Canfor Fuel Switch Projects
2016 Public Sector Climate Action Leadership Symposium

Michael Jordan
Director Environment, Energy and Climate Change Policy
Canfor
Vancouver November 21, 2016
Our Company

BC - based integrated forest products company

- Origins late 1930’s with Pacific Veneer in New Westminster
- Now
  - 10 Sawmills BC, 1 Alta, 12 SE US;
  - majority owner of Canfor Pulp with 3 Kraft Pulp mills in Prince George; 1 BC TMP mill Taylor BC;
  - With recent purchase of Anthony Forest Products we own a glulam beam facility in the SE US and are joint owner of an I-Joist facility in Ontario
- We are a major producer of sustainable forest products
- Products include SPF dimensional lumber, pulp and paper, and beams
- Also a leading producer of green energy including heat and power, and wood pellets

Visit www.canfor.com
SUSTAINABLE PRODUCTS GROWN BY THE POWER OF THE SUN

Forestry is a renewable industry based on the responsible management of our forests. Every area we harvest in British Columbia and Alberta is replanted with native trees to ensure the regeneration of a healthy, natural forest.

More than 98% of our woodlands in Canada are third-party certified to an internationally recognized standard.

Canfor is committed to maximizing the utilization of each tree we harvest, turning nearly 100% of our fibre into useful, sustainable products.

IN 2015, CANFOR PLANTED 78 MILLION TREES!
Growing Forests Absorb Carbon Dioxide and Release Oxygen

- Natural regeneration and planting begin the cycle.
- Carbon absorbed $\text{CO}_2$.
- Oxygen released $\text{O}_2$.
- Carbon storage plateaus in older forests and can slowly be released as trees decay or burn.
- Gradual release $\text{CO}_2$.
- Wood buildings store carbon and it remains stored over the lifetime of the building.
- Harvesting for wood products ensures that carbon continues to be stored.
Wood Residuals are ~1/5 of the Raw Log

Product Yields on a Solid Wood Basis

- Chips: 30%
- Sawdust: 7%
- Planer Shavings: 7%
- Finished Lumber: 47%
- Trim Ends: 4%
- Solid wood: 90%
- Bark: 5%
BC Beehive Burners and Incinerators ~2005
Canfor Historical Beehive Burners and Incinerators

Sawmills

Pulp Mills

Tier 1 Burners

Major Communities

Highways
Beehive Burner at Night
Canfor Houston Beehive Burner Meets its End (May 2007)
Beehive Burner - Malakwa
Renewable Energy

Heat

• All but our recently acquired Wynndel mill in the East Kootenays are heat energy self sufficient.
• Seven of 10 biomass heat energy systems at our BC mills are units constructed by Prince George based Deltech Manufacturing Inc.
Renewable Energy

Combined Heat and Power

- We own and operate a 25 MW capacity Combined Heat and Power Plant in Alberta that supplies our adjacent sawmill with renewable electricity and steam heat for lumber drying in addition to selling renewable electricity to the Alberta Power Pool
Renewable Energy

We started up two wood pellet plants early this year, one in Fort St. John with a capacity of 70,000 t/year of pellets and the other in Chetwynd with a capacity of 110,000 t/year.

Pellets from these plants are bound for Asian markets where they are co-blended with coal to meet renewable portfolio standards and reduce greenhouse gas emissions.

Our 220,000 t/yr pellet plant joint venture with Pinnacle Pellet in Houston BC which started up in fall 2006 sells wood pellets to a Japan utility and coal power plants in Europe.
Chetwynd Pellet ORC

- The Chetwynd Pellet Plant has two bark fired Deltech heat energy systems which supply thermal oil to a Turboden Organic Rankin Cycle generator which generates up to 3MW of electricity displacing the pellet plant load and some of the sawmill electrical load.

