BRITISH COLUMBIA

Treasury Board Submission –

Request for Decision

Minister: Honourable Norm Letnick

Ministry: Agriculture

Date: August 27, 2015 Ministry Document #: TB1606

Title: Efficiency of greenhouse operations in the Greenhouse Carbon Tax Relief Grant Program.

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Background / Context:

When the Program was made permanent in 2013, Government announced it would provide carbon tax relief of 80 percent of eligible fuel use to the greenhouse vegetable, floriculture, forest seedling and wholesale production nursery sectors. Grant amounts are based on fuel usage in the previous year.

Budget 2014 provided $6.5M annually for the Program. The ministry redirected a further $0.4M to the Program. The total cost of the Program in 2014 was $7.12M, which exceeded the Program budget by $0.22M. *Budget 2015* provided $6.6M for the Program. The ministry redirected a further $0.4M to the Program. Total costs of the program were $7.11M in 2015 which exceeded the budget by $0.2M.
On October 23, 2014, the Chair of Treasury Board directed the Minister of Agriculture, to *provide options on program changes to incent operators to upgrade or adopt innovative technologies that improve energy efficiency to potentially assist in managing future program costs.*

Potential changes to the program have been explored based on analysis of two years of survey data from greenhouse operators receiving the carbon tax relief grant. Key findings from the survey are:

(a) Greenhouse operators have limited knowledge of energy audit funding programs, energy efficiency strategies and incentives.
(b) 80 percent of respondents have not conducted an energy audit.
(c) The largest commercial operations often have a full time energy expert working on developing and implementing an energy improvement plan.
(d) Only a small percentage of recommendations provided in an energy audit get implemented as retrofitting is very expensive and options are limited.
(e) Some operators have used the grant money to retain staff and/or hire new staff.
(f) Other operators indicate that the grant money has allowed them to remain competitive and stay in B.C.

As part of the assessment of the Program, the Ministry of Agriculture (Ministry) and FortisBC (a major provider of energy to the industry) discussed the utility's Industrial Energy Audit Program and its Industrial Technology Retrofit Program. A potential partnership with the Program will require a survey to identify annual natural gas usage by the Program participants.

FortisBC advises that they have heard from greenhouse operators that there are no opportunities for improving energy efficiency as:

1. Most viable (technically and financially) upgrades have already been completed and there would be a limited opportunity for improvements in energy efficiencies; and,
2. There are not known technologies to increase the efficiency of the carbon dioxide crop enhancement system.

There is no evidence to support point 1.

FortisBC has indicated that an energy audit coupled with the support of an energy consultant would be needed for the development and implementation of an energy management plan. This plan would identify and prioritize implementation of upgrades and retrofits. FortisBC has indicated that they do not have the resource capacity to handle the potential increase in the number of greenhouse operators requiring an energy audit. FortisBC is currently revising its capital incentive program and operators would not be required to have an energy audit to be eligible; however, only FortisBC customers consuming a minimum of 10,000 gigajoules (medium operations) would be eligible. FortisBC supplies fuel for the medium to large operators but not all operators under the Program are FortisBC customers.

For smaller operations and non-FortisBC customers, energy audits could be done through the Ministry's Environmental Farm Plan (EFP) program. Greenhouse operators can access financial and technical support to identify energy related projects and implement them through the Beneficial Management Practices (BMP) program under the EFP program. Farms are limited to two projects a year through the EFP program. Additional EFP funds would be required if the majority of greenhouse operators participating in the Program were to propose an energy project through the EFP program.

As noted in the survey results, approximately 80 percent of the Program participants have not completed an energy audit. Energy audits cost from $7,500 - $25,000 depending on the size of operations. For smaller greenhouse operations, the cost of an energy audit is a limiting factor. Two thirds of the participants in the Program are small operations and receive less than $0.5M in relief grant payments.

An alternative to having an expensive energy audit may be to introduce a self-assessment tool. There are a number of tools available online but they are not specific to BC. The cost to create a self-assessment tool (via a developer) would be approximately $100,000. The self-assessment tool will provide an operator with (a) an assessment of energy performance, and (b) a detailed report identifying possible upgrades and or retrofits.

Options:

Option 1: Status Quo (RECOMMENDED)

Continue to provide relief to the greenhouse vegetable, floriculture, nursery and forest seedling sectors for carbon tax paid on natural gas and propane burned for heating and carbon dioxide for crop enhancement. Operators receive 80 percent of the carbon tax paid on fuel usage. For 2015, a total of 177 commercial greenhouse operators submitted 192 applications to the program; industry received grant payments for a total of $ 7.10M

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Contact: Ken Nickel, A/Assistant Deputy Minister

(250) 356-1122

Honourable Norm Letnick

August 27, 2015

Date Signed

MARKED

Ministry of Agriculture
BRIEFING NOTE FOR DEPUTY MINISTER FOR DECISION

Ref: 178846 Date: December 6, 2013

Issue: Policy position on the eligibility of cogeneration for the Carbon Tax Relief Grant Program.

Background:

- *Budget 2013* made a commitment to provide carbon tax relief for greenhouse vegetable and floriculture growers. Eligibility criteria similar to those for the 2012 program would apply.
- The program budget is $6.5 million per year for three years (moving to $6.6 million in year three).
- s.17
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- The greenhouse sector is keen to adopt cogeneration technology to improve their competitiveness.
- Cogeneration is a good fit with greenhouse production because all of the outputs (e.g. heat, electricity and CO_2) can be used to raise crops.
- Six vegetable operations submitted Standing Offer Program (SOP) applications for cogeneration facilities and a seventh application was being developed.
- On November 26, 2013, Ministry of Energy and Mines staff advised AGRI staff of a policy decision to make high-efficiency cogeneration fueled by natural gas not eligible for the SOP.
- This decision will reduce the adoption of the technology by the sector.
- BC Hydro has grandfathered one greenhouse vegetable operation s.21 s.21
- Operations that have high-intensity light systems can use the electricity produced through cogeneration and may adopt the technology without the SOP, which could further increase program disbursements.
- Due to the potential impact on program costs, AGRI needs to develop a policy on the eligibility of cogeneration.

First Nations Considerations: NA

Discussion:

- Natural gas and propane used for greenhouse heating or the production of carbon dioxide for crop fertilization are eligible for a relief grant; fuel used to produce electricity is not eligible.
- The portion of fuel consumed by cogeneration to produce heat and CO_2 could be considered eligible.
- A general rule is cogeneration will double fuel consumption. s.13 s.13
- It may be difficult to differentiate fuel used by the cogeneration and boiler systems, which will complicate administration of the program. s.13
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Derek Sturko, Deputy Minister

Date Signed

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A/DIR PS for GT ADM GP

2013 Carbon Tax Relief Grant

SURVEY RESULTS

Final Report

December 2013

Report Prepared by: Lisa Levesque

Contents

Report Highlights

Program Administration

- 94% of respondents felt that the application form was clear and easy to complete.
- Respondents were extremely happy with the customer service they received with only 2 respondents indicating that they were dissatisfied with response times.

