From:	McLachlan, Ian P AGRI:EX
To:	Kennedy, Hilary ENV:EX
Subject:	Carbon Tax Estimates - Analysis Summary - 08 Feb 2012.docx
Date:	Wednesday, February 8, 2012 4:44:39 PM
Attachments:	Carbon Tax Estimates - Analysis Summary - 08 Feb 2012.docx

to discuss the new section on page 4

Carbon Tax Paid By BC Primary Agriculture Sector

08 February 2012

Summary

Using data from Statistics Canada's Report on Energy Supply and Demand, this analysis estimates that BC primary agriculture will pay a projected $28.6 million in 2012/13. Cumulative carbon tax paid from July 1, 2007 to June 30, 2013 is estimated at $94.5 million. *(accompanying spreadsheets are available)*

Carbon Tax Payable ($ millions)	Gasoline	Diesel	Propane	Natural Gas	Total	*Cumulative*
2012/13	$7.7	$12.1	$0.3	$8.5	$28.6	*$94.5*

I. Introduction

Objective: Officials in the BC government and the BC Agriculture Council have quoted differing estimates of the amount of carbon tax paid by the BC primary agriculture sector. This paper attempts to develop a technically sound estimate that all parties agree on.

Analysis Participants: This analysis was led by Innovation and Governance Branch, Ministry of Agriculture and the Climate Action Secretariat, Ministry of Environment, with internal review by the Tax Policy Branch, Ministry of Finance and external review by the BC Agriculture Council.

Background

- The carbon tax was introduced July 1, 2008 to encourage reduced fuel use and low carbon alternatives.
- The tax is one of several measures to help government meet its legislated obligation to reduce BC's greenhouse gas emissions by at least 33% below 2007 levels by 2020 (80% by 2050).
- The initial carbon tax rate was $10/tonne of carbon dioxide equivalent (CO_2e) emissions from fossil fuels, rising by $5 a year to reach $30/tonne on July 1, 2012. The rate effective July 1, 2012 is equal to 7.23 cents/litre for gasoline, 8.28 cents/litre for diesel, and $148.98/gigajoule of natural gas.
- The *Carbon Tax Act* requires the tax to be carbon neutral, so revenues received are in aggregate offset by tax reductions to personal and corporate income taxes, property taxes, and other taxes.
- The primary agriculture sector has expressed significant concern about the amount of carbon tax paid and its effect on competiveness. The sector argues that its carbon tax payments far exceed the benefits received from the offsetting reductions in other taxes.
    - Government has not verified this, due to data limitations.
- The greenhouse industry has been especially vocal, due to its large-scale use of natural gas and need to compete in an international market where no other jurisdictions currently have carbon taxes.
    - However, California has recently implemented a cap-and-trade system which places a carbon price on very large greenhouses (greater than 25kt of emissions per year) beginning in 2013. The remainder of the agriculture sector in California will pay a carbon price on its combustion emissions similar to BC's carbon tax starting in 2015.
- The 2.4 Mt CO_2e of agricultural emissions accounted in the BC GHG Inventory Report comprise emissions from soils, manure management, and enteric fermentation. These emissions are not considered here because they are not related to fossil fuel use and are not subject to the carbon tax.
    - In the inventory report, emissions from fuel use in the agriculture sector, such as those considered here, are reported under the categories of "Transportation" and "Industry".

s.13

II. Carbon Tax Estimates

Scope: For this analysis, BC's primary agriculture sector is defined as crop production and animal production. The sector does not include the food processing or food retailing sectors.

NAICS Codes: Statistics are gathered according to categories of the North American Industrial Classification System (NAICS).

- NAICS code 111 covers Crop Production, with sub-codes of 1111 for oilseed and grain farming, 1112 for vegetable and melon farming, 1113 for fruit and tree nut farming, 1114 for greenhouse, nursery and floriculture production, and 1119 for other crop farming.
- NAICS code 112 covers Animal Production and Aquaculture, with sub-codes of 1121 for cattle ranching and farming (including dairy farms), 1122 for hog and pig farming, 1123 for poultry and egg production, 1124 for sheep and goat farming, and 1129 for other animal production.

Table 1: BC Agriculture Sector – Estimated Carbon Tax

	Gasoline	Diesel	Propane	Natural Gas		
Fuel Use Volumes	*(megalitres)*	*(megalitres)*	*(megalitres)*	*(Gigajoules)*		
2006	*108.5*	*140.4*	*5.6*	*5,716,000*		
2007	*109.8*	*178.4*	*6.7*	*5,716,000*		
2008	108.6	140.2	7.5	5,716,000		
2009	93.5	131.8	5.9	5,716,000		
2010	112.2	142.1	6.0	5,716,000		
Carbon Tax Rates	*cents/litre*	*cents/litre*	*cents/litre*	*cents/GJ*		
2008/09	2.41	2.76	1.53	49.66		
2009/10	3.62	4.14	2.3	74.49		
2010/11	4.82	5.52	3.06	99.32		
2011/12	6.03	6.90	3.83	124.15		
2012/13	7.23	8.28	4.59	148.98		
Carbon Tax Payable *($ millions)*	**Gasoline**	**Diesel**	**Propane**	**Natural Gas**	**Total**	***Cumulative***
2008/09	$2.4	$3.8	$0.1	$2.8	$9.1	*$9.1*
2009/10	$3.7	$5.7	$0.1	$4.3	$13.8	*$22.9*
Estimated 2010/11	$5.1	$8.1	$0.2	$5.7	$19.1	*$42.0*
Projected Estimate 2011/12	$6.4	$10.1	$0.2	$7.1	$23.9	*$65.9*
Projected Estimate 2012/13	$7.7	$12.1	$0.3	$8.5	$28.6	*$94.5*

Sources: Statistics Canada, BC Ministry of Finance.

The carbon tax estimates in Table 1 were derived as follows:

- Carbon tax was calculated by applying the tax rates from Schedule 1 of the Carbon Tax Act to the fuel use volumes for the corresponding carbon tax period (July 1 to June 30). The "Light Fuel Oil" rate was applied to diesel and the "Marketable Natural Gas" rate was applied to natural gas volume. http://www.leg.bc.ca/38th4th/1st_read/gov37-1.htm
- Volumes of gasoline, diesel, propane, and natural gas were obtained from Statistics Canada's 2010 Report on Energy Supply and Demand (preliminary, on CANSIM). http://www5.statcan.gc.ca/cansim/a26

- 2008/09and 2009/10 volumes of gasoline, diesel and propane are 50% of the volumes in the respective pairs of calendar years.
- For 2010/11, 2011/12, and 2012/13, the volumes of gasoline, diesel, and propane used in the carbon tax calculation are equal to the 2006 - 2010 average.
- Natural gas volumes for 2010 are used for all years, due to pending Stats Can revisions for 2006, 2007, 2008, and 2009. This volume is corroborated by FortisBC customer accounts (5,625,000 GJ).

III. Corroborating Estimates

1. **BC Agriculture Council** (2009)

BC Agriculture Council provided an early estimate of $9.6 million for the amount payable in the first year of the carbon tax, 2008/09. This compares closely with the $9.1 million estimate for 2008/09 derived by the present analysis (above).

Estimated Carbon Tax Impacts on BC Agriculture – by sector

Sector	Gasoline ($ 000)	Diesel ($ 000)	Natural Gas ($ 000)	Total ($ 000)
Grain	134	429	-	563
Dairy	246	1,229	183	1,658
Cattle	552	1.708	-	2,269
Poultry	77	80	366	523
Fruit & veg	91	136	-	227
Greenhouse & nursery	135	185	2,135	2,455
Other	716	841	366	1,923
Total	**1,951**	**4,608**	**3,050**	**9,609**

Methodology: BCAC started with fuel use estimates provided in the 1997 NRCan study Descriptive Analysis of On-Farm Energy Use in Canada (http://www.usask.ca/agriculture/caedac/pubs/Energy.PDF)

BCAC assumed that diesel and gasoline use in each sector had increased by 10% since 1997, except for the greenhouse sector which had doubled. For natural gas, BCAC used 2007 sales to farmers of 6.1 million gigajoules (GJ), and allocated this by proportions indicated by the NRCan study: 70% to greenhouses, 12% to poultry and "other", and 6% to dairy.

The total carbon tax estimated across all sub-sectors was $9.6 million for 2008/9.

Based on this estimate for the first year of the carbon tax, assuming constant emissions, the carbon tax costs for the sector for 2012/13 at a rate of $30/tonne would be $28.8 million.

2. Climate Action Secretariat (2012)

The BC Climate Action Secretariat (CAS) has developed estimates using two different methods.

a. **Based on the agriculture sector's share of economic activity:**
   - Primary agriculture represented 0.6% of BC GDP and 3.3% of "goods sector" GDP in 2010.
   - In 2010/11 total carbon tax revenues were $740 million. Dividing this by the 2010/11 fiscal year rate of $18.75/tonne, indicates total BC carbon taxed emissions of 39.5Mt in 2010/11.
   - Assuming on the high side that the agriculture sector could account for 3% of total carbon taxed emissions indicates approximately 0.8Mt in carbon taxed emissions from the sector.

- This would result in $23 million in costs to the sector in fiscal 2012/13 assuming constant emissions levels. (0.8Mt*$18.75/tonne)

b. Based on greenhouse natural gas and diesel data

- Previous analysis based on Fortis BC billing data for natural gas use yielded an estimate of $6.3M in carbon tax costs from the greenhouse sector for 2012/13 . This work assumed 4.4 million GJ of natural gas consumption by greenhouses was constant through 2012/13.
- Based on provincial GHG inventories and contracted work for CAS on diesel fuel use, CAS estimated 450kt of emissions (most from off-road transport) for non-greenhouse agriculture emissions in 2008. This figure does not include emissions from non-greenhouse natural gas combustion, or from gasoline. At $30/tonne in 2012/13, this would leads to a carbon tax cost of $13.5 million.
- With the addition of the emissions $6.3 million from natural gas combustion from greenhouses, the result is $20 million in estimated agriculture sector carbon tax.
- Adding a "guess" for the emissions from gasoline and non-greenhouse natural gas could plausibly yield a 2012/13 sector cost estimate in the $20-$30 million range.

IV. Issues and Limitations (call it QA/QC?)

Factor	Direction	Likely Magnitude
Aquaculture included	downward	Small

Do the fuel use estimates include fuel used by stationary combustion sources?

Some caveats around where the gasoline and diesel are used are likely necessary (scope issue – some of the use will probably be non-agricultural in nature, but by agriculture operations)

Get all the data by detailed NAICS subcodes, when available – special run required.

V. Conclusion

The preferred method described above produces an estimate of $28.6 million in 2011/12, and a cumulative total of $94.5 million for the period from July 1, 2008 to June 30, 2013. This estimate is based on the clearest fuel use data available and the direct application of statutory carbon tax rates.

The preferred method is corroborated by BCAC's earlier work, which extrapolates to a 2011/12 estimate of $28.8 million and CAS estimates of $19 million and $20 million.

Based on the coalescence of several methods, the range estimate for carbon tax costs for the agriculture sector for 2012/13 is likely in the $25-$30 million. For a single estimate for 2012/13, it is recommended that $28.6 million be used, and that the data and assumptions described here be referenced.

Innovation and Governance Branch, Ministry of Agriculture and Lands
Contact: Ian McLachlan, Senior Manager (250) 356-0191

Carbon Tax Paid By BC Primary Agriculture Sector

09 February 2012

Summary

Using data from Statistics Canada's Report on Energy Supply and Demand, this analysis estimates that BC primary agriculture will pay a projected $28.6 million in 2012/13. Cumulative carbon tax paid from July 1, 2007 to June 30, 2013 is estimated at $94.5 million. *(accompanying spreadsheets are available)*

Carbon Tax Payable ($ millions)	Gasoline	Diesel	Propane	Natural Gas	Total	*Cumulative*
2012/13	$7.7	$12.1	$0.3	$8.5	$28.6	*$94.5*

Note: This analysis does not address tax reductions and other measures of the Revenue Neutral Carbon Tax Plan. Total carbon tax impact on the agriculture sector would consider net rather than gross impact.

I. Introduction

Objective: Officials in the BC government and the BC Agriculture Council have quoted differing estimates of the amount of carbon tax paid by the BC primary agriculture sector. This paper attempts to develop a technically sound estimate that all parties agree on.

Analysis Participants: This analysis was led by Innovation and Governance Branch, Ministry of Agriculture and the Climate Action Secretariat, Ministry of Environment, with review and comment by the BC Agriculture Council.

Background

- The tax was introduced July 1, 2008 to encourage reduced fuel use and low carbon alternatives.
- The carbon tax is one of several measures to help government meet its legislated obligation to reduce BC's greenhouse gas emissions by at least 33% below 2007 levels by 2020 (80% by 2050).
- The initial rate was $10/tonne of carbon dioxide equivalent (CO2e) emissions from fossil fuels, rising by $5 a year to reach $30/tonne on July 1, 2012.
- The *Carbon Tax Act* requires the tax to be carbon neutral to the BC government, so revenues received are in aggregate offset by tax reductions. Carbon tax related benefits that would have some impact on the agriculture industry include cuts to farm property taxes, corporate and personal income taxes, and the Northern and Rural Homeowner Benefit.
- The primary agriculture sector has expressed significant concern about the amount of carbon tax paid and its effect on competiveness. The sector argues that its carbon tax payments likely far exceed the benefits received from the offsetting reductions in other taxes.
- The greenhouse industry has been especially vocal, due to its large-scale use of natural gas and need to compete in an international market where no other jurisdictions currently have carbon taxes.
- California has recently implemented a cap-and-trade system which places a carbon price on very large greenhouses (greater than 25kt of emissions per year) beginning in 2013. The remainder of the agriculture sector in California will pay a carbon price on its combustion emissions with coverage implications similar to BC's carbon tax starting in 2015.
- The 2.1 Mt CO2e of agricultural emissions accounted in the BC GHG Inventory Report comprise only emissions from soils, manure management, and enteric fermentation. These emissions are not considered here because they are not related to fossil fuel use and are not subject to the carbon tax.
- In the inventory report, emissions from fuel use in the agriculture sector, are reported under the categories of "Transportation" and "Stationary Combustion".
- All tax policy decisions are the prerogative of the Minister of Finance.

II. Carbon Tax Estimate

Scope: For this analysis, BC's primary agriculture sector is defined as crop production and animal production. The sector does not include the food processing or food retailing sectors.

Results: This analysis results in a 2012/13 carbon tax cost estimate for the agriculture sector of $28.6 million. This figure is likely to be slightly high due to factors described in section IV, below.

Table 1: BC Agriculture Sector – Estimated Carbon Tax

	Gasoline	Diesel	Propane	Natural Gas		
Fuel Use Volumes	*(megalitres)*	*(megalitres)*	*(megalitres)*	*(Gigajoules)*		
2006	*108.5*	*140.4*	*5.6*	*5,716,000*		
2007	*109.8*	*178.4*	*6.7*	*5,716,000*		
2008	108.6	140.2	7.5	5,716,000		
2009	93.5	131.8	5.9	5,716,000		
2010	112.2	142.1	6.0	5,716,000		
Carbon Tax Rates	*cents/litre*	*cents/litre*	*cents/litre*	*cents/GJ*		
2008/09	2.41	2.76	1.53	49.66		
2009/10	3.62	4.14	2.3	74.49		
2010/11	4.82	5.52	3.06	99.32		
2011/12	6.03	6.90	3.83	124.15		
2012/13	7.23	8.28	4.59	148.98		
Carbon Tax Payable *($ millions)*	**Gasoline**	**Diesel**	**Propane**	**Natural Gas**	**Total**	***Cumulative***
2008/09	$2.4	$3.8	$0.1	$2.8	$9.1	*$9.1*
2009/10	$3.7	$5.7	$0.1	$4.3	$13.8	*$22.9*
Estimated 2010/11	$5.1	$8.1	$0.2	$5.7	$19.1	*$42.0*
Projected Estimate 2011/12	$6.4	$10.1	$0.2	$7.1	$23.9	*$65.9*
Projected Estimate 2012/13	$7.7	$12.1	$0.3	$8.5	$28.6	*$94.5*

Sources: Statistics Canada, BC Ministry of Finance.

The carbon tax estimates in Table 1 were derived as follows:

- Carbon tax was calculated by applying the tax rates from Schedule 1 of the Carbon Tax Act to the fuel use volumes for the corresponding carbon tax period (July 1 to June 30). The "Light Fuel Oil" rate was applied to diesel and the "Marketable Natural Gas" rate was applied to natural gas volume. http://www.leg.bc.ca/38th4th/1st_read/gov37-1.htm
- Volumes of gasoline, diesel, propane, and natural gas were obtained from Statistics Canada's 2010 Report on Energy Supply and Demand (preliminary, on CANSIM). http://www5.statcan.gc.ca/cansim/a03?lang=eng&pattern=128-0012..128-0018
- 2008/09 and 2009/10 volumes of gasoline, diesel and propane are 50% of the volumes in the respective pairs of calendar years.
- For 2010/11, 2011/12, and 2012/13, the volumes of gasoline, diesel, and propane used in the carbon tax calculation are equal to the 2006 - 2010 average.
- Natural gas volumes for 2010 are used for all years, due to pending Stats Can revisions for 2006, 2007, 2008, 2009. This volume is corroborated by Fortis BC customer use accounts (5,625,000 GJ).

NAICS Codes: Statistics are gathered according to categories of the North American Industrial Classification System (NAICS).

- NAICS code 111 covers Crop Production, with sub-codes of 1111 for oilseed and grain farming, 1112 for vegetable and melon farming, 1113 for fruit and tree nut farming, 1114 for greenhouse, nursery and floriculture production, and 1119 for other crop farming.
- NAICS code 112 covers Animal Production and Aquaculture, with sub-codes of 1121 for cattle ranching and farming (including dairy farms), 1122 for hog and pig farming, 1123 for poultry and egg production, 1124 for sheep and goat farming, and 1129 for other animal production.

III. Corroborating Estimates

1. BC Agriculture Council (2009)

In 2009, the BC Agriculture Council provided an estimate of $9.6 million for the amount payable in the first year of the carbon tax, from July 1, 2008 to June 30 2009. This compares closely with the $9.1 million estimate for 2008/09 derived by the present analysis (above).