- Waste heat from the ORC generator is used to dry sawdust for the pellet plant in a low emission belt dryer.
Five of our ten BC sawmills are selling offset credits to the CIB.
Schematic Fuel Storage Bin to Energy System Units
Biomass Fuel in Storage Bin
Operator Control Screen Ft. St. John Energy System
Efficient Combustion in Stepped Grate Combustor
## Fort St. John Offset Project

### PID Agreement

#### PROJECT SUMMARY

**Overview**

<table>
<thead>
<tr>
<th>PID Submission Date</th>
<th>31st, 2014</th>
</tr>
</thead>
</table>

**Project Title**

ISO 14064-2, class 5.2.a, BC-FOREST Section 3, subsection 3d

**Project Category**

Biomass Fuel Switch - Canadian Forest Products Ltd - Fort St John BC

**Conditioned area applicable to the Project (in ha)**

312.5

**APRO** (Alvarado, Fenis, and Land), Inc Project category and activity type (if applicable)

n/a

**Is the Project a program of activities?**

“Grouped projects,” that are structured to allow the expansion of a project activity subsequent to validation under the same Project Plan

n/a

**Project Purpose and Objectives**

Provide a summary description (maximum two pages – further detail is requested later in the PID) of how the Project is expected to generate GHG reductions. Include the following:

- a description of key project sources, sinks, and reservoirs;
- technologies and processes; and
- the business scenario including key sources, sinks and reservoirs.

**Expected Emission of the Project**

25 Years

**Expected Validation Period**

[May 7, 2009] to [May 6, 2039]

**Proposed average price per tonne CO2e over contract period**

$15

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### OFFSET PURCHASE AGREEMENT

Between

**HER MAJESTY THE QUEEN IN RIGHT OF BRITISH COLUMBIA, as represented by the Minister of Environment (the “Province”)**

and

**Canadian Forest Products Ltd./Produits Forestiers du Canada Ltée**

(“Vendor”)  

Dated May 2015

25 %

Contract #: GA15FHQ-113E
ISO 14064 Validation Engagement Report for the
Canfor Fort St. John Fuel Switch – GHG Project Plan
dated October 18, 2010

October 18, 2010

The information in this report is confidential and may be legally privileged. It is intended solely for the use of the intended recipients, Offsetters Clean Technology, Inc., Canadian Forest Products Ltd, and the Pacific Carbon Trust. Access to this report by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution or any action taken or omitted to be taken in reliance on it, is prohibited and may be unlawful. Any opinions contained in this report are subject to the terms and conditions expressed in the governing KPMG PRI client engagement contract.
Fort St. John Offset Project

Quantification

**GHG emissions reductions methods and assumptions**

The baseline condition for the project is the consumption of natural gas used for heating kilns to dry lumber produced by the Fort St. John sawmill and for sawmill space heating.

The project activity involves installation of a heat energy system employing a biomass burner and a hot oil/heat exchanger system to utilize sawmill residues to heat oil which:

- replaces natural gas as the source of heat for the kilns; and,
- is planned to replace natural gas as the source of heat for space heating in the sawmill.

GHG emissions reductions are claimed from the substitution of fossil fuels with thermal energy generated by burning waste biomass.

Because the heat energy system is also used to dispose of excess sawmill residues, some of the heat generated by the system is wasted. As a result, direct measurement of biomass consumption or heat generated would not provide an accurate measure of the energy used by the kilns. To estimate the baseline energy use, Offsets developed a model to calculate the additional natural gas that would have been required to run the kilns (and space heating) in the absence of the heat provided by the heat energy system. The model uses kiln production and heating degree days as the primary inputs to determine the kiln energy requirements and hence the amount of natural gas that would have been required to dry the lumber.