Competitiveness

- Close to 30% of respondents stated that they used the grant to invest in capital, infrastructure improvements or technology upgrades that would increase the competitiveness of their business.
- 23 operations commented that the grant enabled them to reduce production costs in various ways:
- Approximately 30% of respondents commented that the grant enabled them to stay competitive with other jurisdictions that are not subject to a carbon tax
- 18 respondents commented that the grant enabled them to maintain or lower their product price, enabling them to better compete in export markets and domestic market (against lower priced imports) and maintain their current market share.
- 10 respondents stated simply that the grant allowed them to maintain their current profit margins and stay in business.
- 4 large operations stated that the grant contributed to their decision not to expand in the USA for the time being, thus retaining jobs and investment in BC. One operation stated that they had put a pilot project in California on hold as a result of the grant.
- 10 respondents stated that the grant has had no impact on their business, with several stating that the grant was simply too small to have an impact.

Job Creation

- 99 growers (60%) reported retention of existing staff as a result of the grant.
- 269 new jobs were reportedly created (142 part-time jobs and 127 full-time jobs).
- 8 growers stated that the grants allowed them to maintain or increase wages, which enabled them to retain highly skilled workers.

Production

- Net total predicted production area expansion in 2013 is 1% across all sectors and 3% in 2014.
- The largest expansion is anticipated in the floriculture sector with predicted growth of 7% by 2014.

Carbon Footprint Reduction

- 66% of respondents indicated that they have adopted, or plan to adopt, at least 1 energy efficiency measure as a result of the grant – the most common measure taken by 63% of respondents) was to repair greenhouse covering to reduce heat loss.
- Less than 1% of respondents adopted new renewable energy technologies with an additional 22% indicating that they plan on adopting them in the future

1.0 Background

The province of British Columbia (BC) introduced a revenue neutral carbon tax in 2008, and remains the only jurisdiction in North and South America to use a carbon tax. BC's greenhouse growers argue that the carbon tax puts them at a competitive disadvantage and that other tax reductions are insufficient to offset negative impacts.

In response, in March 2012, government provided temporary carbon tax relief to greenhouse vegetable and floriculture producers equal to 100% of carbon tax costs for propane and natural gas use. Budget 2013 introduced a permanent carbon tax relief program ("the Program") for BC greenhouse growers with the grant set at 80%. The Program was expanded in April 2013 to include wholesale and forest seedling nurseries.

Grants are calculated for each operation based on their previous year's fuel consumption. In 2012, the Program was administered through a 3rd party and fuel receipts were sought directly from utility providers to verify grant claims. In 2013, the Program was administered by Ministry of Agriculture staff and applicants were responsible for providing fuel receipts directly to substantiate their claim. The Program will continue to be administered by Ministry of Agriculture staff in 2014/15.

2.0 Survey Overview

The Program was designed and implemented to help greenhouse producers improve their competitiveness, create jobs and reduce their carbon footprint. In an effort to measure progress towards these program goals, an online survey was distributed to all 2013 carbon tax relief grant recipients in October 2013. (See Appendix A)

A total of 173 growers received the survey across the greenhouse vegetable, floriculture, wholesale nursery and forest seedling sectors. The survey was administered using the online survey tool, Fluid Surveys. Growers had 3 weeks to complete the survey.

All recipients were notified that completion of the survey was mandatory to ensure eligibility for the 2014 relief grant program. A 96% response rate was achieved with only 5 grant recipients not completing the survey.[1]

[1] 2013 grant recipients that did not complete the 2013 survey include: (1) Don and Anna's Greenhouses; (2 Imperial Pacific Greenhouses, (3) Kang Enterprises Ltd.; (4) Marlane Enterprises Ltd.; and (5) Sunshine Hills Nurseries Ltd.

3.0 Results

3.1 Program Administration (Section 2)

Section 2[2] of the survey gathered growers' input on the program application process and application form to determine if improvements to program administration were needed. Results are summarized below.

Was the application form clear and easy to complete?

Ninety-four percent of respondents felt that the application form was clear and easy to complete.

Do you have any suggestions for how the application process could be improved in 2014?

Applicants' feedback on the application process was overwhelmingly positive. There were a number of specific suggestions for how the application process and form could be improved, including:

- Create an electronic application that can be completed and submitted online
- Clarify wording related to "anticipated usage" on the application form
- Consider alternatives to applicants being required to submit monthly invoices:
  - Exempt greenhouses from carbon tax at point of sale to avoid having to claim monies back
  - Arrange for direct submission of invoices from utility companies
- Send program and application information directly to growers instead of through industry associations to ensure information is received by all operations. A few operations reported that they did not receive information about the 2012 program because they were not active industry association members.
- Allow for applications to be faxed
- Commence the application process earlier in the calendar year to ensure grant funds are received in spring when operating costs are highest

Program managers will consider these suggestions in 2014 program design.

Do you have any comments on the service you received from the Province?

The vast majority of comments regarding customer service were positive, citing prompt and helpful service and appreciation for the thorough and friendly follow up received. Only 2 respondents cited slow response time, which likely corresponded with periods of high application volumes.

[2] Section 1 of the survey collected applicant information for identification purposes.

3.2 Competitiveness (Section 3)

How specifically has the carbon tax relief grant contributed to improving the competiveness of your business?

A number of themes emerged from growers' responses which are summarized below.

(a) Capital, infrastructure and technology investments and upgrades
Close to 30% of respondents stated that they used the grant to invest in capital, infrastructure improvements or technology upgrades that would increase the competitiveness of their business.

(b) Reduced production costs
Twenty-three operations commented generally that the grant enabled them to reduce production costs in various ways: improved energy management/decreased heating costs, improved labour efficiency (through system automation, staff training), or improved production efficiency (new or improved production processes, new growing practices or crops, technology upgrades).

(c) Sustainability
Beyond improving energy efficiency, 3 respondents took other innovative steps to improve the sustainability of their business: implementing a new materials recycling program, replacing disposable shipping racks with reusable metal racks, and switching to the use of recyclable shipping materials. A few respondents reduced their water use through upgrades to water distribution and irrigation systems. .

(d) Remain competitive with other jurisdictions
Approximately 30% of respondents commented that the grant enabled them to stay competitive with other jurisdictions that are not subject to a carbon tax, have very different cost structures (e.g., those in warmer, southern climates where energy needs are much less), or much cheaper capital costs (e.g., Mexico where material costs are much lower, US where regulatory costs lower).

A large proportion of these respondents (18) also commented that the grant enabled them to maintain or lower their product price, enabling them to better compete in export markets and domestic market (against lower priced imports) and maintain their current market share.

Ten respondents stated simply that the grant allowed them to maintain their current profit margins and stay in business.

(e) Improved product distribution
Three respondents stated that the grant helped them to improve their product distribution, either by building new business relationships locally or purchasing equipment (e.g., a new truck) to enable them to reach more consumers or ship larger volumes of product.

(f) Stay in Canada

Four large operations stated that the grant contributed to their decision not to expand in the USA for the time being, thus retaining jobs and investment in BC. One operation stated that they had put a pilot project in California on hold as a result of the grant.

(g) No impact

Ten respondents stated that the grant has had no impact on their business, with several stating that the grant was simply too small to have an impact.

Have you adopted (or plan to adopt) any of the following improvements as a result of the carbon tax relief grant?