Estimated Carbon Tax Impacts on BC Agriculture – by sector

Sector	Gasoline ($ 000)	Diesel ($ 000)	Natural Gas ($ 000)	Total ($ 000)
Grain	134	429	-	563
Dairy	246	1,229	183	1,658
Cattle	552	1.708	-	2,269
Poultry	77	80	366	523
Fruit & veg	91	136	-	227
Greenhouse & nursery	135	185	2,135	2,455
Other	716	841	366	1,923
Total	**1,951**	**4,608**	**3,050**	**9,609**

Methodology:

- BCAC started with fuel use estimates provided in the 1997 NRCan study "Descriptive Analysis of On-Farm Energy Use in Canada" http://www.usask.ca/agriculture/caedac/pubs/Energy.PDF
- BCAC assumed that diesel and gasoline use in each sector had increased by 10% since 1997, except for the greenhouse sector which had doubled.
- For natural gas, BCAC used 2007 sales to farmers of 6.1 million gigajoules (GJ), and allocated this by proportions indicated by the NRCan study: 70% to greenhouses, 12% to poultry, 6% to dairy, and 12% to "other".

Results

The total carbon tax estimated across all sub-sectors was $9.6 million for 2008/9.

Based on BCAC's estimate for the first year of the carbon tax, assuming constant emissions, the carbon tax costs for the sector for 2012/13 at a rate of $30/tonne would be $28.8 million. This compares with $28.6 million in the present analysis (above).

2. Climate Action Secretariat (2012)

The BC Climate Action Secretariat (CAS) has developed estimates using two different methods.

a. Based on the agriculture sector's share of economic activity:

- Primary agriculture represented approximately 0.6% of BC's total GDP and 3.3% of "goods sector" GDP in 2010.
- Based on total collected carbon tax of $740 million in 2010/11, divided by the tax rate for that fiscal year of $18.75/tonne, total BC carbon taxed emissions were 39.5Mt in 2010/11. *(39.5 Mt = $740 million / $18.75/tonne)*
- Assuming on the high side that the agriculture sector could account for 3% of total carbon taxed emissions indicates approximately 1.2Mt in carbon taxed emissions from the sector. *(1.2Mt = 39.5 Mt * 0.03)*
- This would result in an "upper bound" estimate of $34 million in carbon tax payable by the agriculture sector in fiscal 2012/13, assuming constant emissions levels. *($34 million = 1.2Mt* $28.75/tonne)*
- Note: Fiscal year carbon tax rates are calculated by applying the earlier tax rate to three months (April, May, June) and the later tax rate to nine months (July through March). (*2010/11 fiscal year rate of $18.75/tonne = $15/tonne *25% + $20/tonne *75%)*
- Note: This $34 million carbon tax estimate for 2011/12 is considered an "upper bound" because it assumes a very high level of energy and emissions intensity in the agriculture sector).

b. Based on greenhouse natural gas and diesel data.

- Analysis in December 2011 based on Fortis BC billing data for natural gas use from the greenhouse sector yielded an estimate of $6.3 million in carbon tax costs from the greenhouse sector for 2012/13. This work assumed 4.4 million GJ of natural gas consumption by greenhouses was constant through 2012/13. *($6.3 million = 148.98 cents/GJ * 4.4 million GJ)*
- Based on provincial GHG inventories and contracted work for CAS on diesel fuel use, CAS estimated 450kt of emissions (most from off-road transport) for non-greenhouse agriculture emissions in 2008. This figure does not include emissions from non-greenhouse natural gas combustion or from gasoline. At $30/tonne in 2012/13, this leads to a carbon tax cost of $13.5 million. *($13.5 million = $30/tonne * 450kt)*
- With the addition of the $6.3 million from natural gas combustion in greenhouses, the result is approximately $20 million in carbon tax costs. *(approx. $20 million = $13.5 million + $6.3 million)*
- Adding a "rough guess" for the emissions from gasoline and non-greenhouse natural gas could plausibly yield a 2012/13 sector cost estimate in the $20-$30 million range.

IV. Issues and Limitations

While the current analysis is based on the best available data from credible sources, interpretation of the results should be considered in light of the following two factors.

1. **Inclusion of Aquaculture.** The Report on Energy Supply and Demand data includes aquaculture as part of the agriculture sector. While Fortis BC has indicated informally that natural gas use by the aquaculture sector is likely to be low, there is an as yet unascertained amount of natural gas, gasoline, diesel, and propane used in aquaculture that should be subtracted from the fuel use volumes shown here for agriculture. Statistics Canada has been asked for the aquaculture data, and a reply is expected soon. It is expected that the removal of aquaculture figures will be a proportionately small amount.
2. **Non-Agricultural Use Of Fuels**. From the Statistics Canada documentation, it appears that the gasoline and diesel fuel volumes may also include non-agricultural use of the fuels by agricultural operators. For example, the fuel use volumes may include personal car use by farmers or fuel used in home heating. Further clarification on this is required from Statistics Canada.
3. **Natural Gas Use for 2006 – 2009.** The Report on Energy Supply and Demand figures for years before 2010 are subject to substantial revision by Statistics Canada. The reported volumes appear to be far lower than would be expected. Statistics Canada is in the process of addressing this. To deal with this for now, the analysis here has instead used the 2010 natural gas volume for all years.

It is also noted that the data do not show a breakdown of fuel use by the industry sub-sectors shown in the 2009 BCAC analysis (Grain, Dairy, Cattle, Poultry, Fruit & Vegetables, Greenhouse & Nursery). If requested, Statistics Canada may be able to provide a detailed breakdown for these categories.

IV. Conclusion

The preferred method described above produces an estimate of $28.6 million in 2011/12, and a cumulative total of $94.5 million for the period from July 1, 2008 to June 30, 2013. This estimate is based on the clearest fuel use data available and the direct application of statutory carbon tax rates.

The preferred method is corroborated by BCAC's earlier work, which extrapolates to a 2012/13 estimate of $28.8 million, and by CAS estimates of $34 million and $20-$30 million.

Based on the coalescence of the three methods, the range estimate for carbon tax costs for the agriculture sector for 2012/13 is likely in the $20-$30 million range (assuming a confidence interval).

For a single estimate for 2012/13, it is recommended that $28.6 million be used, and that the data and assumptions described here be referenced. Note that this estimate is subject to revision for reasons described above.

Innovation and Governance Branch, Ministry of Agriculture
Contact: Ian McLachlan, Senior Manager (250) 356-0191

Climate Action Secretariat, Ministry of Environment
Contact: Hilary Kennedy, Senior Advisor (250) 953-4881

From:	Hop Wo, Hilary ENV:EX
To:	Dobson, Neil ENV:EX
Subject:	Carbon Tax Estimates - BC Agricuture
Date:	Monday, November 30, 2015 3:37:25 PM
Attachments:	Carbon Tax Estimates - Analysis Summary - Draft - 09 Feb 2012.pdf CT Calculations - 09 Feb 2012.xlsx

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From: McLachlan, Ian P AGRI:EX
Sent: Monday, February 13, 2012 4:51 PM
To: Paradine, Dennis ENV:EX; Kennedy, Hilary ENV:EX
Subject: FW: FOR REVIEW: Carbon Tax Estimates - BC Agricuture

FYI – I spoke with Christina Dawkins at Finance today.

Cheers, Ian

From: McLachlan, Ian P AGRI:EX
Sent: Monday, February 13, 2012 4:50 PM
To: Sidaway-Wolf, Daphne AGRI:EX
Subject: FW: FOR REVIEW: Carbon Tax Estimates - BC Agricuture

Hi Daphne

FYI, I sent this package to Finance's Tax Policy Branch for their information and possible comment/review (see below). I spoke with Chris Dawkins, and she said she would forward it to her director. Appreciating that they are really busy prior to next week's budget, I said it would be OK with us to hear back from them a week after the budget. Chris was not in a position to make any commitments.

As Finance is the lead agency on the carbon tax, I thought it important to keep them in the loop and give them the opportunity for review/comment.

Cheers, Ian

From: McLachlan, Ian P AGRI:EX
Sent: Monday, February 13, 2012 4:39 PM
To: Dawkins, Christina FIN:EX
Subject: FW: FOR REVIEW: Carbon Tax Estimates - BC Agricuture

Hi Chris

I have worked with CAS to produce estimates of carbon tax paid by the agriculture sector. The idea was to get something mutually agreed and technically sound after very different numbers had been quoted by various parties, including the head of the BC Agriculture Council (see below), Minister McRae, and John Dyble.

"None of our competitors have a carbon tax," Garnett Etsell of the BC Agriculture Council told the

committee's Chilliwack hearing. "This has cost us, to date, with the last increase, $45 million a year. With the increase that's anticipated in 2012, that'll be $65 million. Keep in mind that the agriculture industry last year had a cumulative net loss of $80 million."
(Source: B.C. FARM Knowledge Network- BC's Carbon Trading Emission Plan is dead. Tom Fletcher. Nov 23rd, 2011. http://forums.bcac.bc.ca/content.php?r=116)

Attached is the **draft** work I provided to BCAC for their review and comment. CAS and I may be walking them through the numbers later this week.

I am providing this to you to keep Finance in the loop, and also in case Finance staff want to make any technical comments before we finalize the estimates and they start getting referred to. I'll call you to follow up.

Cheers, Ian

Ian McLachlan | Senior Manager | (250) 356-0191
Innovation and Governance Branch – Ministry of Agriculture

From: McLachlan, Ian P AGRI:EX
Sent: Thursday, February 9, 2012 2:27 AM
To: 'Reg Ens'; MacNair, Emily A AGRI:EX
Subject: FOR REVIEW: Carbon Tax Estimates - BC Agricuture

Hi Reg and Emily

Reg, I am following up on our discussion three weeks ago about the need to develop a technically sound estimate of carbon tax paid by the agriculture sector, which hopefully we could all agree on.

I have worked closely with Hilary Kennedy and Dennis Paradine, of the Climate Action Secretariat, as well as with Stats Can and Fortis BC, to produce this draft analysis. Attached is a five page paper laying out the context, data, and results. Also attached is the spreadsheet which has all the calculations. I have tried to document everything clearly, so hopefully that helps.

The draft results are corroborated by alternative methods of calculation, and are also in line with the numbers BCAC produced in 2009.

Please note that I have provided this to you a bit earlier than planned, so that Emily and her committee members can have the material for their discussion planned for this Friday. I may get some new information from Statistics Canada in the next few days, but I do not expect it to change things much.

The materials here are draft and preliminary, so please don't distribute them beyond BCAC and Emily's committee members involved in the discussion.

I thought it would be useful to have a conference call for Dennis, Hilary, and I to walk you through the analysis and for us to discuss your thoughts. Should I set that up? (next week, maybe one

hour?)

Cheers, Ian

Ian McLachlan | Senior Manager, Economic and Policy Analysis | (250) 356-0191
Innovation and Governance Branch – Ministry of Agriculture

Carbon Tax Estimates - Analysis Summary - Draft - 09 Feb 2012.pdf attachment provided as separate document.

CT Calculations - 09 Feb 2012.xlsx

attachment provided as separate document.

Program Criteria

CO2 Fertilization Rebate ($3.25M):

Scope Questions

- Pure CO2? (likely not a large part of total, and not subject to tax??)
- Floriculture?
- Treatment of CO2 used for both heat and fertilization (suggest not included if used for heat)
- Are there any GHs using biomass who have installed the equipment to scrub and use that CO2? – possible disadvantage to them.

Rebate Mechanism Options

- Automatic/universal based CO2 amounts for enhancement
    - Data problems
- Application based – GH to make the case for amount of CO2 for fertilization
    - Does the GH protocol provide quantification ability? Will it?
    - Capacity/cost to GH to quantify
- Flat based on avg % industry use for enhancement, production, or heated area
    - Advantage of maintaining GHG incentive b/c rebate unrelated to tonnes

Eligibility

- Floriculture? Need to check their CO2 needs
- Unheated space? (suggest yes, if NG is used for CO2)
- Pure CO2 purchase vs. CO2 from NG combustion for enhancement
- Check extent of pure CO2 use and if subject to carbon tax (probably not) – include pure CO2 use costs in rebate? (suggest no if no ctax paid)
- Are there any efficiency methods for CO2 fertilization that would reduce amounts of CO2 needed. Have these been installed? How should they be treated? (avoiding punishing those who have taken efficiency measures).

Quantification

- Options in GH protocol?
- Option to use seasonal use as proxy for NG use not for heating (ie rebate summer NG use)

Outcomes questions

- Use trends by GH type. E.g. do large and small GHs use fertilization to the same degree? Crop type etc.

Data Needs (where possible)

- Extent of CO2 use for fertilization by GH type
- Extent of CO2 used for both fertilization and heat
- Extent of CO2 used from natural gas vs. direct/pure or biomass (??)
-

Energy Efficiency Incentive Program ($4.35M):

- Risk of invalidating additionality of existing offsets? (Laura?)

Scope

- Which types of retrofits
    - Curtains
    - Biomass/Biogas fuel switching
    - Heat recovery
    - geothermal
- New builds?
- Floriculture? (assume they heat too so yes?)
- (Can Fortis disaggregate their NG billing data further by NAICS code – vegetable vs. floriculture ctax costs?)
- Target specific operators – e.g. based on worst efficiency
- Vague recollection about profitability being loosely based on some known factors (report I read from MAL last year??) wondering if those parameters could be used to target the program to those operations most needing assistance.

Mechanisms

- Rebate based on listed benchmark technologies
    -
- Based on overall efficiency improvement
    - Would need pre and post evaluations
    - Quantification methods for GH in protocol?
-

Eligibility

- Not retroactive
- Does the retrofit need to be additional (ie. Would not have taken place in absence of program)?
- Issues of overlap with offsets program – dual eligibility?, excluded if selling offsets?
- Exclude unheated space?
- Timing of retrofits e.g. started before 2012? Finished after?
-

Data needs

- Veg vs floriculture NG use
- Capital costs for retrofits, likely size of grant needed to incent, number of retrofits possible etc.
-

RESULTS

Table 1: BC Agriculture Sector – Estimated Carbon Tax

	Gasoline	Diesel	Propane	Natural Gas		
Fuel Use Volumes	*(megalitres)*	*(megalitres)*	*(megalitres)*	*(Gigajoules)*		
2006	*108.5*	*140.4*	*5.6*	*5,716,000*		
2007	*109.8*	*178.4*	*6.7*	*5,716,000*		
2008	108.6	140.2	7.5	5,716,000		
2009	93.5	131.8	5.9	5,716,000		
2010	112.2	142.1	6.0	5,716,000		
Carbon Tax Rates	*cents/litre*	*cents/litre*	*cents/litre*	*cents/GJ*		
2008/09	2.41	2.76	1.53	49.66		
2009/10	3.62	4.14	2.3	74.49		
2010/11	4.82	5.52	3.06	99.32		
2011/12	6.03	6.90	3.83	124.15		
2012/13	7.23	8.28	4.59	148.98		
Carbon Tax Payable *($ millions)*	**Gasoline**	**Diesel**	**Propane**	**Natural Gas**	**Total**	***Cumulative***
2008/09	$2.4	$3.8	$0.1	$2.8	$9.1	*$9.1*
2009/10	$3.7	$5.7	$0.1	$4.3	$13.8	*$22.9*
Estimated 2010/11	$5.1	$8.1	$0.2	$5.7	$19.1	*$42.0*
Projected Estimate 2011/12	$6.4	$10.1	$0.2	$7.1	$23.9	*$65.9*
Projected Estimate 2012/13	$7.7	$12.1	$0.3	$8.5	$28.6	*$94.5*

Sources: Statistics Canada (fuel use volumes), BC Ministry of Finance (carbon tax rates).

Notes:

1. Carbon tax calculated by applying CT rates to the fuel use volumes for the CT year (July 1 to June 30).
2. Carbon tax rates obtained from the Schedule 1 of the Carbon Tax Act.
   Note: Marketable natural gas rate applied to natural gas volume. "Light Fuel Oil" rate applied to diesel volume.
3. Volumes of gasoline, diesel, propane, and natural gas from Statistics Canada's Report on Energy Supply and Demand 2010 (preliminary on CANSIM).
http://www5.statcan.gc.ca/cansim/a03?lang=eng&pattern=128-0012..128-0018
4. 2008/09and 2009/10 volumes of gasoline, diesel and propane are 50% of the volumes in the respective pairs of calendar years.
5. For 2010/11, 2011/12, and 2012/13, the volumes of gasoline, diesel, and propane used in the carbon tax calculation are equal to the 2006 - 2010 ave

From Bill 37, Carbon Tax Act http://www.leg.bc.ca/38th4th/1st_read/gov37-1.htm

TABLE

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Item	**Type of Fuel**	**Rate of tax for the year starting on July 1, 2008**	**Rate of tax for the year starting on July 1, 2009**	**Rate of tax for the year starting on July 1, 2010**	**Rate of tax for the year starting on July 1, 2011**	**Rate of tax for the year starting on July 1, 2012**
1	Aviation Fuel	2.45 ¢/L	3.68 ¢/L	4.90 ¢/L	6.13 ¢/L	7.35 ¢/L
2	Gasoline	2.41 ¢/L	3.62 ¢/L	4.82 ¢/L	6.03 ¢/L	7.23 ¢/L
3	Heavy Fuel Oil	3.11 ¢/L	4.67 ¢/L	6.22 ¢/L	7.78 ¢/L	9.33 ¢/L
4	Jet Fuel	2.62 ¢/L	3.93 ¢/L	5.24 ¢/L	6.55 ¢/L	7.86 ¢/L
5	Kerosene	2.56 ¢/L	3.84 ¢/L	5.12 ¢/L	6.40 ¢/L	7.68 ¢/L
6	Light Fuel Oil	2.76 ¢/L	4.14 ¢/L	5.52 ¢/L	6.90 ¢/L	8.28 ¢/L
7	Methanol	1.09 ¢/L	1.64 ¢/L	2.18 ¢/L	2.73 ¢/L	3.27 ¢/L
8	Naphtha	2.55 ¢/L	3.83 ¢/L	5.10 ¢/L	6.38 ¢/L	7.65 ¢/L
9	Butane	1.76 ¢/L	2.64 ¢/L	3.52 ¢/L	4.40 ¢/L	5.28 ¢/L
10	Coke Oven Gas	1.61 ¢/m^3	2.42 ¢/m^3	3.22 ¢/m^3	4.03 ¢/m^3	4.83 ¢/m^3
11	Ethane	0.98 ¢/L	1.47 ¢/L	1.96 ¢/L	2.45 ¢/L	2.94 ¢/L
12	Marketable Natural Gas	49.66 ¢/GJ	74.49 ¢/GJ	99.32 ¢/GJ	124.15 ¢/GJ	148.98 ¢/GJ
13	Propane	1.53 ¢/L	2.30 ¢/L	3.06 ¢/L	3.83 ¢/L	4.59 ¢/L
14	Raw Natural Gas	1.90 ¢/m^3	2.85 ¢/m^3	3.80 ¢/m^3	4.75 ¢/m^3	5.70 ¢/m^3
15	Refinery Gas	1.76 ¢/m^3	2.64 ¢/m^3	3.52 ¢/m^3	4.40 ¢/m^3	5.28 ¢/m^3
16	High Heat Value Coal	20.79 $/tonne	31.19 $/tonne	41.58 $/tonne	51.98 $/tonne	62.37 $/tonne
17	Low Heat Value	17.72 $/tonne	26.58 $/tonne	35.44 $/tonne	44.30 $/tonne	53.16 $/tonne
18	Coke	24.87 $/tonne	37.31 $/tonne	49.74 $/tonne	62.18 $/tonne	74.61 $/tonne
19	Petroleum Coke	3.67 ¢/L	5.51 ¢/L	7.34 ¢/L	9.18 ¢/L	11.01 ¢/L

