Shortcomings in Canadian Regulation of Wood Biomass Used to Generate Electricity: A Report to Inform Engagement with Proposed *Clean Electricity Regulations*

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EXECUTIVE SUMMARY

Environment and Climate Change Canada ("ECCC") is in the process of developing *Clean Electricity Regulations* ("*CER*") to advance the federal government's climate change mitigation commitments and, in particular, the federal goal of achieving a net-zero electricity sector by 2035. It is anticipated that draft regulations will be published in the *Canada Gazette, Part I* in the near future, creating an opportunity for public review and commentary.

Wood biomass is a fuel source that many jurisdictions have accepted as a source of "clean" or "renewable" energy. ECCC's stakeholder outreach on the *CER* suggests that wood biomass may be considered a source of "clean" electricity advancing the federal government's goal of achieving a net-zero electricity sector; however, ECCC has also posed several pertinent questions concerning its use. These questions reflect a number of longstanding concerns about the use of wood biomass to generate electricity—in particular, concerns about the risks of spurring land-use changes and nature degradation by expanding or creating new markets for wood biomass intended for use as fuel.

The regulation of wood biomass used to generate electricity is inherently complex, because relevant laws are not found exclusively within electricity-sector legislation. When wood biomass is harvested from forests, forestry-sector legislation and unlegislated certification schemes play a significant role in determining what products are brought to market and how. Additionally, domestic and international laws addressing carbon pricing, forest carbon and electricity-sector accounting, greenhouse gas ("GHG") emissions reporting, the avoidance of deforestation and forest degradation, and global commitments to halt and reverse biodiversity loss all shape the perception and reality of wood biomass's virtue as an electricity fuel.

As regards climate change and the dire need to reduce GHG emissions in Canada and around the world, there is no question that burning wood biomass to generate electricity produces GHGs in amounts far greater than other common sources of "clean" or "renewable" electricity, such as wind energy, solar energy, and hydropower. In fact, using wood biomass to generate electricity produces more GHGs than coal per unit of energy produced. The rationale for accepting wood biomass as a "clean" or "renewable" source of electricity notwithstanding its significant GHG implications is that trees and other woody vegetation are part of a natural carbon cycle in which carbon is sequestered, released, and sequestered continuously. Law, policy, and political commentary in this sphere often reflect a presumption that as new vegetation grows after existing vegetation is harvested and burned, the continuous cycle of sequestration and release will neutralize carbon dioxide contributions to the atmosphere over time. There are a number of complications with this presumption, however, as this report explores.

The climate change implications of using wood biomass to generate electricity are in many ways inextricable from national and international concerns about deforestation, forest degradation, and biodiversity loss. Although it is possible to harvest some wood biomass from forests without causing deforestation or forest degradation, there is a danger that expanding or creating new markets for wood biomass fuel will motivate intensified, unsustainable, and economically perverse harvesting practices, in which living trees and harvested wood are not being put to their highest and best ecosystem services and product uses. Additionally, expanded or new markets for

wood biomass fuel that is not sourced from forests carries the risk of motivating the conversion of forest lands to agricultural lands where feedstocks for such fuel can be grown. Scenarios such as these are incompatible with climate change mitigation, global commitments to halt and reverse biodiversity loss, and the international community's sustainable development goals. Some jurisdictions recognize these interconnections and are taking steps to regulate forestry, land-use change, and renewable energy generation in coordinated ways, but sophisticated and holistic regulation of this kind has not yet been implemented across the board in Canada.

This report was prepared to support and inform engagement by the Conservation Council of New Brunswick ("CCNB") on the development of the *CER*. Its subject matter and approach are responsive to questions raised and points of interest highlighted by the CCNB, focusing in particular on how the *CER* could address the use of wood biomass to generate electricity.

The report reviews legislation in the provinces of Alberta, British Columbia, New Brunswick, and Nova Scotia to explore how the use of wood biomass to generate electricity is currently being regulated at the provincial level in Canada. In Alberta and Nova Scotia, electricity-sector legislation recognizes wood biomass as a renewable energy resource when it is deemed to be sustainable. In Alberta's *Renewable Electricity Act*, the definition of "renewable energy resource" includes "sustainable biomass"; in Nova Scotia's *Renewable Electricity Regulations*, "renewable low-impact electricity" includes "biomass that has been harvested in a sustainable manner". Electricity-sector legislation in neither province explains what is meant by "sustainable biomass" or "biomass that has been harvested in a sustainable manner", which indicates that the burden of ensuring the sustainability of wood biomass fuel rests with the forestry sector. However, electricity-sector legislation and forestry-sector legislation in Alberta are not connected explicitly (for example, through the use of shared definitions or requirements incorporated by reference), and explicit connections between electricity-sector legislation and forestry-sector legislation in Nova Scotia are minimal. In British Columbia and New Brunswick, electricity-sector legislation does not explicitly require that wood biomass used to generate electricity be "sustainable"; however, the provinces' electricity regimes rely implicitly on forestry-sector law and policy to ensure that wood biomass used to generate electricity is "clean" or "renewable". Whereas there are some explicit connections between electricity-sector legislation and forestry-sector legislation in British Columbia, there are no such connections in New Brunswick law.

Intersections between electricity-sector regulation, forest carbon accounting, and GHG emissions reporting in Canada make the climate change implications of using wood biomass to generate electricity difficult to calculate, and this raises several concerns from the perspectives of good public policy and public-interest advocacy. Although it is beyond the scope of this report to explore forest carbon accounting, GHG emissions reporting, and electricity carbon pricing in detail, the review of Canadian regulation touches on these topics in order to demonstrate why public-interest advocates are concerned by law and policy that accept and support forest-fueled electricity without necessary safeguards in place.

Additionally, the report considers how ECCC has regulated the use of biomass under Canada's *Clean Fuel Regulations* ("*CFR*") and considers whether regulatory mechanisms established in the *CFR* provide good models for the *CER*'s approach to the use of wood biomass to generate electricity. In particular, the report considers the *CFR*'s use of biomass feedstock regulation to

inform carbon intensity calculations and concludes that these mechanisms could be valuable under the *CER*, under certain circumstances and with appropriate modifications.

To put Canada's current regulatory methods in perspective, the second half of this report reviews legislation in five international jurisdictions: Australia, the European Union ("EU"), the United Kingdom of Great Britain and Northern Ireland, the United States of America ("US"), and the US State of Massachusetts. Regulatory approaches taken by some of these jurisdictions expose shortcomings in Canada's regimes and offer models for improvement. Notably, both Australia and Massachusetts have withdrawn state recognition of forest biomass as a source of renewable electricity, highlighting that "just saying no" to forest-fueled electricity is a viable legal and policy option. On the other hand, the EU example demonstrates that countries accepting the use of wood biomass as a "clean" or "renewable" energy source can and should take steps to coordinate forestry, land-use change, and renewable energy regulation to ensure that use does not hinder climate change mitigation efforts or cause deforestation, forest degradation, or further loss of biodiversity.

Within the international GHG emissions reporting framework that underpins the United Nations Framework Convention on Climate Change ("UNFCCC"), the carbon dioxide ("CO_2") emissions produced by burning wood biomass to generate electricity are not reported as energy-sector emissions but are instead reported as a component of carbon stock changes in agriculture, forestry, and other land use. There is therefore concern among public-interest advocates who support the Government of Canada's goal of achieving a net-zero electricity sector that significant GHG impacts caused by burning wood biomass to generate electricity will be ignored or obscured under the *CER*, particularly if the regulations take a restrictive view of the CO_2 emissions that should be attributed to the electricity sector. While the UNFCCC reporting regime clearly plays a role in shaping domestic law and policy in Canada, genuine efforts to achieve a net-zero electricity regime in Canada must do more than simply displace fossil fuel emissions with equivalent or higher CO_2 emissions that are attributed to another sector.

Although law and policy-makers often say that electricity from wood biomass is carbon neutral, it is more accurate to say that burning wood biomass to generate electricity creates a "carbon debt"—a debt that must ultimately be paid, in one way or another. Canada's capacity to pay that debt sustainably, through forest stewardship and regeneration, and to pay it in time before critical climate tipping points are exceeded, is by no means certain. This must be a crucial consideration informing decisions to accept or reject wood biomass as a "clean" electricity solution under the *CER* and a component of Canada's net-zero electricity future. Moreover, Canada's commitments on the world stage to sustainable development goals and the requirements and objectives of the United Nations Convention on Biological Diversity make it clear that Canada's net-zero electricity regime cannot come at the expense of the dynamic ecosystems that sustain all life on Earth. Unless and until Canadian regulation of wood biomass used to generate electricity acknowledges and addresses these realities, such use will not be "clean", "renewable", or sustainable.

1.0 INTRODUCTION

Environment and Climate Change Canada ("ECCC") is in the process of developing *Clean Electricity Regulations* ("*CER*") to advance the federal government's climate change mitigation commitments and, in particular, the federal goal of achieving a net-zero electricity sector by 2035. It is anticipated that draft regulations will be published in the *Canada Gazette, Part I* in the near future, creating an opportunity for public review and commentary.

Wood biomass is a fuel source that many jurisdictions have accepted as a source of "clean" or "renewable" energy. In this report, the phrase "wood biomass" refers generally to the organic matter of trees and other woody vegetation, particularly when that matter is contemplated for use as fuel. Laws and policies established by different jurisdictions use different variations on the phrase: for example, in New Brunswick's electricity-sector legislation, the phrase "woody biomass" is used, whereas the phrase "wood biomass" is used in Intergovernmental Panel on Climate Change ("IPCC") guidance on reporting national greenhouse gas ("GHG") inventories under the United Nations Framework Convention on Climate Change ("UNFCCC"). In some laws and policies addressing wood biomass derived specifically from forests, more specific phrases are used: for example, Nova Scotia's electricity-sector legislation sets limits on the amount of "primary forest biomass" that can be used to meet electric utilities' renewable energy standards. When specific phrases and definitions are relevant to the analysis and commentary presented in this report, they are used as necessary; otherwise, "wood biomass" is used as an umbrella term for simplicity.

In addition to wood biomass, other forms of non-fossilized organic matter can be used as fuel to generate energy. For example, agricultural crops are grown to produce liquid biomass fuels, and energy can be captured from the combustion or decomposition of organic waste. Some of the laws and policies discussed in this report address the use of "biomass" generally and are not focused specifically on the use of wood biomass to generate electricity. Where necessary, the analysis and commentary recognize the distinction and discuss relevant implications.

ECCC's stakeholder outreach on the *CER* suggests that wood biomass may be considered a source of "clean" electricity advancing the federal government's goal of achieving a net-zero electricity sector; however, ECCC has also posed several pertinent questions concerning its use. These questions reflect a number of longstanding concerns about the use of wood biomass to generate electricity—in particular, concerns about the risks of spurring land-use changes and nature degradation by expanding or creating new markets for wood biomass intended for use as fuel.

The regulation of wood biomass used to generate electricity is inherently complex, because relevant laws are not found exclusively within electricity-sector legislation. When wood biomass is harvested from forests, forestry-sector legislation and unlegislated certification schemes play a significant role in determining what products are brought to market and how. Additionally, domestic and international laws addressing carbon pricing, forest carbon and electricity-sector accounting, GHG emissions reporting, the avoidance of deforestation and forest degradation, and global commitments to halt and reverse biodiversity loss all shape the perception and reality of wood biomass's virtue as an electricity fuel.

Although law and policy-makers often say that electricity from wood biomass is carbon neutral, it is more accurate to say that burning wood biomass to generate electricity creates a "carbon debt"—a debt that must ultimately be paid, in one way or another. Canada's capacity to pay that debt sustainably, through forest stewardship and regeneration, and to pay it in time before critical climate tipping points are exceeded, is by no means certain. This must be a crucial consideration informing decisions to accept or reject wood biomass as a "clean" electricity solution under the *CER* and a component of Canada's net-zero electricity future. Moreover, Canada's commitments on the world stage to sustainable development goals and the requirements and objectives of the United Nations Convention on Biological Diversity ("UN CBD") make it clear that Canada's net-zero electricity regime cannot come at the expense of the dynamic ecosystems that sustain all life on Earth. Unless and until Canadian regulation of wood biomass used to generate electricity acknowledges and addresses these realities, such use will not be "clean", "renewable", or sustainable.

1.1 The Origin and Purpose of This Report

This report was prepared to support and inform engagement by the Conservation Council of New Brunswick ("CCNB") on the development of the *CER*. Its subject matter and approach are responsive to questions raised and points of interest highlighted by the CCNB, focusing in particular on how the *CER* could address the use of wood biomass to generate electricity.

1.2 International Commitments, Goals, and Targets that Are (or Should Be) Informing the Development of the *Clean Electricity Regulations*

Although ECCC's development of the *CER* is clearly a national initiative, the regulations are taking shape within the context of several international commitments, goals, and targets that should inform Canada's efforts to achieve a net-zero electricity sector. Two international treaties to which Canada is a party—the UNFCCC and the UN CBD—are especially significant, as are the global Sustainable Development Goals ("SDGs") that Canada and other United Nations ("UN") member states adopted in 2015 and the United Nations Declaration on the Rights of Indigenous Peoples ("UNDRIP"), which Canada endorsed unequivocally in 2016.

1.2.1 *The United Nations Framework Convention on Climate Change*

Canada is a party to the UNFCCC—the historic treaty under which the international community agreed to a shared objective of stabilizing atmospheric GHG concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system".[1] Established during the Rio Earth Summit in 1992 and legally in force since March of 1994, the UNFCCC is the foundation of the global climate change mitigation regime, including the Paris Agreement of 2015, which quantified the UNFCCC's GHG stabilization objective by setting a global warming limit of no more than 2°C above pre-industrial levels and recognizing the need to aim for a more ambitious 1.5°C limit to mitigate climate catastrophe.

Since the establishment of the Paris Agreement, the Government of Canada has advanced numerous law and policy initiatives designed to reduce GHG emissions in Canada and abroad.

[1] United Nations Framework Convention on Climate Change at Article 2.

As a party to the Paris Agreement, Canada commits to make Nationally Determined Contributions to the global GHG emissions reduction effort, with its current commitment being a reduction of 40-45% below Canada's 2005 levels by 2030.[2] The Government of Canada has also set a goal of achieving domestic GHG emissions neutrality by 2050 and has enshrined that goal in law through the *Canadian Net-Zero Emissions Accountability Act*.[3]

Canada's electricity sector contributes significantly to national GHG emissions, so the Government of Canada has set a goal of achieving a net-zero electricity sector by 2035.[4] ECCC's development of the *CER* aims to advance that goal.