Improvement	Responses	
	Count	%
New technologies to improve processing efficiency (e.g., robots, vision systems, system automation)	52	31%
New technologies or practices to improve labour efficiency	58	35%
New or innovative packaging	21	13%
Other (see below for examples)	47	28%

Specific examples of improvements cited by respondents include:

- Upgrades to, or replacement of heating/cooling or energy management systems (e.g., installed new high efficiency boilers, improved insulation, installed new cooling system to lengthen product shelf life, etc.)
- Upgrades to climate control systems to improve product quality and/or yield.
- Installation of system automations (e.g., automated irrigation systems, systems for improving labour efficiency, automated harvesting, automated trimming/pruning) that will contribute to lowering production costs and improving the bottom line.
- Product traceability system (e.g., I21 Automated vision system)
- Website upgrades (e.g., online purchasing capability)
- Installation of labour tracking system, performance incentive packages, or more competitive wages to boost labour efficiency
- Packaging improvements (e.g., moving from wax to non-wax boxes; pots made with more recycled materials)
- Equipment redesigns or upgrades (e.g., rolling tables to replace stationary tables, bulk handling equipment, container restraints to prevent blow down of containers on windy days
- LEAN training and/or processes (e.g., new product handling practices, resdesign of pack house layout to improved product flows, adjustments to packing container sizes, improved partitioning, etc.)

- Automated reporting by shipping & field staff using handheld devices

Have you implemented new staff training as a result of the carbon tax relief grant? If yes, what kind of training?

A quarter of respondents (42) reported having implemented new staff training as a result of the carbon tax relief grant. Examples include:

- LEAN training
- Energy conservation
- Truck driving skills
- Quality control
- Vegetable grading and packaging
- Safety training

Do you export product or sell domestically?
If your company does export product, what % is produced for export?

Sector	Total	Export Sales			Domestic Sales	
		Count	%*	% of product produced for export	Count	%*
Floriculture	76	27	36%	25%	74	97%
Forest seedling	16	2	13%	30%	16	100%
Greenhouse vegetables	50	31	62%	58%	50	100%
Wholesale nursery	24	14	58%	17%	24	100%
Total	**166**	**74**	**45%**	**38%**	**164**	**99%**

Survey results indicate that almost all respondents rely on domestic sales with only two floriculture operations reporting an exclusive reliance on export sales. Just under half of respondents sell to export markets (45%) although on average across all sectors, only 38% of product is produced for export.

Reliance on exports varies considerably among sectors. Greenhouse vegetable growers rely most heavily on exports with over 60% of respondents selling to export markets, and over half of products (58%) being produced for export by these operations.

A large proportion of wholesale nursery growers are also reliant on export markets (58%), although less than 20% of product is produced for export markets, suggesting a strong reliance on domestic sales.

Floriculture growers are less reliant on export markets with only 36% of operations selling about 25% of product to export markets.

The forest seedling market is clearly dominated by domestic sales with only 1 operation selling an estimated 30% of product to export markets.

3.3 Job Creation (Section 4)

How many (part time and full time) employees have you hired as a result of the carbon tax relief grant?

Sixty growers (36%) reported hiring 141 part-time staff as a result of the grant. Over half of these jobs (78) were created in the floriculture sector.

Thirty-five growers (21%) reported hiring 128 full-time staff as a result of the grant with the majority of these positions (77) created in the greenhouse vegetable sector.

Survey results will be verified using 2013 Statistics Canada data when it becomes available in 2014.

Has the carbon tax relief grant helped you to retain existing staff? If yes, how many?

Ninety-nine growers (60%) reported that the grant helped then retain existing staff. Numbers of staff retained varied widely and appeared to depend on the way the question was interpreted by the respondent. The majority reported being able to retain 1 staff person as a direct result of the grant. Others more generally commented that the grant helped them retain their workforce as a whole (e.g., maintained a workforce of 2 to 300 staff).

Eight growers stated that the grants allowed them to maintain or increase wages, which enabled them to retain highly skilled workers.

3.4 Production (Section 5)

Sector expansion is considered to be the major driver of program cost therefore this information was primarily collected to assist in evaluating program cost containment options.

In 2013, did your heated production area (a) increase (by how much?), (b) decrease (by how much), or (c) stay the same?

Sector	# of operations				
	Total	2013		2014	
		Decrease	Increase	Decrease	Increase
Floriculture	**76**	1	7	2	15
Forest seedling	**16**		2		1
Greenhouse vegetables	**50**	4	5	2	5
Wholesale nursery	**24**		3		5
Total	**166**	**5**	**17**	**4**	**26**

Sector	Production Area (m^2)				
	Total (2012)	Total net predicted expansion (2013)		Total net predicted expansion (2014)	
		Area (m^2)	%	Area (m^2)	%
Floriculture	1,665,473	38,053	2%	110,528	7%
Forest seedling	196,968	2,415	1%	622	<1%
Greenhouse vegetables	2,991,774	15,132	1%	27,843	1%
Wholesale nursery	396,412	947	<1%	5,346	1%
Total	**5,250,627**	**56,547**	**1%**	**144,339**	**3%**

The majority of operations (87%) reported that their production area stayed the same in 2013 compared to 2012. Five operators reported that their production area has decreased, most of which were vegetable growers, and 17 operations (10%) reported that their production area increased in 2013. The net total predicted production area expansion is 1% across all sectors.

In 2014, 4 operations anticipate a production area decrease while 26 operations are planning to expand, with a net total anticipated production area expansion of 3%. The largest expansion is anticipated in the floriculture sector with predicted growth at 7%.

The 2013 expansion numbers are considered very accurate because operators would have already completed or initiated planned expansions when the survey was conducted. The 2014 projections are less certain as market conditions or other unforeseen factors may affect decisions to move ahead with planned expansions.

In 2013, do you anticipate your weeks in production to increase? If so, by how many weeks?

	Floriculture	Greenhouse Vegetable	Forest Seedling	Nursery	All
Avg. weeks in production (2012)	46	40	43	49	**44**
Anticipated production increase (weeks) in 2013	+42	+94	+0	+0	**+136**

Two operations anticipate that their weeks in production will decrease and 13 predict an increase in 2013. It is difficult to quantify the impact of these changes on fuel use given that individual operations have unique production systems, harvest schedules and energy use patterns, however program managers should anticipate a slight increase in natural gas use as a result of increased production.

3.5 Carbon Footprint Reduction (Section 6)

Energy use and carbon emissions fluctuate annually depending on climatic conditions, fuel prices (e.g., price of natural gas relative to the price of biomass), and energy efficiency measures taken by operators. Program application data indicate that total fuel use by the sector increased in 2012 compared to 2011 due to sector expansion, however anecdotal input from industry suggests that 2013 fuel use may drop due to warm, dry conditions throughout the growing season.

Based on 2013 fuel consumption and production area data submitted by program applicants, average energy use by unit production area (GJ/m^2) in 2013 was:

Sector	Avg. Energy Use
Wholesale nursery	0.40 GJ/m^2
Floriculture	0.61 GJ/m^2
Forest seedlings	0.80 GJ/m^2
Greenhouse vegetables	1.48 GJ/m^2

These figures establish a baseline from which it will be possible to monitor trends in carbon footprint reduction (energy use) over time using annual carbon tax relief program data.

Please identify any of the following energy efficiency measures your company has taken or plans to take in the future [prior to 2012; in 2012/2013 as a result of the carbon tax relief grant; planned].

	Prior to 2012		As a result of relief grant (2012/2013)		Planned	
Energy Efficiency Measure	%	Count	%	Count	%	Count
Isolation of standby boilers	25%	41	8%	13	4%	7
Installation of condensers for heat recovery	23%	39	4%	7	12%	20
Installation of hot water heat storage tank	24%	40	2%	4	11%	19
Installation of new thermal curtains	20%	33	6%	10	21%	35
Replacement/updating of thermal curtains	7%	11	17%	28	28%	46
Repair of greenhouse covering to reduce heat loss	11%	18	38%	63	25%	42

Please identify any renewable energy technologies (if any) that your company has installed or plans to install in the future.

