Log it and Burn it

Wood pellets, climate and British Columbia's deepening forest crisis

BY BEN PARFITT

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CCPA
CANADIAN CENTRE
for POLICY ALTERNATIVES
BC Office

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ABOUT THE AUTHOR

BEN PARFITT is the resource policy analyst at the CCPA-BC. Ben joined the staff team in 2005 after years working as an investigative journalist with numerous magazines, and previous to that as a reporter with The Vancouver Sun. He is author and co-author of two books on forestry issues and currently devotes much of his policy research to natural resources, with special attention paid to energy, water, forest resources and climate change. He values being part of a great team at the CCPA as well as the opportunities provided to meet regularly with people and understand their concerns about the state of British Columbia's natural resources and how such resources could be managed better.

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Summary

British Columbia's forests and its once mighty forest industry are in crisis.

After decades of intense logging, the province's forests are depleted and fragmented and the forest industry is hard-pressed to find enough trees to cut down. In the midst of this, demand for wood from BC has soared from an unusual quarter: thermal energy producers that burn millions of tonnes of wood pellets annually to generate electricity.

This demand is fueling the loss of the province's primary forests—forests never before subject to industrial logging—and if allowed to continue, will further deplete them. Fundamental reforms to the management of the province's forests must be a priority and buyers of wood pellets and other forest products must temper their demands as a result.

The indicators of unsustainable demand are evident in BC's trade in wood pellets, which has doubled in the past decade led by massive increases in shipments to Japan, a country rocked by a devastating earthquake and tsunami in 2011. Faced with the loss of nuclear reactors damaged by the tsunami and a decision to temporarily shut down all nuclear facilities in the country, Japan raced to increase energy production from other sources, including thermal electricity plants that burn wood pellets.

As Japan steadily increased production of thermal electricity, its purchases of wood pellets from BC shot up. In 2014, Japan imported a modest 61,700 tonnes of wood pellets from BC. Ten years later, those imports had reached nearly 1.7 million tonnes. The likelihood that such volumes can be sustained is, however, in doubt given the crises in BC's forests. Rising demand and shrinking supply is a volatile mix and all signs point to a collapse in available wood supply from BC for all manner of forest products, including wood pellets.

Over the same decade that Japan's demand for wood pellets soared, logging rates in BC fell by 38%. That decline will continue. Within the next 10 years it is expected that logging rates in the

province will be roughly half what they were 20 years ago. The decline in logging is the primary reason the number of sawmills in BC continues to fall. By 2035 it is estimated there will be only 47 sawmills left, down from the 111 that operated at full tilt in the province in 2005. As sawmills close, the tremendous amount of wood waste generated at those mills will decline too, a matter of importance because large amounts of wood pellets are made from such waste.

The other major wood fibre source for pellet mills is whole logs. But cutting down trees just to make greenhouse gas-emitting wood pellets is climactically and ecologically irresponsible and has been roundly condemned by scientists. Then there's the wildcard of climate change. In 2023, wildfires burned 2.5% of BC's land base setting a new record, the third such milestone in just eight years. All of this and more underscores why BC's forests are in crisis and why BC will be increasingly unable to supply the huge quantities of wood pellets it has to Japan, the United Kingdom and other countries.

This report concludes with six policy recommendations that will help put the management of BC's forests on a better footing and set the stage for a more ecologically responsible supply of wood pellets and other forest products to domestic and international buyers alike.

The six recommendations are:

- Increase dramatically protection of remaining primary and old growth forests.
- Zone the province's primary forests and existing plantations into three broad categories: fully conserved primary and old-growth forests; forests and plantations managed specifically to enhance key "non-timber" resources such as water and wildlife; and lastly a portion of previously logged lands to be managed for timber production and forest products, but with ecological guidelines that must be met.
- Require by law that all timber-processing facilities, including wood pellet mills, must submit annual reports detailing all the wood used at their facilities, with a clear, verifiable breakdown of what form that wood takes.
- Strictly prohibit pellet mills from converting trees logged in primary or old-growth forests directly into wood pellets and require pellet producers to only use the residual waste from sawmills, verifiable wood waste from logging sites, or thinnings from tree plantations as sources of raw material for pellet production.
- Apply the carbon tax to all emissions associated with logs or wood waste that is currently burned as "slash" at logging operations. This will act as an incentive to either leave such wood unburned at logging sites or to bring it into mill towns where it could be used to make a range of forest products, including but not limited to wood pellets.
- Enact a solid-wood-first strategy and penalize all companies that convert logs or portions of logs to wood pellets that could instead be used to make other forest products. Solid wood products like doors or lumber used to frame a house hold the carbon originally sequestered by the tree, while wood pellets instantaneously release stored carbon upon combustion.

Introduction

Exports of wood pellets from Canada have more than doubled in volume in the last 10 years, driven largely by purchases from two countries—Japan and the United Kingdom. Both countries burn millions of tonnes of wood pellets each year in thermal plants to generate electricity and both claim that such energy is clean.

The deepening global climate crisis demands that we "substantially increase protection of our native forests to absorb more CO2 from the atmosphere.

While greenhouse gases are emitted burning wood pellets—vastly more emissions, in fact, than burning coal—Japan, the United Kingdom and other jurisdictions claim that burning pellets is effectively carbon-neutral.[1] They say the CO2 emitted during combustion is later offset by the CO2 stored in planted trees, making wood an energy source that is cleaner than coal, natural gas or oil. But such claims have been dismissed by environmental and climate scientists. In May 2020, some 200 of them warned in a letter to members of the US Senate and House of Representatives that the "evidence does not support the burning of wood in place of fossil fuels as a climate solution." Moreover, the scientists said, the deepening global climate crisis demands that we "substantially increase protection of our native forests to absorb more CO2 from the atmosphere and store more, not less, carbon."[2]

This report examines the burgeoning international trade in pellets and the implications for Canada's forests, in particular those in British Columbia. It draws on statistical information, analysis of recent forest trends and on-the-ground fieldwork in BC and Japan.

1 Sterman, J., W. Moomaw, J.N. Rooney-Varga and L. Siegel. "Does wood bioenergy help or harm the climate?" *Bulletin of the Atomic Sciences*, Vol. 78, No. 3 (2022). https://www.tandfonline.com/doi/epdf/10.1080/00963402.2022.2062933?needAccess=true.

2 Moomaw, William R. et al. Letter to Rep. Kathy Castor, Chair, House Select Committee on the Climate Crisis, et al. May 8, 2020. https://s3.documentcloud.org/documents/6889670/Scientist-Letter-to-Congress-8May20.pdf.

BC produces more wood pellets than any Canadian province. Its pellet production is dominated by Drax, a UK company that owns the world's single-largest wood-burning facility, a massive thermal electricity plant in North Yorkshire, England. Drax wholly or partially owns eight of 12 pellet mills in BC and is responsible for 80% of the province's pellet exports. It also owns or has an interest in two large pellet mills in Alberta giving it an 80% share of the pellet market there as well.

BC is Canada's most heavily forested province and its forests are richer and more varied in biological diversity than forests in any other Canadian province. But after a century-and-a-half of industrial logging that initially focused on coastal old-growth forests before transitioning to the province's vast interior region, most of the province's accessible and economically desirable primary forests are gone. Primary forests refer to all forests in a natural state, regardless of age, that have never before been subject to industrial logging.[3]

Such forests contain far more biological diversity than tree plantations while also providing immense climactic benefits. Research has shown that primary or natural forests with their mix of tree species are more reliable at absorbing and storing carbon than are tree plantations.[4] Primary forests also perform a vital role filtering and moderating water flows, a critical natural service that has significant ecological as well as human health and safety benefits.

Having over-exploited forests, logging companies now confront a supply crisis of their own making.

Over the decades as such forests were logged, a great number of jobs were generated in BC's forests and mill towns, in particular in rural communities. But as this paper notes, the social and economic benefits associated with logging have fallen rapidly. Vast though BC's and Canada's forests are, they are finite. Having over-exploited forests, logging companies now confront a supply crisis of their own making.

The crisis is deepening further due to warmer and drier conditions linked to climate change. As a result, wildfire seasons are increasing in frequency, duration and severity, phenomena predicted by scientists more than 20 years ago.[5] This was evident across Canada in 2023, the worst year for wildfires since the advent of modern record-keeping. It was also the worst year for wildfires in BC's history.