CANSIM note: data can be sorted and results copied from the website
http://www5.statcan.gc.ca/cansim/a03?lang=eng&pattern=128-0012..128-0018

	Gasoline *(megalitres)*	**Diesel** *(megalitres)*	**Propane** *(megalitres)*	**Natural Gas** *(Gigajoules)*	**Natural Gas** *(gigalitres)*
2006	108.5	140.4	5.6	750,000	19.6
2007	109.8	178.4	6.7	743,000	19.4
2008	108.6	140.2	7.5	691,000	18.0
2009	93.5	131.8	5.9	557,000	14.5
2010	112.2	142.1	6.0	5,716,000	148.4

Table 128-0017[1,2]

Supply and demand of primary and secondary energy in natural units

Fuel type	Natural gas, primary energy (gigalitres)	Gas plant natural gas liquids (NGL's), primary energy	Motor gasoline, secondary energy	Diesel fuel oil, secondary energy
2006	19.6	5.6	108.5	140.4
2007	19.4	6.7	109.8	178.4
2008	18	7.5	108.6	140.2
2009	14.5	5.9	93.5	131.8
2010	148.4	6	112.2	142.1

Catalogue no. 57-003-X

Report on Energy Supply and Demand in Canada 2009

http://www.statcan.gc.ca/pub/57-003-x/57-003-x2009000-eng.pdf

Table 1-12
Primary and secondary energy, natural units — British Columbia

	Total coal	Crude oil	Natural gas	Gas plant natural gas liquids (NGL's)	Primary electricity, hydro and nuclear	Steam	Coke	Coke oven gas	Total refined petroleum products	Secondary electricity, thermal
	kilotonnes	megalitres	gigalitres	megalitres	GWH	kilotonnes		gigalitres	megalitres	GWH
Supply and demand characteristics										
Production	21,168.0	1,295.3	30,216.7	1,804.6	56,446.6	.	..	..	x	6,764.7
Exports	20,741.6	4,453.1	27,330.1	173.8	6,852.3	.	..	.	x	.
Imports	..	..	247.6	4.7	11,472.6	.	..	.	x	.
Inter-regional transfers	-429.9	4,909.0	8,398.4	-1,305.3	-855.6	.	..	.	x	.
Stock variation	-427.0	x	684.3	-62.0	.	.	..	.	x	.
Inter-product transfers	.	x	..	..	.	.	.	.	x	.
Other adjustments	118.2	x	-508.1	..	.	.	..	.	x	.
Availability	**541.6**	**x**	**10,340.2**	**392.3**	**60,211.3**	**.**	**..**	**..**	**11,769.1**	**6,764.7**
Stock change, utilities and industry	..	.	.	.	.	.	..	.	130.4	.
Transformed to other fuels:										
Electricity by utilities	.	.	629.7	.	.	.	.	.	0.3	.
Electricity by industry	..	.	7.1	.	.	.	.	..	133.7	.
Coke and manufactured gases	..	.	.	.	.	.	.	.	.	.
Refined petroleum products	.	x	.	8.9	.	.	.	.	.	.
Steam generation	..	.	37.2	.	.	-648.6	.	.	..	.
Net supply	**541.6**	**..**	**9,666.1**	**473.9**	**60,211.3**	**648.6**	**..**	**..**	**11,504.4**	**6,764.7**
Producer consumption	80.5	..	x	61.3	4,702.7	.	.	.	x	...
Non-energy use	..	.	..	..	.	.	..	.	x	...
Energy use, final demand	**461.1**	**.**	**6,944.4**	**412.8**	**62,273.4**	**648.6**	**..**	**..**	**10,665.0**	**...**
Total industrial	**461.1**	**.**	**3,032.0**	**172.8**	**27,808.0**	**648.6**	**..**	**..**	**648.4**	**...**
Total mining and oil and gas extraction	147.6	.	600.0	47.8	1,929.4	.	.	.	209.0	...
Total manufacturing	313.5	.	2,409.8	121.9	25,878.6	648.6	..	..	233.8	...
Pulp and paper manufacturing	x	.	435.3	.	13,289.2	648.7	.	.	28.2	...
Iron and steel manufacturing	.	.	x	.	x	.	.	..	..	...
Aluminum and non-ferrous metal manufacturing	x	.	x	..	x	.	..	.	x	...
Cement manufacturing	x	.	x	..	x	.	..	.	x	...
Refined petroleum products manufacturing	..	.	x	..	x	.	..	.	..	...
Chemicals and fertilizers manufacturing	x	.	8.1	.	1,336.4	.	..	.	0.1	...

All other manufacturing	x	.	1,867.1	x	4,440.5	..	..	.	93.5	...
Forestry and logging and support activities for forestry	.	.	..	.	.	.	.	.	91.3	...
Construction	.	.	22.2	3.1	.	.	.	.	114.4	...
Total transportation	.	.	**442.3**	**125.2**	**229.9**	.	.	.	**8,524.2**	...
Railways	.	.	.	.	.	.	.	.	179.4	...
Total airlines	.	.	.	.	.	.	.	.	1,482.9	...
Canadian airlines	.	.	.	.	.	.	.	.	963.3	...
Foreign airlines	.	.	.	.	.	.	.	.	519.6	...
Total marine	.	.	.	.	.	.	.	.	1,003.2	...
Domestic marine	.	.	.	.	.	.	.	.	668.4	...
Foreign marine	.	.	.	.	.	.	.	.	334.8	...
Pipelines	.	.	438.1	.	44.3	.	.	.	1.6	...
Road transport and urban transit	.	.	4.2	125.2	185.6	.	.	.	1,145.0	...
Retail pump sales	.	.	..	..	.	.	.	.	4,712.1	...
Agriculture	.	.	14.5	5.9	406.1	.	.	.	200.5	...
Residential	..	.	2,108.3	37.2	19,699.0	.	.	.	21.3	...
Public administration	..	.	125.0	..	844.6	.	.	.	90.7	...
Commercial and other institutional	.	.	1,222.2	71.7	13,285.8	..	.	.	1,179.7	...
Statistical difference	.	..	..	-0.2	..	..	.	.	x	...

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

Table 3-12
Refined petroleum products, natural units — British Columbia

	Refinery liquefied petroleum gases (LPG's)	Still gas	Motor gasoline	Kerosene and stove oil	Diesel fuel oil	Light fuel oil	Heavy fuel oil	Petroleum coke	Aviation gasoline	Aviation turbo fuel	Non-energy products	Total refined petroleum products
	megalitres											
Supply and demand characteristics												
Production	x	x	x	x	x	x	x	x	..	x	x	x
Exports	..	.	x	..	x	x	x	.	..	x	x	x
Imports	.	.	x	x	x	..	x	x	x	x	x	x
Inter-regional transfers	x	.	x	x	x	x	x	x	x	x	x	x
Stock variation	x	.	x	x	x	x	x	x	x	x	x	x
Inter-product transfers	x	.	x	x	x	x	x	x	x	x	x	x
Other adjustments	x	x	x	x	x	x	x	x	x	x	x	x
Availability	**90.5**	**263.2**	**4,636.3**	**9.2**	**3,439.8**	**73.7**	**937.1**	**407.4**	**10.2**	**1,552.3**	**349.4**	**11,769.1**
Stock change, utilities and industry	.	.	.	.	.	.	106.2	24.2	.	.	.	130.4
Transformed to other fuels												
Electricity by utilities	.	.	.	.	0.3	..	..	.	.	.	.	0.3
Electricity by industry	.	131.1	.	.	2.5	..	0.1	.	.	.	.	133.7
Coke and manufactured gases	.	.	.	.	.	.	.	.	.	.	.	.
Refined petroleum products	.	.	.	.	.	.	.	.	.	.	.	.
Steam generation	.	.	.	.	.	.	..	.	.	.	.	..
Net supply	**90.5**	**132.1**	**4,636.2**	**9.2**	**3,437.0**	**73.7**	**830.8**	**383.1**	**10.2**	**1,552.2**	**349.4**	**11,504.4**
Producer consumption		x						x		x	x	x

Producer consumption	..	x	..	..	..	..	..	x	..	x	x	x
Non-energy use	...	.	.	.	.	.	.	x	.	.	x	x
Energy use, final demand	**...**	**.**	**4,636.3**	**9.3**	**3,437.0**	**74.7**	**830.8**	**114.5**	**10.2**	**1,552.2**	**...**	**10,665.0**
Total industrial	**...**	**.**	**.**	**3.5**	**498.9**	**10.2**	**21.3**	**114.5**	**.**	**.**	**...**	**648.4**
Total mining and oil and gas extraction	...	.	.	0.2	202.3	6.5	..	.	.	.	...	209.0
Total manufacturing	...	.	.	3.2	97.1	0.8	18.2	114.5	.	.	...	233.8
Pulp and paper manufacturing	...	.	.	3.2	7.2	..	17.8	.	.	.	...	28.2
Iron and steel manufacturing	...	.	.	.	..	.	..	.	.	.	...	..
Aluminum and non-ferrous metal manufacturing	...	.	.	.	..	.	..	x	.	.	...	x
Cement manufacturing	...	.	.	.	..	.	..	x	.	.	...	x
Refined petroleum products manufacturing	...	.	.	.	.	.	.	.	.	.	...	..
Chemicals and fertilizers manufacturing	...	.	.	.	..	..	..	x	.	.	...	0.1
All other manufacturing	...	.	.	..	x	0.7	0.4	x	.	.	...	93.5
Forestry and logging and support activities for forestry	...	.	.	0.1	89.0	1.9	0.3	.	.	.	...	91.3
Construction	...	.	.	..	110.5	1.1	2.8	.	.	.	...	114.4
Total transportation	**...**	**.**	**4,365.7**	**.**	**1,928.3**	**..**	**747.3**	**.**	**4.6**	**1,478.3**	**...**	**8,524.2**
Railways	...	.	.	.	179.4	.	..	.	.	.	...	179.4
Total airlines	...	.	.	.	.	.	.	.	..	1,478.3	...	1,482.9
Canadian airlines	...	.	.	.	.	.	.	.	4.6	958.7	...	963.3
Foreign airlines	...	.	.	.	.	.	.	.	..	519.6	...	519.6
Total marine	...	.	..	.	..	..	747.3	.	.	.	...	1,003.2
Domestic marine	...	.	..	.	255.9	..	412.5	.	.	.	...	668.4
Foreign marine	...	.	.	.	..	.	334.8	.	.	.	...	334.8
Pipelines	...	.	.	.	1.6	.	.	.	.	.	...	1.6
Road transport and urban transit	...	.	200.6	.	944.4	.	.	.	.	.	...	1,145.0
Retail pump sales	...	.	4,165.1	.	547.0	.	.	.	.	.	...	4,712.1
Agriculture	...	.	94.4	..	106.1	..	..	.	.	.	...	200.5
Residential	...	.	.	1.6	.	19.7	..	.	.	.	...	21.3
Public administration	...	.	25.2	..	44.5	0.7	..	.	0.5	19.8	...	90.7
Commercial and other institutional	...	.	151.0	4.1	859.2	44.0	62.2	.	5.1	54.1	...	1,179.7
Statistical difference	...	..	..	..	..	-1.0	..	..	..	..	...	x

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

NAICS Codes codes 111, 112, 1142, 1151 and 1152

http://www.statcan.gc.ca/cgi-bin/imdb/p3VD.pl?Function=getVDDetail&db=imdb&dis=2&adm=8&TVD=118464&CVD=118465&CPV=11&CST=01012012&MLV=5&CLV=1&CHVD=

Table 6-12

Details of natural gas liquids, natural units — British Columbia

	Propane	Butane	Ethane	Gas plant natural gas liquids (NGL's)

	megalitres			
Supply and demand characteristics				
Production	x	x	x	1,804.6
Exports	x	x	.	173.8
Imports	..	x	.	4.7
Inter-regional transfers	x	x	x	-1,305.3
Stock variation	x	x	.	-62.0
Inter-product transfers	.	.	.	..
Other adjustments	.	.	.	..
Availability	**x**	**x**	**.**	**392.3**
Transformed to other fuels				
Refined petroleum products	.	x	.	8.9
Net refinery produced liquefied petroleum gases (LPG's)	x	x	.	90.5
Net supply	**x**	**x**	**.**	**473.9**
Producer consumption	x	x	.	61.3
Non-energy use	.	..	.	..
Energy use, final demand	**412.8**	**.**	**.**	**412.8**
Total industrial	**172.8**	**.**	**.**	**172.8**
Total mining and oil and gas extraction	47.8	.	.	47.8
Total manufacturing	121.9	.	.	121.9
Pulp and paper manufacturing	.	.	.	.
Iron and steel manufacturing	.	.	.	.
Aluminum and non-ferrous metal manufacturing	.	.	.	..
Cement manufacturing	.	.	.	..
Refined petroleum products manufacturing	.	.	.	..
Chemicals and fertilizers manufacturing	.	.	.	.
All other manufacturing	x	.	.	x
Construction	3.1	.	.	3.1
Total transportation	**125.2**	**.**	**.**	**125.2**
Road transport and urban transit	125.2	.	.	125.2
Retail pump sales	.	.	.	..
Agriculture	5.9	.	.	5.9
Residential	37.2	.	.	37.2
Public administration	..	.	.	..
Commercial and other institutional	71.7	.	.	71.7
Statistical difference	..	.	.	-0.2

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

Definitions

Inter-regional transfers - Shows the net inter-regional movement of product between regions.

Inter-product transfers - Shows the transfer of similar products between different product forms, e.g. still gas to natural gas, natural gas to produce hydrogen in petroleum refineries.

Other adjustments - Includes cyclical billing variations, metering differences and losses in transportation. In the case of crude oil, includes sales to non-refineries.

Availability - The amount which was available for use. This includes the summation of production, imports, inter-regional transfers, inter-product transfers and other adjustments, less exports and stock variation.

Net supply - The amount "available" after the amounts used in transformation processes are subtracted. Availability minus stock change – utilities and industry, transformed to electricity – by utilities, transformed to electricity – by industry, transformed to coke and manufactured gases, transformed to refined products and transformed to steam generation.

Producers' Consumption - Producers' consumption as measured here is the consumption by the producing industry of its own produced fuel – for example refined petroleum products consumed by the refined petroleum product industry, or natural gas used in the field, flared and waste, field uses, gathering uses, plant uses and metering adjustments. It does not include consumption of energy forms produced by other energy supply industries – for example; it would exclude the use of natural gas by the petroleum refining industry. In the case of electricity, it includes transmission losses, adjustments, "unaccounted for" amounts which are subject to variation because of cyclical billing, etc., but excludes generating station use output as measured at the generating station gate.

Non-energy use - Amounts shown here are for amounts used for purposes other than fuel purposes. Includes products being used as petrochemical feedstock, anodes/cathodes, greases, lubricants, etc.

Energy use – final demand - The summation of the usage in mining and oil and gas extraction, manufacturing, forestry, construction, transportation, agriculture, residential, public administration and commercial and other institutional.

Total mining and oil and gas extraction - Comprises of establishments primarily engaged in extracting naturally occurring minerals. This includes metal mines, non-metal mines, coal mines, crude petroleum and natural gas extraction industries, stone quarries gravel pits, exploration for minerals, development of mineral properties and contract drilling operations. Up to and including 2003: NAICS code 21, excluding 213118, 213119 and part of 212326. After 2003: NAICS code 21.

Pulp and paper - Includes establishments primarily engaged in manufacturing pulp, paper and paper products. Up

Pulp and paper - Includes establishments primarily engaged in manufacturing pulp, paper and paper products. Up to and including 2003; NAICS codes 322111, 322112, 322122 and parts of 321216, 322121 and 322130. After 2003; NAICS code 322.

Iron and steel - Establishments primarily engaged in operating blast furnaces, casting mills, rolling mills or coke ovens operated in association with blast furnaces including steel foundries. Up to and including 2003; NAICS codes 331110, 331221 and 331514. After 2003; NAICS codes 3311, 3312 and 33151.

Smelting and refining, non-ferrous - Establishments primarily engaged in the production of aluminum and the refining of non-ferrous metals. Up to and including 2003; NAICS codes 331313 and 331410. After 2003; NAICS codes 3313, 3314 and 33152.

Cement - Establishments primarily engaged in manufacturing cement. NAICS code 327310. This classification does not include ready-mix concrete operations, which is included in "Other Manufacturing".

Petroleum refining - Establishments primarily engaged in manufacturing of a group of refined petroleum products including fuels, blended oils and greases. NAICS code 324110 and part of 324190.

Chemicals - Establishments primarily engaged in manufacturing industrial organic and inorganic chemicals and chemical fertilizers. Up to and including 2003: NAICS codes 325110, 325120, 325130, 325181, 325189, 325313 and parts of 325190, 325210, 325410 and 325610. After 2003: NAICS code 325.

Other manufacturing - All other manufacturing industries (NAICS codes 31, 32 and 33) not listed above. In some instances, this classification is used when no breakdown of the component manufacturing industries is provided.

Total manufacturing - The summation of manufacturing industries

Forestry - Establishments primarily engaged in forestry and logging services. NAICS codes 113 and 1153.

Construction - Establishments primarily engaged in the construction of buildings, highways, dams, etc., and those providing services to the construction industry. Special trade contractors primarily engaged in construction work is such specialties as plumbing, carpentry, painting, etc. are included here. NAICS code 23. Sales of asphalt (in Non-energy refined petroleum products table) for paving purposes, regardless of the purchaser, are included here.

Canadian airlines - Domestic airlines engaged primarily in the for-hire, common-carrier transportation of people and/or goods using aircraft, such as airplanes and helicopters. NAICS code 481. Exclude foreign airlines. Also excluded are establishments engaged in providing specialty flying services such as aerial photography, surveying

Excluded are establishments engaged in providing specialty flying services such as aerial photography, surveying, air taxi, flying clubs, flying schools, recreation flying, etc., which are included in 'Commercial and Other Institutional'. Aerial crop spraying/crop dusting is considered to be 'Agriculture'.