Three survey respondents (2%) indicated that they installed a geo-exchange system as a result of the carbon tax relief grant, and one operator installed a biomass boiler. Nine respondents indicated that they are considering installing a geo-exchange system in the future, 17 indicated an interest in installing solar thermal or solar photovoltaic systems, and 11 operators plan to install new biomass boilers.

Please list any other steps your company has taken, or plans to take, to improve energy efficiency and reduce carbon emissions at your operation.

Operators responded with the following examples, listed below in order of response frequency (i.e., most frequent response is listed first):

- Upgrade to high efficiency boilers or heaters
- Install new, or optimize settings on, automated climate control systems
- Cleaning and capture of CO_2 from biomass boilers
- Completion of energy assessment/audit
- Lighting improvements (e.g., LED lighting, high-efficiency lighting, controlling lights using photocells instead of timers)
- Crop management (e.g., change to more cold-tolerant crops/varieties, optimize crop layout, crop partitioning)
- Structural improvements (e.g., raising greenhouse structure, improved venting and air flow infrastructure, replacement of gable ends, installation of improved venting infrastructure, heat exchanger to warm fertilizer water)
- Operational improvements (e.g., daily monitoring of fuel use, regular boiler maintenance, update irrigation protocols)
- Expansion of hot water storage tank capacity
- Improved insulation of hot water tanks and piping
- Install new technologies to reduce particulate emissions and allow increased use of biomass boiler
- Landfill/methane gas capture and conversion to heat, food grade CO_2, and electricity (pilot)
- Adoption of energy efficient designs for new builds
- Installation of cold frames inside greenhouse to protect crops

Are you considering the installation of a co-generation system in the next 1-2 years?

Twenty-eight respondents (17%) indicated that they are considering co-generation in the next 1-2 years however comments suggest that most were only at the research stage and have not made any infrastructure or planning investments to date.

Since the survey was conducted, the Ministry has learned that there is 1 operation that has acquired all required permits and plans to install a cogeneration system in 2014. Six other

operations previously applied to BC Hydro's Standing Offer Program, but were rejected in October 2013 as a result of not having required permits and approvals in place.

As of November 2013, high-efficiency cogeneration is no longer eligible under the Standing Offer Program. As such, proponents will not be able to derive income from electricity sales to BC Hydro. At current energy prices and capital costs, additional income from electricity sales is integral to making cogeneration projects economical, therefore it is considered unlikely that many projects, if any, will proceed in the next 3-4 years.

Do you presently have a biomass boiler installed at your facility?

Thirty-five operations (21%) of operations reported having a biomass boiler installed at their facility. These 35 respondents were asked several more questions to determine the degree to which they actually use the boilers, and anticipated future use.

What percentage of your energy needs was met using biomass in 2012?

% of energy needs met using biomass	Count	%
0-25%	13	37%
26-50%	3	9%
51-75%	11	31%
76-100%	8	23%

These responses suggest that more than half of operations with biomass boilers installed used the boilers to meet more than half of their energy needs.

Do you anticipate your use of biomass in 2013 to increase, decrease or stay the same?
What factors affected your use of biomass in 2013?

Five respondents indicated that they anticipate their use of biomass in 2013 to increase.

The majority of respondents indicated that fuel prices were the dominant factor influencing their decision to use biomass for supplemental heating. As natural gas prices increase, more operators are inclined to switch to biomass. As biomass prices increase operators are disinclined to use their boilers.

Availability of quality biomass products was also raised as a key factor affecting boiler use. An operator's location relative to available biomass sources can be a factor since transportation costs can be significant.

One operator noted that they are not using their biomass boiler because they do not have an electrostatic precipitator installed and cannot meet government regulations on stack emissions. Another operator noted that while the Province supports the installation of biomass boilers, increasing regulation at the municipal level seems to be discouraging their use.

4.0 Conclusions on Program Effectiveness

The Program was designed and implemented to help greenhouse producers improve their competitiveness, create jobs and reduce their carbon footprint. Survey results suggest that notable progress was made towards achieving these goals as a direct or indirect result of the Program.

Over 200 jobs were created in 2013, and many more employees were retained across all sectors. Operators reported an improved ability to compete with other jurisdictions that are not subject to a carbon tax by improving productivity, installing or upgrading technologies to improve greenhouse operations, improving energy management, maintaining competitive prices, and expanding production area or volumes. Operators also reported taking, or planning to take, many steps to reduce their carbon footprint such as making infrastructure improvements, installing new technologies, and automating heating systems to improve efficiency.

APPENDIX A: 2013 Greenhouse Carbon Tax Relief Grant Program Survey

Ministry of Agriculture
BRIEFING NOTE FOR EXECUTIVE DIRECTOR FOR DECISION

Ref: 185102 Date: 22 November 2016

Issue: Greenhouse Carbon Tax Relief Grant 2017 Program changes

Background:
The Greenhouse Carbon Tax Relief Grant Program (GCTRGP) was introduced in 2012 as a one-time 100% rebate of the carbon tax paid (on propane and natural gas in 2011) by the greenhouse vegetable and floriculture sectors. The cost to government was $7.6M in 2012. Industry sector associations administered the program and developed the eligibility criteria.

Budget 2013 announced $20M of program funding over three years for a permanent on-going carbon tax relief grant; the rate established at 80% of the carbon tax paid in the previous year, and expanded the program to include forest seedlings and wholesale nursery sectors. Budget 2014 announced an additional $1M in program funding over three years. AGRI staff has delivered the program for four years; returning over $7.1 M annually to producers using the eligibility criteria developed by industry.

Discussion:

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Contact: Colleen Colwell

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Ministry of Agriculture
BRIEFING NOTE FOR ASSISTANT DEPUTY MINISTER FOR DECISION

Ref: 184605 Date: June 29, 2016

Issue: 2015 Greenhouse Carbon Tax Relief Grant payment to Longview Farms.

Background:
The grant issued to an eligible applicant under the Greenhouse Carbon Tax Relief Grant Program is based on the amount of eligible fuel burnt in the previous calendar year. Applicants submit supplier invoices or a summary enabling fuel usage verification.

In the absence of fuel invoices such as when a greenhouse has been purchased or is a 'new build', the applicant estimates the amount of fuel which will be burnt in the calendar year. The estimate is compared to the actual fuel burnt in the following calendar year. The resultant increase or decrease is applied to the current calendar year grant payment.

Discussion:
Longview Farms purchased the Vantreight Farms on October 31, 2014. The greenhouse was operated for the balance of 2014 and Longview submitted invoices for the 2015 grant applicatior s.17,s.21 Longview estimated the 2015 fuel usage would be similar to Vantreight Farms 2013 usage. The estimated fuel usage was s.17,s.2 and a grant based on s.17,s.21 was issued resulting in a dollar amount of s.17,s.21

Longview Farms replaced some equipment in the greenhouse which resulted in a substantial fuel saving. The actual fuel usage for 2015 was s.21 which was significantly lower than the estimated amount. As a result, the 2015 grant payment to Longview resulted in an overpayment of s.21 Applying the overpayment to the 2016 eligible fuel results in a continued deficit of s.21 . CSNR has been consulted and indicated option two is recommended.

Options:

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2. Carry the overpayment forward and adjust subsequent years grant until the overpayment is cleared.