While there has been much talk of logging burned forests, the reality is that the area burned is so vast that only a fraction of such land is likely to be logged before the burned trees lose their economic value. The supply crisis has resulted in mill closures in every sector of Canada's forest

3 UN Convention on Biological Diversity. Forest Biodiversity Definitions. 2006. https://www.cbd.int/forest/definitions.shtml#:~:text=A%20primary%20forest%20is%20a,alter%20them%20for%20human%20use.

4 Osuri, Anand M., A. Gopal, T.R. Shankar Raman, R. DeFries, S.C. Cook-Patton and S. Naeem. "Greater stability of carbon capture in species-rich natural forests compared to species-poor plantations." *Environ. Res. Lett. 15* (2020). https://iopscience.iop.org/article/10.1088/1748-9326/ab5f75/pdf.

5 Flannigan, M.D., B.J. Stocks, B.M. Wotton. "Climate change and forest fires." *The Science of the Total Enviornment 262* (2000). https://www7.nau.edu/mpcer/direnet/publications/publications_f/files/Flannigan_MD_Stocks_BJ_Wotton_BM_Climate_change_and_forest_fires.pdf.

industry, including the pellet industry itself, a sure sign there will be challenges ahead for producers and buyers of Canadian wood pellets.

The pellet industry and Drax claim the industry's impact on forests the world over is benign. The central reason for this, they assert, is the wood they use is so-called residuals left over after sawmills turn round logs into rectangular products.[6] Typically in sawmilling only about half of each log ends up as a solid wood product like lumber. The other half ends up as sawdust and wood chips. Historically, that woody material was a valuable feedstock for pulp and paper mills that grew up alongside sawmills. Pellet companies are now chasing that same wood supply, leading both pellet and pulp producers to increase their use of whole logs.

Photographs and video footage show large stacks of logs awaiting conversion directly into wood pellets at several Drax facilities in BC.

Photographs and video footage show large stacks of logs awaiting conversion directly into wood pellets at several Drax facilities in BC. Even Drax itself acknowledges that a significant portion of the wood it uses comes from logs, which of course come from trees. The use of those logs underscores that the pellet industry plays a direct role in the exploitation of primary forests and that as the health of those forests diminishes so too will the fortunes of pellet makers and pellet buyers alike. With logging rates in freefall in BC, there is a strong likelihood that Canadian exports of wood pellets to Japan, in particular, will fall.

This report examines both the challenges ahead for the pellet industry and proposes what a more reasonably scaled and supplied pellet-making enterprise might look like. Its central conclusion is that the wood pellet industry should be forbidden from taking whole trees from primary forests and turning them directly into wood pellets because the practice of doing so is both ecologically and climactically ruinous. The pellet industry should only be permitted to access wood from tree plantations. Even then, the first objective should be to turn as much as possible of every tree logged into solid wood products, a policy proposition first advanced by the Canadian Centre for Policy Alternatives (CCPA) in 2010 that garnered support from environmental and labour organizations alike.[7]

Turning whole trees from primary forests or from tree plantations directly into a product to be burned is an inappropriate use of carbon-storing wood fibre, particularly if such fibre can be used instead to make solid wood products that retain the carbon originally stored in the tree. Only the so-called left-over waste should then be converted to pellets and this only after use by the pulp and paper industry, which is capable of making a far wider array of forest products such as bioplastics, biofuels and high-value paper products including recyclable medical masks and gowns.

6 Drax. "About us." Accessed January 24, 2024. https://www.drax.com/ca/about-us/#:~:text=in%20northern%20Louisiana-,The%20material%20we%20use%20to%20make%20pellets%20includes%20sawmill%20and,through%20our%20global%20supply%20chain.

7 Canadian Centre for Policy Alternatives BC Office. *Managing BC's Forests for a Cooler Planet: Carbon Storage, Sustainable Jobs and Conservation.* January, 2010. https://policyalternatives.ca/sites/default/files/uploads/publications/reports/docs/ccpa_bc_managingforests.pdf.

Canada's booming pellet exports

To quantify the growth in Canada's wood pellet trade, the BC office of the Canadian Centre for Policy Alternatives analyzed export data from Statistics Canada. The data provide details on pellet exports by province of origin both by volume exported and by sales value. And, the data show that during the 10 years ending in 2023 both the volume and the value of pellet exports increased substantially.

In 2014, exports of wood pellets from Canada stood at 1.64 million tonnes. Ten years later, exports had doubled to 3.26 million tonnes. The export data show that in all but the most-recent two years, the United Kingdom was the largest buyer of Canadian wood pellets.

But in 2022 that distinction, for the first time, went to Japan, a country that is in the midst of a significant build-out of thermal electricity plants, including those fired by coal, natural gas, wood pellets and palm kernel shells.[8]

Japan, the United Kingdom and South Korea commanded 84% of all of Canada's wood pellet exports in 2022.

The data also show that South Korea began the period with a 7% share of Canada's pellet exports, but that things began to change dramatically a few years ago. In 2020, South Korea purchased 48,500 tonnes of wood pellets from Canada. By 2023, purchases stood at more than 280,000 tonnes, a nearly six-fold increase in just three years. Between them, Japan, the United Kingdom and South Korea commanded 77% of all of Canada's wood pellet exports in 2023.

8 BioEnergy Consult. "The Energy Potential of Palm Kernel Shells." Accessed January 25, 2024. https://policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office/2022/11/ccpa-bc_Climate-Reckoning_web.pdf.

TABLE 1 Wood Pellet Exports from Canada

Year	Total Cdn. Exports	To UK	To Japan	To S. Korea
2014	1,637,589 t	982,809 t (60% share)	61,807 t (4% share)	150,003 t (9% share)
2015	1,627,783 t	1,205,928 t (74% share)	80,203 t (5% share)	49,029 t 3% share)
2016	2,373,110 t	1,664,145 t (70% share)	272,375 t (11% share)	48,914 t (2% share)
2017	2,171,528 t	1,489,577 t (68% share)	245,178 t (11% share)	55,483 t (4% share)
2018	2,651,441 t	1,577,561 t (59% share)	621,928 t (23% share)	40,656 t (2% share)
2019	2,634,241 t	1,656,400 t (63% share)	560,816 t (21% share)	11,804 t (.4% share)
2020	2,900,686 t	1,456,317 t (50% share)	611,244 t (21% share)	48,552 t 2% share)
2021	3,153,191 t	1,259,468 t (40% share)	1,090,635 t (34% share)	253,886 t (8% share)
2022	3,492,510 t	1,101,605 t (31% share)	1,401,495 t (40% share)	425,692 t (12% share)
2023	3,262,748 t	562,104 t (17% share)	1,692,892 t (52% share)	280,104 t (8% share)
TOTALS	**25,904,827 t**	**12,955,914 t (50% share)**	**6,883,948 t (26% share)**	**1,364,123 t (5% share)**

Source: Statistics Canada. Canadian International Merchandise Trade Web Application. https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021004-eng.htm. Accessed date: March 6, 2024.

The importance of British Columbia

By far, the province exporting the most pellets was British Columbia. BC began the 10-year period with a 79% share of the Canadian total and ended with a 68% share. Overall, the province's exports nearly doubled from 1.29 million tonnes in 2014 to 2.21 million tonnes in 2023. The province's preeminent position is not surprising. It is Canada's third-largest province by land area and its most-richly endowed forest jurisdiction.

At 944,000 square kilometres in size, BC dwarfs both Japan at 378,000 square kilometres and England, Scotland and Ireland combined at nearly 392,000 square kilometres. Neither Japan nor the United Kingdom have close to the forests that BC has. BC's forested area alone, at 600,000 square kilometres, exceeds Japan's entire landmass by 1.5 times.

With its long-established forest industry and rail-linked coastal ports, particularly its port in Prince Rupert, BC is well positioned to supply overseas customers with wood pellets, especially those in the Pacific Rim. Many of the province's pellet mills are situated in communities along the rail line linking the vast central and northern regions with Prince Rupert. The communities of Smithers, Houston, Burns Lake, Terrace and Prince George all fit this bill and are or were major wood pellet producers.