Domestic marine - Establishments primarily engaged in the water transportation of passengers and goods, using equipment designed for those purposes and provided by ships of Canadian registry (flag). Commercial fishing is also included. NAICS codes 1141 and 483. Excluded are usage by National Defence and the Canadian Coast Guard, which are included in Public Administration.

Pipelines - Establishments primarily engaged in operating pipelines for the transport of natural gas, crude oil and other products. Also included are establishments engaged in the distribution of natural gas through a series of mains. NAICS codes 486 and 2212.

Road transport and urban transit - Establishments primarily engaged in truck transport services, in the operation of urban, interurban and rural transit systems, school buses, charter and sightseeing buses, taxis and limousine services to airports and stations. Card Lock (Key Lock) operations are also included here. NAICS codes 484, 485, 4871, 4879, 4884, 4885 and 4889.

Transportation - In this sector, only the use of fuel by the transportation industry for transportation purposes are included. Excluded are any fuels used for activities not directly involved in transportation (i.e. train stations, warehouses, airports, etc.). These amounts are included in Commercial and other institutional. Fuels, which have been purchased for use by the agriculture, commercial and public institutions sectors for transportation purposes, are included in the sectors to which the fuel was sold.

Agriculture - Establishments primarily engaged in agricultural, hunting and trapping activities. NAICS codes 111, 112, 1142, 1151 and 1152. Excluded are any operations primarily engaged in food processing, farm machinery manufacture and repair.

Residential - Includes all personal residences including single family residences, apartments, apartment hotels, condominiums and farm homes.

Public administration - Establishments of federal, provincial and municipal governments primarily engaged in activities associated with public administration. This includes such establishments such as the Federal Public Service, National Defence, RCMP and provincial and local administrations. NAICS code 91.

Text table 1

Energy conversion factors

Fuel type	Natural unit	2003	2004	2005	2006	2007	2008	2009
		terajoules						
Coal								
Anthracite	kilotonne	27.70	27.70	27.70	27.70	27.70	27.70	27.70
Imported bituminous	kilotonne	29.82	29.82	29.82	29.82	29.82	29.82	29.82
Canadian bituminous								
Newfoundland and Labrador, Prince Edward Island, Nova Scotia and Quebec	kilotonne	28.96	28.96	28.96	28.96	28.96	28.96	28.96
New Brunswick	kilotonne	26.80	26.80	26.80	26.80	26.80	26.80	26.80
Ontario	kilotonne	25.43	25.43	25.43	25.43	25.43	25.43	25.43
Manitoba	kilotonne	26.02	26.02	26.02	26.02	26.02	26.02	26.02
Saskatchewan, Alberta, Yukon, Northwest Territories and Nunavut	kilotonne	25.43	25.43	25.43	25.43	25.43	25.43	25.43
British Columbia	kilotonne	26.02	26.02	26.02	26.02	26.02	26.02	26.02
Sub-bituminous	kilotonne	19.15	19.15	19.15	19.15	19.15	19.15	19.15
Lignite	kilotonne	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Coal coke	kilotonne	28.83	28.83	28.83	28.83	28.83	28.83	28.83
Coke oven gas	gigalitre	19.14	19.14	19.14	19.14	19.14	19.14	19.14
Propane	megalitre	25.31	25.31	25.31	25.31	25.31	25.31	25.31
Butane	megalitre	28.44	28.44	28.44	28.44	28.44	28.44	28.44
Ethane	megalitre	17.22	17.22	17.22	17.22	17.22	17.22	17.22
Crude oil	megalitre	39.22	39.28	38.52	38.32	39.32	38.99	38.99
Light and medium [1]	megalitre	38.51	38.51	38.51	38.51	38.51	38.51	38.51
Heavy [1]	megalitre	40.90	40.90	40.90	40.90	40.90	40.90	40.90
Pentanes plus [1]	megalitre	35.17	35.17	35.17	35.17	35.17	35.17	35.17
Still gas from refineries	gigalitre	36.08	36.08	36.08	36.08	36.08	36.08	36.08
Still gas from upgraders	gigalitre	43.24	43.24	43.24	43.24	43.24	43.24	43.24
Motor gasoline	megalitre	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Kerosene & stove oil	megalitre	37.68	37.68	37.68	37.68	37.68	37.68	37.68
Diesel	megalitre	38.30	38.30	38.30	38.30	38.30	38.30	38.30
Light fuel oil	megalitre	38.80	38.80	38.80	38.80	38.80	38.80	38.80
Heavy fuel oil	megalitre	42.50	42.50	42.50	42.50	42.50	42.50	42.50
Petroleum coke from refineries	megalitre	46.35	46.35	46.35	46.35	46.35	46.35	46.35
Petroleum coke from upgraders	megalitre	40.57	40.57	40.57	40.57	40.57	40.57	40.57
Aviation gasoline	megalitre	33.52	33.52	33.52	33.52	33.52	33.52	33.52
Aviation turbo fuel	megalitre	37.40	37.40	37.40	37.40	37.40	37.40	37.40
Petrochemical feedstock	megalitre	35.17	35.17	35.17	35.17	35.17	35.17	35.17
Naphtha specialties	megalitre	35.17	35.17	35.17	35.17	35.17	35.17	35.17
Asphalt	megalitre	44.46	44.46	44.46	44.46	44.46	44.46	44.46

Asphalt	megalitre	44.46	44.46	44.46	44.46	44.46	44.46	44.46
Lubricating oils and greases	megalitre	39.16	39.16	39.16	39.16	39.16	39.16	39.16
Other petroleum products	megalitre	39.82	39.82	39.82	39.82	39.82	39.82	39.82
Natural gas	gigalitre	38.20	38.21	38.26	38.18	38.11	38.26	38.43
Electricity	gigawatt hour	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Steam	kilotonne	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Solid wood waste	kilotonne	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Spent pulping liquor	kilotonne	14.00	14.00	14.00	14.00	14.00	14.00	14.00

1. Not used individually except in the calculation of the total crude oil factor.

mega = million
giga = billion
tera=trillion
peta = 1,000 trillion

1 GL = 1,000 m3 = 38,000 GJ

1000 litres in a cubic metre
1 gigalitre = 1,000,000 litres
1 m3 ng = 38 megajoules as methane
1GJ = 26.316 m3
1TJ = 26300 m3 ng

1 Gl = 38,000 GJ

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Table 1-12
Primary and secondary energy, natural units — British Columbia

	Total coal	Crude oil	Natural gas	Gas plant natural gas liquids (NGL's)	Primary electricity, hydro and nuclear	Steam	Coke	Coke oven gas	Total refined petroleum products	Secondary electricity, thermal
	kilotonnes	megalitres	gigalitres	megalitres	GWH	kilotonnes		gigalitres	megalitres	GWH
Supply and demand characteristics										
Production	26,162.8	1,968.0	28,903.2	1,826.6	58,164.9	.	0.0	0.0	x	7,376.0
Exports	25,057.1	6,765.7	26,792.9	239.2	8,574.6	.	0.0	.	x	.
Imports	0.0	0.0	138.4	38.8	11,666.1	.	0.0	.	x	.
Inter-regional transfers	-473.2	7,458.4	8,299.3	-1,114.6	-1,115.7	.	0.0	.	x	.
Stock variation	76.8	x	307.0	9.0	.	.	0.0	.	x	.
Inter-product transfers	.	x	0.0	0.0	.	.	.	.	x	.
Other adjustments	121.8	x	16.5	0.0	.	.	0.0	.	x	.
Availability	**677.5**	**x**	**10,257.6**	**502.6**	**60,140.7**	**.**	**0.0**	**0.0**	**12,038.7**	**7,376.0**
Stock change, utilities and industry	0.0	.	.	.	.	.	0.0	.	86.8	.
Transformed to other fuels:										
Electricity by utilities	.	.	406.9	.	.	.	.	.	7.9	.
Electricity by industry	0.8	.	217.0	.	.	.	.	0.0	140.8	.
Coke and manufactured gases	0.0	.	.	.	.	.	.	.	.	.
Refined petroleum products	.	x	.	9.6	.	.	.	.	.	.
Steam generation	0.1	.	10.1	.	.	-752.8	.	.	0.1	.
Net supply	**677.5**	**0.0**	**9,623.6**	**493.0**	**60,140.7**	**752.8**	**0.0**	**0.0**	**11,803.1**	**7,376.0**
Producer consumption	105.3	0.0	x	41.5	5,870.2	.	.	.	x	...
Non-energy use	..	.	x	-1.5	.	.	0.0	.	x	...
Energy use, final demand	**571.4**	**.**	**7,145.1**	**524.4**	**61,646.4**	**752.8**	**0.0**	**0.0**	**10,946.2**	**...**
Total industrial	**571.3**	**.**	**3,072.3**	**219.5**	**29,143.1**	**752.8**	**0.0**	**0.0**	**766.8**	**...**
Total mining and oil and gas extraction	184.0	.	440.0	60.8	2,141.2	.	.	.	279.3	...
Total manufacturing	387.3	.	2,585.0	154.8	27,001.8	752.8	0.0	0.0	191.9	...
Pulp and paper manufacturing	x	.	373.7	.	12,925.4	752.8	.	.	13.4	...
Iron and steel manufacturing	.	.	x	.	x	.	.	x	x	...
Aluminum and non-ferrous metal manufacturing	x	.	x	x	x	.	x	.	x	...
Cement manufacturing	x	.	x	x	x	.	x	.	x	...
Refined petroleum products manufacturing	x	.	x	x	x	.	x	.	x	...
Chemicals and fertilizers manufacturing	x	.	8.9	.	2,497.5	.	x	.	0.1	...

All other manufacturing	x	.	2,091.5	x	4,319.3	0.0	x	.	78.6	...
Forestry and logging and support activities for forestry	.	.	0.0	.	.	.	.	.	139.0	...
Construction	.	.	47.3	3.9	.	.	.	.	156.6	...
Total transportation	**.**	**.**	**455.3**	**159.1**	**174.5**	**.**	**.**	**.**	**8,640.6**	**...**
Railways	.	.	.	.	.	.	.	.	207.9	...
Total airlines	.	.	.	.	.	.	.	.	1,524.4	...
Canadian airlines	.	.	.	.	.	.	.	.	1,118.8	...
Foreign airlines	.	.	.	.	.	.	.	.	405.6	...
Total marine	.	.	.	.	.	.	.	.	1,155.3	...
Domestic marine	.	.	.	.	.	.	.	.	816.8	...
Foreign marine	.	.	.	.	.	.	.	.	338.5	...
Pipelines	.	.	451.1	.	57.0	.	.	.	2.0	...
Road transport and urban transit	.	.	4.2	159.1	117.7	.	.	.	1,183.9	...
Retail pump sales	.	.	0.0	0.0	.	.	.	.	4,567.1	...
Agriculture	.	.	18.0	7.5	381.6	.	.	.	249.4	...
Residential	..	.	2,096.7	47.3	17,693.9	.	.	.	23.4	...
Public administration	0.0	.	138.0	0.0	823.3	.	.	.	114.8	...
Commercial and other institutional	.	.	1,364.8	91.0	13,430.0	0.0	.	.	1,151.2	...
Statistical difference	.	0.0	0.0	-0.1	0.0	0.0	.	.	x	...

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

NAICS Codes codes 111, 112, 1142, 1151 and 1152

http://www.statcan.gc.ca/cgi-bin/imdb/p3VD.pl?Function=getVDDetail&db=imdb&dis=2&adm=8&TVD=118464&CVD=118465&CPV=11&CST=01012012&MLV=5&CLV=1&CHVD=

Table 3-12

Refined petroleum products, natural units — British Columbia

	Refinery liquefied petroleum gases (LPG's)	Still gas	Motor gasoline	Kerosene and stove oil	Diesel fuel oil	Light fuel oil	Heavy fuel oil	Petroleum coke	Aviation gasoline	Aviation turbo fuel	Non-energy products	Total refined petroleum products
	megalitres											
Supply and demand characteristics												
Production	x	x	x	x	x	x	x	x	x	x	x	x
Exports	x	.	x	x	x	x	x	.	x	x	x	x
Imports	.	.	x	x	x	x	x	x	x	x	x	x
Inter-regional transfers	x	.	x	x	x	x	x	x	x	x	x	x
Stock variation	x	.	x	x	x	x	x	x	x	x	x	x
Inter-product transfers	x	.	x	x	x	x	x	x	x	x	x	x
Other adjustments	x	x	x	x	x	x	x	x	x	x	x	x
Availability	**71.2**	**279.1**	**4,529.8**	**9.4**	**3,719.4**	**85.4**	**1,010.1**	**349.7**	**10.7**	**1,601.8**	**372.2**	**12,038.7**
Stock change, utilities and industry	.	.	.	.	.	.	110.1	-23.3	.	.	.	86.8
Transformed to other fuels												
Electricity by utilities	.	.	.	.	7.9	0.0	0.0	.	.	.	.	7.9

Electricity by industry	.	123.8	.	.	5.0	0.0	11.9	.	.	.	.	140.8
Coke and manufactured gases	.	.	.	.	.	.	.	.	.	.	.	.
Refined petroleum products	.	.	.	.	.	.	.	.	.	.	.	.
Steam generation	.	.	.	.	.	.	0.1	.	.	.	.	0.1
Net supply	**71.2**	**155.3**	**4,529.8**	**9.4**	**3,719.4**	**85.4**	**888.0**	**373.0**	**10.7**	**1,601.8**	**372.2**	**11,803.1**
Producer consumption	x	x	x	x	0.2	x	x	x	x	x	x	x
Non-energy use	...	.	.	.	.	.	.	x	.	.	x	x
Energy use, final demand	**...**	**.**	**4,529.8**	**9.4**	**3,719.4**	**85.4**	**888.0**	**102.0**	**10.8**	**1,601.8**	**...**	**10,946.2**
Total industrial	**...**	**.**	**.**	**1.9**	**638.1**	**13.3**	**11.5**	**102.0**	**.**	**.**	**...**	**766.8**
Total mining and oil and gas extraction	...	.	.	1.8	270.6	6.9	0.0	.	.	.	...	279.3
Total manufacturing	...	.	.	0.0	76.2	2.3	11.4	102.0	.	.	...	191.9
Pulp and paper manufacturing	...	.	.	0.0	2.0	0.0	11.4	.	.	.	...	13.4
Iron and steel manufacturing	...	.	.	.	x	.	x	.	.	.	...	x
Aluminum and non-ferrous metal manufacturing	...	.	.	.	x	.	x	x	.	.	...	x
Cement manufacturing	...	.	.	.	x	.	x	x	.	.	...	x
Refined petroleum products manufacturing	...	.	.	.	.	.	.	.	.	.	...	x
Chemicals and fertilizers manufacturing	...	.	.	.	x	x	x	0.1	.	.	...	0.1
All other manufacturing	...	.	.	0.0	x	2.3	0.0	x	.	.	...	78.6
Forestry and logging and support activities for forestry	...	.	.	0.1	135.9	2.9	0.1	.	.	.	...	139.0
Construction	...	.	.	0.0	155.4	1.2	0.0	.	.	.	...	156.6
Total transportation	**...**	**.**	**4,248.8**	**.**	**2,044.1**	**0.0**	**817.3**	**.**	**4.6**	**1,519.8**	**...**	**8,640.6**
Railways	...	.	.	.	207.9	.	0.0	.	.	.	...	207.9
Total airlines	...	.	.	.	.	.	.	.	4.6	1,519.8	...	1,524.4
Canadian airlines	...	.	.	.	.	.	.	.	4.6	1,114.2	...	1,118.8
Foreign airlines	...	.	.	.	.	.	.	.	0.0	405.6	...	405.6
Total marine	...	.	6.1	.	332.0	0.0	817.3	.	.	.	...	1,155.3
Domestic marine	...	.	6.1	.	329.3	0.0	481.5	.	.	.	...	816.8
Foreign marine	...	.	.	.	2.7	.	335.8	.	.	.	...	338.5
Pipelines	...	.	.	.	2.0	.	.	.	.	.	...	2.0
Road transport and urban transit	...	.	207.8	.	976.2	.	.	.	.	.	...	1,183.9
Retail pump sales	...	.	4,041.0	.	526.0	.	.	.	.	.	...	4,567.1
Agriculture	...	.	108.6	0.1	140.2	0.5	0.0	.	.	.	...	249.4
Residential	...	.	.	1.7	.	21.8	0.0	.	.	.	...	23.4
Public administration	...	.	22.6	0.0	69.9	0.7	0.0	.	0.3	21.3	...	114.8
Commercial and other institutional	...	.	143.6	5.6	827.1	49.1	59.2	.	5.8	60.7	...	1,151.2
Statistical difference	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	...	x

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

Table 6-12

Details of natural gas liquids, natural units — British Columbia

	Propane	Butane	Ethane	Gas plant natural gas liquids (NGL's)
	megalitres			

Supply and demand characteristics				
Production	x	x	x	1,826.6
Exports	x	x	.	239.2
Imports	x	x	.	38.8
Inter-regional transfers	x	x	x	-1,114.6
Stock variation	x	x	.	9.0
Inter-product transfers	.	.	.	0.0
Other adjustments	.	.	.	0.0
Availability	**x**	**x**	**.**	**502.6**
Transformed to other fuels				
Refined petroleum products	.	x	.	0.0
Net refinery produced liquefied petroleum gases (LPG's)	154.8	524.4	.	0.0
Net supply	**0.0**	**60.8**	**.**	**0.0**
Producer consumption	3.9	0.0	.	0.0
Non-energy use	.	x	.	0.0
Energy use, final demand	**219.5**	**.**	**.**	**0.0**
Total industrial	**-0.1**	**.**	**.**	**0.0**
Total mining and oil and gas extraction	0.0	.	.	0.0
Total manufacturing	47.3	.	.	0.0
Pulp and paper manufacturing	.	.	.	.
Iron and steel manufacturing	.	.	.	.
Aluminum and non-ferrous metal manufacturing	.	.	.	239.2
Cement manufacturing	.	.	.	38.8
Refined petroleum products manufacturing	.	.	.	-1,114.6
Chemicals and fertilizers manufacturing	.	.	.	.
All other manufacturing	7.5	.	.	0.0
Construction	91.0	.	.	0.0
Total transportation	**0.0**	**.**	**.**	**60.8**
Road transport and urban transit	x	.	.	-1.5
Retail pump sales	.	.	.	524.4
Agriculture	x	.	.	0.0
Residential	0.0	.	.	0.0
Public administration	0.0	.	.	x
Commercial and other institutional	0.0	.	.	x
Statistical difference	x	.	.	x

Note(s): See "Data quality, concepts and methodology — Explanatory notes for tables" section.