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Approved / Not Approved

July 5, 2016
Date Signed

Contact: Colleen Colwell, Innovation and Adaptation Services Branch, 250-356-5346
Selena Basi, Innovation and Adaptation Services Branch, 250-356-6660
Joan Easton, Innovation and Adaptation Services Branch, Executive Director

Ministry of Agriculture
BRIEFING NOTE FOR DEPUTY MINISTER FOR DECISION

Ref: 183445 **Date:** March 17, 2016

Issue: Eligibility of cogeneration or Combined Heat and Power (CHP) fuel for the Greenhouse Carbon Tax Relief Grant Program (GCTRGP)

Background:

Natural gas and propane burnt for greenhouse heating or carbon dioxide (CO_2) production for crop fertilization is eligible for the Greenhouse Carbon Tax Relief Grant Program (GCTRGP). New technology in the form of Combined Heat and Power (CHP) engines has emerged since the program was introduced. Such CHP units produce power not only for greenhouse heating and CO_2 but also electricity for sale back into the power grid. A decision is needed on whether fuel burnt by a CHP to produce electricity is eligible for GCTR grants.

Electricity generated by a CHP can be utilized in a greenhouse if high intensity light systems are installed. Alternatively, if an appropriate agreement is in place, power can be sold back to BC Hydro.

There is one greenhouse operator in the province currently using a CHP engine but two other companies have expressed interest. s.21 began operating a CHP engine in late 2015, delivering electricity to the grid under an electricity purchase agreement (EPA) under BC Hydro's Standing Offer Program (SOP). This specific type of resale arrangement is not an option for future CHP users as BC Hydro has now removed CHP as a Clean Energy (CEA) technology. The BC Hydro purchase agreement and price that s.21 enjoys is on a grandfathered basis.

GCTR grants are based on the previous year's fuel usage. Fuel burnt in s.21 cogeneration unit in 2015 will be included in the fuel invoices submitted for the current GCTRGP application. s.21 and other potential greenhouse industry CHP users may be assuming that all fuel burn in a CHP engine will be eligible for the GCTRGP.

Discussion:

Budget 2013 established the GCTRGP for British Columbia's commercial vegetable, forest seedling, wholesale landscape nurseries and floriculture operations. Grants are equal to 80% of the carbon tax paid on natural gas and propane burnt for greenhouse heating and CO_2 production for crop fertilization. s.12

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AGRI has explored whether the *Carbon Tax Act* and *Regulations* provides an exemption for CHP engines such that farmers would not have to pay carbon tax on the natural gas or propane burnt by a CHP.

- Operating a stationary engine or portable engine is a prescribed use under S 20.1 (2) (d) of the *Carbon Tax Regulation*. Natural gas and propane are fuels listed in Schedule 1 of the *Carbon Tax Act*.

AGRI staff have been told by Ministry of Finance staff that no exemption is available as the provision for stationary engines only applies to those using coloured fuels. Further discussion with Finance is warranted but a more favourable interpretation is now unlikely to occur in time for the current (2016) relief grant.

CHP engines burn more fuel than a boiler to make the same amount of heat and CO_2 because they are also producing electricity. Based on research, it is estimated that the total fuel burnt by a greenhouse increases by 50% by operating a CHP. The 2015 grant issued to s.17,s.21 for 2014 fuel consumption was s.17,s.21 Assuming no efficiency savings from using a CHP engine, the annual fuel bill for s.21 could be s.17,s.21 CHP engine only became operational in the fall of 2015 so the expected increase to the 2016 grant would be substantively smaller than the full year amount. If other greenhouse operators install CHP engines additional costs could be incurred, but at this time there is no clear cost benefit associated with an engine unless the electricity generation provides an economic advantage.

It has been established that it is relatively straightforward for a CHP engine user to determine how much fuel has been used for heat and CO_2 production and how much has been used for electricity generation.

First Nations Considerations: N/A

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2. Fuel burnt in CHP engine for production of **electricity** is **ineligible** for the GCTRG program. Applicant will provide documentation determining the amount of fuel burnt to produce electricity. (RECOMMENDED)

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Approved/Not approved

Contact: Colleen Colwell, Greenhouse Carbon Tax Relief Grant Manager,
Innovation and Adaptation Services Branch

MGR JR ED JE ADM DM

2016/03/21

Ministry of Agriculture
BRIEFING NOTE FOR ASSISTANT DEPUTY MINISTER FOR INFORMATION

Ref: 181190

Date: 20 November 2014

Issue: Status of 2014 Greenhouse Carbon Tax Relief Program (GCTRGP)

Background:

- The B.C. government provides carbon tax relief to commercial greenhouses. The grant covers 80 per cent of the carbon tax paid on natural gas and propane used for greenhouse heating and CO2 production.
- The grants are intended to help operators reduce carbon footprint, increase competitiveness, and enhance job creation in British Columbia.
- The 2014 program covers all commercial greenhouse sectors, including vegetable growers, floriculture, wholesale production nurseries, and forest seedling nurseries.
- The 2013 and 2014 programs utilized the eligibility criteria that were established by the industry for the temporary rebate program in 2012.
- Greenhouse operators can apply to the Carbon Tax grant by completing and emailing the application form and supporting documentation to Ministry of Agriculture.

Discussion:

- In 2013 the grant program returned $7.16 million to all 173 applicants that requested the grant.
- In 2014 the program has returned $7.12 million to 178 applicants. Seven additional applicants were denied the grant as they failed to comply with the established requirements; an appeal review is being conducted for all cases. An additional $11,624.17 could be returned to industry if all the appeals were to be successful.
- Program area is proposing administrative changes that would streamline the process and increase efficiency in the delivery of the program in 2015.
- Industry has requested that government explore the option of providing greenhouse operators with an exception on payment of Carbon Tax at the point of sale (as it is the case for both the motor fuel tax and carbon tax on coloured fuel) in addition to the grant.

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Contact: Colleen Colwell 250 356 5346

DIR GT ADM GP

CONFIDENTIAL
ADVICE TO ASSISTANT DEPUTY MINISTER

Ministry of Agriculture
BRIEFING NOTE FOR MINISTER FOR INFORMATION

Ref: 180454 (x-ref Batch 180451) Date: August 28, 2014

Issue: Greenhouse Carbon Tax Relief Program

Background:

- The greenhouse carbon tax relief program, which provides carbon tax relief of 80% of eligible fuel costs to the greenhouse vegetable, floriculture, forest seedling and wholesale nursery sectors was made permanent in 2013.

- Budget 2013 provided $6.5M annually for the program and Budget 2014 provided and additional $0.40M annually which is currently frozen. Total cost of the program in 2014/15 is estimated at $7.12M which exceeds the budget.

- The Ministry was directed to return to Treasury Board with options on how program commitments would be met within the Ministry's overall budget.

First Nations Considerations: N/A

Discussion

- In 2014/15, 178 applicants are eligible to receive $7.12M. This is down slightly from the $7.16M operations received in 2013/14; however, program costs are expected to increase due to expansion of the sector over the next few years.

- To date, 122 applicants have been paid totaling $6.3M. The Ministry cannot process further claims until a decision is made regarding access to the frozen funding and how the Ministry will make up the shortfall. A commitment was made by government to have all cheques cut to applicants by September 30, 2014.