1.2.2 *The United Nations Convention on Biological Diversity*

The UN CBD is another product of the Rio Earth Summit in 1992. Over the past thirty years, it has been an impetus for most Canadian laws (federal and provincial) designed to protect and conserve nature or reverse the decline of species at risk.

The primary objectives of the UN CBD are to conserve Earth's biodiversity, ensure that the components of biodiversity are used sustainably, and ensure that the benefits of biodiversity's genetic resources are shared fairly and equitably.[5] Since 1992, parties to the treaty have sought to achieve these objectives in several ways, including by setting global and domestic biodiversity targets.

At the tenth Conference of the Parties ("COP10"), held in 2010 in Nagoya, Aichi Prefecture, Japan, the parties to the UN CBD adopted a strategic plan that included twenty targets known as the Aichi Biodiversity Targets.[6] Several of those targets are relevant to the use of wood biomass to generate electricity, especially where such use implicates unsustainable forestry practices and state support for markets that contribute to biodiversity loss and the loss of carbon-sequestering ecosystems. To highlight just some key examples:

> Target 3: "By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions".

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[2] Canada's GHG emissions in 2005 were reported as being roughly 739 megatonnes ("Mt") of carbon dioxide equivalent ("CO_2e"), which means that Canada's current NDC under the Paris Agreement is a commitment to reduce emissions to no more than roughly 406.5 to 443 Mt CO_2e by the end of 2030. See: Government of Canada, "Canada's 2021 Nationally Determined Contribution under the Paris Agreement" at page 12. Parties' Nationally Determined Contributions ("NDCs") can be viewed through the NDC Registry maintained by the UNFCCC Secretariat.

[3] *Canadian Net-Zero Emissions Accountability Act*, SC 2021, c 22.

[4] Environment and Climate Change Canada, *A clean electricity standard in support of a net-zero electricity sector: discussion paper* (8 March 2022) ["ECCC *Discussion Paper*"].

[5] United Nations Convention on Biological Diversity at Article 1.

[6] UN CBD Secretariat, "Aichi Biodiversity Targets" (undated).

> Target 5: "By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced".
>
> Target 7: "By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity".
>
> Target 15: "By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification".[7]

In December 2022, the fifteenth Conference of the Parties ("COP15") was held in Montreal, and the strategic plan established at COP10 was updated as the parties to the treaty established a new global biodiversity framework—the Kunming-Montreal Global Biodiversity Framework ("KMGBF").[8] The KMGBF includes four global goals that aspire to achieve a vision of "living in harmony with nature" by 2050 and twenty-three global targets that parties must aim to achieve by 2030.[9] As with the Aichi Biodiversity Targets, several of the KMGBF's 2030 targets are relevant to the use of wood biomass to generate electricity, especially where such use implicates unsustainable forestry practices and state support for markets that contribute to biodiversity loss and the loss of carbon-sequestering ecosystems. To highlight just some key examples:

> Target 1: "Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and sea-use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities".
>
> Target 10: "Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services".
>
> Target 14: "Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively

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[7] *Ibid*.
[8] UN CBD Secretariat, "Kunming-Montreal Global Biodiversity Framework" (8 May 2023).
[9] Conference of the Parties to the Convention on Biological Diversity, CBD/COP/DEC/15/4 (19 December 2022) ["CBD/COP/DEC/15/4"].

aligning all relevant public and private activities, and fiscal and financial flows with the goals and targets of this framework".

Target 18: "Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least $500 billion per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity".[10]

As a party to the UN CBD, Canada must update its existing national biodiversity strategy and action plan before the next Conference of the Parties (scheduled for 2024) to bring them into alignment with the KMGBF. ECCC is currently working actively on this file, which may create opportunities for synergies between national energy policy and the national biodiversity strategy and action plan.

1.2.3 *The 2030 Agenda for Sustainable Development*

In September 2015, just a few months shy of the Paris Agreement being established under the UNFCCC, Canada and all other UN member states adopted the *2030 Agenda for Sustainable Development*, which, among other things, established the seventeen SDGs to which the international community has agreed to strive.[11] Several of these goals are relevant to the use of wood biomass to generate electricity, especially where such use implicates unsustainable forestry practices and state support for markets that contribute to biodiversity loss and the loss of carbon-sequestering ecosystems.

SDG 7 is to "[e]nsure access to affordable, reliable, sustainable and modern energy for all"; SDG 12 is to "[e]nsure sustainable consumption and production patterns"; SDG 13 is to "[t]ake urgent action to combat climate change and its impacts"; and, SDG 15 is to "[p]rotect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".[12] Under each of these goals, several specific targets were set to further their achievement.

To date, ECCC's stakeholder outreach concerning the *CER* has not mentioned the SDGs, but sustainability is highlighted as an objective in the discussion paper that ECCC released in March 2022.[13] Specifically, the discussion paper remarks that achieving a net-zero electricity system within Canada will require a "whole-of-government approach, coupled with commercial and sustainable viability" and that "[c]reating good, well-paying jobs in the net-zero economy and ensuring that workers have the right tools and skill sets is essential to building a sustainable and prosperous future for Canada".[14] While these remarks are no doubt true, they do not foreground the necessary interconnections between Canada's renewable energy transition and the global

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[10] *Ibid* at Annex, Section H.
[11] United Nations Department of Economic and Social Affairs, "Sustainable Development: The 17 Goals" (undated).
[12] United Nations Department of Economic and Social Affairs, "Transforming Our World: the 2030 Agenda for Sustainable Development" (undated).
[13] ECCC *Discussion Paper* at pages 10-11.
[14] *Ibid*.

SDGs to which Canada has committed. Notably, the SDGs cited above highlight the interconnectivity between the global imperatives to mitigate climate change, halt biodiversity loss, and change the way we energize our societies.

1.2.4 *The United Nations Declaration on the Rights of Indigenous Peoples*

Finally, it would be remiss not to recognize the adverse effects that Crown management of forests can have on the Aboriginal rights, treaty rights, and inherent rights of Indigenous peoples in Canada. In 2016, Canada endorsed UNDRIP without qualification,[15] and, in 2021, the Government of Canada enacted the *United Nations Declaration on the Rights of Indigenous Peoples Act*,[16] which aims to hold the federal government accountable to its commitment to implement UNDRIP fully in Canadian law.

To the extent that expanding or creating new markets for wood biomass fuel motivates intensified, unsustainable, and economically perverse harvesting practices in forests within Canada, Indigenous rights connected to the forests will likewise be imperilled. Such rights could not only include rights to harvest, use, and/or sell wood products harvested from forests but could also include rights to maintain cultural continuity, including by maintaining cultural ways of being in relationship with forest ecosystems and species.

Notably, among the international instruments discussed in this section, UNDRIP is not alone in spotlighting the rights of Indigenous peoples and the roles they can and should play in governing their traditional territories. These are also highlighted within the KMGBF and the *2030 Agenda for Sustainable Development*.

Deforestation and forest degradation within Canada can adversely affect Indigenous rights that are protected by Canada's Constitution, and ECCC therefore has a constitutional duty to consult Indigenous rightsholders as the *CER* are developed. Moreover, given the Government of Canada's growing recognition of the vital role that Indigenous peoples play in stewarding local ecosystems sustainably—including through the use of mechanisms such as Indigenous Protected and Conserved Areas—ECCC should be engaging Indigenous peoples beyond the prescriptive consultation framework, recognizing and learning from Indigenous nations that are forest conservation leaders.

1.3 Considerations and Concerns Regarding the Treatment of Wood Biomass under the *Clean Electricity Regulations*

1.3.1 *The Proposed Frame and Contents of the Regulations*

The proposed contents of the *CER* will not be fully clear until ECCC publishes draft regulations and an accompanying Regulatory Impact Analysis Statement ("RIAS") in the *Canada Gazette,*

[15] Indigenous and Northern Affairs Canada, "Canada Becomes a Full Supporter of the United Nations Declaration on the Rights of Indigenous Peoples" (10 May 2016).
[16] *United Nations Declaration on the Rights of Indigenous Peoples Act*, SC 2021, c 14.

Part I, but ECCC has described several key objectives and intentions in stakeholder outreach.[17]

As described in stakeholder outreach, the *CER* will likely share similarities with Canada's *Clean Fuel Regulations*, which were promulgated in 2022. Whereas the *Clean Fuel Regulations* specifically target the carbon intensities of liquid fossil fuels, the proposed *CER* are expected to target the carbon intensities of fossil fuels used to generate electricity in Canada whether those fuels be solids, liquids, or gasses. Abating the use of natural gas to generate electricity appears to be a primary concern,[18] but ECCC has indicated that the *CER* will be "technologically neutral",[19] meaning that the regulations will likely not directly prohibit or restrict certain fuels used to generate electricity but will instead impose emissions performance standards that must not be exceeded, regardless of what fuels are used. The practical result that appears to be contemplated by the *Proposed Frame for the Clean Electricity Regulations* that ECCC published in July 2022 ("*Proposed Frame*") is that the *CER* will deter the commissioning of new natural gas-fired electricity generating facilities after 2025.[20]

Although ECCC is clearly focused on deterring the use of fossil fuels to generate electricity, several questions concerning the use of wood biomass to generate electricity must be considered carefully as the *CER* are developed. These questions include: whether electricity generated from wood biomass should be subject to an emissions performance standard under the *CER*, and, if so, what that standard should be; whether other restrictions or special reporting requirements should be imposed generally on the use of wood biomass to generate electricity; and, whether electricity generated from the combustion of wood biomass should qualify as an eligible offset if a compliance credit system is established under the *CER*.

Additionally, ECCC's *Proposed Frame* raises a significant concern about the scope of the *CER*. The document states that electricity generation facilities regulated under the *CER* will be facilities that combust any amount of fossil fuel to generate electricity. This suggests that electricity generation facilities that do not combust fossil fuels will not be regulated under the *CER*—meaning that facilities designed to combust biomass fuel exclusively would be excluded from the regulatory regime. This creates a risk that the *CER* would incent the commissioning of new electricity generation facilities designed to combust wood biomass fuel exclusively—facilities that would, effectively, get a regulatory "free pass". Given the significant GHG impacts of burning wood biomass to generate electricity, as well as broader concerns regarding deforestation, forest degradation, and biodiversity loss, ECCC must avoid this result.

1.3.2 *Why Using Wood Biomass to Generate Electricity Creates Unique Complexities*

Unlike most of the other sources of electricity that are frequently characterized and subsidized as being "clean" or "renewable", wood biomass is a combustion fuel. Wind turbines, tidal arrays, and hydroelectric facilities generate electricity by harnessing the force of kinetic energy; solar arrays absorb and channel energy from the sun. Although there are GHG emissions associated

[17] See ECCC *Discussion Paper* and Environment and Climate Change Canada, *Proposed Frame for the Clean Electricity Regulations* (26 July 2022) ["ECCC *Proposed Frame*"].
[18] See the "Context" discussion in ECCC *Proposed Frame.*
[19] ECCC *Discussion Paper*.
[20] *Ibid*.

with manufacturing, transporting, and operationalizing wind, tidal, hydroelectric, and solar energy infrastructure, the ultimate generation of electricity from such facilities produces minimal climate-warming emissions. By contrast, when wood biomass is burned to generate electricity, that combustion is comparable to the combustion of fossil fuels like coal and natural gas. In fact, comparing GHGs released per unit of energy produced, burning wood biomass to generate electricity emits more GHGs than burning coal.[21]

Given these realities, one may well wonder why many jurisdictions in Canada and abroad accept wood biomass as a "clean" or "renewable" source of electricity. The answer typically given by law and policy-makers is essentially as follows. When fossil fuels like coal and natural gas are burned to generate energy, they release GHGs in a linear manner. The GHGs enter the atmosphere and remain there unless they are captured by unassociated systems or anthropogenic technologies. By contrast, when wood biomass is burned to generate energy, it releases GHGs—more specifically, carbon dioxide ("CO_2")—in a manner that is cyclical and continuous, no different from the natural processes through which CO_2 is absorbed from the atmosphere by trees while they live, released back into the atmosphere when those trees die, and absorbed from the atmosphere again by new trees as they grow.[22] In essence, the presumption that justifies embracing wood biomass as a "clean" or "renewable" source of electricity is that, so long as trees and other woody vegetation being burned as fuel are replaced by new generations of CO_2-absorbing growth, a continuous cycle of release and absorption will neutralize net GHG effects.

The summary above states the case for wood biomass electricity in relatively simplistic terms. The reality is that achieving carbon neutrality in the use of wood biomass to generate electricity is, at best, a complex and highly contingent undertaking.

From a GHG accounting perspective, seedlings and young trees do not sequester significant amounts of carbon until they are several decades old, which means that when forest stands are harvested heavily, it takes decades before regeneration begins to offset CO_2 emissions and serve as a carbon sink. The time required for new growth to offset CO_2 emissions caused by harvesting and burning wood biomass has been described as creating a "carbon debt".[23] In the absence of biomass energy carbon capture ("BECC") technologies used to capture CO_2 emissions when wood biomass is burned, the carbon debt created by emitting CO_2 in the present must be paid off (neutralized by new growth) in the future.

Applying the lens of "carbon debt" to the use of wood biomass to generate electricity makes it easier to identify several considerations that should be taken into account before wood biomass is assumed to be carbon neutral or embraced as a "clean" and "renewable" source of electricity. These include, but are not necessarily limited to, the following considerations.

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[21] IEA Bioenergy, "Is energy from woody biomass positive for the climate?" (January 2018).
[22] For an illustration of this difference, see: *ibid* at page 2. See also: Office of the Auditor General of Canada, *2023 Reports 1 to 5 of the Commissioner of the Environment and Sustainable Development – Report 1: Forests and Climate Change* (20 April 2023) at page 2 ["*Forests and Climate Change Report 2023*"].
[23] For a discussion of the "carbon debt" lens, see East Coast Environmental Law, *Forest Biomass Energy Policy in the Maritime Provinces: Accounting for Science* (15 December 2015) at pages 19-21 ["ECEL *Forest Biomass Report*"].

Whether wood biomass burned to generate electricity comes from residuals or debris that are incidental to established forestry activities (such as branches that would otherwise be burned as slash, wood chips and shavings that would otherwise be waste, etc.) and can be sourced without expanding or intensifying harvests. Residuals and debris that are wasted or burned as slash are counted as CO_2- emitting sources in international GHG inventory reporting; some argue therefor that if residuals and debris will be counted as sources of CO_2 emissions in any case, they may as well be burned to meet energy needs, as such use would not increase the carbon debts that are already being created by forestry activities.