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Sector	Gasoline $0	Diesel $0	Natural Gas $0	Total $0	%	
Grain	134	429	-	563	6%	
Dairy	246	1,229	183	1,658	17%	6.00%
Cattle	552	1,708	-	2,269	24%	
Poultry	77	80	366	523	5%	12.00%
Fruit & veg	91	136	-	227	2%	
Greenhouse & nursery	135	185	2,135	2,455	26%	70.00%
Other	716	841	366	1,923	20%	12.00%
Total	**1,951**	**4,608**	**3,050**	**9,609**	100%	100%

Check: 1951 4608 3050 9618

The Carbon Tax and BC's Agriculture

In the February 2008 Budget, the Provincial government announced the carbon tax. It is estimated that the tax will cost farmers in BC close to ten million dollars the first year. By 2012 these estimates will more than triple. The estimates do not include the surcharges that agriculture's suppliers impose on everything brought onto or off the farm.

The table below details the potential financial impacts by each sector of agriculture. The greenhouse sector which uses natural gas to heat their greenhouses is the hardest hit. Greenhouse growers will be paying $15,000 per hectare in the first year of the tax. By the third year, this figure triples. The cattle sector is also hit hard – their figures include diesel and gas usage on the farm and also the fuel used to transport their cattle to market.

Estimated Carbon Tax Impacts on BC Agriculture – by sector

Sector	Gasoline ($ 000)	Diesel ($ 000)	Natural Gas ($ 000)	Total ($ 000)
Grain	134	429	-	563
Dairy	246	1,229	183	1,658
Cattle	552	1.708	-	2,269
Poultry	77	80	366	523
Fruit & veg	91	136	-	227
Greenhouse & nursery	135	185	2,135	2,455
Other	716	841	366	1,923
Total	**1,951**	**4,608**	**3,050**	**9,609**

Mitigating the impacts of the carbon tax was one of the Council's top issues in 2008. Upon the advice of the Minister of Agriculture and Lands, a carbon tax mitigation committee was formed. The committee had representatives from every sector of primary agriculture, the Ministry of Agriculture and Lands, and the climate action team. The

committee developed a wide range of options ranging from excluding agriculture to tax deferrals on product exported out of the province. Executive had several meetings with many different ministers to detail the impacts of the tax and to advance mitigation options developed by the committee. Over the course of the year the most potential were a revised PST system, changes to business management programs, and technical incentives to benefit agriculture. As the discussion progressed over the year, it became apparent that a combination of solutions will be needed to provide effective mitigation.

Methodology:
The starting point was a 1997 NRCan study (Descriptive Analysis of On-Farm Energy Use in Canada) that broke out by each sector how many litres of natural gas, gasoline, and diesel they used. To factor in for the expansion and increased use of diesel and gasoline in each sector the usage was increased by 10%; except the greenhouse sector which has doubled in size over the last ten years. The number of litres was multiplied by the carbon tax for each fuel type to derive total impact of $1.951 million for gasoline and $4.608 million for diesel.

Terasen stated that 2007 sales of natural gas to farmers were 6.1 million gigajoules (GJ). The 2007 NRCan study was used to allocate natural gas usage between sectors. The estimates were that greenhouses used 70% and that poultry and other each used 12% and that dairy used 6%. The carbon tax was multiplied by the natural gas used to derive an impact estimate of $3.050 million. The total across all sectors of agriculture is $9.606 million

However, the methodology used to estimate more current gasoline and diesel volumes when applied to natural gas was 44% lower that the figure supplied by Terasen, so the $9.6 million could be underestimated by 44%, which provided an upper estimate of $13.5 million.

Source: http://www.usask.ca/agriculture/caedac/pubs/Energy.PDF

For agricuture sector

From: Light, Dennis [mailto:Dennis.Light@fortisbc.com]
Sent: Monday, February 6, 2012 4:41 PM
To: McLachlan, Ian P AGRI:EX
Subject: RE: QUESTION: Natural Gas Use In BC Agriculture (Stas Can Puzzle)
Importance: High

Thanks for your email, Ian. I have attached a slide that I prepared recently for my 2012 industry sectors showing 5,625,000 GJ's for Agriculture. My data covers all of the NAICS codes used by Stats Can, plus a few more not specified below in the email. So I would say that a safe number to use for BC's Agriculture gas load based on Stats Can's use of NAICS codes would certainly be between about 5,500,000 GJ's and 6,000,000 GJ's…very close to your estimates of 6.25 Million GJ's annually.

Unfortunately, I have not had any exposure or contact with Stats Can or the RESD report, so am unable to make a comment on their results. I also have no idea who uses Giglitres to measure natural gas…I've never heard the term myself (but I am only working in the utility and customer world…not that of statisticians or other theoretical realms). Natural gas in GJ's is an energy measurement, not solely a volume measurement. But it looks to me like they might be out by one decimal place...which would almost nail the numbers I found for Agriculture gas use @ 5,625,000 GJ's vs their 5,572,350 GJ's (moving out one place). I'm no engineer or mathematician, so that is only an observation.

While our system isn't perfect (we're working on it and getting more accurate all the time), I have used actual gas-use data from customer accounts to compile my numbers (and rounded for presentation and discussion purposes).

Hope this helps,
Dennis.

Dennis Light | **Commercial & Industrial Energy Solutions** | **FortisBC**
Key Account Manager | Agriculture/Food & Beverage Processors

FORTIS BC

Toll-Free within BC: 1-888-954-7857
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For Greenhouse sector (from greenhouse report)

From: Light, Dennis [mailto:Dennis.Light@fortisbc.com]
Sent: Monday, December 12, 2011 5:04 PM

To: Colwell, Colleen AGRI:EX
Subject: BC Greenhouse Natural Gas Consumption
Importance: High

Good afternoon Colleen. Due to BC Privacy Legislation, I cannot provide you with specific customer names or their individual annual consumption numbers or any Carbon Tax charges; however, I can provide the combined consumption figures for those greenhouses using natural gas for growing crops in the province.

Parameters:

1. The GJ (giga-joule) figures used are for 2010 since we don't have 2011 numbers yet. There have been some changes in some of the individual accounts (expansion, shut-downs, etc.) from 2010 to 2011, so I incorporated those that I know of into these numbers to be as accurate as possible for 2011.
2. I have only included NAICS Code 1114 and from that have removed all of the Silviculture (forestry seedlings - greenhouse grown) and Mushroom/Sprout Growers (grown in barns, not greenhouses) from the final totals. So the total numbers include NAICS 1114 hot house, floriculture, and nursery plant growing operations only.
3. You will see a combined amount for all 150 gas accounts; and then a breakdown of accounts using less than 5,000 GJ's per year (these are most likely to be the nursery operations and probably do not use CO2 for growing) and those using more than 5,000 GJ's annually since those are most likely to use CO2 for growing. This is arbitrary, unfortunately, since it would take a specific customer survey to accurately identify those that are only plant nursery operations. Nurseries are typically smaller operations and do not usually need CO2 or the higher temperatures normally associated with growing peppers, cucumbers, tomatoes, or flowers.

I wasn't sure how you needed these, so use the breakdown if necessary. Plus, as discussed, I was unable to get the "financials" for the Carbon Tax specifically; however, due to the nature of the Carbon Tax, it is based on GJ consumption of gas and should be easy enough for you to determine costs knowing the Carbon Tax incremental increases each July 1st:

1. 150 total BC greenhouse accounts (as identified above) = 4,375,000 GJ's annually.
2. 50 'nursery' (<5,000GJ) greenhouse accounts = 150,000 GJ's annually.
3. 100 'hot house and floriculture' (>5,000GJ) greenhouse accounts = 4,225,000 GJ's annually.

I have rounded slightly to clean up the numbers, but as mentioned above, there were changes from 2010 to 2011 and I have tried my best make these numbers as current as possible. On the surface, that's about $5.5 million dollars NOT being potentially reinvested into the greenhouse industry in the province by the growers (@ $1.25/GJ Carbon Tax). And in speaking with them, the Carbon Tax directly impacts upgrades to existing infrastructure, their future livelihood, BC's ability to produce food locally and cost-effectively, etc. And this is only the natural gas component of the Carbon Tax for the growers who use other fossil fuels for transportation and farm equipment. I'll leave the rest of the analysis to you guys.

Please let me know if you need any further clarification or anything else.

Regards,
Dennis.

Dennis Light | **Commercial & Industrial Energy Solutions** | **FortisBC**
Key Account Manager | Agriculture/Food & Beverage Processors

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NAICS Codes codes 111, 112, 1142, 1151 and 1152

http://www.statcan.gc.ca/cgi-bin/imdb/p3VD.pl?Function=getVDDetail&db=imdb&dis=2&adm=8&TVD=118464&CVD=118465&CPV=11&CST=01012012&MLV=5&CLV=1&CHVD=118466

11 - Agriculture, forestry, fishing and hunting	
Code	**Subsector**
111 Crop production	Crop production
112 Animal production and aquaculture	Animal production and aquaculture
113 Forestry and logging	Forestry and logging
114 Fishing, hunting and trapping	Fishing, hunting and trapping
115 Support activities for agriculture and forestry	Support activities for agriculture and forestry

112 - Animal production and aquaculture	
Code	**Industry group**
1121 Cattle ranching and farming	Cattle ranching and farming
1122 Hog and pig farming	Hog and pig farming
1123 Poultry and egg production	Poultry and egg production
1124 Sheep and goat farming	Sheep and goat farming
1125 Aquaculture	Aquaculture
1129 Other animal production	Other animal production

111 - Crop production	
Code	**Industry group**
1111 Oilseed and grain farming	Oilseed and grain farming
1112 Vegetable and melon farming	Vegetable and melon farming
1113 Fruit and tree nut farming	Fruit and tree nut farming
1114 Greenhouse, nursery and floriculture production	Greenhouse, nursery and floriculture production
1119 Other crop farming	Other crop farming

RESULTS

Table 1: BC Greenhouse Sector – Estimated Carbon Tax

	Gasoline	Diesel	Natural Gas				
2010 Fuel Use Volumes	*(megalitres)* 7.9	*(megalitres)* 5.7	*(Gigajoules)* 4,375,000				
Carbon Tax Rates	*cents/litre*	*cents/litre*	*cents/GJ*				
2008/09	2.41	2.76	49.66				
2009/10	3.62	4.14	74.49				
2010/11	4.82	5.52	99.32				
2011/12	6.03	6.90	124.15				
2012/13	7.23	8.28	148.98		85%	15%	natural gas use shares (from Fortis)
Blended rates							
2011	5.425	6.21	111.735				
2012	6.63	7.59	136.565				
Carbon Tax Payable *($ millions)*	***Gasoline***	***Diesel***	***Natural Gas***	***Total***	***Veg***	***Floriculture***	
Estimate 2011/12	*$0.5*	*$0.4*	*$5.4*	*$6.3*	*$5.4*	*$0.9*	
Estimate 2012/13	*$0.6*	*$0.5*	*$6.5*	*$7.6*	*$6.4*	*$1.1*	
Calendar 2010	$0.3	$0.3	$3.8	$4.4	$3.7	$0.7	
Calendar 2011	$0.4	$0.4	$4.9	$5.7	$4.8	$0.9	
Calendar 2012	$0.5	$0.4	$6.0	$6.9	$5.9	$1.0	
Calendar 2013	$0.6	$0.5	$6.5	$7.6	$6.4	$1.1	

Sources: Analysis by AGRI and CAS; fuel use data from Fortis BC/Stats Can; statutory carbon tax rates.

Notes:

1. Carbon tax calculated by applying CT rates to the fuel use volumes for the CT year (July 1 to June 30).
"2012/13" rate refers to th erate in effect from July 1, 2012 to June 30, 2013.

2. Carbon tax rates obtained from the Schedule 1 of the Carbon Tax Act.
Note: Marketable natural gas rate applied to natural gas volume. "Light Fuel Oil" rate applied to diesel volume.

3. Volumes of gasoline and diesel are derived from BC primary agriculture figures from Statistics Canada's Report on Energy Supply and Demand 2010, pro-rated for the greenhouse sector share estimated by BCAC in 2009 (7% of gasoline use and 4% of diesel use).
http://www5.statcan.gc.ca/cansim/a03?lang=eng&pattern=128-0012..128-0018

4. Natural gas volumes for 2010 are used for all years, due to pending Stats Can reporting revisions for 2006, 2007, 2008, 2009.
Note: This volume is corroborated by Fortis BC customer use accounts (5,625,000 GJ).

5. Estimated 2010 volumes are applied to 2011/12 and 2012/13.

http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1298591117432&lang=eng

of the natural gas was used by the greenhouse sector

#DIV/0!
#DIV/0!

Sector	Gasoline $0	Diesel $0	Natural Gas $0	Total $0	%
Grain	134	429	-	563	6%
Dairy	246	1,229	183	1,658	17%
Cattle	552	1,708	-	2,269	24%
Poultry	77	80	366	523	5%
Fruit & veg	91	136	-	227	2%
Greenhouse & nursery	135	185	2,135	2,455	26%
Other	716	841	366	1,923	20%
Total	**1,951**	**4,608**	**3,050**	**9,609**	100%

Check:	1951	4608	3050	9618
GH share	6.9%	4.0%	70.0%	25.5%

Greenhouse sector used 7% of the gasoline, 4% of the diesel, and 25.5%

of the natural gas.

Convert ft2 to m2 1 square foot = 0.09290304 square meter

0.09290304

1,189,158.91	m2	
832,411		70%
582,688		70%
1,128,960	GJ	
124.15	CT rate1	
148.98	CT rate2	
136.57	Blended	
1,541,764.22		

From: Bob Pringle [mailto:bpringle@ufgca.com]
Sent: Wednesday, March 7, 2012 12:23 PM
To: Stewart, Melanie AGRI:EX; Shoemaker, Wes AGRI:EX
Cc: John Kerkhoven s.22
Subject: Meeting tomorrow

Wes/ Melanie for out discussion tomorrow, we estimate the size of the pool for floriculture as follows

a. Estimated total UFG and other known gas burning heated greenhouse space = 12,800,000 sqft
b. Estimated percentage of this amount burning gas and propane + 12,800,000 X 70% = 8,960,000 sqft tot
c. "Reduction factor" for occasional/ seasonal and limited heating users 70% X 8,960,000= 6,272,000 sqft
d. Estimated gj of gas usage per square foot for year round maximum heating needs =.18 gj/sqft
e. Adjusted rate for 2012 =$1.375
f. Estimated maximum carbon tax to be paid in 2012 = 6,272,000 sqft of equivalent maximum heating use

So we have estimated the size of the pool at $1,552,320 vs the initial estimate of $1million. This amount woul

Also, please confirm the time of the meeting for tomorrow as John Kerkhoven has a 1pm start time and I hav

Bob Pringle
CEO, United Flower Growers Co-operative Association
4085 Marine Way, Burnaby, B.C. V5J 5E2
office: 604 630 4859
cell: 604 837 8356

al gas burning heated greenhouse space
of equivalent maximum heating use area.

area X .18gj/sqft X $1.375/gj = $1,552,320

ld be put into the pool and drawn on based on actual 2011 paid multiplied by a rate factor for 2012.

e 2:30. Thanks, Bob

	Propane	Natural Gas	
	3.83		124.15
	4.59		148.98
2012 blend	4.21		136.57
	cents per litre	cents per GJ	

http://www.nrcan.gc.ca/energy/sources/natural-gas/1

One cubic meter is about equal to 0.038 GJs

1 m3	0.038 GJ
1 GJ	26.31579 m3

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Withheld pursuant to/removed as

DUPLICATE

From:	McLachlan, Ian P AGRI:EX
To:	Paradine, Dennis ENV:EX
Cc:	Kennedy, Hilary ENV:EX
Subject:	CT Greenhouse Sector Calculations - 14 Feb 2012.xlsx
Date:	Wednesday, April 4, 2012 1:36:11 PM
Attachments:	CT Greenhouse Sector Calculations - 14 Feb 2012.xlsx

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Hilary has these.

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DUPLICATE

includes hot house, floriculture, and nursery plant growing operation only
This includes 150 greenhouse accounts.