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Conclusion

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Contact: Grant Thompson, Director, Innovation and Adaptation Services Branch
250 356-7057

DIR GT ADM GP A/DM GP

Treasury Board Submission –
Request for Decision

Minister:	Honourable Pat Pimm	
Ministry:	Agriculture	
Date:	December 11, 2013	Ministry Document #: 05-14
Title:	**Greenhouse Carbon Tax Relief Grant Program**	

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Options:

Option 1: Program costs are capped at $6.5 million in 2014/15 and $6.6 million in 2015/16, with individual grants prorated based on total eligible requests (Recommended).

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2013 Carbon Tax Relief Grant

SURVEY RESULTS

Final Report

December 2013

Report Prepared by: Lisa Levesque

Contents

Report Highlights

Program Administration

- 94% of respondents felt that the application form was clear and easy to complete.
- Respondents were extremely happy with the customer service they received with only 2 respondents indicating that they were dissatisfied with response times.

Competitiveness

- Close to 30% of respondents stated that they used the grant to invest in capital, infrastructure improvements or technology upgrades that would increase the competitiveness of their business.
- 23 operations commented that the grant enabled them to reduce production costs in various ways:
- Approximately 30% of respondents commented that the grant enabled them to stay competitive with other jurisdictions that are not subject to a carbon tax
- 18 respondents commented that the grant enabled them to maintain or lower their product price, enabling them to better compete in export markets and domestic market (against lower priced imports) and maintain their current market share.
- 10 respondents stated simply that the grant allowed them to maintain their current profit margins and stay in business.
- 4 large operations stated that the grant contributed to their decision not to expand in the USA for the time being, thus retaining jobs and investment in BC. One operation stated that they had put a pilot project in California on hold as a result of the grant.
- 10 respondents stated that the grant has had no impact on their business, with several stating that the grant was simply too small to have an impact.

Job Creation

- 99 growers (60%) reported retention of existing staff as a result of the grant.
- 269 new jobs were reportedly created (142 part-time jobs and 127 full-time jobs).
- 8 growers stated that the grants allowed them to maintain or increase wages, which enabled them to retain highly skilled workers.

Production

- Net total predicted production area expansion in 2013 is 1% across all sectors and 3% in 2014.
- The largest expansion is anticipated in the floriculture sector with predicted growth of 7% by 2014.

Carbon Footprint Reduction

- 66% of respondents indicated that they have adopted, or plan to adopt, at least 1 energy efficiency measure as a result of the grant – the most common measure taken by 63% of respondents) was to repair greenhouse covering to reduce heat loss.
- Less than 1% of respondents adopted new renewable energy technologies with an additional 22% indicating that they plan on adopting them in the future

1.0 Background

The province of British Columbia (BC) introduced a revenue neutral carbon tax in 2008, and remains the only jurisdiction in North and South America to use a carbon tax. BC's greenhouse growers argue that the carbon tax puts them at a competitive disadvantage and that other tax reductions are insufficient to offset negative impacts.

In response, in March 2012, government provided temporary carbon tax relief to greenhouse vegetable and floriculture producers equal to 100% of carbon tax costs for propane and natural gas use. Budget 2013 introduced a permanent carbon tax relief program ("the Program") for BC greenhouse growers with the grant set at 80%. The Program was expanded in April 2013 to include wholesale and forest seedling nurseries.

Grants are calculated for each operation based on their previous year's fuel consumption. In 2012, the Program was administered through a 3rd party and fuel receipts were sought directly from utility providers to verify grant claims. In 2013, the Program was administered by Ministry of Agriculture staff and applicants were responsible for providing fuel receipts directly to substantiate their claim. The Program will continue to be administered by Ministry of Agriculture staff in 2014/15.

2.0 Survey Overview

The Program was designed and implemented to help greenhouse producers improve their competitiveness, create jobs and reduce their carbon footprint. In an effort to measure progress towards these program goals, an online survey was distributed to all 2013 carbon tax relief grant recipients in October 2013. (See Appendix A)

A total of 173 growers received the survey across the greenhouse vegetable, floriculture, wholesale nursery and forest seedling sectors. The survey was administered using the online survey tool, Fluid Surveys. Growers had 3 weeks to complete the survey.

All recipients were notified that completion of the survey was mandatory to ensure eligibility for the 2014 relief grant program. A 96% response rate was achieved with only 5 grant recipients not completing the survey.

3.0 Results

3.1 Program Administration (Section 2)

Section 2[1] of the survey gathered growers' input on the program application process and application form to determine if improvements to program administration were needed. Results are summarized below.

Was the application form clear and easy to complete?

Ninety-four percent of respondents felt that the application form was clear and easy to complete.

Do you have any suggestions for how the application process could be improved in 2014?

Applicants' feedback on the application process was overwhelmingly positive. There were a number of specific suggestions for how the application process and form could be improved, including:

- Create an electronic application that can be completed and submitted online
- Clarify wording related to "anticipated usage" on the application form
- Consider alternatives to applicants being required to submit monthly invoices:
    - Exempt greenhouses from carbon tax at point of sale to avoid having to claim monies back
    - Arrange for direct submission of invoices from utility companies
- Send program and application information directly to growers instead of through industry associations to ensure information is received by all operations. A few operations reported that they did not receive information about the 2012 program because they were not active industry association members.
- Allow for applications to be faxed
- Commence the application process earlier in the calendar year to ensure grant funds are received in spring when operating costs are highest

Program managers will consider these suggestions in 2014 program design.

Do you have any comments on the service you received from the Province?

The vast majority of comments regarding customer service were positive, citing prompt and helpful service and appreciation for the thorough and friendly follow up received. Only 2 respondents cited slow response time, which likely corresponded with periods of high application volumes.

[1] Section 1 of the survey collected applicant information for identification purposes.

3.2 Competitiveness (Section 3)

How specifically has the carbon tax relief grant contributed to improving the competiveness of your business?

A number of themes emerged from growers' responses which are summarized below.

(a) Capital, infrastructure and technology investments and upgrades
Close to 30% of respondents stated that they used the grant to invest in capital, infrastructure improvements or technology upgrades that would increase the competitiveness of their business.

(b) Reduced production costs
Twenty-three operations commented generally that the grant enabled them to reduce production costs in various ways: improved energy management/decreased heating costs, improved labour efficiency (through system automation, staff training), or improved production efficiency (new or improved production processes, new growing practices or crops, technology upgrades).

(c) Sustainability
Beyond improving energy efficiency, 3 respondents took other innovative steps to improve the sustainability of their business: implementing a new materials recycling program, replacing disposable shipping racks with reusable metal racks, and switching to the use of recyclable shipping materials. A few respondents reduced their water use through upgrades to water distribution and irrigation systems. .

(d) Remain competitive with other jurisdictions
Approximately 30% of respondents commented that the grant enabled them to stay competitive with other jurisdictions that are not subject to a carbon tax, have very different cost structures (e.g., those in warmer, southern climates where energy needs are much less), or much cheaper capital costs (e.g., Mexico where material costs are much lower, US where regulatory costs lower).

A large proportion of these respondents (18) also commented that the grant enabled them to maintain or lower their product price, enabling them to better compete in export markets and domestic market (against lower priced imports) and maintain their current market share.

Ten respondents stated simply that the grant allowed them to maintain their current profit margins and stay in business.

(e) Improved product distribution
Three respondents stated that the grant helped them to improve their product distribution, either by building new business relationships locally or purchasing equipment (e.g., a new truck) to enable them to reach more consumers or ship larger volumes of product.