Coastal cities in Japan, where much of the country's existing and contemplated thermal electricity plants are located, benefit from their relatively close proximity to Prince Rupert, with ocean tankers capable of reaching the country from BC in as little as eight days.9

TABLE 2 Wood Pellet Exports from British Columbia

Year	Total B.C. Exports	To UK	To Japan	To S. Korea
2014	1,291,745 t	899,743 t (70% share)	61,701 t (5% share)	150,003 t (12% share)
2015	1,258,902 t	1,015,412 t (81% share)	80,203 t (6% share)	48,983 t (4% share)
2016	1,934,933 t	1,381,694 t (71% share)	272,375 t (14% share)	48,914 t (2% share)
2017	1,779,405 t	1,307,318 t (73% share)	245,178 t (14% share)	53,736 t (3% share)
2018	2,268,412 t	1,492,139 t (66% share)	621,928 t (27% share)	40,656 t (2% share)
2019	2,137,329 t	1,488,292 t (70% share)	560,816 t (26% share)	11,804 t (.5% share)
2020	2,365,569 t	1,252,818 t (53% share)	611,244 t (26% share)	48,555 t 2% share)
2021	2,371,404 t	836,661 t (35% share)	1,090,551 (46% share)	253,886 t (10% share)
2022	2,530,670 t	704,415 t (28% share)	1,394,469 t (55% share)	425,692 t (17% share)
2023	2,212,063 t	234,682 (11% share)	1,692,868 t (76% share)	280,104 t (13% share)
TOTALS	**20,150,432 t**	**10,613,174 t (53% share)**	**6,631,333 t (33% share)**	**1,362,333 t (7% share)**

Source: Statistics Canada. Canadian International Merchandise Trade Web Application.https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021004-eng.htm. Accessed date: March 6, 2024.

9 CN. "Prince Rupert Transit Time Advantage." Accessed January 25, 2024. https://www.cn.ca/en/repository/popups/tools/prince-rupert-transit-time-advantage/.

That proximity, combined with Japan's accelerated building of bioenergy facilities (a topic to be discussed later), has allowed Japan to rapidly increase its wood pellet imports from Canada.

From a modest 61,701 tonnes imported from Canada in 2014, Japan's share of Canada's pellet production soared to nearly 1.7 million tonnes in 2023. Japan ended the 10-year period controlling more than three quarters of all the wood pellets exported from the province, with exports to the United Kingdom falling to just 11% of the share.

The Drax Factor

Much of British Columbia's, and indeed Canada's, trans-oceanic wood pellet trade is controlled by one company—the Drax Group. The company operates a massive wood pellet-fired thermal electricity plant in North Yorkshire, England.[10]

Drax's thermal electricity plant in North Yorkshire, England. Photo: Drax Group.

10 Drax. "Drax Power Station. Key facts." Accessed April, 19, 2024. https://www.drax.com/about-us/our-sites-and-businesses/drax-power-station/.

For many years, Drax purchased pellets from British Columbia and shipped the bulk of its purchases down the west coast of North America to the Panama Canal, then through the canal and northeast across the Atlantic Ocean to England. The company also ships a great deal of wood pellets from the southeast United States.

In April 2021, Drax finalized its purchase of Pinnacle Renewable Energy Inc., the BC wood pellet producer that controlled the majority of pellet mills in the province. With the purchase, Drax asserted that it was "the world's leading biomass generation and supply business."[11]

In 2023, Drax wholly or partially owned eight of BC's 12 pellet mills. The estimated capacity of those eight facilities is nearly 1.7 million tonnes per year, while the combined capacity of all of the province's pellet mills is nearly 2.1 million tonnes. This gives Drax direct or indirect control of 80% of BC's pellet exports. The company enjoys a similar monopoly position in neighbouring Alberta where it directly or indirectly controls 600,000 of the estimated 755,000 tonnes of wood pellets produced in that province annually.

Walls of logs at three Drax pellet mills

Drax has repeatedly stated that it uses very few logs to make its wood pellets and that its pellet facilities subsist largely on a diet of "residual" wood fibre supplied by local sawmills.

In an April 2023 news release the company stated that 81% of the wood it uses in its Canadian pellet operations comes from "sawmill residues" while the remainder consists of "material collected from harvest residuals and low-grade wood, such as tops and branches, low-quality trees or parts that are diseased or misshapen."[12] It is difficult to verify such statements, however, because the company does not publicly disclose the number of logs arriving at its facilities for direct conversion into wood pellets nor does it publish publicly available data on the number of trucks delivering sawmill residuals.

Photographic documentation indicates, however, that large numbers of logs of varying size and quality are being delivered to Drax facilities where they are turned directly into wood pellets. Almost all such logs originate in primary forests because those are virtually the only forests in the interior of the province that are being logged and it is in the interior region of BC that all pellet production takes place.

Large numbers of logs of varying size and quality are being delivered to Drax facilities where they are turned directly into wood pellets.

11 Drax. "Drax completes acquisition of Pinnacle Renewable Energy Inc." Accessed January 25, 2024. https://www.drax.com/us/press_release/drax-completes-acquisition-of-pinnacle-renewable-energy-inc/.

12 Drax. "Drax applauds Canadian budget commitment to biomass and clean energy investments." Accessed January 25, 2024. https://www.drax.com/ca/press_release/drax-applauds-canadas-budget-commitment-to-biomass-and-clean-energy-investments.

The Drax-owned Burns Lake wood pellet mill. Photo: Stand.Earth

A photographic record from 2021 taken at three Drax pellet mills underscores the importance of whole logs to the pellet-making enterprise. The photograph of the Burns Lake mill shows large stacks of logs taken from local forests in the foreground and masses of wood chips in the background. In 2022, while accompanying a film crew from the United Kingdom that was shooting footage for a half-hour documentary for the BBC investigative news programme, Panorama, the CCPA watched for a number of hours as one log after another was lifted from the beds of logging trucks and dropped onto a conveyor belt entering the mill for direct conversion into wood pellets.[13]

In a report detailing the wood fibre supply needs of Drax's pellet mills in both Burns Lake and in the nearby community of Houston, the authors state that approximately 21% of the wood

13 BBC. "BBC Panorama: The Green Energy Scandal Exposed." Accessed January 24, 2024. https://www.youtube.com/watch?v=qadWRkPkKus.

A pellet mill in Houston co-owned by Drax, Canfor Corporation and the Wit'set First Nation. Photo: Stand.Earth

entering both mills was in "roundwood form," meaning logs.[14] The same report, which covered the five years ending in 2019, showed there were notable variations between years. In 2019, the highest year of log consumption at the Burns Lake pellet mill, 32% of all the wood entering the facility was in roundwood form. In Houston, 2019 was also the year of most log use with 42% of the fibre used in the mill that year being roundwood.

Photographs taken at the Houston pellet mill revealed a similar scene to that in Burns Lake. A long wall of logs awaited conversion directly into wood pellets at the facility, while behind the logs mountains of wood chips were staged for conversion as well. The logs ranged in size from very small to reasonably large.

14 Williams, J and G. Bull. *Catchment Area Analysis: Pinnacle Renewable Energy's Burns Lake and Houston Mills, Wood Pellet Sustainability.* Accessed January 24, 2024. https://www.drax.com/wp-content/uploads/2020/11/BC-CAA-Final-Report.pdf.

Walls of logs awaiting conversion to pellets at Drax's Smithers pellet mill. Photo: Stand.Earth

During fieldwork in the summer of 2022, the CCPA witnessed similarly "low-grade" logs being converted directly into large squares of solid wood known as cants at a small sawmill not far from the community of Wit'set, where many members of the Wit'set First Nation work. This work at the Seaton Forest Products sawmill (north of the community of Wit'set) contradicted pellet industry claims that the logs it uses are only suitable for conversion into wood pellets.

That said, pellet mills do process significant volumes of wood waste from sawmills. An outstanding question is what will happen at pellet mills in the future as more sawmills close their doors and waste wood supplies dry up. In Houston, Drax benefited from being in the same community where Canfor operated one of the largest sawmills in the province and at one time the largest sawmill in the world. But Canfor closed the sawmill in 2023. With Drax no longer able to access that critical supply of waste wood fibre, will the company have to process more logs from primary forests instead to make up the shortfall?.

Smoke and mirrors?

The wood pellet mill in Smithers, 64 kilometres north of Houston, is also owned by Drax and is run in partnership with West Fraser, one of the largest forest companies operating in BC. Like Drax's mills in Burns Lake and Houston, the pellet operation clearly relies on large volumes of logs taken directly from primary forests as raw material.

According to Drax, its BC pellet operations help reduce greenhouse gas emissions associated with the large volumes of broken logs, branches and woody debris that are left behind at logging operations and deliberately burned in "slash piles" each year to reduce the risks of the wood waste igniting and burning in uncontrollable wildfires. Rather than that wood being burned in "slash" piles, Drax says it turns it into pellets instead.