Date	Legislated Tax Rate ($/tonne)	Carbon Tax Rate for Natural Gas (cents/m3)	Carbon Tax Rate for Natural Gas (cents/GJ)	Natural Gas use 2010* (assumed constant) (GJ)	Greenhouse Sector $ Paid in CT	Greenhouse sector $ Paid in CT Small operations only (<5000GJ/yr)	Greenhouse sector $ Paid in CT Larger operations only (>5000GJ/yr)
01-Jul-08	$10	1.9	49.66		$ 2,172,625	$ 74,490	$ 2,098,135
01-Jul-09	$15	2.85	74.49		$ 3,258,938	$ 111,735	$ 3,147,203
01-Jul-10	$20	3.8	99.32	4375000	$ 4,345,250	$ 148,980	$ 4,196,270
01-Jul-11	$25	4.75	124.15		$ 5,431,563	$ 186,225	$ 5,245,338
01-Jul-12 (Scheduled/forecast)	$30	5.7	148.98		$ 6,517,875	$ 223,470	$ 6,294,405
						150000 GJ/yr	4225000 GJ/yr

Total GH Revenue	$	521,815,974
CT as % of revenue 2012		1.25%

Average NG consumption	29167	GJ
Average NG consumption - small GH or	3000	GJ
Average NG consumption - large GH	42250	GJ

Natural Gas Consumption is from Fortis BC, for their customers in 2010

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DUPLICATE

			source
% of GH fuel biomass		30%	approx average for known large greenhouses
% of GH fuel natural gas		70%	approx average for known large greenhouses
Average annual natural gas consumption 50 acre GH (		300000 GJ	50 acres = 200,000 m2 x 1.5 GJ/m2 average use
Approximate total BC GH acres		1270 acres	approx. 2010: 5,139,191 m2 = 1,270 acres veg and flowers 2,718,828m2 = 672 acres veg only (1)
Natural gas emissions factor	0.049666667	GJ/t	implied by rates in carbon tax act
GHG tonnes per GH acre (incl. biomass)		298	50 is because the 300k GJ is for avg. Size 50acre GH
GHG tonnes per GH acre (excl. Biomass)		208.6	
% Greenhouse area likely heated		76%	approx with glass vs other structures BC glass as % of all g/hse 3,885,550m2 divided by 5,139,191m2 = 76% (2)
total BC GH area likely heated		965	
total GH emissions from heated GH, incl. Biomass		287630	
total gh emissions from heated GH, excl. Biomass		201341	
2012-13 carbon tax cost	$	6,040,222	for July1-June 30
Annual farm gate revenue (avg. 50 acre GH)	$	20,543,936	see notes 2 and 3
Revenue per acre	$	410,879	
Total BC GH revenue	$	521,815,974	
Carbon tax as % of revenue		1.16%	

sources:

1. Stats Canada G/hse, sod and nursery industries - 2010 table 1, table 2
2. Stats Canada G/hse sod and nusrsery industries - 2010 table 1
3. Stats Canada G/hse , sod and nursery industries - 2010 table 6

				source
% of GH fuel biomass		30%		approx average for known large greenhouses
% of GH fuel natural gas		70%		approx average for known large greenhouses
Average annual natural gas consumption 50 acre GH (G		300000	GJ	from MMG 2009
Approximate total BC GH acres		770	acres	approx.
Natural gas emissions factor		0.049666667	GJ/t	implied by rates in carbon tax act
GHG tonnes per GH acre (incl. biomass)		298		50 is because the 300k GJ is for avg. Size 50acre GH
GHG tonnes per GH acre (excl. Biomass)		208.6		
% Greenhouse area likely heated		70%		We don't have a good number here. Please advise.
total BC GH area likely heated		539		
total GH emissions from heated GH, incl. Biomass		160622		
total gh emissions from heated GH, excl. Biomass		112435		
2012-13 carbon tax cost	$	3,373,062		for July1-June 30
Annual farm gate revenue (avg. 50 acre GH)	$	21,263,000		from MMG 2009
Revenue per acre	$	425,260		
Total BC GH revenue	$	327,450,200		
Carbon tax as % of revenue		1.03%		

BC Green House Sector and the Carbon Tax

Notes for Deputy Minister, Ministry of Environment

- **More important factors affect green house competitiveness than the carbon tax.**
  - A warmer climate, and the ability to produce year-round are advantages for competitors in Mexico and California. This is cited as the primary reason for investment by BC companies in new facilities in California.
  - California also has the advantage in serving the US, the main market for green house products, because shipping across international borders increases shipping time, and risks (e.g. spoilage).
  - The high Canadian dollar hurts all exporters relying on US markets.
  - Labour costs are higher in BC than in Mexico and California, which has cheaper and more flexible access to migrant farm workers.
  - High upfront capital costs relative to operating income hinder investment in BC. In contrast, Mexico can use less sophisticated technology (e.g. plastic tunnels) with lower capital costs.
  - Incentives are offered by other governments: tax credits, favourable depreciation rates, free water etc.
  - Land prices in BC are substantially higher than in the US and Mexico.

- **Green house sector calculations of carbon tax impact use incorrect assumptions.**
  - Their analysis assumes that 100% of energy use by green houses is from natural gas.
  - 2010 Reporting Regulation data shows that for the largest emitters, only 60% of energy use is from natural gas. 35% is from biomass and 5% from biogas. Neither is subject to the carbon tax.
  - Proportions of biomass use are likely lower for smaller facilities, but a significant number of these green houses are not heated at all.
  - The industry has stated that for one large green house operator, 2012 carbon tax rates ($30/t) lead to a $1m annual cost.
    - Based on 2010 reporting data, and accounting for biomass and biogas, the highest expected carbon tax cost to a single operator in 2012 is approximately $500,000.
  - Contrary to industry assertions of carbon tax costs representing 1-2% of total revenue now, and 2-4% in 2012, Climate Action Secretariat estimates, using conservative assumptions, that carbon tax costs will account for 1-1.5% of total revenue in 2012.

- Government has provided assistance through tax expenditures and other measures to other sectors for whom the carbon tax, competitiveness, or other circumstances have created challenges:
  - Rural and northern home owner grant.
  - Low income refundable tax credit.
  - Changes to the natural gas royalty structure.
  - 50% reduction in school property tax for land classified as farm.
- Such mechanisms can help alleviate the green house sector's competitiveness issues while leaving the carbon price signal intact.

- The strength of BC's carbon tax is its comprehensiveness, with the same rate applied to all emitters. This is an essential feature for efficiency, and ensures that all sectors contribute to greenhouse gas reduction targets.
- Exempting certain sectors (unless an equally stringent regulatory mechanism is used as a substitute) increases the overall cost of achieving greenhouse gas targets by forcing remaining sectors to make deeper reductions at greater cost.
- Providing an exemption for the green house sector would create an opportunity for other sectors (e.g. cement, natural gas) to demand exemptions based on their special circumstances, further undermining the integrity and effectiveness of the carbon tax.

- **Many options are available to green houses to reduce GHG emissions and carbon tax payments.**
  - Replacing natural gas with biomass (e.g. pine beetle wood) or biogas from landfills is already in place in various green houses and not subject to the carbon tax.
  - Waste heat from industrial facilities can displace natural gas heating.
  - Heat screens, heat curtains, and heat storage can increase energy efficiency.
  - Calibration of thermostats reduces natural gas use.
  - Many of these options have been implemented in green houses, and some have generated income for producers while reducing carbon tax costs by generating offsets through the Pacific Carbon Trust.

- **From 2009 to 2010, with the carbon tax in effect, green house area and sales continued to grow.**
  - Total green house sales for BC increased by 3%.
  - Green house area in BC increased by 6%.
  - The number of operators increased by 25.
  - Sales of tomatoes increased by 16%; cucumbers by 14%; and peppers by 4%. Sales of cut flowers and potted plants also increased.
  - Exports accounted for 26% of total vegetable and fruit sales in 2009, and 12% of total flower and plant sales.

    - Source: Statistics Canada

- **The sector has benefitted from BC's climate action agenda.**
  - Green houses have seen a disproportionate benefit from government offset purchases.
  - 4 projects (each over 5 years):
    - 20,000t from insulating curtains.
    - 90,000t from insulating curtains and biomass.
    - 20,000t from insulating curtains and an Enhanced Environmental System which increases heating and cooling efficiency.
    - 8,000t from switching from coal and natural gas to biomass.
  - In addition to offset revenues for each tonne reduced, each tonne is also a reduction in the carbon tax and a fuel cost saving

- **Carbon dioxide is not sequestered by green house operations.**
  - Green houses use CO_2 to encourage plant growth.
  - However, unlike trees which store carbon for decades or longer, green house plants (cucumber, tomato, flowers) grow, are harvested, and decay on time frames of less than a year in most cases.
  - CO_2 that is absorbed in the growth of green house plants is released at the end of the plants' lives in a cycle too short to have any impact on atmospheric concentrations of CO_2.

MINISTRY OF ENVIRONMENT
MEETING INFORMATION NOTE

September 21, 2011
August 2, 2011
File:
CLIFF/tracking #: 151981

PREPARED FOR: Honourable Terry Lake, Minister of Environment

DATE AND TIME OF MEETING:

ATTENDEES:

ISSUE(S): The green house sector is requesting a carbon tax exemption due to competitiveness concerns.

Background:

BC's carbon tax applies to the combustion of fossil fuels in the province. The current rate of $25 per tonne of greenhouse gases emitted is charged at the point of sale of fuels regardless of whether the purchaser represents a given sector or is a private individual. As such, the carbon tax applies to the combustion of fossil fuels in the agriculture sector (e.g. fuel for farm equipment, natural gas burned to heat green houses).

Emissions from green house operators are almost entirely from the combustion of natural gas (covered by the carbon tax) or biomass (not covered by the carbon tax) for heat, and natural gas for CO2 fertilization. As a result, for the largest operators, roughly 70% of emissions are covered by the carbon tax.

For the broader agriculture sector, most emissions are not from combustion, so the carbon tax only covers 2% of total emissions (excluding green houses).

The agriculture sector has consistently raised concerns with the carbon tax. In particular, greenhouse growers recently requested an exemption from the carbon tax claiming that:

- They export flowers and vegetables to markets that do not pay carbon tax
- The carbon tax cost in 2012 is estimated to be $9.5M, or 2% of total sales
- The carbon tax is not "revenue neutral" for the sector and that the sector pays 6 to 100 times more carbon tax than it receives in personal income tax cuts.
- The overall impact is making the sector unsustainable and BC companies have recently invested in two new operations in the US.

Industry has claimed that carbon tax costs will account for 2% of total revenues in 2012. They do not state their assumptions for this calculation; however, previous forecasts of a similar magnitude (2-4%) by the industry have assumed that 100% of energy needs are being provided by natural gas.

- Biomass systems are used at varying degrees depending on the relative price of the fuel and infrastructure in place. Large operations use in a range of 30%

biomass and this is increasing as operations fuel switch to avoid paying the carbon tax.
- Greenhouses have sold over 14,000 tonnes per year of offsets from four green houses for projects to promote energy saving devices and switching to biomass.

Green houses currently account for 18% of total sales in the agriculture sector. 26% of green house vegetable and fruit, and 12% of flower and plant sales are to export markets.

Green house competitiveness is affected by the high Canadian dollar, timelines shipping goods across borders, competitors with a warmer climate, lower labour and land costs, and access to government incentives, as well as carbon tax costs. These would all be key considerations in the recent decision of two companies to invest in new facilities in California.

BC's green house sector saw extensive capacity growth and investment in the 1990s. A lull in investment in BC and investing abroad in the early 2000s are to be expected.

As part of the revenue neutral carbon tax, the sector benefits from:
- Reduced general corporate income tax and small business income tax rates.
- 50% reduction in school property taxes for classified farm land.

In addition the sector will benefit from:
- A new 87.5% farm building exemption on greenhouse operations.
- Continued purchasing of offsets for energy conservation and fuel switching to biomass.

Among jurisdictions with carbon prices (proposed or implemented), approaches are mixed with respect to treatment of the agriculture sector. Australia, Sweden, the EU, and Germany do not cover agriculture in their cap and trade, carbon tax, or eco-tax schemes. New Zealand, the UK, Finland, Norway, and Ireland do cover agriculture. Finland has a reduced rate for green houses.

Exempting or providing preferential rates for emissions-intensive trade-exposed sectors is common in carbon price designs. While the agriculture sector in BC is trade exposed to a degree, it is not highly emissions intensive s.13,s.17
s.13,s.17

Discussion:

The BC carbon tax's design employs a uniform carbon price on combustion emissions. This remains a rare approach among carbon tax designs.

A consistent carbon price across sectors is held by economists to be a crucial design feature to ensure efficiency, generating emissions reductions at the least possible cost. Exclusion of any part of the economy from carbon pricing requires remaining sectors to make deeper, more expensive reductions to reach emissions targets unless excluded sectors are subject to other policies (e.g. regulation) yielding similar reductions.

s.13,s.17

BC's "revenue neutral" carbon tax approach has to date provided assistance to sectors facing challenges without harming the integrity of the price signal. Other financial mechanisms are available that can provide targeted assistance with competitiveness or equity concerns. Past examples include:

- The Rural and Northern Homeowner Grant
- The Low Income Refundable Tax Credit
- 50% reduction in school property taxes for farms

SUGGESTED RESPONSE:

- BC's carbon tax has had international acclaim for its lack of exemptions and proximity to the 'ideal' design for efficient emissions reductions.
- The agriculture sector in BC pays the carbon tax on a limited portion of its emissions. Greenhouses are more affected but also can benefit from energy conservation and fuel switching to biomass at relatively low cost.
- Growing season, cross-border trade challenges, and labour costs, among others contribute to green house competitiveness challenges and investment decisions.
- The green house sector has benefitted from selling offsets to the Pacific Carbon Trust, earning revenue, and reducing their carbon tax costs by reducing emissions.
- BC's approach to date has used other mechanisms than the carbon tax to provide assistance to sectors while keeping the carbon price signal intact.

Attachments:

Contact:	**Alternate Contact:**	**Prepared by:**
James Mack	*Dennis Paradine*	*Hilary Kennedy*
Climate Action Secretariat	*Climate Action Secretariat*	*Climate Action Secretariat*
250-387-9456	*250-387-0732*	*250-356-5829*

Reviewed by	Initials	Date
DM		
DMO		
ADM		
Dir./Mgr.		
Author	HK	22-09-11

Page 104 to/à Page 109

Withheld pursuant to/removed as

DUPLICATE

Outstanding design questions (or clarifications of direction) –

- Trust? One time funding?
- Trust? Who to administer? Impartiality of Industry Assns.
- Revenue source? Impact on revenue neutrality?
- Treatment of floriculture – esp for item 1. Exclude, or use threshold for eligibility?
- Treatment of nurseries
- Capital costs, tipping points for uptake, strategy for setting eligibility thresholds and reimbursement amounts (item 2)
- Objective – (item 2) many small or few large projects
- Eligibility of nascent technology, scaling
- Avoiding arbitrage for liquid vs. NG CO_2 for enhancement
- Lisa- email mentioned RFP on CO_2 use – better data – impact of this?
- Which technologies – extent of existing implementation, extent of opportunities, some technologies preferred?
- Effect on offsets – still worth investment in a GH protocol?
- How much reporting needed on NG use/ purpose? How?
- Treatment of liquid CO_2 (eligibility criteria could exclude those already using liquid CO_2 from the benefit.
- Retrofits only. New builds?
- Expert review/audit/verification
-

Plant Enhancement Benefit

Size of Fund

Total fund is based on an estimate of the carbon tax costs paid by the greenhouse industry as a whole for CO2 plant enhancement

Assumption based on industry information: 50% of natural gas use is for enhancement.

Total natural gas carbon tax costs: $6.5M

Size of fund: $3.25M

s.13

Eligibility

Objective is to have a benefit available to any operation undertaking CO2 plant enhancement, regardless of the source of the CO2 (i.e. not penalizing operations that buy liquid CO2 or scrub from a biomass boiler).

An operation is eligible for the program if it can demonstrate that in 2011/12 it:

- Is an vegetable operation AND:
  - Used natural gas to produce CO2 for plant enhancement beyond the natural gas that was used for heating.
  - Purchased liquid CO2 or used a CO2 waste stream from another facility for enhancement.
  - Or,
  - Produced CO2 for plant enhancement using a fuel other than natural gas (e.g. biomass, biogas)
  - Lower bound threshold to keep out the really small users (are there any?) or avoid gaming?

- Is a floriculture operations AND:
  - Grew x or y crops
  - AND Used CO2 for enhancement from any of the three means above
  - Lower bound threshold ?
  -

Operations would need to submit receipts? Signed declarations?

Disbursement

Option 1:

For vegetables:

Benefit amount/hectare = $3.2M x individual facility hectares / total eligible facility hectares.

For floriculture:

Benefit amount/hectare= one fifth of vegetable amount

(assumes vegetables use 50% of natural gas for enhancement and floriculture uses 10%)

s.13

Data needs: floor area by facility

Option 2:

Benefit amount= 50% of carbon tax paid for natural gas (vegetables) 10% of carbon tax paid for natural gas (floriculture)

Data needs: actual carbon tax paid by facility (submit natural gas receipts for 2011?)

Supporting the Green House Sector

While maintaining a strong carbon price signal

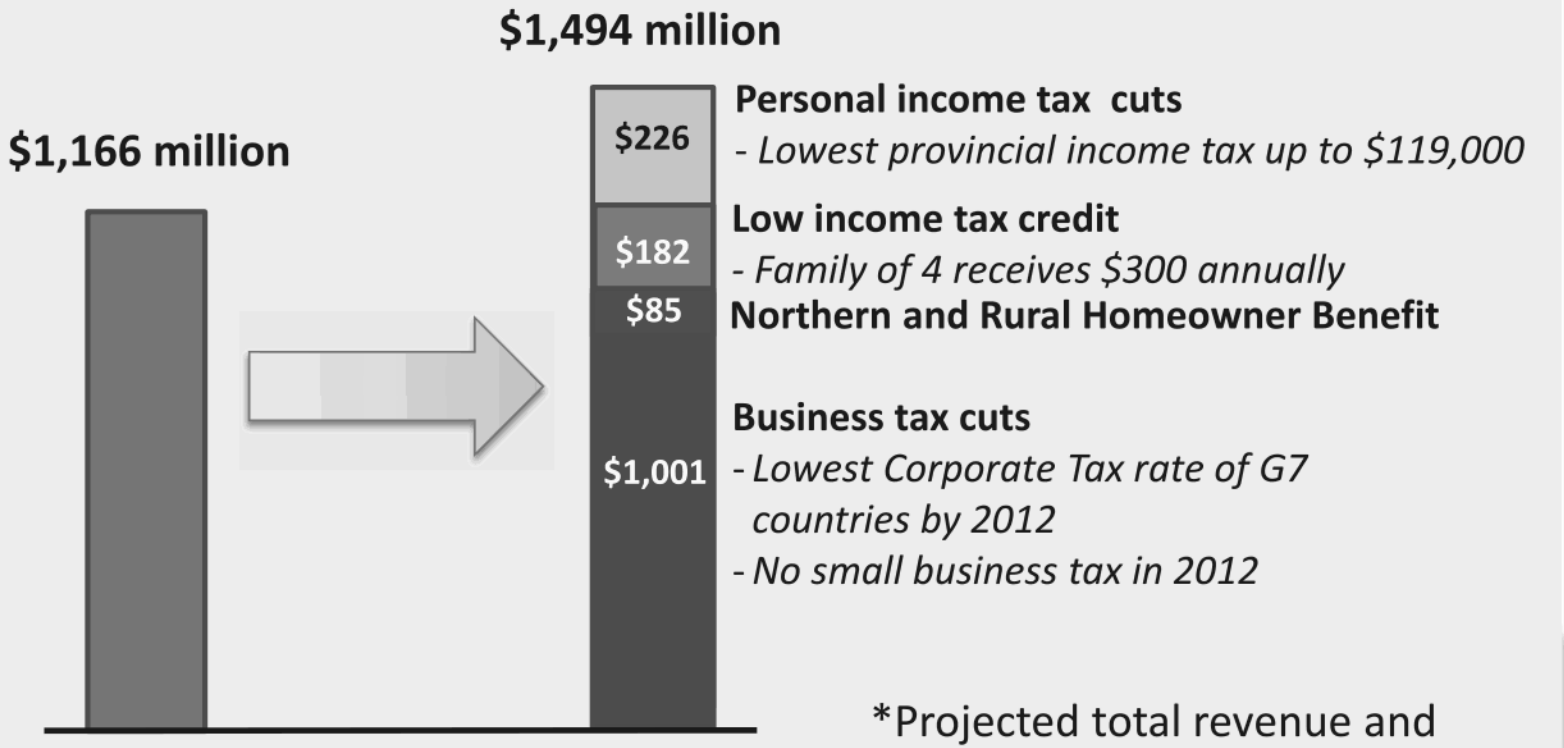
Ministry of Environment

The BC Green House Sector: Current Situation

- The green house sector has raised the following concerns about their competitiveness:
  - The carbon tax significantly increases natural gas costs.
  - Growers in competitor jurisdictions do not pay this extra cost.
  - BC growers are investing in California, not BC.
- Statistics Canada data shows that from 2009 to 2010, with the carbon tax in effect, the sector is growing.
  - Total BC green house sales increased by 3%, green house area by 6%, and the number of operators by 5%.
  - Sales of tomatoes, cucumbers, peppers, cut flowers and potted plants increased.
- In 2009, exports accounted for 26% of total vegetable, and 12% of total flower and plant sales.