(f) Stay in Canada

Four large operations stated that the grant contributed to their decision not to expand in the USA for the time being, thus retaining jobs and investment in BC. One operation stated that they had put a pilot project in California on hold as a result of the grant.

(g) No impact

Ten respondents stated that the grant has had no impact on their business, with several stating that the grant was simply too small to have an impact.

Have you adopted (or plan to adopt) any of the following improvements as a result of the carbon tax relief grant?

Improvement	Responses	
	Count	%
New technologies to improve processing efficiency (e.g., robots, vision systems, system automation)	52	31%
New technologies or practices to improve labour efficiency	58	35%
New or innovative packaging	21	13%
Other (see below for examples)	47	28%

Specific examples of improvements cited by respondents include:

- Upgrades to, or replacement of heating/cooling or energy management systems (e.g., installed new high efficiency boilers, improved insulation, installed new cooling system to lengthen product shelf life, etc.)
- Upgrades to climate control systems to improve product quality and/or yield.
- Installation of system automations (e.g., automated irrigation systems, systems for improving labour efficiency, automated harvesting, automated trimming/pruning) that will contribute to lowering production costs and improving the bottom line.
- Product traceability system (e.g., I21 Automated vision system)
- Website upgrades (e.g., online purchasing capability)
- Installation of labour tracking system, performance incentive packages, or more competitive wages to boost labour efficiency
- Packaging improvements (e.g., moving from wax to non-wax boxes; pots made with more recycled materials)
- Equipment redesigns or upgrades (e.g., rolling tables to replace stationary tables, bulk handling equipment, container restraints to prevent blow down of containers on windy days
- LEAN training and/or processes (e.g., new product handling practices, resdesign of pack house layout to improved product flows, adjustments to packing container sizes, improved partitioning, etc.)

- Automated reporting by shipping & field staff using handheld devices

Have you implemented new staff training as a result of the carbon tax relief grant? If yes, what kind of training?

A quarter of respondents (42) reported having implemented new staff training as a result of the carbon tax relief grant. Examples include:

- LEAN training
- Energy conservation
- Truck driving skills
- Quality control
- Vegetable grading and packaging
- Safety training

Do you export product or sell domestically?
If your company does export product, what % is produced for export?

Sector	Total	Export Sales			Domestic Sales	
		Count	%*	% of product produced for export	Count	%*
Floriculture	76	27	36%	25%	74	97%
Forest seedling	16	2	13%	30%	16	100%
Greenhouse vegetables	50	31	62%	58%	50	100%
Wholesale nursery	24	14	58%	17%	24	100%
Total	**166**	**74**	**45%**	**38%**	**164**	**99%**

Survey results indicate that almost all respondents rely on domestic sales with only two floriculture operations reporting an exclusive reliance on export sales. Just under half of respondents sell to export markets (45%) although on average across all sectors, only 38% of product is produced for export.

Reliance on exports varies considerably among sectors. Greenhouse vegetable growers rely most heavily on exports with over 60% of respondents selling to export markets, and over half of products (58%) being produced for export by these operations.

A large proportion of wholesale nursery growers are also reliant on export markets (58%), although less than 20% of product is produced for export markets, suggesting a strong reliance on domestic sales.

Floriculture growers are less reliant on export markets with only 36% of operations selling about 25% of product to export markets.

The forest seedling market is clearly dominated by domestic sales with only 1 operation selling an estimated 30% of product to export markets.

3.3 Job Creation (Section 4)

How many (part time and full time) employees have you hired as a result of the carbon tax relief grant?

Sixty growers (36%) reported hiring 141 part-time staff as a result of the grant. Over half of these jobs (78) were created in the floriculture sector.

Thirty-five growers (21%) reported hiring 128 full-time staff as a result of the grant with the majority of these positions (77) created in the greenhouse vegetable sector.

Survey results will be verified using 2013 Statistics Canada data when it becomes available in 2014.

Has the carbon tax relief grant helped you to retain existing staff? If yes, how many?

Ninety-nine growers (60%) reported that the grant helped then retain existing staff. Numbers of staff retained varied widely and appeared to depend on the way the question was interpreted by the respondent. The majority reported being able to retain 1 staff person as a direct result of the grant. Others more generally commented that the grant helped them retain their workforce as a whole (e.g., maintained a workforce of 2 to 300 staff).

Eight growers stated that the grants allowed them to maintain or increase wages, which enabled them to retain highly skilled workers.

3.4 Production (Section 5)

Sector expansion is considered to be the major driver of program cost therefore this information was primarily collected to assist in evaluating program cost containment options.

In 2013, did your heated production area (a) increase (by how much?), (b) decrease (by how much), or (c) stay the same?

Sector	# of operations				
	Total	2013		2014	
		Decrease	Increase	Decrease	Increase
Floriculture	**76**	1	7	2	15
Forest seedling	**16**		2		1
Greenhouse vegetables	**50**	4	5	2	5
Wholesale nursery	**24**		3		5
Total	**166**	**5**	**17**	**4**	**26**

Sector	Production Area (m^2)				
	Total (2012)	Total net predicted expansion (2013)		Total net predicted expansion (2014)	
		Area (m^2)	%	Area (m^2)	%
Floriculture	1,665,473	38,053	2%	110,528	7%
Forest seedling	196,968	2,415	1%	622	<1%
Greenhouse vegetables	2,991,774	15,132	1%	27,843	1%
Wholesale nursery	396,412	947	<1%	5,346	1%
Total	**5,250,627**	**56,547**	**1%**	**144,339**	**3%**

The majority of operations (87%) reported that their production area stayed the same in 2013 compared to 2012. Five operators reported that their production area has decreased, most of which were vegetable growers, and 17 operations (10%) reported that their production area increased in 2013. The net total predicted production area expansion is 1% across all sectors.

In 2014, 4 operations anticipate a production area decrease while 26 operations are planning to expand, with a net total anticipated production area expansion of 3%. The largest expansion is anticipated in the floriculture sector with predicted growth at 7%.

The 2013 expansion numbers are considered very accurate because operators would have already completed or initiated planned expansions when the survey was conducted. The 2014 projections are less certain as market conditions or other unforeseen factors may affect decisions to move ahead with planned expansions.

In 2013, do you anticipate your weeks in production to increase? If so, by how many weeks?

	Floriculture	Greenhouse Vegetable	Forest Seedling	Nursery	All
Avg. weeks in production (2012)	46	40	43	49	**44**
Anticipated production increase (weeks) in 2013	+42	+94	+0	+0	**+136**

Two operations anticipate that their weeks in production will decrease and 13 predict an increase in 2013. It is difficult to quantify the impact of these changes on fuel use given that individual operations have unique production systems, harvest schedules and energy use patterns, however program managers should anticipate a slight increase in natural gas use as a result of increased production.

3.5 Carbon Footprint Reduction (Section 6)

Energy use and carbon emissions fluctuate annually depending on climatic conditions, fuel prices (e.g., price of natural gas relative to the price of biomass), and energy efficiency measures taken by operators. Program application data indicate that total fuel use by the sector increased in 2012 compared to 2011 due to sector expansion, however anecdotal input from industry suggests that 2013 fuel use may drop due to warm, dry conditions throughout the growing season.