"Burning it at the roadside is a waste of a resource that could be put to much better use in generating renewable electricity, displacing fossil fuels, and it highlights the positive role the bioenergy industry can play in enhancing the forests and supporting communities," Alan Knight, Drax's group director of sustainability, wrote in June 2022.[15]

"Drax is already using some of this waste wood," Knight continued. "This waste wood comprises around 20% of our feedstock. The remaining 80% comes from sawmill residues like sawdust, chips and shavings."

However, the CCPA found that in the Bulkley Valley, where Smithers is located, the valley's notoriously poor air quality during slash-burning season has not improved since the pellet mill commenced operations. Logs continue to come out of the region's forests and are converted into wood pellets while burning slash piles remains an unwelcome fixture and health hazard in the region.[16] During fieldwork in the summer of 2022 for a CBC television documentary on the broadcaster's flagship investigative news show The Fifth Estate, piles of slash were filmed at logging blocks that had been left behind to be burned rather than hauled to pellet mills for processing.[17]

If burning wood at logging operations is wasting a resource, as Knight states, then why is Drax only using "some" and not all of that rejected material? Look no further than the issue of cost. Like any business, Drax cuts costs wherever possible. In the biomass business, one significant cost is transporting wood to pellet mill sites.

15 Drax. "Supporting a circular economy in the forests." Accessed January 24, 2024. https://www.drax.com/ca/opinion/supporting-a-circular-economy-in-the-forests.

16 Parfitt, B. "Pellet Plant's Promises of Cleaner Air Go Up in Smoke." The Tyee. April 28, 2023. Accessed January 24, 2024. https://thetyee.ca/Analysis/2023/04/28/Pellet-Plant-Clean-Air-Fail.

17 CBC. "Why wood from B.C. Forests is burning to fuel U.K. energy needs -The Fifth Estate." Accessed January 24, 2024. https://www.youtube.com/watch?v=5lAlqhyaMQQ.

Stu Spencer, a senior researcher at FP Innovations, a Canadian not-for-profit, forest-focused research and development institute, reports that delivering whole logs to biomass plants is cheaper than delivering wood in any other form. That is because logs are denser and less bulky than logging slash or wood chips.[18] Spencer's analysis found it takes 31 trucks to deliver enough logs for 1,000 oven-dried tonnes of biomass. Delivering the same volume of wood in the form of logging slash would require doubling the number of truck deliveries to 63.

Another critical issue is that logs occupy less space in mill yards than wood in other forms. The footprint of a stack of logs is two thirds that of wood chips and one third that of logging slash. The less space occupied, the easier it is to more-efficiently move material around at pellet mills and other wood-processing operations. In summary, it is cheaper and more efficient for Drax and other pellet producers to use logs. But the days of easy and cheap access to droves of raw logs to turn into pellets may be coming to an end.

18 FP Innovations. "Module 1 – Biomass Basics: Common Language, Conversions, Moisture Content." Accessed January 24, 2024. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-tenures/fibre-recovery/topic_1_module_1_biomass_basics.pdf.

A supply crisis – Part 1 Falling logging rates, rising mill closures

Despite the surge in wood pellet exports over the past decade, there are signs of an emerging fibre crisis that will have consequences for both producers and consumers of Canadian-made wood pellets. The most-immediate and consequential problem is that logging rates in Canada's most-heavily forested province are falling and poised to fall much further still.

In just 10 years, the number of trees cut down in BC's forests has declined by one third. Analysis by the CCPA of the publicly accessible Harvest Billing System database maintained by the provincial government shows that more than 76 million cubic metres of trees were logged across BC in 2013. By 2022, the tally stood at 51.3 million cubic metres, marking a 32% decline.[19] By 2035, forest industry analysts recently predicted in an article in Business in Vancouver magazine, logging rates in the province could fall to 38 million cubic metres per year, meaning that in a little over 20 years, logging rates in the province will be halved. Steep drops in logging rates are also predicted by the provincial government as well.[20]

In just 10 years, the number of trees cut down in BC's forests has declined by one third.

19 British Columbia. "Harvest Billing System (HBS)." Accessed January 24, 2024. https://www2.gov.bc.ca/gov/content/industry/forestry/competitive-forest-industry/timber-pricing/harvest-billing-system.

20 Bennett, N. "B.C. forest industry is dealing with death by a thousand cuts." *Business in Vancouver.* October 31, 2023. Accessed January 24, 2024. https://biv.com/article/2023/10/bc-forestry-industry-dealing-death-thousand-cuts.

Given the precipitous fall, it is no surprise there has been a corresponding decline in the number of sawmills. This will have direct bearing on the financial viability of wood pellet companies, some of which have sawmill companies as their partners and who count on contractors working for the sawmills to deliver either logs or mill residuals to their pellet facilities. In 2005, there were 111 sawmills in the province. Today, there are 64. By 2035, the number could be as low as 47. Such a huge decline in just 30 years is bound to have significant consequences for the pellet industry, consequences are already being seen.

In the last year and a half, three pellet mills in BC have closed their doors. The first closure occurred in March 2022 when Japan's Sumitomo Corporation closed its Pacific Bioenergy pellet mill in Prince George. A "dwindling" supply of wood fibre was cited as the reason for the closure. [21] The mill was at the time the largest pellet-maker in Canada and had operated for 20 years. Sumitomo had become full owner of the facility just five years earlier.

Since then, two more wood pellet mills have also closed. This includes the permanent closure of a pellet mill in Chetwynd, where Sumitomo was an investor, and the indefinite closure of a third mill in Terrace. Between them, the three mills produced 487,000 tonnes of wood pellets annually: Prince George, 285,000 tonnes, Chetwynd, 120,000 tonnes and Terrace, 82,000 tonnes.

21 Scace, M. "After over two decades in Prince George, Pacific Bioenergy pellet mill shuts down: As B.C.'s fibre supply continues to dwindle, it became impossible to continue company operations, company's president said." *Prince George Post*. March 4, 2022. Accessed January 24, 2024. https://www.princegeorgepost.com/news/local-news/after-over-two-decades-in-prince-george-pacific-bioenergy-pellet-mill-shuts-down.

A supply crisis – Part 2 Wildfires

While over-cutting of the province's forests is the decisive factor in the steady decline in logging rates and the commensurate rise in the number of mills closing, it is not the only issue that will constrain wood pellet exports from BC in future years. The increasing frequency and severity of wildfires is also emerging as a potentially significant constraint on future timber supply.

In 2022, more than 2,200 wildfires ignited in BC. The total area burned was 2.5 million hectares, or 25,000 square kilometres, which represents 2.6% of the province's land base burned in a single year. This was nearly double the area burned in 2018, which was the previous record for the province and that bested the record set in 2017. Of note to Japan, the area of BC forest burned in 2022 was nearly twice as large as Nagano prefecture and more than 11 times Tokyo's landmass.

In September 2022, the provincial government issued revised estimates and increased the amount of money it expected to spend fighting wildfires that year to $1 billion, a figure nearly twice that of 2017, which established a record then for firefighting costs.[22] The vast majority of forests burned were in the northeast of the province, where as much as two million hectares of land were scorched.

The BC government is trying to provide incentives to log burned forests, expressly offering numerous First Nations opportunities to harvest trees from such landscapes.[23] But the area of

22 City News. "2023 B.C. wildfire costs 'highest ever', finance minister says". September 27, 2023. Accessed January 24, 2024. https://vancouver.citynews.ca/2023/09/27/2023-bc-wildfire-costs-record.

23 British Columbia. "New forestry agreements with First Nations accelerate wildfire salvage." November 16, 2022. Accessed January 24, 2024. https://news.gov.bc.ca/releases/2022FOR0078-001723.

Part of the massive Donnie Creek forest fire that burned in northeast BC in 2023. Photo: BC Wildfire Service.

burned forest is so vast it is unlikely that more than a small fraction will be logged before the burned trees lose their economic value. The government acknowledged as much in 2018 stating that "trees killed or badly damaged by wildfire begin deteriorating immediately, and commercial value declines rapidly."[24] Logging such forests too aggressively also carries with it potentially grave ecological costs as wildfires alter landscapes in ways that benefit many species.

"For birds, fire is associated with higher diversity, rivalling the effects of productivity on richness, and for mammals, fire's positive association with diversity is even stronger," a team of scientists said in the journal, Ecology Letters, in April 2023.[25]

Given this, it is difficult to see how the enormous area of forestland burned in BC (in excess of 2% of the provincial land base in 2023) will not result in reduced availability of wood fibre, with consequences for pellet makers and buyers alike.