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**Table 5: Emissions Reduction**

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline Emissions (tCO₂e)</th>
<th>Project Emissions (tCO₂e)</th>
<th>Emissions Reduction (tCO₂e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>16,135</td>
<td>1,039</td>
<td>14,296</td>
</tr>
<tr>
<td>Total</td>
<td>16,135</td>
<td>1,039</td>
<td>14,296</td>
</tr>
</tbody>
</table>
Fort St. John Offset Project

Verification

Verification Statement

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Report Period</td>
<td>January 1, 2015 to December 31, 2015</td>
</tr>
<tr>
<td>Intended User of Document</td>
<td>This report has been prepared for Canadian Forest Products Ltd. and the BC Ministry of Environment, Climate Action Secretariat for the express purpose of facilitating the issuance of offset units under the Greenhouse Gas Industrial Reporting and Control Act (the Act) and the Greenhouse Gas Emission Control Regulation (the Regulation).</td>
</tr>
</tbody>
</table>
| Document Prepared by          | Phillip Cunningham
                                | Ruby Canyon Engineering, Inc. |
                                | 743 Horizon Ct., Suite 385, Grand Junction, CO 81506 USA |
                                | 970.241.9298 ext. 13 |
                                | pcunningham@ruby-canyon.com |
| Date                           | March 24, 2016                      |
| [Reference/Project/Number]    | No Project Number                   |
EXHIBIT C
TRANSFER FORM

This Assignment and Transfer Agreement (this “Transfer”) is dated July 8, 2016 and is between Her Majesty the Queen in Right of British Columbia, as represented by the Minister of Environment (the “Province”) and Canadian Forest Products Ltd. (“Vendor”).

WHEREAS pursuant to an Offset Purchase Agreement between the Province and Vendor made as of May 23, 2015 (the “Offset Agreement”), Vendor agreed to sell, convey, assign, transfer and set over to the Province certain Project Offsets (as that term is defined in the Offset Agreement).

NOW, THEREFORE, IN CONSIDERATION of the mutual promises contained in the Offset Agreement and this Transfer, the Province and Vendor agree as follows:

1. TRANSFER AND ASSIGNMENT.

Vendor hereby absolutely and irrevocably grants, sells, conveys, assigns, transfers and sets over all of Vendor’s right, title, interest, property, claim and demand in and to the following Project Offsets that are the Offset Units (as such term is defined in the Greenhouse Gas Industrial Reporting and Control Act, S.B.C 2014, c. 29) described below to the Province:

<table>
<thead>
<tr>
<th>Project Report Period (Contract Vintage)</th>
<th>Project and Address</th>
<th>Quantity (tCO₂e)</th>
<th>Serial Numbers (if available)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Start</td>
<td>Capital Cost</td>
<td>Reductions to end 2015</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>Ft St John</td>
<td>13.4 millions $</td>
<td>85,345 tCO₂e</td>
<td></td>
</tr>
<tr>
<td>Mackenzie</td>
<td>14.4 millions $</td>
<td>80,021 tCO₂e</td>
<td></td>
</tr>
<tr>
<td>Prince George</td>
<td>14.1 millions $</td>
<td>48,894 tCO₂e</td>
<td></td>
</tr>
<tr>
<td>Chetwynd</td>
<td>9.3 millions $</td>
<td>50,368 tCO₂e</td>
<td></td>
</tr>
<tr>
<td>Elko</td>
<td>11.0 millions $</td>
<td>11,776 tCO₂e</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62.2 millions $</strong></td>
<td><strong>276,404 tCO₂e</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Canfor Offset Projects

<table>
<thead>
<tr>
<th>Contract Vintage</th>
<th>Minimum Volume tCO₂e</th>
<th>Maximum Volume tCO₂e</th>
<th>Estimated Reductions to end 2017 tCO₂e</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>47,000</td>
<td>67,000</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>47,000</td>
<td>67,000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>94,000</td>
<td>134,000</td>
<td>400,000</td>
</tr>
</tbody>
</table>
Conclusion

• We appreciate the opportunity to sell carbon offsets from several of our fuel switch projects to the BC Government

• Offset Revenue was taken into account in our decision to undertake these projects and together with carbon tax elimination was significant in the ROR on these projects

• We are looking at further innovative GHG reduction projects within Canfor and Canfor Pulp and are excited about the potential opportunity to contribute further to the low carbon economy

QUESTIONS?