BC's Revenue Neutral Carbon Tax

- BC's Carbon Tax applies to all emissions from the combustion of fossil fuels.
- The rate will be $30/tonne in 2012/13. All emitters pay the same rate.
- There are no exemptions for specific sectors.



*Projected total revenue and reductions for fiscal 2012/13

Competitiveness Pressures on the Green House Industry

- Relative to key competitors California and Mexico, BC faces the following challenges:
  - Colder climate and shorter growing season.
  - High Canadian dollar.
  - High labour costs.
  - High upfront capital costs relative to revenues.
  - High land prices.
  - Other jurisdictions offer tax credits, favourable depreciation rates, free water etc.
  - Carbon tax.
  - Higher costs/risks shipping cross-border *(relative to California)*

The Carbon Tax and the Green House Sector

- Payments are related almost entirely to natural gas use for heat and for CO_2 fertilization.
- Many green houses have reduced their emissions and carbon tax costs by
  - Switching to biomass or biogas for heat
  - Implementing insulation and energy efficiency measures
- Four green house operators have generated offsets through such measures, and earned revenue.
- Calculations of the sector's carbon tax costs should account for alternatives to natural gas that are currently being used.
- MoE estimates that in 2012, carbon tax costs will represent 1% of total sales from the sector.

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- The strength of the carbon tax is its comprehensiveness.
- Exempting some sectors increases costs of reaching greenhouse gas targets.
- Other sectors (e.g. Cement) have stronger competitiveness claims.

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BC's approach to date has used other mechanisms to provide targeted relief.

- Measures in place:
  - Rural and Northern Homeowner Grant
  - Low income refundable tax credit
  - Changes to the natural gas royalty structure
  - Reduction in school property tax for farms
- This type of financial solution can alleviate competitiveness issues while leaving the carbon signal intact.

Options:

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Supporting the Green House Sector

While maintaining a strong carbon price signal

Ministry of Environment

Current Situation

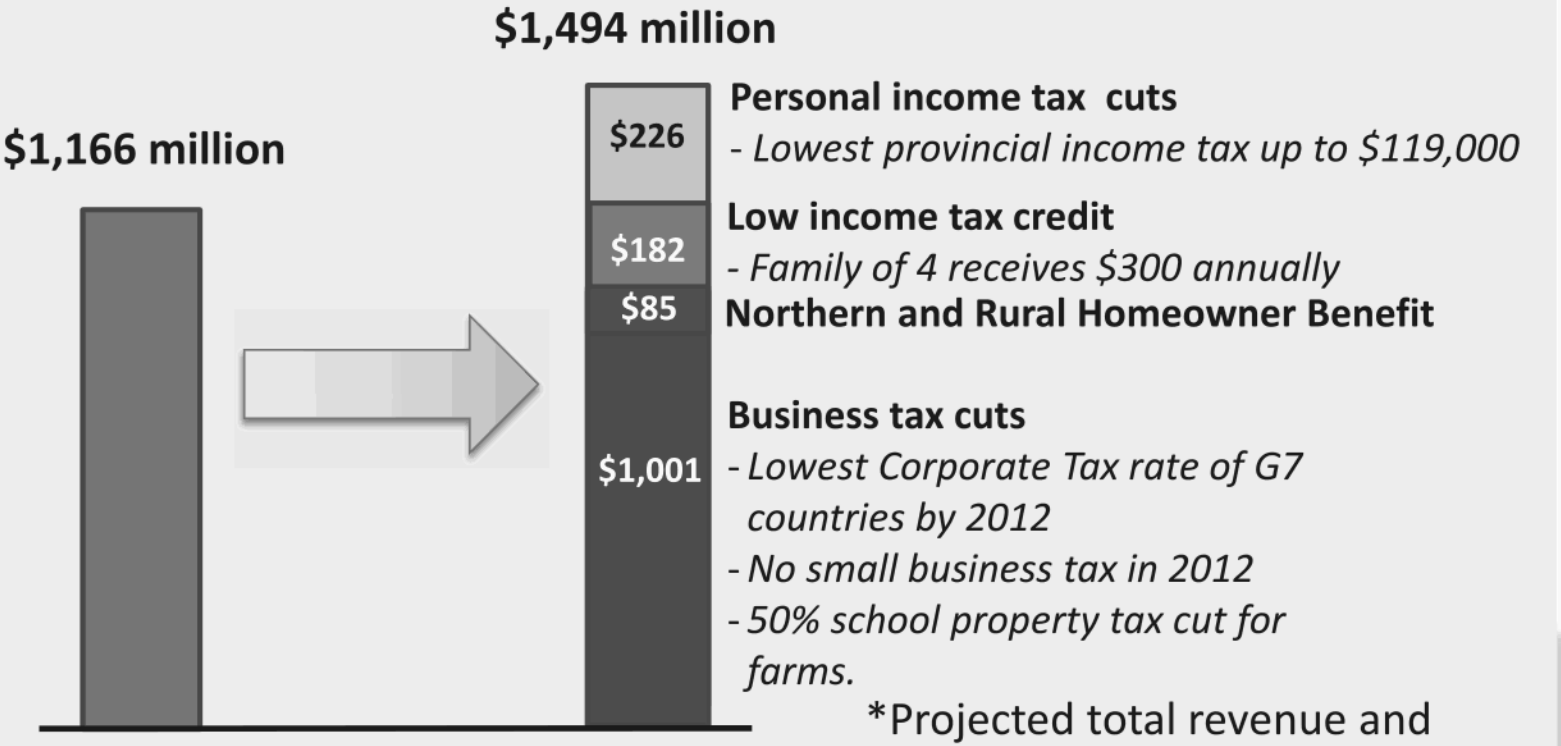
- The green house sector raises competitiveness concerns re carbon tax:
  - It increases natural gas costs.
  - Growers in competitor jurisdictions do not pay this extra cost.
  - BC growers are investing in California, not BC.
- BC green house sector sales are about 18% of total agricultural sales.
- In 2009, exports accounted for 26% of total vegetable, and 12% of total flower and plant sales.
- Sector faces various challenges, however, it also continues to grow (Statistics Canada):
  - 2010 total BC green house sales increased by annual 3%, green house area by 6%, and the number of operators by 5%.
  - Sales of tomatoes, cucumbers, peppers, cut flowers and potted plants increased.

Competitiveness Challenges

- Relative to key competitors California and Mexico, BC faces the following challenges:
  - Shorter growing season.
  - High Canadian dollar (C$1=US$0.97).
  - High labour costs (min. wage $10 vs. $8 in CA; illegal workers).
  - Other jurisdictions offer tax credits, favourable depreciation rates, free water etc.
  - Higher costs/risks shipping cross-border *(relative to California)*
  - Carbon tax

BC's Revenue Neutral Carbon Tax

- BC's Carbon Tax applies to all emissions from the combustion of fossil fuels.
- The rate will be $30/tonne in 2012/13. All emitters pay the same rate.
- There are no exemptions for specific sectors. BC has tailored tax benefits to balance costs.



*Projected total revenue and reductions for fiscal 2012/13

The Carbon Tax and the Green House Sector

- Payments are related almost entirely to natural gas use for heat and for CO_2 fertilization.
- Some green houses have reduced their emissions and carbon tax costs by
  - Switching to biomass or biogas for heat
  - Implementing insulation and energy efficiency measures
- Four green house operators have generated offsets through such measures, earning revenue and avoiding carbon tax costs through reduced emissions.
- Past industry cost estimates have incorrectly applied the carbon tax to biomass use.

Consequences of Carbon Tax Exemption

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- Exempting some sectors increases costs of reaching greenhouse gas targets.

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- Other sectors (e.g. cement) have stronger competitiveness claims.

s.13,s.17

- Jeopardizes $1.2Bn revenue stream.

BC's approach to date has used other mechanisms to balance carbon tax

- Measures in place:
  - Rural and Northern Homeowner Grant
  - Low income refundable tax credit
  - Reduction in school property tax for farms
- This type of financial solution can alleviate competitiveness issues while leaving the carbon price signal intact.

Options:

s.13,s.17

Ministry of Agriculture
Proposal for Greenhouse Energy Innovation Program

Executive Sponsor: Melanie Stewart, Assistant Deputy Minister.

Summary

The Greenhouse Energy Innovation Program is a one-year $7.6M program to incent renewable energy and energy efficiency, enhance greenhouse industry competiveness, and promote BC job creation. The program would make the carbon tax revenue neutral to the greenhouse sector as a whole for 2012/13, while maintaining the signal to reduce emissions.

s.13

ISSUE

The greenhouse sector identifies the carbon tax as a significant competitive disadvantage. Constraints on capacity for capital investment in the sector limit its ability s.13 s.13 make investments in energy efficiency and renewable energy to reduce their tax costs and enhance operations. s.13

BACKGROUND

- The sector is the second largest in Canada (behind Ontario) with $560M in product sales in 2010 (40% of BC's total farm cash receipts). The sector produces vegetables and ornamental plants.
- 480 greenhouse vegetable and floriculture operations in BC employ an estimated 5,420 workers.
- The sector is a large user of natural gas for heating and to obtain "food grade" CO2 for plant enhancement. It will pay an estimated $7.6M in carbon tax in 2012/13.
- The sector says the carbon tax places it at a competitive disadvantage and discourages investment.
- There are no exemptions from the carbon tax on a sector basis. The greenhouse sector receives benefits from carbon tax-enabled tax cuts to income and property taxes.
- A special report on the greenhouse sector, pursuant to the BC Jobs Plan, recommends ....

PROPOSED PROGRAM

- Under the Greenhouse Energy Innovation Program, $7.6 M would be placed in a trust that would administer the funds for disbursement to eligible applicants.
- The funding would be provided for one year only, would be forward looking (not retroactive), and would maintain~~ing~~ the integrity of the carbon tax.
- Funding would be limited only to the greenhouse sector, in recognition of its food-based need for natural gas.
- The program has two possible components – ~~the~~ Sector Revenue Neutrality for CO2 Plant Enhancement s.13 and the Renewable Energy and Efficiency Incentive.

s.13

Component 1: CO_2 Plant Enhancement Rebate ($3.2M, one-time)

Rationale:- On average, approximately 50% of the natural gas used by vegetable greenhouses is to obtain food grade CO2. The program would return the $3.2 million in carbon tax revenues from natural gas used for this purpose to the sector for disbursal to those greenhouses that use CO2 for plant enhancement. s.13

Desired Outcomes: Industry will use the s.13 -savings to invest in BC and create jobs.

Considerations:

- The proportion of gas uses for plant CO2 are difficult to verify, and vary considerably according to an operation's size, energy efficiency measures taken, and crop needs. For this reason and because it is desirable to maintain the incentive for greenhouses to reduce their natural gas consumption for all purposes, it is proposed that disbursement to facilities be based on a non-energy related parameter (e.g. production, heated area).
- This option would not undermine the GHG emission reduction incentive effects of the carbon tax. It would reduce costs to the sector as a whole and reward those greenhouses that operate efficiently s.13
- This option would ~~not~~ have limited benefit to floriculture growers, whose CO_2 use is typically minimal.
- Note: C O_2 fertilization produces GHG emissions.~~, as t~~There is no sequestration of CO2 in greenhouses.

Component 2: Renewable Energy and Efficiency Incentive ($4.4M, one-time)

Rationale: Industry indentifies high capital costs as a critical barrier to adoption of new technologies for energy efficiency, renewable energy and cogeneration. Carbon tax liability reduces investable funds.

Desired Outcomes: Industry will invest in innovative technologies that reduce energy use s.13 and future carbon tax costs and increase the proportion of renewable energy used, creating jobs in BC.

Considerations:

- Would include equipment purchases or technology demonstration projects:
  - measures to reduce heat loss, store excess heat, optimize environmental control, and conserve electricity
  - Cogeneration, fuel switching, renewable energy
- Funding could be delivered through existing provincial programs such as the Environmental Farm Plan program and the Innovative Clean Energy (ICE) Fund, LiveSmart BC.
- Cost sharing options
- Maintains carbon tax integrity. Increases incentive for further emission reductions and energy cost savings through new technologies, and does not require extensive data collection or verification.
- Opportunity to benefit the entire sector, as funds would be accessible to all operators, irrespective of past technology adoption and CO_2 natural gas requirements (i.e., floriculture growers).
- This program would be of primary benefit to operations that have not yet made efficiency upgrades. Highly efficient operations may be ineligible.
- This program would limit the greenhouse sector's ability to generate greenhouse gas offsets in 2012/13, as well as the availability of offset projects in subsequent years.

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REQUIRED RESOURCES

0.5 FTE in Ministry of Agriculture and 0.5 FTE in Ministry of Environment, to administer the program. These resources will be found from exiting allocations.

PROGRAM RISKS

By linking to the carbon tax payable, other sector s.1 will request similar programs.

IMPLEMENTATION

Following approval, detailed implementation steps will be developed by a dedicated team the ministries of Agriculture (lead), Environment, and Finance. Target roll-out date is May 2012.

NEXT STEPS:

Link to jobs plan report
Links to carbon offset use

Appendix 1: Scope of Activities for Renewable Energy and Efficiency Incentive

Energy Efficiency

- Reduce heat loss: insulate; repair glazing; install a flue-gas economizer; install multi-layer thermal curtains to retain heat at night.
- Store excess heat: store excess heat in a hot water storage tank and release during periods of heating demand.
- Optimize systems: automate advanced environmental control systems to optimize energy use; disable heating water zone pumps unless need for heating in the zone.
- Conserve electricity: gain efficiencies in lighting and ventilation fans; install retractable shade curtains for times of peak solar radiation.

Cogeneration

- ????????
- ??????????

Fuel Switching

- Use bio-energy: build on existing greenhouse projects in this area, such as increased use of existing wood-waste boilers.

From:	Lilly, Liz ENV:EX
To:	Dalal, Suntanu GCPE:EX
Cc:	Lesiuk, Tim ENV:EX; White, Thomas ENV:EX
Subject:	RE: PICS WHITE PAPER, TO BE RELEASED TUESDAY, JULY 22 AT 0840. EMBARGOED
Date:	Friday, July 18, 2014 5:17:04 PM

Heads up, please see below.

Liz Lilly
Executive Director, Climate Change Policy
Climate Action Secretariat
Ministry of Environment
PO Box 9486 STN PROV GOV
Victoria, V8W 9W6
2nd Floor, 395 Waterfront Crescent
Phone (250)356-7917
Cell (250)889-1073


Please consider the environment before printing this e-mail

From: picsdir [mailto:picsdir@uvic.ca]
Sent: Friday, July 18, 2014 2:49 PM
To: Mack, James AGRI:EX; Lesiuk, Tim ENV:EX; White, Thomas ENV:EX; Lilly, Liz ENV:EX
Cc: Robyn Meyer
Subject: PICS WHITE PAPER, TO BE RELEASED TUESDAY, JULY 22 AT 0840. EMBARGOED

James, Tim, Thomas, Liz:

Attached is our latest WP, sent as a heads-up. Please do not circulate or pass on. We'll release on Tuesday morning. Brendon Schaufele at U Ottawa will handle all media interviews/interactions via Robyn.

The key message is that available data do not show a negative impact of the C tax on BC's agricultural exports. There are caveats, but that's what the date show (and they've been exhaustively considered!).

Hope you all have a fine weekend.
Tom

Thomas F. Pedersen, PhD, FRSC, FAGU
Executive Director, Pacific Institute for Climate Solutions
University of Victoria
PO Box 1700 STN CSC
Victoria, BC, V8W 2Y2

e: picsdir@uvic.ca
tel: 250 853 3595
fax: 250 853 3597
web: http://pics.uvic.ca

From:	Powell, Charlotte AGRI:EX
To:	Paradine, Dennis ENV:EX; Hop Wo, Hilary ENV:EX
Subject:	RE: Request: review info for accuracy
Date:	Tuesday, January 28, 2014 3:01:35 PM

Thanks – so would the following be better?
s.13

From: Paradine, Dennis ENV:EX
Sent: Tuesday, January 28, 2014 2:49 PM
To: Powell, Charlotte AGRI:EX; Hop Wo, Hilary ENV:EX
Subject: RE: Request: review info for accuracy

I can answer this one. For QA and CA, the electricity used to power greenhouses would be subject to the current traded price on carbon, and the greenhouses themselves would be subject to trading if they have 25,000 tonnes of emissions or more (so, yes, a large greenhouse). Starting in ? 2015? all fuel will be covered by the trading program, so non-capped greenhouses would have the current market price of carbon cost on the fuel they combust.

Dennis Paradine

250-387-0732

From: Powell, Charlotte AGRI:EX
Sent: January-28-14 2:45 PM
To: Hop Wo, Hilary ENV:EX; Paradine, Dennis ENV:EX
Subject: RE: Request: review info for accuracy

Hi Hilary – thanks for your voicemail. Lots of good information – i really appreciate all your help with this! One last (i hope) question from me – does the following bullet capture things correctly? Thanks again!
s.13

From: Hop Wo, Hilary ENV:EX
Sent: Monday, January 27, 2014 5:06 PM
To: Powell, Charlotte AGRI:EX; Paradine, Dennis ENV:EX
Subject: RE: Request: review info for accuracy

Charlotte,

The bullet is correct (with one nuance below), but is not comprehensive. It would help to know what exactly you want to know, and why. Do you want to know all the notable carbon prices in North America? Are you trying to highlight BC as different? Is it just a fact check on the bullet as is?

If the latter, I'd just change

Some jurisdictions in Canada and the United States have smaller, targeted carbon ~~pricing~~ tax mechanisms.

CA and QC systems are neither smaller, nor really targeted, but are carbon *pricing* systems.

For comprehensiveness, you might consider including Alberta's intensity based emissions trading system, and the electricity sector cap and trade system that is in place in several Northeast US states (both of which would have been in place when your original note was written).

If you are wanting to show momentum on carbon pricing, you might also mention that Oregon, Washington, and Massachusetts are all considering state level carbon taxes, with plebiscites likely next year.

I'm around tomorrow if you have further questions.