24 Nicholls, D., T. Ethier. *Post-Natural Disturbance Forest Retention Guidance: 2017 Wildfires*. Ministry of Forests, Natural Resource Operations and Rural Development. January 19, 2018. Accessed January 24, 2024.https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/2017_fire_report_revised.pdf.

25 Moritz Max A., E. Batllori and B. Bolker. "The role of fire in terrestrial vertebrate richness patterns." *Ecology Letters* Volume 26, Issue 4. February 11, 2023. Accessed January 26, 2024. https://onlinelibrary.wiley.com/doi/full/10.1111/ele.14177#:~:text=For%20birds%2C%20fire%20is%20associated,there%20are%20few%20clear%20associations.

A supply crisis – Part 3 Increased forest conservation

As primary forests shrink and are fragmented by industrial logging in BC and elsewhere in Canada, pressure has mounted on the provincial and federal governments to do more to protect some of what remains.

In response, the provincial government recently announced a $300-million fund to assist First Nations to protect areas of old-growth or primary forests within their territories.[26] The funding commitment followed a pledge by the Canadian government to conserve 30% of the country's lands and waters by 2030.[27]

Both announcements came after the provincial government commissioned an independent strategic review of how the province manages old-growth forests; a review that prompted the government to appoint an independent panel including foresters and biologists that

26 British Columbia. "Province launches made-in-B.C. conservation tool, takes further action on old-growth forest." October 26, 2023. Accessed January 24, 2024. https://news.gov.bc.ca/releases/2023FOR0061-001662#:~:text=Together%2C%20this%20%24300%20million%20will,for%20low%2Dcarbon%20economic%20opportunities.

27 Government of Canada. "Government of Canada recognizing federal land and water to contribute to 30 by 30 nature conservation goals." December 9, 2022. Accessed January 24, 2024. https://www.canada.ca/en/environment-climate-change/news/2022/12/government-of-canada-recognizing-federal-land-and-water-to-contribute-to-30-by-30-nature-conservation-goals.html#:~:text=The%20federal%20government%20has%20set,maintain%20a%20strong%2C%20sustainable%20economy.

recommended logging be deferred in 2.6-million hectares of old-growth forest in the province.[28] Protecting just half that amount of forest would amount to an area as large as Japan's Nagano Prefecture and five times the size of Tokyo's land mass.

It is likely that more primary forest will be conserved in BC, which will result in a further tightening of "timber supplies" for the logging industry and for buyers of wood products from BC, including wood pellets.

Into the hinterland

With less and less wood fibre available, a company called Peak Renewables has proposed to build what would be by far Canada's largest wood pellet mill in the boreal forest in the remote northeast corner of BC. If built, the proposed mill would be located in Fort Nelson, the northern-most community of any size in the province. The mill's proponents state it would produce 600,000 tonnes of wood pellets per year, which would mean an output 50% greater than the largest pellet mills currently operating in the country.[29]

The estimated area of forestland that would have to be logged each and every year to keep the pellet mill operating would be approximately 100 square kilometres.

The mill's formidable processing horsepower is not its most distinguishing feature. Far more consequential is that the proposed facility would use no wood chips or other residual wood fibre at all. That is because there are no sawmills operating in Fort Nelson and the nearest sawmills of any size are more than 400 kilometres away.

Wood to make pellets at the proposed Fort Nelson operation would come directly from trees logged in the region's forests. With roughly two cubic metres of wood needed to make each tonne of wood pellets, 1.2 million cubic metres of trees would be required to feed the proposed mill, which in the Fort Nelson area equates to roughly 1.2 million trees per year. The estimated area of forestland that would have to be logged each and every year to keep the pellet mill operating would be approximately 100 square kilometres.

After details emerged about the proposed facility and how it would rely exclusively on whole trees to make wood pellets, condemnation of the project emerged from a most-unusual source—the industry association representing wood pellet makers across Canada. In a commentary published in Canadian Biomass magazine in February 2021, Gordon Murray, executive

28 Gorley, A. and G. Merkel. *A New Future for Old Forests: A Strategic Review of How British Columbia Manages for Old Growth Forests Within its Ancient Ecosystems.* April 30, 2020. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf.

29 Parfitt, B. "Trees to Pellets? Fort Nelson's Future Hangs in the Balance." The Tyee. February 17, 2021. https://thetyee.ca/Analysis/2021/02/17/Trees-Pellets-Fort-Nelson-Future-Hangs-Balance.

director of the Wood Pellet Association of Canada (WPAC) (an industry association whose member companies include Drax) said WPAC opposed the project.

"WPAC does not support wood pellet manufacturing proposals that are predicated on the large-scale harvesting of forests for the sole purpose of pellet production," Murray wrote, adding that his organization had been "inundated" with calls after details of the Peak Renewable plan were published by the CCPA.[30]

A mighty earthquake and Japan's energy insecurity

The country importing more wood pellets from Canada than any other did not seriously consider bioenergy as a significant energy source until March 11, 2011 when its energy vulnerability was thrust violently into the spotlight. The earthquake that occurred that day—"The Great East Japan Earthquake"—was among the most powerful ever recorded.

The epicentre of the 9.1 magnitude event was 130 kilometres out in the Pacific Ocean east of the coastal city of Sendai and caused the Pacific seabed to shift by as much as 24 metres in an east-west motion triggering a tsunami that caused tremendous loss of life and damage to buildings and infrastructure, particularly on eastern Japan's low-lying coastal plain.[31] More than a decade later, the legacy of the earthquake and tsunami is still evident. Entire coastal neighbourhoods destroyed during the event were not rebuilt and instead new housing was constructed further inland. New roads and rail lines were also built further inland on raised beds, and riverbanks were also raised and fortified in an effort to contain future tsunami surges.

The earthquake and tsunami triggered an outpouring of public opposition to nuclear power.

The natural catastrophe also had a lasting impact on Japan's energy supplies. At the time of the disaster, a number of nuclear reactors provided 30% of Japan's power supply and the country had ambitions to increase the sector's share to 41% by 2017 and 50% by 2030. Such growth was seen as one way to reduce Japan's dependence on imports of fossil fuels.[32]

The earthquake and tsunami triggered an outpouring of public opposition to nuclear power, which continues to this day in a large segment of Japan's population, and the government took the extraordinary step of shutting down not just the reactors that were vulnerable to tsunamis but all reactors. At the time of the disaster, 11 nuclear reactors at four facilities operated in the

30 Murray, G. "Opinion: Trees must go to their highest and best use, our business depends on it." *Canadian Biomass Magazine*, Wood Pellet Association of Canada. February 22, 2021. Accessed January 24, 2024. https://www.canadianbiomassmagazine.ca/trees-must-go-to-their-highest-and-best-use-our-business-depends-on-it.

31 Lovett, R. A. "Japan Earthquake Shifted Seafloor by 79 feet." *National Geographic News*. May 11, 2011. Accessed January 24, 2024. https://www.nationalgeographic.com/science/article/110519-japan-earthquake-tsunamis-science.

32 World Nuclear Association. "Nuclear Power in Japan." Updated January 2024. Accessed January 24, 2024. https://world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx.

A new pellet-burning thermal plant under construction in Sendai. Photo: Conservation North.

tsunami zone. All were immediately shut down after the event. Eight of the downed facilities had access to power, which allowed them to operate their heat removal system cooling pumps and achieve a safe shutdown.[33] But that was not the case at the Fukushima Daichi facility where all power supply including backup generators was lost when the facility was flooded by the 15-metre tsunami. According to the World Nuclear Association (WNA), it took weeks of round-the-clock work, some valiantly performed by employees at the reactor who had lost family members in the disaster, to restore heat removal functions on site and cool down the over-heated spent fuel ponds.

In the intervening years, only one of those 11 reactors—the No. 2 Onagawa reactor—has been approved for a re-start by the Miyagi prefectural government and two local municipalities. Presently, Japan has 33 operable reactors, but only 10 have received regulatory approval to restart.

33 World Nuclear Association. "Fukushima Daiichi Accident." Updated August 2023. https://world-nuclear.org/information-library/safety-and-security/safety-of-plants/fukushima-daiichi-accident.aspx.

All of this had a profound impact on the island nation's energy supply, which services the needs of approximately 125 million people. Nuclear power's share of that energy supply now sits at just 4.8%. To make up for the shortfall, energy production from other sources was ramped up including fossil fuels (primarily liquefied natural gas and coal), solar power and bioenergy.[34] In April 2023, the Institute for Sustainable Energy Policies reported that solar power accounted for nearly 10% of Japan's electricity production, up from 9.3% the year before, while biomass power generation stood at 4.6%, up from 4.1%.[35] Despite these increases, nearly three quarters of Japan's electricity was generated by burning fossil fuels including liquefied natural gas (nearly 30% of total electricity generation) and coal (nearly 28%).