Whether accepting wood biomass as a "clean" or "renewable" source of electricity creates new markets, or new market incentives, for forest products that would not otherwise be wasted or put to higher and longer-lived uses. As some argue that burning residuals and debris to meet energy needs makes sense for the reasons described above, it follows that one method to avoid new biomass carbon debts is to avoid creating new biomass-for-energy markets for forest products. Regulators in the EU have sought to address this issue by implementing a "cascading principle" that requires harvested forest products to be put to their highest and best economic uses, with biomass-for-energy uses ranked next to last, above only waste.[24]

Whether applicable laws and policies ensure that if forest products other than residuals and debris can be harvested as biomass-for-energy, forest harvesting is managed in a way that enables the "carbon books" to be balanced. If wood biomass used to generate electricity is sourced from forests in ways that create new carbon debts over and above those already being created by established forestry activities, clearly the forestry sector must be managed carefully over the long term so that such debts are "paid off" in time as planned. Some jurisdictions in Canada and abroad appear to address this issue by requiring that wood biomass used to generate electricity be sourced exclusively from "sustainable" forestry practices, but Canada currently lacks coordinated regimes through which regulators can monitor the actual GHG implications of burning harvested forest products to generate electricity.

How efficiently energy is generated when wood biomass is the fuel. Roughly fifteen years ago, the Government of Massachusetts commissioned the Manomet Center for Conservation Sciences to study the GHG impacts of using forest biomass to generate energy. The study that the Center issued in 2010 ("the Manomet study")[25] applied a "carbon debt" lens to the analysis and found that the magnitude of the debt created by burning forest biomass to generate energy and the time required to repay that debt depend on several factors, including the efficiency of the energy generated through forest biomass combustion.[26] A key takeaway from the report was that if forest biomass is going to be used to generate energy, it should be used as efficiently as possible. Following the publication of the Manomet Report, the Government of Massachusetts revised its Renewable Energy Portfolio Standard to require that energy generating facilities achieve a minimum of 60% efficiency when burning wood biomass as fuel in order to qualify for full renewable energy credits; half credits could be produced if 50% efficiency was achieved.[27]

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[24] The "cascading principle" is discussed in more detail in Section 3.2.1 of this report.
[25] Manomet Center for Conservation Sciences, *Biomass Sustainability and Carbon Policy Study* (June 2010).
[26] See ECEL *Forest Biomass Report* at pages 19-21 for a discussion of the Manomet study and its consequences for Massachusetts energy law and policy.
[27] *Ibid* at page 15.

Lifecycle carbon emissions saving requirements were imposed as well.[28] The practical result was that electricity-only facilities could not receive renewable energy credits by using wood biomass to generate electricity, as such facilities could not achieve the required efficiencies.[29]

Whether BECC technologies can be used to minimize the carbon debt created when wood biomass is burned. This consideration can have different implications, depending on the circumstances. If the wood biomass being burned to generate electricity comes from residuals and debris that are incidental to established forestry activities and are not sourced from new biomass-for-energy markets, then using BECC technologies could theoretically minimize the carbon debts that would otherwise be created as part of habitual forestry practices, potentially creating net positive effects by capturing CO_2 emissions that would occur in any case under the status quo. However, if forestry activities have expanded or intensified to create and supply new biomass-for-energy markets, then BECC technologies would presumably be used to minimize the new carbon debts created when wood biomass sourced from such markets is burned.

Whether it is legally or morally acceptable to risk exceeding climate "tipping points" today by creating carbon debts that will not be repaid for decades to come (and may not be repaid at all). Global scientists are making it clear that we cannot afford to pass critical climate "tipping points" in the decades to come and must work strenuously to minimize GHG emissions in the here and now.[30] If using wood biomass to generate electricity today releases GHGs that bring us closer to climate tipping points with no ability to reverse that trajectory in time, justifying emissions today by banking on their neutralization in the latter half of the century may be seen as legal and moral derelictions of responsibility.

While the "carbon debt" lens is useful and helps to identify several important considerations and concerns about the use of wood biomass to generate electricity, it must be borne in mind that CO_2 is not the only GHG released when wood biomass is burned. Methane ("CH_4") and nitrous oxide ("N_2O"), among other pollutants, are released as well. Mature living trees do not absorb CH_4 and N_2O from the atmosphere in the same way they absorb CO_2, which means that burning wood biomass to generate electricity actually creates a "GHG debt" that is larger than the "carbon debt" that new forest growth can repay. This means that wood biomass should not be characterized as a "climate neutral" energy source, even under the best possible circumstances, because although it may be possible to cultivate carbon neutrality in the use of wood biomass to generate electricity, broader GHG neutrality cannot be achieved by controlling harvests and managing regenerative lifecycles that focus on carbon alone.

Additionally, the use of wood biomass to generate electricity raises broader concerns related to the triple planetary crises of biodiversity loss, climate change, and pollution. Industrial forestry in Canada and abroad already raises significant concerns about effects on biodiversity, and such concerns are amplified by the potential for expanded or intensified forestry activities creating and supplying new biomass-for-energy markets. The air pollution caused by burning wood

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[28] *Ibid*.
[29] For an accessible overview of this history, see Miriam Wasser, "Mass. Has Strong Rules About Burning Wood for Electricity. In 2021, It Plans To Roll Them Back" *WBUR* (22 December 2020).
[30] Renee Cho, "How Close Are We to Climate Tipping Points?" *Columbia Climate School: State of the Planet* (11 November 2021).

biomass has human health implications over and above the climate-warming effects of GHGs, and many members of the public are understandably concerned about the air quality consequences of biomass-fired electricity generation facilities.

ECCC implicitly recognized some of these considerations and concerns in stakeholder outreach conducted during the early stages of developing the *CER*. In the discussion paper published in 2022—at which point ECCC was discussing a proposed "clean electricity standard" ("CES")—the following questions were posed:

> 7. To what extent can negative emission technologies like BECCs and DAC contribute to meeting the obligations of a CES regulation? To what extent should they be allowed to contribute to meeting those obligations?
>
> […]
>
> 17. If CO_2 emissions from biomass combustion are not counted towards compliance under a CES, to what degree might biomass generation increase?
>
> 18. What types of biomass are suited to electricity generation? What are their characteristics with respect to regenerative life cycle, non-CO_2 GHG emissions, and land use characteristics?"
>
> 19. What emissions reporting and compliance requirements for biomass generation should be considered to ensure that nature is protected and land-based emissions do not increase?"[31]

These questions are important, but they do not address all of the considerations and concerns associated with Canadian use of wood biomass to generate electricity. At least one additional question that ECCC should be considering is whether regulation and reporting practices in Canada enable accurate and transparent accounting of the GHG emissions caused by harvesting and burning wood biomass to generate electricity. If there are shortcomings in Canadian regulation of wood biomass used to generate electricity—as this report argues there are—then accepting wood biomass as part of Canada's net-zero electricity future risks undermining the objective from the start.

To varying degrees, the considerations and concerns discussed in this section inform the regulation of wood biomass used to generate electricity in Canada and abroad. Depending on the jurisdiction, concerns about the GHG emissions and "carbon debt" impacts of using wood biomass to generate electricity may be addressed by imposing carbon intensity, energy efficiency, or carbon capture requirements; concerns may also be addressed on the feedstock side by imposing restrictions on the kinds of wood biomass that can be burned legally or the locations from which such biomass is sourced. The jurisdictional analyses that follow in Section 2 and Section 3 seek to identify regulatory mechanisms used to address these concerns.

[31] ECCC *Discussion Paper* at pages 13-14.

2.0 CANADIAN REGULATION OF WOOD BIOMASS USED TO GENERATE ELECTRICITY

2.1 Alberta

In Alberta, the phrase "sustainable" biomass appears in various pieces of electricity-sector legislation, but the phrase is not defined.

Alberta's electricity-sector statutes and regulations that refer to biomass include:

- *Renewable Electricity Act*, SA 2016, c R-16.5;
- *Micro-Generation Regulation*, Alta Reg 27/2008 (under the *Electric Utilities Act*);
- *Small Scale Generation Regulation*, Alta Reg 194/2018 (under the *Electric Utilities Act*);
- *Conservation and Reclamation Regulation*, Alta Reg 115/93 (under the *Environmental Protection and Enhancement Act*); and,
- *Technology Innovation and Emissions Reduction Regulation*, Alta Reg 133/2019 (under the *Emissions Management and Climate Resilience Act*).

Of these, the *Renewable Electricity Act*, *Micro-Generation Regulation*, and *Small Scale Generation Regulation* are most relevant to electricity generation in the province.

Under the *Renewable Electricity Act*, the phrase "renewable energy resource" is defined as meaning "an energy resource that occurs naturally and that can be replenished or renewed within a human lifespan, including, but not limited to": "moving water", "wind", "heat from the earth", "sunlight", and "sustainable biomass"; correspondingly, "renewable electricity" means "electricity that has been produced from a renewable energy resource.[32]

Under the *Micro-Generation Regulation*, electricity generated from biomass will only meet the regulation's definition of "renewable or alternative energy" if the "greenhouse gas intensity" of "the electric energy produced" or "the total energy produced from the simultaneous generation of electric energy and production of thermal energy from the same fuel source" "is less than or equal to 418 kg per MWH".[33] "Biomass" is not defined in the regulation, nor is it clear how the regulation expects GHG intensity to be calculated for its purposes.

A substantially similar definition of "renewable or alternative energy" is used in the *Small Scale Generation Regulation*, except there it is clearer that the "emissions intensity" of the total energy produced must be less than or equal to 418 kg CO_2e per MWh (the reference to CO_2e is omitted

[32] *Renewable Electricity Act*, SA 2016, c R-16.5 at subsections 1(1) and 1(i). The same definitions are used in the *Conservation and Reclamation Regulation*, which operates under the *Environmental Protection and Enhancement Act*: see Alta Reg 115/93 at subsection 1(q.3). A similar definition appears in the *Technology Innovation and Emissions Reduction Regulation* under the *Emissions Management and Climate Resilience Act*, where "renewable electricity facility" is defined as meaning "an electricity facility that produces electricity from an energy resource that occurs naturally and that can be replenished or renewed within a human lifespan, including, but not limited to": "moving water", "wind", "heat from the earth", "sunlight", and "sustainable biomass": see Alta Reg 133/2019 at clause 1(1)(nn).

[33] *Micro-Generation Regulation*, Alta Reg 27/2008 at clause 1(1)(1).

in the *Micro-Generation Regulation*).[34] As with the *Micro-Generation Regulation*, "biomass" is not defined in the *Small Scale Generation Regulation*, nor is it clear how the regulation expects emissions intensity to be calculated for its purposes.

Alberta's *Carbon Competitiveness Incentive Regulation* (repealed in 2020 and replaced with the *Technology Innovation and Emissions Reduction Regulation*) provided the regulatory foundation for an *Energy Generation from the Combustion of Biomass Waste* protocol that imposes requirements concerning the eligibility, under the Alberta Emission Offset System, of energy generated by burning biomass waste that would otherwise be disposed of in a landfill or lost to other un-economic uses. Although the *Carbon Competitiveness Incentive Regulation* is no longer in force, the Government of Alberta's webpage for the Alberta Emission Offset System indicates that the *Energy Generation from the Combustion of Biomass Waste* protocol remains in effect under the *Technology Innovation and Emissions Reduction Regulation*.[35] It is beyond the scope of this report to conduct a detailed analysis of the *Energy Generation from the Combustion of Biomass Waste* protocol and the extent to which its use under the Alberta Emission Offset System affects the broader use of wood biomass to generate electricity in Alberta.

2.2 British Columbia

British Columbia's electricity sector legislation appears not to define the word "biomass" as a general term, but the more specific phrase "wood biomass" was used and defined in a 2007 direction to the British Columbia Utilities Commission ("BCUC").[36] Although energy-sector legislation in the province gives the impression that the provincial government views biomass energy as being is inherently positive, from a GHG emissions reduction perspective, some requirements that could be considered "sustainable" feedstock requirements have been embedded within the system, although their sustainability purpose is not explicit.

Some provincial regulation of biomass is conducted under British Columbia's *Forest Act*, which recognizes "bioenergy" as an energy resource derived specifically from Crown timber and which regulates "bioenergy supply contracts" in a manner that intersects with the regulation of "energy supply contracts" more generally under the *Utilities Commission Act*.

British Columbia's electricity-sector statutes and regulations that refer to biomass include:

- *Clean Energy Act*, SBC 2010, c 22;
- *Special Direction No. 10 to the British Columbia Utilities Commission*, BC Reg 245/2007 (under the *Utilities Commission Act*);
- *Direction to the British Columbia Utilities Commission Respecting the Biomass Energy Program*, BC Reg 71/2019 (under the *Utilities Commission Act*);
- *Apollo Forest Products Ltd Exemption Regulation*, BC Reg 242/2016;
- *Community-Based Biomass Call Exemption Regulation*, BC Reg 45/2012; and,
- *Greenhouse Gas Emission Reporting Regulation*, BC Reg 249/2015 (under the *Greenhous Gas Industrial Reporting and Control Act*).

[34] *Small Scale Generation Regulation*, Alta Reg 194/2018 at subsection 1(1).
[35] Government of Alberta, "Alberta Emission Offset System" (undated).
[36] *Special Direction No. 10 to the British Columbia Utilities Commission*, BC Reg 245/2007.

Of these, the *Clean Energy Act*, the regulatory directions to the BCUC, and the regulatory exemptions from requirements of the *Utilities Commission Act* are most relevant to electricity generation in the province.

Within the *Clean Energy Act*, the phrase "clean or renewable resource" is defined as meaning "biomass, biogas, geothermal heat, hydro, solar, ocean, wind or any other prescribed resource".[37] One of the provincial energy objectives set out in the *Clean Energy Act* is "to reduce waste by encouraging the use of waste heat, biogas and biomass".[38] These are the only two uses of the word "biomass" in the Act (the word is not defined therein), but it can be inferred that biomass is implicated throughout the Act in references to "clean or renewable resources", "bio-energy", and electricity generated by pulp and paper mills in the province.