Based on 2013 fuel consumption and production area data submitted by program applicants, average energy use by unit production area (GJ/m^2) in 2013 was:

Sector	Avg. Energy Use
Wholesale nursery	0.40 GJ/m^2
Floriculture	0.61 GJ/ m^2
Forest seedlings	0.80 GJ/ m^2
Greenhouse vegetables	1.48 GJ/ m^2

These figures establish a baseline from which it will be possible to monitor trends in carbon footprint reduction (energy use) over time using annual carbon tax relief program data.

Please identify any of the following energy efficiency measures your company has taken or plans to take in the future [prior to 2012; in 2012/2013 as a result of the carbon tax relief grant; planned].

	Prior to 2012		As a result of relief grant (2012/2013)		Planned	
Energy Efficiency Measure	%	Count	%	Count	%	Count
Isolation of standby boilers	25%	41	8%	13	4%	7
Installation of condensers for heat recovery	23%	39	4%	7	12%	20
Installation of hot water heat storage tank	24%	40	2%	4	11%	19
Installation of new thermal curtains	20%	33	6%	10	21%	35
Replacement/updating of thermal curtains	7%	11	17%	28	28%	46
Repair of greenhouse covering to reduce heat loss	11%	18	38%	63	25%	42

Please identify any renewable energy technologies (if any) that your company has installed or plans to install in the future.

Three survey respondents (2%) indicated that they installed a geo-exchange system as a result of the carbon tax relief grant, and one operator installed a biomass boiler. Nine respondents indicated that they are considering installing a geo-exchange system in the future, 17 indicated an interest in installing solar thermal or solar photovoltaic systems, and 11 operators plan to install new biomass boilers.

Please list any other steps your company has taken, or plans to take, to improve energy efficiency and reduce carbon emissions at your operation.

Operators responded with the following examples, listed below in order of response frequency (i.e., most frequent response is listed first):

- Upgrade to high efficiency boilers or heaters
- Install new, or optimize settings on, automated climate control systems
- Cleaning and capture of CO_2 from biomass boilers
- Completion of energy assessment/audit
- Lighting improvements (e.g., LED lighting, high-efficiency lighting, controlling lights using photocells instead of timers)
- Crop management (e.g., change to more cold-tolerant crops/varieties, optimize crop layout, crop partitioning)
- Structural improvements (e.g., raising greenhouse structure, improved venting and air flow infrastructure, replacement of gable ends, installation of improved venting infrastructure, heat exchanger to warm fertilizer water)
- Operational improvements (e.g., daily monitoring of fuel use, regular boiler maintenance, update irrigation protocols)
- Expansion of hot water storage tank capacity
- Improved insulation of hot water tanks and piping
- Install new technologies to reduce particulate emissions and allow increased use of biomass boiler
- Landfill/methane gas capture and conversion to heat, food grade CO_2, and electricity (pilot)
- Adoption of energy efficient designs for new builds
- Installation of cold frames inside greenhouse to protect crops

Are you considering the installation of a co-generation system in the next 1-2 years?

Twenty-eight respondents (17%) indicated that they are considering co-generation in the next 1-2 years however comments suggest that most were only at the research stage and have not made any infrastructure or planning investments to date.

Since the survey was conducted, the Ministry has learned that there is 1 operation that has acquired all required permits and plans to install a cogeneration system in 2014. Six other

operations previously applied to BC Hydro's Standing Offer Program, but were rejected in October 2013 as a result of not having required permits and approvals in place.

As of November 2013, high-efficiency cogeneration is no longer eligible under the Standing Offer Program. As such, proponents will not be able to derive income from electricity sales to BC Hydro. At current energy prices and capital costs, additional income from electricity sales is integral to making cogeneration projects economical, therefore it is considered unlikely that many projects, if any, will proceed in the next 3-4 years.

Do you presently have a biomass boiler installed at your facility?

Thirty-five operations (21%) of operations reported having a biomass boiler installed at their facility. These 35 respondents were asked several more questions to determine the degree to which they actually use the boilers, and anticipated future use.

What percentage of your energy needs was met using biomass in 2012?

% of energy needs met using biomass	Count	%
0-25%	13	37%
26-50%	3	9%
51-75%	11	31%
76-100%	8	23%

These responses suggest that more than half of operations with biomass boilers installed used the boilers to meet more than half of their energy needs.

Do you anticipate your use of biomass in 2013 to increase, decrease or stay the same? What factors affected your use of biomass in 2013?

Five respondents indicated that they anticipate their use of biomass in 2013 to increase.

The majority of respondents indicated that fuel prices were the dominant factor influencing their decision to use biomass for supplemental heating. As natural gas prices increase, more operators are inclined to switch to biomass. As biomass prices increase operators are disinclined to use their boilers.

Availability of quality biomass products was also raised as a key factor affecting boiler use. An operator's location relative to available biomass sources can be a factor since transportation costs can be significant.

One operator noted that they are not using their biomass boiler because they do not have an electrostatic precipitator installed and cannot meet government regulations on stack emissions. Another operator noted that while the Province supports the installation of biomass boilers, increasing regulation at the municipal level seems to be discouraging their use.

4.0 Conclusions on Program Effectiveness

The Program was designed and implemented to help greenhouse producers improve their competitiveness, create jobs and reduce their carbon footprint. Survey results suggest that notable progress was made towards achieving these goals as a direct or indirect result of the Program.

Over 200 jobs were created in 2013, and many more employees were retained across all sectors. Operators reported an improved ability to compete with other jurisdictions that are not subject to a carbon tax by improving productivity, installing or upgrading technologies to improve greenhouse operations, improving energy management, maintaining competitive prices, and expanding production area or volumes. Operators also reported taking, or planning to take, many steps to reduce their carbon footprint such as making infrastructure improvements, installing new technologies, and automating heating systems to improve efficiency.

APPENDIX A: 2013 Greenhouse Carbon Tax Relief Grant Program Survey

Treasury Board Submission –

Request for Decision

Minister: Honourable Norm Letnick

Ministry: Agriculture

Date: September 17, 2014 Ministry Document #: TB1502

Title:	**Greenhouse Carbon Tax Relief Grant Program**

Issue:

Budget 2014 provided an additional $0.40M annually for three years for the Greenhouse Carbon Tax Relief Grant Program (program). This additional funding was frozen and the Ministry of Agriculture (ministry) was directed to provide Treasury Board with options on how the program commitments will be met within the ministry's overall budget.

Request:

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Background:

In 2012, Government provided temporary carbon tax relief to commercial greenhouse vegetable and floriculture producers' equal to 100 percent of carbon tax paid on propane and natural gas used for heating and carbon dioxide production. *Budgets 2013* and *2014* provided funding for a permanent carbon tax relief grant program for commercial British Columbia (BC) greenhouse growers to help them maintain their competitive edge.

The permanent program provides a grant of 80 percent of the carbon tax paid on eligible fuel use and, as a result of lobbying, was expanded to include wholesale nursery production and forest seedling nurseries. Greenhouse operations are distinct from other sectors, as fossil fuels are used to produce heat and carbon dioxide which are essential to maximize crop yield.

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Discussion:

The options described here were evaluated based on consistency with government commitments, fairness, and ability to administer:

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Options:

Option 1: The ministry is requesting access to $0.40M frozen funds (totalling $1.6M over four years) to fund the program, in addition to re-profiling funding totalling $1.424M from the AIS Trust to Greenhouse Carbon Tax Relief Grant Program (Appendix 1). (Recommended)

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Contact: Grant Parnell
Assistant Deputy Minister
Business Development Division

(250) 356-1122

Honourable Norm Letnick

September 19, 2014
Date Signed

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