In an attempt to end the country's reliance on fossil fuel imports and make progress toward its commitment to "net zero" greenhouse gas emissions by 2050, Japan's government led by Prime Minister Fumio Kishida has proposed that the remainder of the country's idled nuclear reactors be reopened as well as a new generation of reactors built. The nuclear re-set is part of the government's self-described "green transformation" plans and comes despite a large segment of the Japanese population remaining opposed to any expansion of nuclear power in the country, although such opposition may be softening.

In June 2022, a poll by the Nikkei business paper found that a slim majority of respondents (53%) favoured putting nuclear reactors back into service provided they could be operated safely. This marked the first time since 2011 that support for nuclear exceeded opposition, The Guardian reported.[36] Still, with the country divided on nuclear, Japan remains committed to promoting bioenergy and other allegedly "renewable" forms of power such as solar and wind both as a means of meeting its energy needs and addressing climate change.

Japan remains committed to promoting bioenergy.

A policy lever employed by the Japanese government to speed up renewable energy production is its feed-in tariff system or FIT. Under FIT, energy utilities purchase electricity at favourable rates and durations set by the federal Ministry of Economy, Trade and Industry (METI). The end users of the energy then pay a surcharge to help cover the costs of the renewable portion of the energy supply.[37] FIT has been instrumental in spurring the growth of the solar and bioenergy sectors in Japan, the latter of which continues its share of upward growth trend.

34 Yamaguchi, M. "Japan records steepest population decline while number of foreign residents hits new high." Associated Press. July 26, 2023. Accessed January 26, 2024. https://apnews.com/article/japan-population-decline-foreign-low-births-d047ea6136a5c66ffc45508cb824d5f1.

35 Insititute for Sustainable Energy Policies. *2022 Share of From Renewable Energy Sources in Japan (Preliminary)*. April 26, 2023. Accessed January 26, 2023. https://www.isep.or.jp/en/1436.

36 McCurry, J. "'A form of self-destruction': Japan weighs up plan to expand nuclear power." The Guardian. November 30, 2022. Accessed January 24, 2024. https://www.theguardian.com/world/2022/nov/30/a-form-of-self-destruction-japan-weighs-up-plan-to-expand-nuclear-power.

37 Ichigo Green. "The introduction of Japan's FIT System for Renewable Energy." Accessed January 24, 2024. https://www.ichigo-green.co.jp/en/operation/purchase/#:~:text=Under%20Japan's%20FIT%20system%2C%20electric,of%20the%20total%20power%20supply.

A memorial to schoolchildren and others to die during the 2011 earthquake, steps from a new pellet-burning plant in Sendai. Photo: Conservation North.

A report by the US Department of Agriculture's Foreign Agricultural Service found that as of 2023, METI had qualified 900 biomass power plants in Japan with a combined capacity of 8.3 gigawatts of capacity for credit under Japan's feed-in tariff program.[38] To date, less than half of that approved capacity is installed, meaning there is tremendous potential for many more thermal electricity plants to be built in Japan—plants that would increase the country's importation of wood pellets from Canada, the United States and Vietnam as well as palm oil residues from Indonesia and Malaysia.

During fieldwork in Japan in November and December 2023, the CCPA was able to visit a number of thermal electricity plants under construction, nearing completion or recently completed and operating. The new plants were all located on low-lying coastal lands either in or to the north of Sendai, the city that was closest to the epicentre of the 2011 earthquake. Questions are being raised about just where the resources will come from to meet the ever-expanding

38 United States Department of Agriculture. *Japan Biomass Annual 2013.* August 10, 2023. https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Japan%20Biomass%20Annual%202023_Tokyo_Japan_JA2023-0071.pdf.

energy demand. Land to grow trees, or other materials to be burned for energy, is in limited supply and faces demands that go well beyond the needs of bioenergy producers.

Land poverty

In addition to rejecting claims that burning wood pellets is a climate solution, scientists note that the increased usage of bioenergy and other non-fossil forms of energy, such as wind power and solar power, will come at considerable cost to lands and natural resources.

All energy forms rely on processed raw materials, be it the massive amounts of steel, concrete and mined and enriched uranium used in nuclear power plants, the aluminum and lithium used respectively in solar frames and panels, the immense amounts of copper and aluminum used in wind turbines, the voluminous amounts of fine-grained sand and water used in natural gas fracking operations, or the rare-earth metals and copper that are essential to power electrical vehicles, cellphones and computers, to name just a few. The big strike against bioenergy is that ramping up production beyond the immense amount of such energy already being produced will intensify pressure on forests, which are in finite supply and which are vitally important carbon storehouses.

In November 2023, the respected international policy institute, Chatham House, issued a comprehensive report on how rising competition for land threatens international and environmental security.[39] A key finding of the report is that while there is a clear need to reduce greenhouse gas emissions, accelerating the switch from burning fossil fuels to using other energy sources will come at significant cost. "With global energy demand increasing, a rapid transition from fossil fuels is vital if the worst effects of climate change are to be avoided," the report's authors state. "However, renewable energy sources generally require more land. This is particularly true for bioenergy, which requires upwards of 1,000 times as much land as fossil alternatives per megawatt hour (MWh) generated."

Renewable energy sources generally require more land.

While birth rates are slowing, the world's human population continues to climb and is expected to reach 9.8 billion by 2050 (up from 8.1 billion today) and will continue upward until 2080 before falling.[40] Current patterns of energy and food consumption cannot be sustained, the Chatham House report's authors warn, arguing that short of dramatic shifts in food consumption, massive increases in new tracts of land devoted to farming will be required. In less than one generation, or by 2050, one billion hectares of new land devoted to food production—an

39 King, R., T. Benton, A. Frogatt, H. Harwatt, D. Quiggin and L. Wellesley. *The emerging global crisis of land use: How rising competition for land threatens international and environmental stability, and how the risks can be mitigated.* Chatham House. November, 2023. Accessed January 24, 2024. https://www.chathamhouse.org/sites/default/files/2023-1½023-11-22-emerging-global-crisis-land-use-king-et-al.pdf.

40 United Nations Department of Economic and Social Affairs. "World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100." Accessed January 26, 2024. https://www.un.org/en/desa/world-population-projected-reach-98-billion-2050-and-112-billion-2100.

area roughly the size of Canada—could be needed to feed humanity without dramatic changes in what we eat and how we grow our food, the report concludes. At the same time, attempting to radically re-order the world's primary sources of energy will place formidable demand on land as well.

Wood is currently the primary bioenergy feedstock for thermal electricity and heat.

According to the International Energy Agency, biomass-based energy accounted for 9.5% of the world's primary energy supply in 2018, making it at the time the largest "renewable" energy source on the planet.[41] That translates into a tremendous demand on both forests and farmland, the latter of which likely began as forest before it was logged to make way for crop production or grazing lands. According to The Union for the Promotion of Oil and Protein Plants, wood is currently the primary bioenergy feedstock for thermal electricity and heat, while maize, sugarcane, palm oil, soybean oil and rapeseed oil are the primary sources for biofuels.[42] Any increase in demand for bioenergy will come at the expense of more demands from finite and increasingly threatened forest ecosystems around the world, either forests cleared to make way for more farmland or intensified use of forests and tree plantations. In other words, more "green" energy from wood will ultimately come at the expense of less green in the form of healthy, biologically rich and diverse primary forests.

The authors of the Chatham House report warn, the bioenergy industry's demands on land and resources stand to increase further in the event that companies like Drax take the additional step of capturing the carbon emitted during the combustion of all those pellets and attempt to capture such emissions, process them and pump them underground for storage. (In early 2024, the company received regulatory approval from the UK government to do just that at its massive thermal plant in North Yorkshire.)[43]

41 International Energy Agency. *The Oil and Gas Industry in Energy Transitions.* January, 2020. Accessed January 26, 2024. https://iea.blob.core.windows.net/assets/4315f4ed-5cb2-4264-b0ee-2054fd34c118/The_Oil_and_Gas_Industry_in_Energy_Transitions.pdf.

42 King, R., et al.

43 United Kingdom. "Drax Bioenergy with Carbon Capture and Storage Project development consent decision announced." January 16, 2024. Accessed January 26, 2024. https://www.gov.uk/government/news/drax-bioenergy-with-carbon-capture-and-storage-project-development-consent-decision-announced.