The *Special Direction No. 10 to the British Columbia Utilities Commission* was a regulatory direction issued in 2007 in relation to a process through which the British Columbia Hydro and Power Authority (the "Authority") was seeking to acquire electricity generated by the combustion of "wood biomass". The direction defined "wood biomass" as meaning: "wood residue" as defined by British Columbia's *Forest Act*, "wood debris from logging, construction or demolition operations", "organic residues from pulp and paper production processes", and "timber, within the meaning of the *Forest Act*, infested by the mountain pine beetle".[39] This definition appears to restrict wood biomass that is eligible for electricity generation purposes to residuals, debris, industrial by-products, and infested timber for which there are no higher economic uses. These restrictions may therefore be considered "sustainable" feedstock requirements, and they share similarities with the "cascading principle" that EU legislators are expected to implement in revised renewable energy legislation.[40] Given that the same definition of "wood biomass" and restrictions on its use are not included with the *Clean Energy Act*, it is unclear to what extent they shape electricity-sector regulation in the province more generally. Deeper research and analysis into British Columbia's forestry-sector regimes would be necessary to provide further insight in this regard.

It is also noteworthy that *Special Direction No. 10 to the British Columbia Utilities Commission* altered the considerations of that the BCUC was expected to take into account when considering whether a biomass contract proposed as a result of a "call for power" by the Authority was in the public interest: the directive required the BCUC to be guided primarily by several legislated presumptions, including the presumption that "the acquisition of energy by the authority under a biomass contract will reduce the risk to the authority of future costs associated with the production of gasses that contribute to global climate change".[41]

The *Direction to the British Columbia Utilities Commission Respecting the Biomass Energy Program* was a regulatory direction issued in 2019 that was designed to enable the Authority to

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[37] *Clean Energy Act*, SBC 2010, c 22 at subsection 1(1).
[38] *Ibid* at subsection 2(j).
[39] *Special Direction No. 10 to the British Columbia Utilities Commission*, BC Reg 245/2007 at subsection 1(1). Section 1 of British Columbia's *Forest Act*, RSBC 1996, c 157 defines "wood residue" as meaning "wood chips, slabs, edgings, sawdust, shavings and hog fuel", and it defines "timber" as meaning "trees, whether standing, fallen, living, dead, limbed, bucked or peeled".
[40] See Section 3.2.1 of this report.
[41] *Special Direction No. 10 to the British Columbia Utilities Commission*, BC Reg 245/2007 at section 4.

enter into contracts to purchase electricity generated at specific "biomass facilities" that the direction identified. Essentially, the direction restricted the BCUC's usual powers to review and cancel energy supply contracts entered into by the Authority and imposed a program-specific rate schedule that the BCUC was required to implement.

The *Community-Based Biomass Call Exemption Regulation* exempted the Authority and all other project proponents from having to meet certain requirements of the *Utilities Commission Act* when responding to a "community-based biomass call for electricity" program that was established within the province. In general, the requirements from which the Authority and other proponents were exempted are information requirements designed to help the BCUC determine whether energy supply contracts are in the public interest; the exemption is therefore suggestive of a presumption, on the part of the provincial government, that enabling electricity generation from "community-based biomass" would be in the public interest. The regulation does not define "community-based biomass".

The *Apollo Forest Products Ltd Exemption Regulation* exempted a corporation, Apollo Forest Products Ltd., from Part 3 of the *Utilities Commission Act* (which deals with the regulation of public utilities) with respect to a transmission system owned by the corporation, the corporation's transmission of electricity from its biomass thermal generation facility to the Authority's grid, and the transmission of electricity from the Authority's transmission system to the corporation's biomass fuel processing project.[42]

2.3 New Brunswick

New Brunswick's *Electricity from Renewable Resources Regulation*, NB Reg 2015-60 (under the *Electricity Act*) is the only example of electricity-sector legislation in the province that refers to biomass. The regulation refers to biomass just three times. "Biomass energy" is included in the regulation's definition of "source", which means that "biomass energy" is included in the regulation's definition of "electricity from renewable resources".[43] These definitions are set out in section 2 of the regulation, as follows:

> **"electricity from renewable resources"** means
>
> > (a) electricity that is generated inside the Province in an innovative manner and provides a net environmental benefit to the Province,
> >
> > (b) electricity generated inside or outside the Province from a source, and
> >
> > (c) electricity that is obtained under the Large Industrial Renewable Energy Purchase Program.
>
> […]
>
> **"source"** means

[42] *Apollo Forest Products Ltd Exemption Regulation*, BC Reg 242/2016 at section 2.
[43] *Electricity from Renewable Resources Regulation – Electricity Act*, NB Reg 2015-60 at section 2.

(a) solar energy;

(b) wind energy;

(c) hydroelectric energy;

(d) ocean-powered energy;

(e) biogas energy;

(f) biomass energy; and

(g) sanitary landfill gas.

Additionally, the regulation's definition of "eligible electricity" for the purposes of the Large Industrial Renewable Energy Purchase Program ("LIREPP") includes electricity "generated through the combustion of woody biomass", as follows:

> **"eligible electricity"** means electricity generated in the Province at any of the following facilities owned and operated by an eligible large industrial enterprise:
>
> (a) an eligible facility at which electricity is generated through the combustion of woody biomass or its by-products from the chemical manufacture of pulp, including black and red liquors, for the purposes of cogeneration or producing combined heat and power;
>
> (b) a facility at which electricity is generated through the combustion of woody biomass or its by-products from the chemical manufacture of pulp, including black and red liquors, for the purposes of cogeneration or producing combined heat and power; or
>
> (c) a facility at which electricity is generated from a source.[44]

These definitions are the only references to biomass within the regulation, and the regulation does not impose requirements concerning the sustainable use of biomass to generate electricity.

In addition to the *Electricity from Renewable Resources Regulation*, biomass is mentioned in the *Forest Products Act*, which defines "biomass" as including: "residual treetops, branches, foliage, non-merchantable woody stems, flail chipping residue and any other residual products of the forest that are above ground". The Act defines the phrase "primary forest products" as including "wood chips and biomass produced at or on the harvest site".[45] Additionally, biomass is mentioned in the Act's definition of "private woodlot", which

[44] *Ibid* at section 23.
[45] *Forest Products Act*, RSNB 2012, c 105 at section 1.

includes all forest land with certain exceptions, including (as an exception) "forest land owned by a person whose principal business is the operation of a wood processing facility, unless the main function of the wood processing facility is the production of wood chips and biomass at or on the harvest site".[46] However, these definitions are not integrated into related electricity-sector legislation within the province.

Apart from an additional brief reference to biomass in the *Timber Regulation* under the *Crown Lands and Forests Act* related to timber pricing, these appear to be the only explicit references to biomass in New Brunswick legislation. The term is not defined in New Brunswick's *Electricity Act*. In 2008, the Government of New Brunswick introduced a forest biomass harvesting policy that provides some biomass feedstock regulation applying to Crown lands in the province, but that policy does not appear to have been updated since, and it is unclear to what extent (if any) it was connected to electricity-sector regulation in the province.[47]

2.4 Nova Scotia

Nova Scotia's electricity-sector statutes and regulations that refer to biomass include:

- *Electricity Act*, SNS 2004, c 25;
- *Renewable Electricity Regulations*, NS Reg 155/2010 (under the *Electricity Act*);
- *Cap-and-Trade Program Regulations*, NS Reg 194/2018 (under the *Environment Act*);
- *Greenhouse Gas Emissions Regulations*, NS Reg 260/2009 (under the *Environment Act*); and,
- *Quantification, Reporting and Verification Regulations*, NS Reg 29/2018 (under the *Environment Act*).

Of these, the *Electricity Act* and *Renewable Electricity Regulations* are most relevant to electricity generation in the province.

Nova Scotia's *Renewable Electricity Regulations* define biomass to mean: "untreated organic material and includes material that has been processed so as to change its size, shape, density, moisture level, or degree of purity, and secondary waste by-products from its processes, but does not include material for which other diversion methods are viable or the treated by-products of manufacturing processes".[48] Within the regulations, "untreated organic material" means "organic material that has not been treated or organic material that has been treated in conformance with a government policy or regulation respecting the material".[49]

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[46] *Ibid* at section 1. Additionally, New Brunswick's *Natural Products Act* defines "biomass" as having the same definition given in the *Forest Products Act*, and "biomass produced at or on the harvest site" is included in the Act's definition of "farm product".
[47] Government of New Brunswick, "Forest Biomass Harvesting" FMB 019 2008 (28 October 2008).
[48] *Renewable Electricity Regulations* at subsection 3(1). This definition also appears in the *Electricity Act*.
[49] *Ibid* at subsection 2(1).

The *Renewable Electricity Regulations* define "renewable electricity" as meaning, among other things, "renewable low-impact electricity generated after December 31, 2001".[50] The regulations define "renewable low-impact electricity" as meaning electricity produced from any one of a number of listed sources, including "biomass that has been harvested in a sustainable manner".[51] What constitutes "a sustainable manner" for the purposes of this definition is not defined by the regulations or any other legislation in Nova Scotia.

Nova Scotia's electricity-sector legislation caps the amount of "primary forest biomass" that can be used to meet renewable electricity standards, but it does not cap the amount of forest biomass or other wood biomass that can be used to generate electricity more generally. "Primary forest biomass" is defined as meaning "biomass produced from primary forest products harvested in the Province and first used as a fuel".[52] The phrase "primary forest products" comes from Nova Scotia's *Forests Act*, which defines it as meaning "any of the commercially valuable raw materials cut or harvested from a forest".[53] The cap on the amount of primary forest biomass that can be used to meet Nova Scotia's renewable electricity standards is set out in section 8 of the *Renewable Electricity Regulations*, as follows:

> 8(1) No more than 350 000 dry tonnes annually of primary forest biomass over the average amount of primary forest biomass consumed annually in the Province for the years 1995 to 2005, that average being 3.285×10^6 dry tonnes, may be used to attain any renewable electricity standard.
>
> (2) For the purposes of a renewable low-impact electricity generation facility that uses primary forest biomass, only the amount of electricity the Minister determines is generated from the use of primary forest biomass as permitted by subsection (1) qualifies for any renewable electricity standard.

The *Renewable Electricity Regulations* establish a system whereby an electricity generation facility can apply for an "electricity standard approval", which will approve the facility as a renewable low-impact generation facility for the purposes of the province's renewable electricity standards. Under the regulations, when an applicant applies for an electricity standard approval of a biomass project, they must "include a biomass fuel procurement plan outlining how the applicant intends to ensure that its fuel supply will meet sustainable harvesting requirements".[54] Likewise, the regulations require the Minister to be satisfied by "an applicant who is requesting approval of a biomass generation facility […] that their biomass fuel procurement plan demonstrates that the applicant will meet sustainable harvesting requirements".[55] These requirements for sustainable harvesting plans connects Nova Scotia's electricity-sector regulation to its forestry-sector regulation in an abstract way, but the *Renewable Electricity Regulations* do not explain what "sustainable harvesting" means, nor do they connect "sustainable harvesting" to requirements established in forestry-sector legislation.

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[50] *Ibid* at subsection 3(1).
[51] *Ibid* at subsection 3(1). This definition also applies under the *Electricity Act*.
[52] *Ibid* at subsection 2(1).
[53] *Forests Act*, RSNS 1989, c 179 at subsection 3(q).
[54] *Renewable Electricity Regulations* at section 11.
[55] *Ibid* at subsection 13(3).

Nova Scotia's community feed-in tariff ("COMFIT") program established under the *Renewable Electricity Regulations* recognized privately-owned biomass combined heat and power plants that use some of the heat produced as a category of entity that could qualify as an electricity generator under the program.[56] The program also required all generation facilities using biomass fuel to be combined heat and power generation facilities in order to qualify.[57] An applicant proposing a biomass project had to include in their application "a biomass fuel procurement plan outlining how the applicant intends to ensure that its fuel supply will meet sustainable harvesting requirements".[58] This requirement was subject to the same problems described above concerning the "sustainable harvesting" plans required for electricity standard approvals: these requirements appear to connect electricity-sector regulation to forestry-sector regulation but do not do so explicitly. Biomass electricity generated by projects approved through the COMFIT program qualifies for the renewable electricity standard but is subject to the cap on the use of primary forest biomass for electricity generation.

Under Nova Scotia's *Greenhouse Gas Emissions Regulations*, "biomass that has been harvested in a sustainable manner" is included as a source of renewable energy for the purposes of the regulations' definition of "low-emissions electricity". What constitutes "a sustainable manner" for the purposes of this definition is not defined by the regulations or any other legislation in Nova Scotia.

In the autumn of 2022, the Government of Nova Scotia amended the *Renewable Electricity Regulations* to impose an additional renewable electricity obligation on Nova Scotia Power Incorporated ("NSPI") that has the practical effect of adding more biomass electricity to Nova Scotia's grid. The amendment requires NSPI to "acquire at least 135 GWh of dispatchable renewable electricity from a renewable low-impact electricity generation facility located in the Province" in 2023, 2024, and 2025, respectively, and it states that, in meeting this requirement, NSPI:

> (a) may only acquire dispatchable renewable electricity from a biomass generation facility if the facility is produced from secondary waste by-products that result from the processing of untreated organic material; and
>
> (b) must pay $30/MWh for all dispatchable renewable electricity acquired from a biomass generation facility in addition to any price specified in any existing power purchase agreement, up to a maximum of $4.05 million per year.[59]

The Government of Natural Resources and Renewables was explicit about its intention to add more wood biomass to the grid,[60] and environmental advocates in the province viewed the amendments as a measure clearly taken to support Nova Scotia's forestry industry.[61]

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[56] *Ibid* at subsection 20(1).
[57] *Ibid* at clause 20(3)(b).
[58] *Ibid* at subsection 24(o).
[59] *Renewable Electricity Regulations* at subsection 6AA(3), as amended by NS Reg 338/2022.
[60] Nova Scotia Department of Natural Resources and Renewables, "Regulations Require More Renewable Electricity" (19 December 2022).
[61] See for example: Michael Gorman, "Province orders Nova Scotia Power to use biomass to generate electricity" *CBC News* (19 December 2022).