Hilary

From: Powell, Charlotte AGRI:EX
Sent: January-27-14 4:51 PM
To: Paradine, Dennis ENV:EX
Cc: Hop Wo, Hilary ENV:EX
Subject: Request: review info for accuracy

Hi Dennis – Ian McLachlan thought you would be the person to ask.... I am hoping that you won't mind reviewing the bullet below for accuracy (from an estimates note re: the greenhouse carbon tax relief program). I found this info in the Budget 2013 report. Is there more current information? Thanks!

CROSS JURISDICTIONAL COMPARISON:

- BC's carbon tax is the only one of its kind in North America. Some jurisdictions in Canada and the United States have smaller, targeted carbon pricing mechanisms. California and Quebec have cap and trade systems.

Charlotte Powell
Sr Manager, Innovation and Climate Adaptation
Ministry of Agriculture
(250) 356-6660
charlotte.powell@gov.bc.ca

Taxes and Tax Credits/Subsidies affecting the Agriculture Sector

Measure	Tax affected	Implemented	**Revenues 2011** for/from agriculture sector (total all sectors 2011:	Able to estimate?	Notes
Carbon tax	Carbon tax	2008	$950M)		
Prescribed rates for assessed value (not higher market value)	Property Tax				
50% of assessed value of farm exempt from school taxes (ALR used as farm)	Property Tax				
Farm land school tax credit - 50% reduction for farm land	Property Tax		($2M)		Only measure directly linked to the revenue neutral carbon tax plan.
Exemption for farm outbuildings	Rural area property tax				
Maxiumum cumulative exemption of $50k of assessed value for outbuildings	other property taxes				
Farm dwellings exemption	Rural area property tax				
Exemption for trasfer of familiy farm corporations	property transfer tax	pre 2008			
exemption of coloured fuel used in operation of a farm (off-highway, on highway for farm purpose)	motor fuel tax		($5M)		2008 expansion of exemption to on-highway when used for a farm purpose
refund on clear fuel used internationally for a farm purpose	motor fuel tax				Not yet reinstated.
Items exempt from PST	Provincial Sales Tax	Various			Various items and implementation dates. E.g. Exemption for ATVs used for farm purpose introduced in 2008, egg packing and refrigeration equipment in 2009.
No capital gains tax on property transfer to a child - until child sells farm	Income tax				
Lifetime capital gains exemption of $750,000 for qualified farm property	Income tax	Increased from $500k in 2010	($42M) (*** includes both family farms and small business)		

assumes all natural gas

		veg	floriculture		
	sq m	2520917	1574038	statscan	
	ha	252.0917	157.4038		
2005	GJ/ha/yr	25250	20000	GH report	does this include electricity? - if yes would that be significant?
	Sector GJ/y	6365315	3148076	49%	
	2012 ctax	9484320	4690633	14174953	
2012	GJ/ha/yr	16500			
	Sector GJ/y	4159513	2038161	assumes proportion the same from 2005	
	2012 ctax	6197674	3036860		
	total			9234535	
	flori % of total		33%		

Ainsworth, Diana ENV:EX

From: Nicoll, Sara ENV:EX
Sent: Tuesday, April 19, 2011 10:22 AM
To: Correspondence Unit ENV:EX
Subject: FW: New Message from Premier Designate website

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Red Category

-----Original Message-----
From: OfficeofthePremier, Office PREM:EX
Sent: Friday, April 8, 2011 10:20 AM
To: s.22
Cc: Minister, FIN FIN:EX; Minister, ENV ENV:EX
Subject: RE: New Message from Premier Designate website

Sent e-mail to Sara asking if Finance will respond. Rish

Thank you for your message. Yes, we will ask the Minister's office to review your comments and be in touch with you at their earliest opportunity. We appreciate your being in touch.

-----Original Message-----
From: s.22
Sent: Thursday, April 7, 2011 9:55 PM
To: Christy Clark
Subject: Re: New Message from Premier Designate website

Thank you,

Since there is a new cabinet: did you forward my email to the minister? For our greenhouse industry, this carbon tax is killing our business. BC is the only place in the whole world with carbon tax. In our opinion: this is unfair business. Some big greenhouse operations are moving the business to other parts of the world and one of the reasons is the carbon tax.

We have some very strong arguments why we want to see the carbon tax gone and we like to have to opportunity to express those arguments.

Please advise when and with we can met. With me, I mean the BC Greenhouse Association.

Thanks in advance,

s.22
----- Original Message -----
From: "Christy Clark" s.17
s.22

Sent: Tuesday, March 08, 2011 11:29 AM
Subject: Re: New Message from Premier Designate website

Dear s.22

These are exciting times for British Columbia as we change the way government works and focus on reconnecting with the public. I want to encourage a real, two-way dialogue between residents and government and ensure good ideas find their way to Victoria.

Thank-you for your feedback on the Carbon Tax and I want you to know your voice will be heard. After a new cabinet is sworn-in, I will forward your email to the appropriate minister and they will respond to your email.

Again, thank-you for taking the time to share your concerns, as it plays a pivotal part of building a stronger British Columbia for families across the province.

Christy Clark

On Tue, Mar 8, 2011 at 7:53 AM, s.22 wrote:
>
>
> Someone has filled out the form on the Premier Designate website.
> Below are the details.
>
> Name: s.22
>
> Email Address s.22
>
> Message: I ask you to consider to remove the carbon tax. s.22
s.22 We use
> wood to heat the greenhouse in the winter. In the summer we use
> natural gas because we use the gasses for the plants (plants need
> CO2, and that is what we give them). In short, we need natural gas to
> produce the CO2 which the s.22 need. So, our boilers are
> running during the day, gasses are pumped into the greenhouses and the
> heat is stored in big buffer tanks. The heat stored in the tanks, is
> used during the night. In 2013, the carbon tax will be $ 1.50/Gj. We
> use 120.000 GJ (without the woodboilers we use
> 300.000 GJ). So we pay 120.000 X $ 1.50 = $ 180.000 carbon tax.
>
> We think that this is totally unfair, since we don\'t release gasses
> to the atmosfhere. Almost all of the gasses are used for the plants.
> Carbon tax for us is like getting a speeding ticket on the highway
> while driving
> 90 km.
>
> The greenhouse business is deeply suffering from the carbon tax and
> Gordon Campbell was totally NOT interested in discussing it with us.
>
> With a new premier, we hope to have an open dialoque.
>

> Thank you for your time and we are very much willing to have a meeting
> with you and staff to explain in detail our situation.
>
> Captcha code s.22
>
> User IP Address: s.22
>
> Date Submitted: Mar-08-2011 7:53 am
>
>
>
>

MINISTRY OF ENVIRONMENT
INFORMATION NOTE

August 2, 2011
File: 280-20
CLIFF/tracking #: 147411

PREPARED FOR: Honourable Terry Lake, Minister of Environment

ISSUE: The Minister asked for information on whether other jurisdictions have included agriculture in their carbon pricing mechanisms. The Minister of Finance is beginning pre-budget consultations and will be meeting with greenhouse growers in September.

Background:
BC's carbon tax applies to the combustion of fossil fuels in the province. The current rate of $25 per tonne of greenhouse gases emitted is charged at the point of sale of fuels regardless of whether the purchaser represents a given sector or is a private individual. As such, the carbon tax applies to the combustion of fossil fuels in the agriculture sector (e.g. fuel for farm equipment, natural gas burned to heat greenhouses).

Most of the greenhouse gas emissions in the agricultural sector come from land-use change, emissions from agricultural soils and fertilizers, and enteric fermentation (digestion by cattle, hogs, etc.) and are not covered by a carbon price. As a result, carbon tax-subject emissions from agriculture are roughly 2% of their total emissions (excluding greenhouses), or 8% of total emissions from the agriculture sector if greenhouses are included. Emissions from greenhouse operators are almost entirely from the combustion of natural gas (covered by the carbon tax) or biomass (not covered by the carbon tax).

The agriculture sector has consistently raised concerns with the carbon tax. In particular, greenhouse growers recently requested an exemption from the carbon tax claiming that:

- They export flowers and vegetables to markets that do not pay carbon tax
- The carbon tax cost in 2012 is estimated to be $9.5M, or 2% of total sales
- The carbon tax is not "revenue neutral" for the sector and that the sector pays 6 to 100% more carbon tax than it receives in personal income tax cuts.
- The overall impact is making the sector unsustainable and BC companies have recently invested in two new operations in the US.

Climate Action Secretariat, Ministry of Agriculture, and Ministry of Finance are assessing the costs and benefits of the revenue neutral carbon tax and other measures on the sector. Because of difficulties in determining fuel use for the sector, a more complete assessment will not be finished by Tax Policy until late September. Figures provided by industry appear to overestimate the impact on climate policies on the sector.

- The industry estimates on carbon costs assume 100% natural gas use by the sector even though biomass systems are used at varying degrees depending on the relative price of the fuel. Large operations use in a range of 30% biomass and this is increasing as operations fuel switch to avoid paying the carbon tax.
- Greenhouses have sold over 14,000 tonnes/yr of offsets from four greenhouses for projects to promote energy saving devices and switch to biomass.
- When assessing its export potential, the industry must consider not only the costs of the carbon tax but also issues such as the value of the Canadian dollar,

timelines for goods crossing the border, length of growing seasons, and promotion of local products. These would all be key considerations in the recent decision of two companies to invest in new facilities in California.

- As part of the revenue neutral carbon tax, the sector benefits from:
  - Reduced rates of general corporate income tax and small business corporate income tax rates.
  - 50% reduction in school property taxes for classified farm land.
- In addition the sector will benefit from:
  - The HST (pending referendum results).
  - A new 87.5% farm building exemption on greenhouse operations.
  - Continued purchasing of offsets for energy conservation and fuel switching to biomass.

Discussion:

The BC carbon tax's design employs a uniform carbon price on combustion emissions. This remains a rare approach among carbon tax designs.

A consistent carbon price across sectors is held by economists to be a crucial design feature to ensure efficiency, generating emissions reductions at the least possible cost. Exclusion of any part of the economy from carbon pricing requires remaining sectors to make deeper, more expensive reductions to reach emissions targets unless excluded sectors are subject to other policies (e.g. regulation) yielding similar reductions.

However, protection of economically important and energy intensive sectors, either through limited tax scope, direct exemptions, or reduced rates, is the norm in jurisdictions with carbon prices in place.

Coverage of agriculture in other jurisdictions with carbon prices:

Jurisdiction	Carbon Price Type	Applies to Agriculture?	Notes:
Europe	Cap and trade	No	
Sweden	Carbon tax	No	
Australia	Carbon tax	No	Not yet implemented. Specific exemption for agriculture.
Germany	Eco tax	No	
New Zealand	Cap and trade	Yes	Emissions from agricultural waste are covered as of 2013. Agriculture accounts for half of the country's emissions.
UK	Climate levy	Yes	Applies to non-transport energy use in industrial sectors.
Ireland	Carbon tax	Yes	Similar to BC's: applied to fossil fuels. €15/tonne (C$20).
Norway	Carbon tax	Yes	Tax rates vary. Agriculture estimated to face an average cost of 181NOK/tonne (C$32).
Finland	Carbon tax	Yes	Greenhouses pay a reduced rate.

While the agriculture sector in BC is trade exposed to a degree, it is not highly emissions intensive, and not among those sectors identified by the Climate Action Secretariat as a priority for competitiveness concerns. s.13,s.17

SUMMARY:

- BC's carbon tax has had international acclaim for its lack of exemptions and proximity to the 'ideal' design for efficient emissions reductions.
- The agriculture sector in BC pays the carbon tax on a limited portion of its emissions. Greenhouses are more affected but also can benefit from energy conservation and fuel switching to biomass at relatively low cost.
- The international experience in including or exempting the agriculture sector from carbon pricing systems is mixed.
- The Minister of Finance is beginning pre-budget consultations and is listening to a variety of requests to tax changes. CAS is working with the Ministry of Finance and the Ministry of Agriculture to better understand the costs and benefits of BC's climate policies on the sector.

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DMO		
A/Head	JM	8/25/11
Dir./Mgr.	JH	8/09/11
Author	HK	8/02/11

MINISTRY OF ENVIRONMENT
MEETING INFORMATION NOTE

September 21, 2011
File: 280-20
CLIFF/tracking #: 151981

PREPARED FOR: Honourable Terry Lake, Minister of Environment

DATE AND TIME OF MEETING: September 29, 8:00am – 8:30am

ATTENDEES: Ministers McRae, Lake and Falcon and DMs; MLA Les and Mike McDonald

ISSUE(S): The green house sector is requesting a carbon tax exemption due to competitiveness concerns.

BACKGROUND:

BC's carbon tax applies to the combustion of fossil fuels in the province. The current rate of $25 per tonne of greenhouse gases emitted is charged at the point of sale of fuels regardless of whether the purchaser represents a given sector or is a private individual. As such, the carbon tax applies to the combustion of fossil fuels in the agriculture sector (e.g. fuel for farm equipment, natural gas burned to heat green houses at the same rate as for individuals and other sectors.

Emissions from green house operators are almost entirely from the combustion of natural gas (covered by the carbon tax) or biomass (not covered by the carbon tax) for heat, and natural gas for CO2 fertilization. For the largest operators as a group, roughly 70% of their total fuel use is covered by the carbon tax.

For the broader agriculture sector, most emissions are not from combustion, so the carbon tax only covers 2% of total emissions (excluding green houses).

The agriculture sector has consistently raised concerns with the carbon tax. In particular, greenhouse growers recently requested an exemption from the carbon tax claiming that:

- They export flowers and vegetables to markets that do not pay carbon tax
- The carbon tax cost in 2012 is estimated to be $9.5M, or 2% of total sales
- The carbon tax is not "revenue neutral" for the sector and that the sector pays 6 to 100 times more carbon tax than it receives in income tax cuts.
- The overall impact is making the sector unsustainable and BC companies have recently invested in two new operations in the US.

Industry has claimed that carbon tax costs will account for 2% of total revenues in 2012. They do not state their assumptions for this calculation; however, previous forecasts of a similar magnitude (2-4%) by the industry have assumed that 100% of energy needs are being provided by natural gas.

- Biomass systems are used to varying degrees depending on the relative price of the fuel and infrastructure in place. Large operations use in the range of 30%

biomass and this is increasing as operations fuel switch to avoid paying the carbon tax.
- Greenhouses have sold over 14,000 tonnes per year of offsets from four green houses for projects to promote energy saving devices and switching to biomass.

Green houses currently account for 18% of total sales in the agriculture sector. 26% of green house vegetables and fruit, and 12% of flower and plant sales, are exported.

Green house competitiveness is affected by the high Canadian dollar, shipping goods across borders, competitors with a warmer climate, lower labour and land costs, and access to government incentives, as well as carbon tax costs. These would all be key considerations in the recent decision of two companies to invest in new facilities in California.

BC's green house sector saw extensive capacity growth and investment in the 1990s. A lull in investment in BC and investing abroad in the early 2000s are to be expected.

As part of the revenue neutral carbon tax, the sector benefits from:
- Reduced general corporate income tax and small business income tax rates.
- 50% reduction in school property taxes for classified farm land.

In addition the sector will benefit from:
- A new 87.5% farm building exemption on greenhouse operations.
- Continued purchasing of offsets for energy conservation and fuel switching to biomass.

Among jurisdictions with carbon prices (proposed or implemented), approaches are mixed with respect to treatment of the agriculture sector. Australia, Sweden, the EU, and Germany do not cover agriculture in their cap and trade, carbon tax, or eco-tax schemes. New Zealand, the UK, Finland, Norway, and Ireland do cover agriculture. Finland has a reduced rate for green houses.

Exempting or providing preferential rates for emissions-intensive trade-exposed sectors is common in carbon price designs. While the agriculture sector in BC is trade exposed to a degree, it is not highly emissions intensive, and not among those sectors identified by the Climate Action Secretariat as a priority for competitiveness concerns.

DISCUSSION:

The BC carbon tax's design employs a uniform carbon price on combustion emissions. This remains a rare approach among carbon tax designs.

A consistent carbon price across sectors is held by economists to be a crucial design feature to ensure efficiency, generating emissions reductions at the least possible cost. Exclusion of any part of the economy from carbon pricing requires remaining sectors to make deeper, more expensive reductions to reach emissions targets unless excluded sectors are subject to other policies (e.g. regulation) yielding similar reductions.

BC's "revenue neutral" carbon tax approach has to date provided assistance to sectors facing challenges without harming the integrity of the price signal. Other financial mechanisms are available that can provide targeted assistance with competitiveness or equity concerns. Past examples include:

- The Rural and Northern Homeowner Grant
- The Low Income Refundable Tax Credit
- 50% reduction in school property taxes for farms

SUGGESTED RESPONSE:

- BC's carbon tax has had international acclaim for its lack of exemptions and proximity to the 'ideal' design for efficient emissions reductions.
- The agriculture sector in BC pays the carbon tax on a limited portion of its emissions. Greenhouses are more affected but also can benefit from energy conservation and fuel switching to biomass at relatively low cost.
- Growing season, cross-border trade challenges, and labour costs, among others contribute to green house competitiveness challenges and investment decisions.
- The green house sector has benefitted from selling offsets to the Pacific Carbon Trust, earning revenue, and reducing their carbon tax costs by reducing emissions.
- BC's approach to date has used other mechanisms than the carbon tax to provide assistance to sectors while keeping the carbon price signal intact.
- Any decision about changes to the carbon tax, or about other sorts of tax measures will be made by the Minister of Finance.

Attachments:

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BC GREENHOUSE GROWERS' ASSOCIATION

CAS

March 5, 2013

Premier Christy Clark
Victoria B.C.

Re: Budget 2013 Carbon Tax Relief Grant Program

Dear Madam Premier;

The carbon tax relief grant program included in the 2013 Budget is very welcome news for the greenhouse sector.

A healthy agri-food sector is critical to BC's food security and critically important to our future. We are pleased by the Government's acknowledgement that greenhouse agriculture is unique in that we purposefully produce CO2 for the growth of our plants. We thank you for your recognition that relief from the carbon tax is essential in maintaining the competitiveness of our sector.

The carbon tax relief in 2012 was a lifeline for our members. With the grant in 2013 and future years there is a measure of predictability in the tax regime that will allow our members to compete more effectively with Growers throughout North America and to make business investment decisions for now and the future.

Kind Regards

Peter Cummings
President and Chair

Linda Delli Santi
Executive Director

cc. The Honourable Norm Letnick, Minister of Agriculture
The Honourable Mike de Jong, Minister of Finance
The Honourable Pat Bell, Minister of Jobs, Tourism and Skills Training
The Honourable Rich Coleman, Minister of Energy, Mines and Natural Gas
The Honourable Dr.Terry Lake, Minister of Environment
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