Six essential policy shifts

This report has provided details on the rapid rise in the production and export of wood pellets from Canada to Japan, the UK and Korea, with exports from BC outstripping those of any other Canadian province. The growth in exports comes at a critical juncture for forests in western Canada. Logging rates are falling and mills are closing. Wildfires are burning with greater frequency, intensity and duration. And there is growing pressure on both the federal and provincial governments to conserve more of what remains of the country's primary forests.

The growth in exports comes at a critical juncture for forests in western Canada.

Unless there are significant changes in forest policy, the likelihood is that even more of the shrinking stock of primary forests in BC and Canada will be logged to supply bioenergy companies with wood pellets, an eventuality underscored by a proposal to build the largest wood pellet mill yet in Canada, in the remote boreal forests outside of Fort Nelson, BC. With both the Canadian and federal governments acknowledging a deepening biodiversity crisis in the country, shifts in policy are needed.

This report advocates for six policy reforms:

- Increase dramatically protection of remaining primary and old growth forests in the province as recommended to the provincial government in October 2021 by a panel appointed by the government to guide the conservation of old-growth forests.
- Zone the province's forests and existing plantations into three broad categories: fully conserved primary and old-growth forests; forests and plantations managed specifically to enhance key "non-timber" resources such as water and wildlife; and lastly a portion of previously logged lands to be managed for timber production and forest products, but with ecological guidelines that must be met.

- Require by law that all timber-processing, including wood pellet mills, must submit annual reports detailing all wood used at their facilities, with a clear, verifiable breakdown of what form that wood takes.
- Strictly prohibit pellet mills from converting trees logged in primary or old growth forests directly into wood pellets and require that pellet producers only use the residual waste from sawmills, verifiable wood waste from logging sites, or thinnings from tree plantations as sources of raw material for pellet production.
- Apply the carbon tax to all emissions associated with logs or wood waste that is currently burned as "slash" at logging operations. This will act as an incentive to either leave such wood unburned at logging sites or to bring it into mill towns where it could be used to make a range of forest products, including, but not limited to, wood pellets.
- Enact a solid-wood-first strategy and penalize all companies that convert logs or portions of logs to wood pellets that could instead be used to make other forest products.

PROTECTING PRIMARY AND OLD-GROWTH FORESTS

Policy recommendation 1: *Increase dramatically protection of remaining primary and old growth forests.*

Such increases in protection will require financial compensation to those First Nations whose traditional lands are most directly impacted by such decisions.

The first and most-important policy shift is for the governments of British Columbia and Canada to commit fully to the conservation of more primary forests. Scientists repeatedly warned both levels of government that the future of many imperilled plant and animal communities depends on adequate protection of primary forests.

Most recently, the BC government received a report from a panel it appointed to guide efforts to conserve more old-growth forests.[44] The panel's report recommended logging deferrals in 2.6 million hectares of old growth and primary forest in the province. A subsequent CCPA report suggests, however, that within the provincial Ministry of Forests bureaucracy there is resistance to following through on this commitment.[45] It is imperative that government leaders instruct the ministry to honour the government's commitments to increase protection of the remaining old-growth and primary forests.

Such increases in protection will, by necessity, require financial compensation to those First Nations whose traditional lands are most directly impacted by such decisions. The need for such compensation was acknowledged by the BC government

44 Old Growth Technical Advisory Panel, *Priority Deferrals: An Ecological Approach*, October 2021. Accessed March 11, 2024. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/summary_for_g2g_package.pdf.

45 Parfitt, Ben. *Leaked data reveals new threat to BC's old growth forests*. Canadian Centre for Policy Alternatives. March 7, 2024. Accessed March 11, 2024. https://www.policynote.ca/old-growth-leak.

in October 2023 when it announced a new $300-million fund to assist First Nations in conservation efforts.

"The new Conservation Financing Mechanism will add further First Nations-led protections for the beautiful lands and waters that are integral to who we are as British Columbians and to First Nations' culture and way of life," Nathan Cullen, BC's Minister of Water, Land and Resource Stewardship, said of the funding. "We call on other groups and individuals to contribute to this fund, which will help protect the remarkable forests and diverse ecosystems that people, communities and wildlife depend on."[46]

It will take some time until that program's effectiveness can be weighed against new areas of primary forest conserved in the province, and in particular the degree to which those conserved forests align with the significant scientific advice given the BC government. Science must drive decisions on what forests are conserved, not interest-based negotiations, where business interests typically prevail.

ZONING FORESTLANDS

Policy Recommendation 2: *Zone the province's forests and existing plantations into three broad categories: fully conserved primary and old-growth forests; forests and plantations managed specifically to enhance key "non-timber" resources such as water and wildlife; and lastly a portion of previously logged lands to be managed for timber production and forest products, but with ecological guidelines that must be met.*

Hand-in-hand with increases in forest area protected is zoning forestlands that is long overdue and vital to establishing a new regime in the province where both forest conservation and a revamped, less timber-centric forest management regime prevails. Zoning forestlands is not a new concept. It has been promoted for decades.

In 1997, Clark Binkley, then dean of the faculty of forestry at the University of British Columbia, noted that the "implicit assumption" in the province was that "virtually the whole forested land base would, one day, be available for timber production."[47]

"This policy has clearly failed to satisfy legitimate demands from the environmental community or to produce the predictably high levels of timber harvest needed to sustain the forest

46 British Columbia. "Province launches made-in-B.C. conservation tool, takes further action on old-growth." October 26, 2023. Accessed January 26, 2024. https://news.gov.bc.ca/releases/2023FOR0061-001662#:~:text=Together%2C%20this%20%24300%20million%20will,for%20low%2Dcarbon%20economic%20opportunities.

47 Binkley, Clark S. "Preserving Nature through intensive plantation forestry: The case for forest allocation with illustrations from British Columbia." *Forestry Chronicle*, Vol. 73, No. 5. September/October, 1997. Accessed January 26, 2024. https://pubs.cif-ifc.org/doi/pdf/10.5558/tfc73553-5

products industry and industry-dependent communities," Binkley wrote, before touching on the theme of land scarcity addressed in the Chatham House report.

"The core problem is that, despite a vast forest estate in British Columbia, land has become scarce," he wrote.

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Binkley advocated for an end to viewing the whole of the province as one giant, seemingly inexhaustible wood fibre basket and for creating a network of forest zones where forest conservation was given its due and dedicated parcels of land would grow trees to make forest products.

"Such a policy could lead to substantial higher, sustainable timber harvests as well as a system of parks that covers more than half of the Province," Binkley wrote.[48]

It is sad commentary that in the ensuing 27 years successive provincial governments failed to pursue some form of zonation. The result is a deeper, more-profound biodiversity and forest industry employment crisis, with roughly a halving of the industry workforce in just 20 years. A 2020 report on the future of old-growth forests commissioned by the BC government and written by professional foresters Al Gorley and Garry Merkel also advocated for zoning.

Their report began by noting that nearly 30 years earlier, the provincial government of the day had received another report on the future of old-growth forests, which had advocated for a three-zone concept where significant chunks of forest were conserved, other forests that had already been logged were dedicated for future timber production, and still other forests were identified to be managed to maintain the attributes of older, more-biologically diverse forests.

"The current management system has gone part way to this three-zone conservation framework by assigning biodiversity emphasis areas for the setting of old growth targets, but there is no definitive, legally established zoning as was originally envisioned," Al Gorley and Gary Merkel wrote in 2020.

They added, "We believe there is an opportunity to bring greater certainty to the management system, achieve a more optimal mix of public benefits, and encourage innovation, by formalizing this three-zone concept."[48]

FULL DISCLOSURE

Policy recommendation 3: *Require by law that all timber-processing, including wood pellet mills, must submit annual reports detailing all wood used at their facilities, with a clear, verifiable breakdown of what form that wood takes.*

48 Gorley, A. and G. Merkel.

BC's Ministry of Forests has long-maintained a database known as the Harvest Billing System that provides a wealth of information on what trees are logged in the province.[49] Members of the public can use the database to configure specific searches for information that will reveal among other things:

- The volume of trees logged in a particular area.
- The species of tree logged and whether the trees yielded high- or low-value logs.
- Where logs are scaled or measured to assess the volume and value of wood (This is often done at the mill site where the logs will be processed into lumber or other products.).
- The name of the company or entity that owns the rights to log the trees.
- The money paid to the province by the logging entity. In BC, fees known as stumpage, must be paid for all trees cut on publicly owned or "Crown" lands.