Although Nova Scotia's *Renewable Electricity Regulations* and *Greenhouse Gas Emissions Regulations* refer to "biomass that has been harvested in a sustainable manner", and although Nova Scotia's *Electricity Act* empowers the Governor in Council to make regulations "respecting standards that biomass sources must meet in order to qualify as a source of renewable low-impact electricity",[62] the Government of Nova Scotia has yet to clarify by regulation what it means for biomass to be harvested "in a sustainable manner" and has yet to establish more explicit connections between electricity-sector and forestry-sector legislation that are relevant to wood biomass harvesting and use. This is especially concerning in light of the provincial government's recent decision to double down on the use of wood biomass to generate electricity in order to support local forestry markets. Nova Scotian legislation appears to provide for sustainable harvesting and use of wood biomass to generate electricity, but it lacks the coordinated regulation that is required to ensure that such harvesting and use will indeed help rather than hinder the province's ambitions to achieve "sustainable prosperity".[63]

2.5 Intersections with Forest Carbon Accounting in Canada's National Inventory Reports

2.5.1 *National Inventory Reporting under the UNFCCC and Paris Agreement: Introduction to Reporting Obligations and Methods*

Among its obligations as a party to both the UNFCCC and the Paris Agreement, Canada periodically calculates and reports its national GHG inventory, which is comprised of the GHG emissions and removals that are attributed to Canada each year. National Inventory Reports ("NIRs") are submitted annually to the IPCC and include descriptive reports and Common Reporting Format ("CRF") tables that compile the figures grounding report descriptions.

UNFCCC parties must use "comparable methodologies" to prepare their NIRs; methodologies are presented by the IPCC and adopted by the parties during Conferences of the Parties.[64] Parties to the Paris Agreement have agreed to prepare their NIRs using the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* ("2006 IPCC Guidelines"),[65] and they have also agreed to "use any subsequent version or refinement of the IPCC guidelines agreed upon by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement".[66] In 2019, the IPCC presented a *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* ("the *2019 Refinement*"),[67] introducing some significant changes

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[62] *Electricity Act*, SNS 2004, c 25 at subsection 5(du).
[63] These ambitions are expressed in Nova Scotia's *Environmental Goals and Climate Change Reduction Act*, SNS 2021, c 20.
[64] Petteri Taalas and Inger Andersen, "Foreword", Intergovernmental Panel on Climate Change, *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (2019) at page iv ["Taalas and Andersen Foreword"].
[65] Intergovernmental Panel on Climate Change, *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (2006) ["*2006 IPCC Guidelines*"].
[66] Decision 18/CMA.1 at Annex, II(C). Published in FCCC/PA/CMA/2018/3/Add.2, *Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the third part of its first session, held in Katowice from 2 to 5 December 2018. Addendum 2. Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement*. See also Taalas and Andersen Foreword at page iv.
[67] Intergovernmental Panel on Climate Change, *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (2019) ["*2019 Refinement*"].

and clarifications to the NIR treatment of harvested wood products used for energy purposes. The parties to the Paris Agreement have not formally adopted the 2019 Refinement as obligatory guidance for NIRs; however, at the Conference of the Parties serving as the meeting of the parties to the Paris Agreement ("CMA") held in Glasgow in 2021, the parties agreed that the *2019 Refinement* could be used on a voluntary basis.[68] Canada's most recent NIR attests to using the *2006 IPCC Guidelines* as the source of its reporting methodologies but also notes some instances in which specific guidance from the *2019 Refinement* was used.[69]

The *2006 IPCC Guidelines* and *2019 Refinement* are each comprised of five volumes, with the first volume covering "general guidance and reporting" and subsequent volumes covering the four key sectors of the NIR framework: "Energy"; "Industrial Processes and Product Use"; "Agriculture, Forestry and Other Land Use" ("AFOLU"); and, "Waste". The GHGs emitted by burning wood biomass to generate electricity occupy a unique space within this framework. Non-CO_2 emissions are counted as Energy sector emissions, but CO_2 emissions are covered by the AFOLU sector and counted under one of two AFOLU categories: "Forest Land" or "Harvested Wood Products" ("HWP"). The 2019 Refinement offers a useful summary of this longstanding practice and the rationales behind it:

> Carbon dioxide (CO_2) emissions from the combustion of biomass or biomass-based products are captured within the CO_2 emissions in the AFOLU sector through the estimated changes in carbon stocks, e.g. from biomass harvest, even in cases where the emissions physically take place in other sectors (e.g., energy). This approach to estimate and report all CO_2 emissions from biomass or biomass-based products in the AFOLU was introduced in the first IPCC guidelines for national greenhouse gas emissions (IPCC 1995), reflecting close linkages with data on biomass harvesting, and for the pragmatic reason to avoid double counting.
>
> In AFOLU, CO_2 emissions from biomass or biomass-based products used for energy purposes are calculated as an implicit component of carbon stock changes, e.g., for all forest types and other wood producing land categories, as part of carbon stock changes in the HWP pool, or when a country chooses to use more advanced (higher tier) methodologies for carbon stock changes in above ground biomass from annual crops. The CO_2 emissions from biomass or biomass-based products used for energy purposes are not included in the sectoral total emissions in either the Energy or Waste sectors. This guidance is to avoid the possibility of double counting these emissions in two or more inventory sectors.
>
> In the Energy sector, CO_2, methane (CH_4) and nitrous oxide (N_2O) emissions from combustion of biomass or biomass-based products for energy are estimated, but the CO_2 emissions are recorded as an information item that is not included in the sectoral total

[68] Decision 5/CMA.3 at article 28. Published in FCC/PA/CMA/2021/10/Add.2, *Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021. Addendum Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its third session*.

[69] See for example Environment and Climate Change Canada, *National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada* (April 2023) at pages i, 113, 158, 194, 214, and 235 ["*NIR 1990-2021*].

> emissions for the Energy sector. This provides a complete picture of a country's energy system and avoids double counting of these emissions with those reported in the AFOLU sector. The CH_4 and N_2O emissions from the combustion of biomass or biomass-based products for energy are reported and included in the sectoral total emissions in the Energy sector, as these are not covered by the estimation methods in the AFOLU sector.[70]

As is evident from this summary, the underlying rationale for counting the CO_2 emissions of wood biomass used for energy purposes within the AFOLU sector is to avoid double-counting. To put it in simplistic terms, the methodology recognizes that when trees are cut from a forest, the carbon they have sequestered will be released in one way or another: when trees are used to create long-lived wood products, their sequestered carbon will be emitted years down the road when the wood products have outlived their useful lives and are disposed of as waste; when trees (or parts thereof) are combusted to generate energy, their sequestered carbon will be released immediately as CO_2.

As noted above, the *2006 IPCC Guidelines* and *2019 Refinement* both allow the CO_2 emissions of wood biomass used for energy purposes to be counted under one of two categories of the AFOLU sector: Forest Land (under which carbon losses resulting from "fuelwood removal" are estimated) or HWP (under which CO_2 emissions resulting from the oxidation of harvested wood are estimated).[71] Depending on the approach used, emissions may be counted as the result of carbon stock changes within a nation's forests or as more direct releases, but all of the available approaches recognize that there are CO_2 emissions associated with burning wood biomass to generate energy. In other words, there is no presumption under the NIR framework that using wood biomass for energy purposes is carbon- or GHG-neutral.

2.5.2 *Obscure Treatment of Wood Biomass Used to Generate Electricity in Canada's Most Recent National Inventory Report*

Canada's most recent NIR is the *National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada* ("*NIR 1990-2021*") and its corresponding CRF tables. As noted above, the NIR attests to using the *2006 IPCC Guidelines* as the source of its reporting methodologies but also notes some instances in which specific guidance from the *2019 Refinement* was used.[72]

The treatment of wood biomass used to generate electricity in the *NIR 1990-2021* is obscure and difficult to reconcile with the guidance presented in the *2006 IPCC Guidelines*. As is expected, CH_4 and N_2O emissions from the combustion of biomass fuels are reported as Energy sector emissions, but the CO_2 emissions released by such combustion are not reported clearly. The report states that those CO_2 emissions "appear as a memo item" in the Energy sector's CRF tables, and Table 1.A(a), which contains sectoral background data for energy, estimates that

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[70] *2019 Refinement*, Volume 1: General Guidance and Reporting, "Chapter 1: Introduction to National GHG Inventories" at section 1.1.

[71] See generally: *2006 IPCC Guidelines*, Volume 4: Agriculture, Forestry and Other Land Use, "Chapter 4: Forest Land" and "Chapter 12: Harvested Wood Products"; *2019 Refinement*, Volume 4: Agriculture, Forestry and Other Land Use, "Chapter 4: Forest Land" and "Chapter 12: Harvested Wood Products". It is beyond the scope of this report to provide detailed summaries of the reporting approaches available under these chapters for wood biomass used to generate electricity.

[72] See for example *NIR 1990-2021* at pages i, 113, 158, 194, 214, and 235.

321.03 kilotonnes ("kt") of CO_2 emissions were released by the use of biomass to generate electricity in 2021.[73] However, it is difficult to find a corresponding record of these emissions in the CRF tables reporting emissions within the Land Use, Land-Use Change, and Forestry ("LULUCF") sector, and Table 1 of the CRF tables provides this concerning note:

> Amounts of biomass used as fuel are included in the national energy consumption but the corresponding CO_2 emissions are not included in the national total as it is assumed that the biomass is produced in a sustainable manner. If the biomass is harvested at an unsustainable rate, net CO_2 emissions are accounted for as a loss of biomass stocks in the land use, land-use change and forestry sector.[74]

Acknowledging that the author of this report has limited experience navigating the complexities of Canada's NIRs, it appears from our research that 321.03 kt of CO_2 emissions caused by burning biomass to generate electricity in 2021 have been rendered invisible within the CRF tables for the LULUCF sector, and it is difficult to determine whether assumptions about the sustainability of Canada's forestry practices are playing a role. We are unaware of any support within relevant chapters of the *2006 IPCC Guidelines* or the IPCC's *Good Practice Guidance for Land Use, Land-Use Change and Forestry*[75] for the ECCC position, quoted above, that biomass can be assumed to be produced in a sustainable manner and that CO_2 emissions caused by burning "sustainable" biomass need not be included in national totals.

This is not to say that these CO_2 emissions are not being reported properly—due to our limited experience in this area, we cannot comment conclusively on the propriety or impropriety of Canada's NIR method and results. For the purposes of this report, our point here is simply that there is considerable obscurity in the way the *NIR 1990-2021* treats wood biomass used to generate electricity.[76] Given that electricity-sector law and policy in Canada appears to assume that the GHG implications of burning biomass to generate electricity are either negligible or are being considered within and balanced by forestry-sector management, we need much clearer quantification and accounting of the impact that biomass-for-energy harvesting has on Canada's AFOLU / LULUCF emissions; otherwise, it will be difficult if not impossible to determine whether burning wood biomass to generate electricity is hindering or contributing to Canada's climate change commitments and net-zero aspirations.

2.5.3 *Broader Concerns Regarding the Quantification and Accounting of Canada's Forest Carbon Emissions*

Within the past two years, a series of reports issued jointly by Nature Canada and the Natural Resources Defence Council ("NRDC") have raised concerns about how the Government of

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[73] *NIR 1990-2021* at page 66; CRF Table 1.A(a): Sectoral Background Data for Energy (Sheet 1 of 4).
[74] *NIR 1990-2021*, CRF Table 1: Sectoral Report for Energy at note 1.
[75] Intergovernmental Panel on Climate Change, *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (2003).
[76] Compared to the guidance presented in the *2006 IPCC Guidelines*, the *2019 Refinement* offers much more substantive commentary on the treatment of CO_2 emissions caused by using HWP for energy purposes. It may be that using the *2019 Refinement* guidelines in this area would improve the transparency and accessibility of information.

Canada quantifies and accounts for forestry-sector GHG emissions in its annual NIRs.[77] The core argument advanced throughout the series is that the Government of Canada "does not transparently report" the GHG emissions that are caused by the logging industry each year,[78] and, more specifically, that Canada's quantification and accounting methods for forest carbon improperly take the benefit of massive forest carbon sinks that should not be attributed to anthropogenic activities. The result of this improper quantification and accounting, according to the series, is that the GHG emissions that can and should be attributed directly to industrial forestry activities appear on the books to be fully offset by carbon sinks to which the forestry industry cannot lay claim. According to the authors of the series, this approach falsely makes it seem as though Canada's forestry sector is being regulated, and Canada's forests are being managed more broadly, in a way that leads to net carbon removals from the atmosphere each year instead of net emissions. The research, analysis, and perspectives grounding the arguments advanced in the series are explained most clearly in the 2021 report authored by Matthew J. Bramley, entitled *Canada's Approach to Forest Carbon, Quantification and Accounting: Key Concerns*.[79]

This report does not echo or endorse all of the points raised in the Nature Canada-NRDC series of reports, as our research to date indicates that some of the arguments related to improper reporting under the UNFCCC may be debatable. That said, we agree with the core argument advanced throughout the series, which is that forestry-sector GHG emissions are not reported transparently in Canada's NIRs, in a way that is easy for law and policy-makers and interested members of the public to understand. As we have already noted, the LULUCF sections of Canada's *NIR 1990-2021* and corresponding CRF tables make it very difficult to tell how specific categories of forestry-sector emissions, such as harvested wood products used for energy purposes, are contributing to the CO_2 emissions of the sector as a whole and being offset (or not) by managed forest carbon sinks.

Notably, an audit report issued by Canada's Commissioner of the Environment and Sustainable Development ("the Commissioner") in April 2023 amplified some of the concerns raised by the Nature Canada-NRDC series. Under the heading "Greenhouse gas effects of forests were not effectively communicated to support decision making and accountability", the audit report communicates several findings, including:

> 1.54 We found that the information produced by Environment and Climate Change Canada and Natural Resources Canada was primarily focused on meeting international reporting obligations and was not aimed at other critical public and private sector decision makers. For example, although Natural Resources Canada provided support to users of the information, such as provinces and environmental organizations, to help them

[77] See especially: Matthew J. Bramley, *Canada's Approach to Forest Carbon, Quantification and Accounting: Key Concerns* (28 October 2021), issued jointly by Nature Canada, the Natural Resources Defence Council ("NRDC"), Natura Québec, and Environmental Defence ["Bramley 2021"]; Matthew Bramley and Graham Saul, *What Are the Net Greenhouse Gas Emissions from Logging in Canada?* (October 2022), issued jointly by Nature Canada and NRDC; and, Jennifer Skene and Michael Polanyi, *Lost in the Woods: Canada's Hidden Logging Emissions Are Equivalent to Those from Oil Sands Operations* (October 2022), issued jointly by Nature Canada and NRDC ["Skene and Polanyi 2022].

[78] Skene and Polanyi 2022 at page 2.

[79] Bramley 2021.

