Stock	Additions / Revisions	Depletion / Quantity of production	Reserve life				
	CAPP ¹	CAPP ²	CANSIM 031-0002 ³	Rate of return folder	(E*F)	(C+D+G)	(B-H)	(Mt-1)	(M-J+L)	AER ST98 ⁴	AER ST98 ⁴	(M/L)	(PV(NS2,N##,-1/N##))	(I*N*O)/1000		
1	10,000.00	4,000.00	100.00	10,000.00	0.02	200.00	4,300.00	5,700.00	..	100,000	1,000	99,900	99.90	0.25	139.67	

$$NPV = \sum_{t=1}^T \frac{RR_1}{(1 + r_i)^t}$$

Reserve life	Discount factor	Net Present Value
years	4%	\$'000 000
(M/L)	(PV(NS2,N##,-1/N##))	(I*N*O)/1000
100	0.2453	216

Questions?

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