This information must be provided to the provincial government by all businesses logging the province's forests and is a reflection of the public ownership of BC's forests. Almost all BC forests belong to the people of the province, with 94% of the land base publicly owned or "Crown" land. Only 6% is private land, the bulk of it on southern Vancouver Island.

While companies, individuals, Indigenous and non-Indigenous communities have all been approved by the provincial government to log certain forests, the quid pro quo is that stumpage fees are collected on the trees that are logged. These fees provide a public benefit and members of the public have access to information on what is logged. Fees are not collected from First Nations for logs coming off of treaty lands or from private landowners. However, all logs originating on treaty and private lands must be reported as being logged. As important as such data is, there are shortcomings. It is exceedingly difficult to fully track how many logs are moving to specific mill sites, including pellet mills, and the quantity of residuals in the form of chip trucks that are moving from one mill to another. Therefore, there is little opportunity for members of the public to verify pellet company statements that the wood used in pellet production is, overwhelmingly, sawmill residuals.

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Under Section 136 of the province's Forest Act, all companies including sawmills, pulp mills and pellet mills must maintain records on all wood delivered to their facilities. This includes both information on the logs delivered to such mills, but also "wood residue" such as wood chips. This information must then be furnished to the provincial Forests minister.[50] This information is not published by the government, but should be as it would provide data to corroborate pellet company statements that the wood used is overwhelmingly from mill residues and not from whole trees. It would also allow the public to better

49 British Columbia. "Harvest Billing System (HBS)." Accessed January 24, 2024.

50 British Columbia. Forest Act. Accessed January 26, 2024. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96157_11#section136

understand trends. Are more logs from publicly owned forests entering pellet mills over time as the number of sawmills in the province diminishes? If so, what are the implications for the province's forests and what are the implications for climate when more trees are logged and then turned directly into a product to be burned?

Greater transparency is required both in the countries where wood pellets are made and in the countries where they are consumed if the pellet industry's claims of carbon neutrality are to be substantiated.

PROHIBIT CONVERSION OF PRIMARY FORESTS INTO WOOD PELLETS

Policy recommendation 4: *Strictly prohibit pellet mills from converting trees logged in primary or old-growth forests directly into wood pellets and require that pellet producers only use the residual waste from sawmills, verifiable wood waste from logging sites, or thinnings from tree plantations as sources of raw material for pellet production.*

The largest wood pellet operator in BC frequently states that it uses few logs to make its wood pellets. But the visual record suggests otherwise as do recent investigations by respected news outlets in the United Kingdom and Canada.

Cutting down trees in primary forests and converting them directly into wood pellets has been roundly criticized on environmental and climate grounds by scientists and should to the full extent possible be prohibited. To ensure that logs are not directed to pellet mills, the provincial Ministry of Forests should dedicate sufficient resources to scrutinizing wood flows to pellet mills, something that may require increases in "scaling" inspections and/or scaling staff increases. Log scalers are trained to evaluate log volumes and log values.

DISCOURAGE WASTEFUL, CARBON-EMITTING SLASH-BURNING

Policy recommendation 5: *Apply the carbon tax to all emissions associated with logs or wood waste that is currently burned as "slash" at logging operations. This will act as an incentive to either leave such wood unburned at logging sites or to bring it into mill towns where it can be used to make a range of forest products, including, but not limited to, wood pellets.*

After logging, companies typically push the waste wood left over into piles known as slash and then deliberately set the slash piles on fire in the late fall on grounds that this will reduce the risk of such wood subsequently burning up in uncontrolled wildfires. The greenhouse gas emissions associated with such burning activities are substantial and should be discouraged. Drax and other companies claim that wood found in such piles is ideally suited to conversion to wood pellets. Yet burning the piles continues largely unabated.

In 2017, BC's then-environment minister was instructed by the premier to extend the carbon tax to cover all logs and logging slash left behind at logging sites and then deliberately burned to reduce the risk of the material subsequently burning in uncontrolled wildfires.[51] Seven years later, the provincial government has yet to follow through on this commitment. Doing so is long overdue.

SOLID WOOD FIRST

Policy Recommendation 6: *Enact a solid-wood-first strategy and penalize all companies that convert logs or portions of logs to wood pellets that could be used to make other forest products. Solid wood products like doors or the lumber used to frame a house hold onto the carbon originally sequestered by the tree, while wood pellets instantaneously release all their stored carbon upon combustion.*

Burning wood has an immediate climate impact that is only offset over decades by the carbon stored in new trees as they grow. The less wood burned, the less greenhouse gas emissions. Trees cut down and converted immediately into wood pellets to be burned by the millions of tonnes each year at thermal electricity plants around the world constitutes a significant and growing source of greenhouse gas emissions. The more such plants, the greater the demand will be for the wood fibre to feed them.

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As noted earlier, wood pellet mills in BC already turn prodigious numbers of logs directly into pellets. In addition, the logs are a major source of raw material along with the waste wood purchased from nearby sawmills. An outstanding question is what may happen in the face of further sawmill closures. Will such closures force pellet mill owners to increase the number of whole logs they process to make up for the shrinking supply of sawmill residuals? From a climate perspective, a tree cut down and made into a solid wood product is far more desirable than cutting a tree down and converting it into a product to be burned.

When the wood from a tree becomes a door, window frame or other solid product, the carbon stored in the tree continues to be stored and will do so until those products are either landfilled or burned. Even after the logs used to make such products have been run through a mill it is often the case that the waste left over still contains valuable wood fibre that can be put to use in ways that do not require that fibre to be burned. Pellet industry assertions that there is no other use for such waste are self-serving and do not stand up to scrutiny.

One forest product company in north central BC that exemplifies a solid wood first approach is based in Vanderhoof, a town about an hour's drive west of Prince George. The company—Vanderhoof Specialty Wood Products—manufactures high-value boards known as finger-jointed lumber. Finger-jointing is the process whereby short pieces of wood—often the trim ends

51 Parfitt, B. "Up in smoke: B.C. backtracks on promise to deter logging industry from burning wood waste." *The Narwhal*, March 23, 2020. Accessed, January 28, 2024.

left over as waste at sawmills—are cut in a zigzag pattern on their ends and then glued and pressed together with other similarly processed wood pieces to make longer pieces of lumber.[52] This type of higher-value wood product cuts down dramatically on the amount of waste or rejected wood left over at sawmills and later chipped as sawmill residuals.

The Vanderhoof operation takes what truly is waste and turns it into wood pellets. The difference between the Vanderhoof pellet operation and Drax's myriad pellet operations is the Vanderhoof mill is a fully integrated operation owned by a single company where multiple products are made with so-called "waste" moving from one product line to the other. The nearby pellet mills operated by Drax were built to handle very large volumes of wood both from nearby sawmills and logs taken directly from the forest. Another notable difference in the two types of pellet operations is scale.

The BC government should actively promote a solid-wood-first strategy in the province.

The most-recent report by the BC government on timber processing facilities in the province notes that the pellet mill in Vanderhoof has an estimated annual output of 33,000 tonnes per year, whereas the nearest Drax-owned pellet mill in Burns Lake has a capacity more than eight times greater, at 271,000 tonnes per year.

To the full extent possible, the BC government should actively promote a solid-wood-first strategy in the province. To encourage that outcome, the government should penalize all companies that make wood pellets from wood that could otherwise be turned into solid wood products. The penalty would be in the form of a reforestation or restoration levy requiring pellet companies to directly pay for incremental tree-planting and tree-tending costs equivalent to the volume of wood they used and that could have been used for other purposes.

52 Vanderhoof Specialty Wood Products. "About Us." Accessed January 26, 2024. https://www.vswp.ca/about-us/.

Conclusion

For decades, governments and logging companies in heavily forested jurisdictions throughout Canada have asserted that their forests are well-managed and that trade partners can reliably count on them supplying forest products now and in the future. In recent years such claims have been increasingly discredited.

Declining logging rates, rising mill closures and forest industry job losses, more frequent and severe wildfires, and increased national and international indignation and protest over the continued loss of old-growth and primary forests have combined to underscore just how unsustainable the industrial forest enterprise as currently defined is. The slide has only deepened and the stakes have become higher over the past 20 years as a new wood-consuming enterprise took root in BC and began to spread across the country. The rapidly expanding number of wood pellet mills has added a new layer of demand for wood fibre from forests that can only yield so many trees, while simultaneously deepening the global climate crisis.

The prudent choice is to acknowledge the fundamentally unsustainable nature of the current industrial forestry and pellet enterprises and institute necessary policy reforms that conserve more forests and place a premium on forest products that do the least climate harm.

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