> asses the effectiveness of measures or to evaluate mitigation options, this information was not made widely available. The results of these assessments were generally uniquely tailored to the users or limited to the scientific literature.
>
> […]
>
> 1.60 **Forestry sector emissions**. We found that Environment and Climate Change Canada did not separately report total emissions from the forestry sector in Canada. Instead, these emissions were dispersed throughout the national inventory reports, making it impractical to determine their aggregate effects. For example, some emissions were included under the land-use category, but emissions from equipment used in forestry operations and logging were included under a different category.
>
> 1.61 Many stakeholders, such as academics and environmental and health groups, have expressed concern about the lack of transparency about greenhouse gas emissions from logging. One stakeholder report estimated that net emissions from logging accounted for approximately 10% (75 Mt CO_2 eq) of Canada's total in 2020. This estimate was largely based on information reported publicly by the departments. Natural Resources Canada and Environment and Climate Change Canada disagreed with this estimate but provided no alternative estimate that was specific to logging. They also indicated that producing a logging estimate would be outside of international reporting obligations.
>
> 1.62 In our view, sector-specific reporting, as is done for the oil and gas industry, would support the development of effective policy measures to reduce emissions from the forestry sector.[80]

Notably, the audit report does not find that ECCC is reporting forestry-sector GHG emissions improperly in Canada's NIRs; instead, the report emphasizes the importance of aggregating (or disaggregating) and effectively communicating sector-specific information to support policy-making, decision-making, and accountability. Commenting on its finding that the GHG effects of Canada's forests have not been communicated effectively "to support decision-making and accountability", the report emphasizes that finding is important "because accurate and consistent information on forest-related greenhouse gas emissions can support the development of policies, allow stakeholders and decision makers to assess progress, and determine whether any adjustments or further actions are needed".[81] It is worth noting that Target 21 of the KMGBF established at the UN CBD Conference of the Parties in December resonates strongly with the Commissioner's report:

> Target 21: "Ensure that the best available data, information and knowledge are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management […]".[82]

[80] *Forests and Climate Change Report 2023* at pages 17-19.
[81] *Ibid* at page 15.
[82] CBD/COP/DEC/15/4 at Annex, Section H.

Although the Commissioner's remarks address forestry-sector reporting, they can and should be applied likewise to electricity-sector reporting that intersects with forestry concerns—most notably as regards the use of wood biomass sourced from forests to generate electricity.

2.6 Carbon Pricing in Canada and the Use of Wood Biomass to Generate Electricity

It is beyond the scope of this report to address Canada's carbon pricing regimes in detail, but one key aspect of the federal Output-Based Pricing System ("OBPS") under Canada's *Greenhouse Gas Pollution Pricing Act* ("*GGPPA*") should be noted, as federal regulation in this sphere can be expected to intersect with the *CER*.

Canada's OBPS is designed for industrial facilities that have historically emitted GHGs above a certain threshold, and it applies in provinces and territories that have not established comparable carbon pricing systems that meet the federal benchmark.[83] Electricity generation facilities meeting the threshold criteria are subject to the OBPS in the provinces/territories where it applies; however, CO_2 emissions produced by burning biomass to generate electricity are excluded from the calculation of the total emissions that determine the facilities' compensation obligations.[84] This means that electricity generated by burning wood biomass carries no financial consequences under the OBPS, and electricity generation facilities have no corresponding incentives to curtail the GHGs that wood biomass combustion produces.

Section 1.3.1 of this report notes that ECCC's *Proposed Frame* for the *CER* raises a significant concern about the scope of the regulations because it suggests that electricity generation facilities that do not combust fossil fuels will not be regulated under the new regime. It is argued in that section that if electricity generation facilities designed to combust biomass fuel exclusively are excluded from regulation under the *CER*, the regime risks incenting the commissioning of new biomass-only facilities that will receive, effectively, a regulatory "free pass".

This concern is amplified by the existing structure of Canada's OBPS, which effectively gives electricity generation facilities another "free pass" concerning the use of wood biomass to generate electricity.[85] There is at the very least a twofold risk of incenting the commissioning of biomass-only electricity generation facilities in Canada if neither the *CER* nor Canada's carbon pricing regime(s) assign financial consequences for wood biomass combustion.

Notably, the early discussion paper that ECCC released in March 2022 (when it was still contemplating a "clean electricity standard", or "CES") asked the following questions concerning prospective alignment with federal carbon pricing:

> 9. Should the way in which electricity generation is currently treated by carbon pricing be changed to facilitate achieving NZ2035 [net-zero by 20235]?

[83] A high-level summary of the OBPS is provided in ECCC *Discussion Paper* at page 24.
[84] See *Output-Based Pricing System Regulations*, Can Reg 2019-266 at sections 22 and 20(2)-20(5).
[85] It is beyond the scope of this report to review the output-based pricing regimes of provinces and territories where the OPBS does not apply, but it is understood that the same lacuna is found beyond the federal system.

10. How might the treatment of electricity under the OBPS have to change to align with the CES?[86]

While we think it doubtful that ECCC is contemplating a radical change of course that would see wood biomass electricity priced under the OBPS, it is worth highlighting the detriments of allowing wood biomass to be burned for electricity without financial consequence.

2.7 Federal Regulation of Wood Biomass Feedstocks under the *Clean Fuel Regulations*

Canada's *Clean Fuel Regulations* ("*CFR*") operate under *CEPA*. The regulations impose carbon intensity requirements for liquid fossil fuels that are produced in or imported into Canada, but they also create alternative compliance mechanisms that, among other things, allow producers and importers to meet their obligations through participation in a "compliance credit" market that the regulations establish.[87]

Under the regulations, compliance credits may be created in several ways, including through the production of low carbon intensity fuels that are produced from biomass feedstocks. In an effort to ensure that compliance credits created through the production of biomass-based fuels do indeed have lower carbon intensities than the fossil fuels they are designed to replace, the regulations impose several requirements dictating what kinds of biomass feedstocks are eligible or ineligible. In particular, the sections of the regulations that address the creation of compliance credits include specific land-use and biodiversity criteria that are used in the characterization of low carbon intensity fuels.

This report does not provide an in-depth analysis of the *CFR*'s approach to biomass feedstocks. Table 1, presented in Appendix A, identifies some particularly important provisions in the regulations and, in doing so, provides a high-level overview of the regime as it relates to biomass. Some key aspects of the approach worth noting here include:

- eligibility of feedstock from forest biomass that is "derived from fire prevention and protection activities or from clearing activities that are not related to harvesting";[88]
- eligibility of feedstock from "secondary forest residues that are by-products of industrial wood-processing operations";[89]
- a restriction (not yet in effect) that will disallow the harvesting of eligible forest biomass feedstock "from land located in an area that provides a habitat for any rare, vulnerable or threatened species";[90]

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[86] ECCC *Discussion Paper* at page 13.
[87] The *Clean Fuel Regulations* were promulgated in 2022. They are designed to repeal the *Renewable Fuels Regulations*, but the provision effecting the repeal (section 175) has not yet been proclaimed—it is set to come into force on September 30, 2024: see subsection 176(2). For a more in-depth review of the *Clean Fuel Regulations*, the Regulatory Impact Analysis Statement that ECCC provided when the proposed regulations were first published in the *Canada Gazette, Part I* is a helpful resource: see Government of Canada, "Clean Fuel Regulations – Regulatory Impact Analysis Statement", *Canada Gazette, Part I*, Volume 154 (19 December 2020).
[88] *Clean Fuel Regulations*, SOR 2022/140 at paragraph 46(1)(b)(i).
[89] *Ibid* at paragraph 46(1)(b)(iii).
[90] *Ibid* at subsection 48(1).

- restrictions (some in effect and some not yet in effect) designed to prevent land-use change and the conversion of forest lands to crop lands;[91] and,
- a requirement (not yet in effect) for feedstock derived from forest biomass to be harvested in accordance with a forest management plan that meets several listed requirements.[92]

In general, these requirements and restrictions suggest some degree of desire to prioritize the use of wood biomass that is salvaged or produced as a by-product of industrial wood-processing activities, which reflects some degree of desire not to incent the creation or expansion of a biomass-for-energy market for wood that has higher economic uses. Some degree of desire to prevent deforestation is also evident.

The use of carbon intensity requirements to support the *CFR*'s compliance credit regime may be mirrored in the *CER*. ECCC's *Proposed Frame* for the *CER* states that the *CER* will "establish an emissions performance standard having an intensity form (i.e., t/GWh)" and that a regulated facility will "be prohibited from operating when its quantified emissions performance exceeds the applicable standard over a period of time", while "[a]ny residual emissions below the standard would be subject to financial compliance requirements, such as offset purchases".[93] These comments suggest that ECCC may be contemplating a compliance credit regime for the *CER* that is similar to the one established under the *CFR* and that electricity generated by the combustion of biomass—including wood biomass—could potentially qualify as an eligible source of offsets.

Given the scope and intractability of concerns about the use of wood biomass to generate electricity, wood biomass should arguably not be an eligible source of offsets in a compliance credit regime established under the *CER*.

However, if ECCC does move forward with an approach along these lines, it would be valuable for the regulations to include restrictive eligibility requirements that limit the kinds of wood biomass that are eligible to create compliance credits and also limit the ecosystems from which wood biomass can be sourced. Limiting eligible feedstocks to woody residuals, debris, or by-products of established forestry and wood-processing practices is an option that has some precedent in the *CFR* and is also demonstrated to some extent in British Columbia's electricity-sector legislation (discussed above in Section 2.2); moreover, it would align with the EU's implementation of the "cascading principle" (discussed below in Section 3.2.1). Further restrictions designed more specifically to prevent deforestation, forest degradation, and biodiversity loss would also be advisable—the *CFR* also provide some precedent for restrictions along these lines, but improvements in line with recent and anticipated EU regulation would be preferable.

[91] *Ibid* at subsections 50(1) and 51(1).
[92] *Ibid* at section 52.
[93] ECCC *Proposed Frame*.

3.0 INTERNATIONAL REGULATION OF WOOD BIOMASS USED TO GENERATE ELECTRICITY

The jurisdictions discussed in this chapter were selected as jurisdictions of interest by the project developers, and the selection should not be taken to suggest that noteworthy developments in the regulation of wood biomass used to generate electricity are not occurring elsewhere.

3.1 Australia

Australia was selected as a jurisdiction of interest following the December 2022 decision by its Minister of Climate Change and Energy to remove "native forest biomass" from the list of renewable energy sources that are eligible for use under Australia's Renewable Energy Certificates ("REC") program.[94]

Australia's REC program is governed by Australia's *Renewable Energy (Electricity) Act 2000*. Within the program, tradeable renewable energy certificates are produced through the generation of electricity using eligible renewable energy sources. Electricity purchasers who fall under the purview of the program are required to acquire and surrender a certain number of certificates each year or pay shortfall charges. The Act lists several eligible renewable energy sources that can be used to generate electricity for the REC program and enables additional sources to be prescribed by regulations. "Wood waste" is one of the eligible renewable energy sources listed in the Act.

Before the regulatory amendments that the Minister for Climate Change and Energy made in December, Australia's *Renewable Energy (Electricity) Regulations 2011* defined "wood waste", for the purposes of the REC program, as including "biomass from a native forest that meets all of the requirements in subregulation (2)". The regulatory requirements stated that in order to qualify as an eligible renewable energy source, biomass from a native forest must be a by-product of harvesting operations. The requirements also established other conditions designed to ensure that native forest resources were prioritized for higher-value processes and that harvesting operations were being conducted in accordance with "ecologically sustainable forest management principles". The regulations defined "ecologically sustainable forest management principles" as follows:

> ***ecologically sustainable forest management principles*** means the following principles that meet the requirements of ecologically sustainable development for forests:
>
> (a) maintenance of the ecological processes within forests, including the formation of soil, energy flows, and the carbon, nutrient and water cycles;
> (b) maintenance of the biological diversity of forests;
> (c) optimization of the benefits to the community from all use of forests within

[94] For accessible and informative context, see Justin Catanoso, "Australia rejects forest biomass in first blow to wood pellet industry" *Mongabay* (21 December 2022).

ecological constraints.[95]

The amendments made in December 2022 withdrew regulatory recognition of native forest biomass as an eligible form of "wood waste" for the purposes of the REC program. The amendments may be understood as a response to public concern that the existing restrictions on forest biomass feedstocks could not guarantee the sustainability of using wood biomass to generate electricity.[96]

Going forward, new entrants to the REC program will not be able to produce RECs by burning native forest biomass to generate electricity; however, the December amendments allow the "grandfathering" of some pre-existing use of native forest biomass as an eligible renewable energy resource. The requirements and definitions discussed above will continue to apply to the electricity generation facilities that are authorized to continue burning native forest biomass as an eligible renewable energy resource.

3.2 European Union

The EU's approach to regulating wood biomass as a renewable energy resource has been evolving steadily over the past fifteen years and has drawn considerable attention recently as EU legislators have worked to revise the Union's Renewable Energy Directive ("RED") and replace a key timber regulation to strengthen Union efforts to avoid deforestation, forest degradation, and biodiversity loss.[97] As a jurisdiction that has relied heavily on wood biomass a renewable electricity resource but is increasingly recognizing the risks inherent in supporting biomass-for-energy markets without appropriate safeguards in place, the EU's evolving regime can offer useful models for Canadian regulation under the *CER*.

Until recently, three legal instruments have held special relevance for the regulation of wood biomass to generate electricity in the EU: the RED, the "Timber Regulation", and the "Waste Directive". The RED is currently in the process of undergoing significant revisions by EU legislators, and the Timber Regulation is now being replaced by a "Deforestation and Forest Degradation Regulation" that aims more specifically to ensure the preservation and sustainable management of forests in the EU and around the globe. Sections 3.2.1 - 3.2.3 below explore these instruments in more detail, focusing in particular on the RED.[98]

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[95] *Renewable Energy (Electricity) Regulations 2001* (as amended and in force on 1 July 2022) at subregulation 8(4).
[96] The "Explanatory Statement" issued by the Minister for Climate Change and Energy provides further insight in this regard.
[97] The EU's first RED was Directive 2009/28/EC. That directive was replaced by the current RED, Directive (EU) 2018/2001, which entered into force in December 2018 and is commonly known as "REDII".
[98] For an informative overview of the intersections between the RED, Waste Directive, and Timber Regulation as they stood in 2014, see Richard Sikkema *et al*, "Legal Harvesting, Sustainable Sourcing and Cascaded Use of Wood for Bioenergy: Their Coverage through Existing Certification Frameworks for Sustainable Forest Management" *Forests* 5 (2014) ["Wood for Bioenergy"].

3.2.1 *Relevance of the Waste Directive*

Directive 2008/98/EC is the EU directive commonly known as the "Waste Directive".[99] As regards the use of wood biomass to generate electricity, the Waste Directive plays a smaller role than the RED, the Timber Regulation, and the Deforestation and Forest Degradation Regulation, but it is worth noting its implications for the use of post-consumer wood waste as an energy source.[100]

The Waste Directive establishes a "waste hierarchy" that sets "a priority order of what constitutes the best overall environmental option in waste legislation and policy".[101] As established in Article 4.1 of the directive, that waste hierarchy is as follows:

> (a) prevention;
> (b) preparing for re-use;
> (c) recycling;
> (d) other recovery, e.g. energy recovery; and
> (e) disposal.

Notably, energy recovery ranks low on the list of priorities, above only disposal.

The waste hierarchy established in the Waste Directive intersects with the EU's renewable energy regime. Under the current RED, EU member states are required to ensure that their national energy policies and support schemes "are designed with due regard" to the waste hierarchy to "avoid undue distortive effects on the raw material markets".[102] The RED gives the European Commission a similar responsibility to consider the waste directive when carrying out certain activities supporting RED implementation.[103]

As noted above, the Waste Directive has a fairly limited application with regard to the use of wood biomass to generate electricity. The directive addresses "waste" specifically, and it recognizes a distinction between "waste" and "by-products". Woody by-products of industrial production (such as chips, savings, and sawdust from forestry operations, for example) may reasonably be recognized as "by-products" rather than "waste" and thus excluded from the directive's requirements. Post-consumer wood waste—such as wood components of furniture, structures, etc. that have reached the end of their useful lives—is what the Waste Directive captures most clearly.

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[99] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives ["Waste Directive"].
[100] Academic scholarship assessing the aptitude of EU law and policy to ensure the lawfulness and sustainability of forest harvesting to produce wood biomass fuel, as well as the best use of harvested forest products, identifies the Waste Directive, Timber Regulation, and RED (as they stood in 2014) as the three pillars of the EU system: see Sikkema *et al*, "Wood for Bioenergy".
[101] Waste Directive at Recitals paragraph 31.
[102] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable resources, at Article 3.3 ["REDII"].
[103] *Ibid* at Article 28.6.

Notably, one of the revisions that EU legislators are currently making to the RED resonates with the waste hierarchy established in the Waste Directive and will likely work in tandem with it. That revision is a formal recognition and implementation of the "cascading principle" under the RED. As conceived in the RED revision, the cascading principle will set a priority order of what constitutes the best economic and environmental options for the use of harvested wood products. As expressed in the most current version of the revision text that is available to the public:

> Member states shall take measures to ensure that energy from biomass is produced in a way that minimises undue distortive effects on the biomass raw material market and harmful impacts on biodiversity, the environment and the climate. To that end, they shall take into account the waste hierarchy as set out in Article 4 of Directive 2008/98/EC and ensure the application of the cascading principle, with a focus on support schemes and with due regard to national specificities.
>
> With a view to ensuring that woody biomass is used according to its highest economic and environmental value in the following order of priorities:
>
> (1) wood-based products;
> (2) extending their service life;
> (3) re-use;
> (4) recycling;
> (5) bio-energy; and
> (6) disposal;
>
> support schemes for energy from biofuels, bioliquids, and biomass fuels shall be designed in a way to avoid incentivising unsustainable pathways and distorting competition with the material sectors.[104]

The rationale for this revision is expressed in an anticipated revision to the RED's Recitals that is worth quoting at length:

> There is a growing recognition of the need to align bioenergy policies with the cascading principle of biomass use, with a view to ensuring fair access to the biomass raw material market for the development of innovative, high value-added bio-based solutions and a sustainable circular bioeconomy. When developing support schemes for bioenergy, Member States should therefore take into consideration the available sustainable supply of biomass for energy and non-energy uses and the maintenance of the national forest carbon sinks and ecosystems as well as the principles of the circular economy and the biomass cascading use […]. In line with the cascading principle, woody biomass should be used according to its highest economic and environmental added value in the following order of priorities: 1) wood-based products, 2) extending their service life, 3) re-use, 4) recycling, 5) bio-energy and 6) disposal. Where no other use for woody biomass is economically viable or environmentally appropriate, energy recovery helps to reduce energy generation from non-renewable resources. Member States' support

[104] See Appendix B of this report, which compares Article 3.3 of REDII and the compromise text of the anticipated REDIII.

> schemes for bioenergy should therefore be directed to such feedstocks for which little market competition exists with the material sectors, and whose sourcing is considered positive for both climate and biodiversity, in order to avoid negative incentives for unsustainable energy pathways […].[105]

An important focus on state "support schemes" for wood biomass fuels is evident in these passages, and it reflects the attention that EU legislators are giving to the economic and environmental sustainability of subsidizing the use of wood biomass to generate electricity. The Government of Canada, through ECCC, should be asking similar questions and taking similar steps to identify and prevent harmful consequences to forests and biodiversity that would follow the establishment of *CER* that indirectly encourage unsustainable wood biomass use.

3.2.2 *Relevance of the Timber Regulation and the Deforestation and Forest Degradation Regulation*

Regulation (EU) No 995/2010 is the EU regulation commonly known as the "Timber Regulation".[106] The Timber Regulation was established in 2010. It recognized the vital products and services that forests provide to humankind, and it aimed to curb illegal logging and related market activities by restricting the timber and timber products allowed to enter the Union.[107] The regulation associates illegal logging with several environmental and socio-economic harms, including deforestation, forest degradation, biodiversity loss, climate-warming CO_2 emissions, and exacerbation of "extreme weather events and flooding".[108] However, although these harms were clearly on the minds of EU legislators when the regulation was established, the substantive contents of the regulation focus on curbing "illegal logging" and were not designed specifically to prevent deforestation and forest degradation.

In the spring of 2023, EU legislators established a new regulation designed to repeal and replace the Timber Regulation. Unlike its predecessor, Regulation (EU) 2023/115, the "Deforestation and Forest Degradation Regulation",[109] is designed to prevent deforestation and forest degradation within the EU and around the globe, focusing in particular on curbing the harmful effects of EU consumption of seven commodities associated with deforestation and forest degradation: oil palm, soya, wood, cocoa, coffee, cattle, and rubber.

The Deforestation and Forest Degradation Regulation defines "deforestation" as meaning "the conversion of forest to agricultural use, whether human-induced or not",[110] and it defines "forest degradation" as meaning:

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[105] Compromise Text for REDIII (provided as an attachment to this report) at Recitals, paragraph 4.
[106] Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market ["Timber Regulation"].
[107] Sikkema *et al*, "Wood for Bioenergy" provides an informative overview of the Timber Regulation and how it has been applied in practice.
[108] Timber Regulation at Recitals paragraph 3.
[109] Regulation (EU) 2023/1115 of the European Parliament and of the Council of 31 May 2023 on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 ["Deforestation and Forest Degradation Regulation"]. The regulation is set to come into force on 29 June 2023.
[110] Deforestation and Forest Degradation Regulation at Article 2(3).

> […] structural changes to forest cover, taking the form of the conversion of:
>
> (a) primary forests or naturally regenerating forests into plantation forests or into other wooded land; or
>
> (b) primary forests into planted forests.[111]

Corresponding definitions of "primary forest", "naturally regenerating forest", "planted forest", "plantation forest", and "other wooded land" are set out as well.[112]

To accomplish its aim of preventing deforestation and forest degradation, the regulation establishes a fundamental prohibition that disallows certain commodities and products from being placed on the EU market or exported from the EU. The prohibition states:

> Relevant commodities and relevant products shall not be placed or made available on the market or exported, unless all the following conditions are fulfilled:
>
> (a) they are deforestation-free;
>
> (b) they have been produced in accordance with the relevant legislation of the country of production; and
>
> (c) they are covered by a due-diligence statement.[113]

The regulation defines "deforestation-free" as meaning:

> (a) that the relevant products contain, have been fed with or have been made using, relevant commodities that were produced on land that has not been subject to deforestation after 31 December, 2020; and
>
> (b) in the case of relevant products that contain or have been made using wood, that the wood has been harvested from the forest without inducing forest degradation after 31 December, 2020[.][114]

Relevant commodities and products are listed in Annex I of the regulation, and they include "[f]uel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms".[115] A straightforward reading of the annex's listing for fuel wood indicates that it will apply to wood biomass fuel used to generate electricity.

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[111] *Ibid* at Article 2(7).
[112] See *ibid* at Article 2(8), 2(9), 2(10), 2(11), 2(12).
[113] *Ibid* at Article 3.
[114] *Ibid* at Article 2(13).
[115] *Ibid* at Annex I, 4401.

The Deforestation and Forest Degradation Regulation can be expected to affect Canadian exports of harvested wood products, including wood biomass fuel, to the EU market. Although the regulation has significant nuances and complexities, the overall thrust is that wood products sourced from Canada must be "deforestation-free", meaning that they must be harvested from forests without inducing forest degradation—that is, without inducing the conversion of primary forests or naturally regenerating forests into plantation forests, planted forests, or other wooded land. Producers will bear the onus of demonstrating that the necessary mechanisms are in place to ensure and monitor compliance. If existing legislation and certification schemes are not sufficient, they must therefore be improved.

Although the Deforestation and Forest Degradation Regulation can be expected to shape Canadian regulation of harvested wood products that are intended for export to the EU, it will have no direct effect on Canadian regulation of harvested wood products used within Canada. Nevertheless, the EU's establishment of the regulation presents an advocacy opportunity for public-interest advocates in Canada who wish to strengthen Canadian regulation of wood biomass used to generate electricity. To the extent that law, policy, and certification scheme improvements may be necessary in Canada to ensure that harvested wood products meet the requirements that the Deforestation and Forest Degradation Regulation imposes on imports to the EU, Canadian legislators should carry those improvements forward to domestic use as well.

3.2.3 *Relevance of the Renewable Energy Directive*

Directive (EU) 2018/2001 is the EU's current RED, commonly known as "REDII" because it replaced the first RED, which was established in 2009. REDII is the central pillar of the EU's renewable energy regime. Among other things, it establishes the agreed amount of total energy consumption in the EU that must be met with renewable energy (at least 32% by 2030),[116] and it imposes several requirements concerning the energy sources that EU member states will use to meet that target.

EU legislators are currently in the process of revising the REDII and establishing what will become the REDIII. The revision process began in July 2021 when the European Commission submitted a proposed revision to the European Parliament and European Council.[117] After receiving the Commission's proposed revision, the Parliament and the Council each took steps to develop and adopt negotiating positions that proposed various changes to the revision drafted by the Commission. Seven trilogues between representatives of the Commission, Parliament, and Council were held between October 2022 and March 2023, and the final trilogue in March 2023 resulted in a "compromise text" to be submitted for adoption by the Parliament and the Council, respectively.[118] Although the contents of the revision will not be cemented until a finalized text has been established through formal legislative processes, the compromise text provides a good indication of what is to come.

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[116] REDII at Article 3.1.
[117] European Commission, "Proposal for a Directive of the European Parliament and of the Council, amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652" (14 July 2021).
[118] Compromise Text for REDIII provided as an attachment to this report.

Once EU directives like the RED are established (or revised) and brought into force, they impose legal obligations on all EU member states, who must "transpose" directives into their domestic laws to ensure that the objectives of the directives are achieved. EU directives typically give member states considerable flexibility in deciding how they will implement requirements through their own legal systems, as the goal is to achieve "harmonization" of outcomes across the EU, not absolute standardization of regulatory approaches. However, EU directives can sometimes impose highly specific obligations or restrictions that leave little room for variances in implementation. Depending on the context, it is sometimes but not always possible for member states to implement environmental laws and policies that are more stringent than those of other member states when the issues targeted by such laws and policies are governed by EU directives designed to create harmonization throughout the Union.[119]

In its current form, REDII recognizes biomass as an energy source that can contribute to the EU's total renewable energy target as well as to the state-specific renewable energy shares of EU member states; it can be taken into account when measuring compliance with the EU's renewable energy obligations; and, it is among the renewable energy technologies that are eligible for member state financial support.[120] However, in order for biomass fuels to be used and supported in these ways, they must fulfil applicable "sustainability criteria" and "greenhouse gas emissions saving criteria" that the directive imposes.

The sustainability criteria and greenhouse gas emissions saving criteria imposed within REDII demonstrate several approaches designed to avoid unwanted effects of accepting or supporting biomass as a source of renewable energy. These include, among other things:

- requirements for monitoring and management of soil quality and soil carbon in agricultural land used as a source of biomass fuel;[121]
- disqualification of agricultural biomass "made from raw material obtained from land with a high biodiversity value" (for example, primary forests that have been degraded or converted for agricultural use);[122]
- disqualification of agricultural biomass "made from raw material obtained from land with high-carbon stock" (for example, wetlands and "continuously forested" areas);[123]
- disqualification of agricultural biomass derived from converted peatland;[124]
- sustainability criteria for forest biomass fuel, designed to "minimise the risk of using forest biomass derived from unsustainable production", including requirements for producing countries to have appropriate legislation and monitoring and enforcement

[119] For example, Article 29 of REDII gives member states some flexibility to go beyond the minimum sustainability criteria and energy efficiency requirements of the directive by imposing additional criteria or higher standards, but it bars member states from refusing to recognize biofuels and bioliquids as renewable energy sources for the purposes set out in Article 29 when biofuels and bioliquids are obtained in compliance with the Article; additionally, the provision granting member states flexibility to establish additional sustainability criteria for biomass fuels also requires the European Commission to assess the market impact of such criteria by December 31, 2026 and, if necessary, propose measures to ensure harmonization. See REDII at Article 29.11, 29.12, and 29.14.
[120] REDII at Article 29.1.
[121] *Ibid* at Article 29.1.
[122] *Ibid* at Article 29.3.
[123] *Ibid* at Article 29.4.
[124] *Ibid* at Article 29.5.

systems in place to control forest harvesting, ensure forest regeneration, and support the maintenance of soil quality and biodiversity;[125]

- land-use, land-use change, and forestry ("LULUCF") requirements for forest biomass fuel, designed to ensure that countries producing forest biomass are parties to the Paris Agreement, are monitoring and reporting carbon stock and sink changes resulting from forest harvesting, and have legislation or management systems in place to ensure that the production of forest biomass fuel does not have net negative effects on forest carbon stocks and sinks;[126]
- a GHG emissions saving requirement of 70% for biomass fuels used to generate electricity in installations that began operation as of January 2021, going up to 80% for installations that begin operation as of January 2026;[127] and,
- a stipulation that electricity produced from biomass fuel meet at least one of the following requirements:
    - "it is produced in installations with a total rated thermal input below 50 MW";
    - "for installations with a total rated thermal input from 50 to 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, meeting an energy efficiency level associated with the best available techniques (BAT-AEELs) as defined in Commission Implementing Decision (EU) 2017/1442";
    - "for installations with a total rated thermal input above 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, achieving an net-electrical efficiency [*sic*] of at least 36 %";
    - "it is produced applying Biomass CO_2 Capture and Storage".[128]

As is shown by this bulleted list, several of the sustainability requirements imposed in REDII apply specifically to biomass sourced from agricultural land and do not apply to biomass sourced from forest land. Although the requirements applied to biomass sourced from agricultural land are designed in large part to prevent deforestation, forest degradation, and ecological harms to other biodiverse wooded areas, the absence of analogous criteria applying to forest land itself has been a concern for many and was a key issue in the recent revision process.[129]

The treatment of wood biomass—and forest biomass in particular—under the RED became a central and relatively contentious issue in the movement to revise REDII and develop REDIII.[130] The European Parliament's position on the revisions was that REDII's treatment of forest

[125] *Ibid* at Article 29.6.
[126] *Ibid* at Article 29.7.
[127] *Ibid* at Article 29.10.
[128] *Ibid* at Article 29.11.
[129] The RED's history demonstrates incremental progress over time to incorporate criteria for and restrictions on forest biomass as a source of renewable energy. The original RED only established sustainability criteria for liquid biofuels; the application of sustainability criteria to forest biomass and the introduction of GHG emissions savings requirements for solid and liquid biomass fuels were new developments under REDII: see Zachary James Mather Gratton, Søren Larsen, and Niclas Scott Bentsen, "Understanding the sustainability debate on forest biomass for energy in Europe: A discourse analysis" *PLos ONE* 16:2 (2020) at page 2.
[130] See for example: WWF, "Eu co-legislators prepare for key negotiations on the future of renewables" (6 March 2023); Frédéric Simon, "Biomass fight leaves EU renewable energy talks in a deadlock" *EURACTIV* (16 February 2023); Justin Catanos, "As EU finalizes renewable energy plan, forest advocates condemn biomass" (7 December 2022).

biomass should be revised substantially so as to strictly limit certain forms of forest biomass as qualifying renewable energy sources. Specifically, the Parliament worked to introduce an entirely new framework for the use of "primary woody biomass" into REDIII—a framework that would have excluded a broad category of wood biomass from being used to meet renewable energy obligations and would also have excluded such biomass from eligibility for state financial support (within the renewable energy sphere). The Parliament also proposed a strict limit on the amount of energy generated from primary woody biomass that could count towards the EU's renewable energy target and the renewable energy shares of individual member states, effectively prohibiting any increase in the use of such biomass beyond the levels allowed in recent years.[131]

As proposed by the Parliament, the phrase "primary woody biomass" would have been defined as meaning:

> […] all roundwood felled or otherwise harvested and removed. It comprises all wood obtained from removals, i.e., the quantities removed from forests, including wood recovered due to natural mortality and from felling and logging. It includes all wood removed with or without bark, including wood removed in its round form, or split, roughly squared or in other form, e.g., branches, roots, stumps and burls (where these are harvested) and wood that is roughly shaped or pointed. This does not include woody biomass obtained from sustainable wildlife prevention measures in high-risk fire prone areas, woody biomass obtained from road safety measures, and woody biomass extracted from natural disasters, active pests or diseases to prevent their spread, whilst minimising wood extraction and protecting biodiversity, resulting in more diverse and resilient forests, and shall be based on guidelines from the Commission[.][132]

As can be seen from this definition, the primary woody biomass framework proposed by the Parliament would have excluded almost all wood biomass sourced from forests, representing a radical departure from the EU's established regime. The proposal may be understood as an attempt to go far beyond the sustainability criteria established for forest biomass in REDII, reflecting concern that those criteria are not sufficient to prevent deforestation and forest degradation.

The European Council did not agree with the Parliament's proposed approach to "primary woody biomass", and the compromise text that finally emerged from the trilogues between the European Commission, Parliament, and Council does not introduce the Parliament's proposed framework.[133] However, the compromise text does include several new restrictions and requirements that will apply to forest biomass used for renewable energy purposes if and when the text is adopted and brought into force. These include, among other things:

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[131] See: European Parliament, "Amendments adopted by the European Parliament on 14 September 2022 on the proposal for a directive of the European Parliament and of the Council, amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652" (14 September 2022), at proposed Article 29.1, subparagraph (ia).

[132] *Ibid* at proposed Article 2.47ab.

[133] See Appendix B of this report for a comparison between key provisions of REDII and analogous provisions in the Compromise Text of REDIII provided as an attachment to this report.

- a requirement for EU member states to take into account the waste hierarchy set out in the Waste Directive and apply the cascading principle to ensure that wood biomass is used for its highest economic and environmental values (with energy generation ranking low in both orders of priorities);
- a requirement for member states to ensure that support schemes for biomass fuels are designed so as to avoid incenting "unsustainable pathways";
- a prohibition disallowing member states from granting direct financial support for saw logs, veneer logs, industrial grade roundwood (as defined by the directive), stumps, and roots to produce energy;
- a prohibition disallowing member states from granting new support or renewing support for electricity generation fueled by forest biomass in electricity-only installations, with limited exceptions (one exception allows support to be granted for electricity produced using carbon capture and storage);
- requirements extending the restrictions on agricultural biomass to forest biomass in circumstances where other conditions specific to forest biomass have not been met;
- expanded language requiring the use of "sustainable forest management principles" and the prevention of negative impacts, including degradation of primary forests and old growth forests;
- enhanced reporting requirements for installations producing biomass fuels from forest biomass;
- enhanced reporting and planning requirements for member states, mandating that member states assess their domestic supplies of forest biomass that could be used for energy purposes and assess how compatible such use would be with their energy and climate commitments and plans; and,
- an expanded number of electricity-generation facilities to which the directive's sustainability and greenhouse gas emissions saving criteria will apply.[134]

Although the final outcome of the ongoing RED revision is still uncertain, the regulatory mechanisms used in REDII and the contents of the REDIII compromise text are instructive. Even when taken at a high level, if the evolving EU RED regime is used as a model for Canadian regulation under the *CER*, it suggests that the regulation of wood biomass used to generate electricity should at minimum include:

- provisions designed to ensure the sustainability of forest harvesting, including by preventing the deforestation or degradation of primary forests, old growth forests, and other wooded lands with high biodiversity value;
- provisions designed to ensure that forest harvesting has no net negative effects on forest carbon stocks and sinks and is consistent with a Canada's GHG emissions reduction commitments and targets; and,
- GHG emissions saving criteria designed to ensure that when wood biomass is used to generate electricity, it is demonstrably reducing GHG emissions that would otherwise occur by generating electricity with fossil fuels.

[134] See Appendix B of this report.

Additionally, efficiency requirements and requirements for the use of BECC technologies can be imposed as an additional suite of options from which regulated facilities can take their pick, according to their technological and economic capacities.

3.3 United Kingdom of Great Britain and Northern Ireland

The UK was an EU member state until February 1, 2020, and REDII was transposed into UK law before "Exit Day" on January 31, 2020. At this time, the UK's withdrawal from the EU does not appear to have resulted yet in substantial changes between UK regulation of wood biomass used to generate electricity and corresponding regulation among the remaining EU member states (as that regulation is structured by REDII). UK biomass laws still retain the structure of the EU regime; however, the UK is currently undertaking an extensive law reform initiative designed to identify and review all retained EU law that remains "on the books" in the UK so that such laws can either be repealed or reconstituted as UK laws that exist entirely independently from the EU regime.[135] The future regulation of wood biomass used to generate electricity in the UK is therefore uncertain; however, there have been indications that the UK Government is interested in increasing the use of biomass to generate energy throughout the UK, combined with ambitions to advance technological capacities and the use of BECC.[136]

Scholarship consulted in the drafting of this report indicates that the UK was an early adopter of legal criteria designed to ensure the lawful and sustainable sourcing of wood biomass used for energy purposes, anticipating that such legal requirements would eventually be set by the EU and also considering the attention to forest sustainability emerging from the Rio Earth Summit in 1992.[137] Under UK law, sustainability criteria, GHG emissions saving requirements, and energy efficiency requirements for biomass used to generate electricity were implemented through a "Renewables Obligation" program established through three legislative orders: the *Renewables Obligation Order* (as amended), which applies within England and Wales; the *Renewable Obligation (Scotland) Order* (as amended), which applies within Scotland; and, the *Renewables Obligation Order (Northern Ireland)* (as amended), which applies within Northern Ireland. This report refers to these three orders collectively as the "Renewables Obligation Orders".

Under the Renewables Obligation program, UK electricity suppliers must acquire sufficient Renewables Obligation Certificates ("ROCs"), which are produced by generating electricity using compliant renewable energy sources. The number of ROCs required corresponds to the MWh of electricity supplied to electricity customers.[138] In order for electricity generated from

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[135] See: UK Government, Department for Business, Energy & Industrial Strategy, "The Retained EU Law (Revocation and Reform) Bill 2022" (22 September 2022).
[136] See for example: Alice Booth and Jonathan Wentworth, "Biomass for UK energy", *UK Parliament POST* (12 January 2023); UK Government, Department for Business, Energy & Industrial Strategy, *Biomass Policy Statement* (November 2021); UK Government, Department for Business, Energy & Industrial Strategy and the Rt Hon Kwasi Kwarteng, MP, "Government seeks to further improve diversity of energy supply by boosting biomass" (11 August 2022); House of Commons Library, "Sustainability of burning trees for energy generation in the UK" (2 December 2022).
[137] Sikkema *et al*, "Wood Biomass for Energy" at pages 2168-71.
[138] UK Government, Department for Business, Energy & Industrial Strategy, "Renewables obligation level calculations: 2023 to 2024" (20 December 2022).

biomass to qualify for the production of ROCs, sustainability criteria, GHG emissions saving requirements, and applicable energy efficiency requirements must be met.

The Office of Gas and Electricity Markets ("Ofgem") is the independent energy regulator for Great Britain. It maintains guidance on how operators of generating stations using solid biomass or other biofuels to generate electricity can ensure that they comply with the Renewables Obligations Orders.[139]

It is beyond the scope of this report to conduct an in-depth analysis of how wood biomass is regulated under the Renewables Obligation Orders, including the extent to which that regulation illustrates the practical implementation of the EU's REDII. Initial review suggested that the Renewables Obligation Orders regimes align with the REDII and illustrate the application of sustainability criteria and greenhouse gas emissions saving requirements for wood biomass used to generate electricity. Further research and analysis would be required to provide deeper insight and more specific commentary on the presence of useful models for Canadian regulation under the *CER*.

3.4 United States of America

Research and analysis on US regulation of wood biomass used to generate electricity focused initially on US regulation at the federal level, as review of all individual state regimes was beyond the scope of the report. Targeted review of developments in the State of Massachusetts was conducted subsequently to address special points of interest.

3.4.1 *Federal Regulation in the United States*

Within the US, the characterization of energy sources as "clean" or "renewable" technologies and the inclusion of such sources in Renewable Portfolio Standards ("RPSs") and Clean Energy Standards ("CESs") is conducted primarily at the state level, with a limited role played by the federal government.

Research conducted for this part of the report used keyword searches to look for resources discussing the regulation of biomass used for electricity purposes throughout the US. Those searches identified some resources providing useful commentary on how biomass is defined in key federal legislation in the US, recent disputes over such definitions, and the nature of the numerous laws and policies that exist to promote the use of bioenergy throughout the US.[140] A 2019 report prepared by the Congressional Research Service was found to present a useful overview of how biomass legislation has been defined in federal legislation since 2004, along with informative commentary explaining how the definitions presented in key federal statutes

[139] Ofgem, *Renewables Obligation: Sustainability Criteria* (24 April 2018). For a shorter and more accessible overview, see: Ofgem, "Biomass sustainability" (undated).
[140] Useful resources identified include: Deborah S. Page-Gumroese *et al*, "Forest Biomass Policies and Regulations in the United States of America" *Forests* 13 (2022); Congressional Research Service, "Biomass: Comparison of Definitions in Legislation" (27 June 2019); IEA Bioenergy, "Implementation of bioenergy in the United States – 2021 update" (October 2021); National Conference of State Legislatures, "State Renewable Portfolio Standards and Goals" (13 August 2021); and, US Department of Energy, Federal Energy Management Program, "Biomass for Electricity Generation" *Whole Building Design Guide* (15 September 2016).

have shaped federal policies designed to incent adoption of domestic renewable energy sources.[141] A 2022 report advocating for greater use of forest biomass throughout the US was found to offer a useful overview of federal legislation that supports the use of forest biomass to produce bioenergy sources.[142] Analogous resources providing summaries of state legislation and policy were not identified, although the searches discovered a dated resource illustrating state wood biomass policies across the US as of 2008.[143]

Generally, our research indicated that US federal legislation addressing the use of biomass as an energy source deals primarily with incenting renewable energy adoption and sustainable land use through tax credits and other incentive programs and does not directly regulate the use of biomass to generate electricity.

3.4.2 *Biomass Regulation in the State of Massachusetts*

As is described in Section 1.3.2 of this report, roughly fifteen years ago, the Government of Massachusetts commissioned the Manomet Center for Conservation Sciences to study the GHG impacts of using forest biomass to generate energy. The study that the Center issued in 2010 ("the Manomet study")[144] applied a "carbon debt" lens to the analysis and found that the magnitude of the debt created by burning forest biomass to generate energy and the time required to repay that debt depend on several factors, including the efficiency of the energy generated through forest biomass combustion.[145] A key takeaway from the report was that if forest biomass is going to be used to generate energy, it should be used as efficiently as possible.

Following the publication of the Manomet Report, the Government of Massachusetts revised its Renewable Energy Portfolio Standard ("RPS") to require that energy generation facilities achieve a minimum of 60% efficiency when burning wood biomass as fuel in order to qualify for full renewable energy credits; half credits could be produced if 50% efficiency was achieved.[146] Lifecycle carbon emissions saving requirements were imposed as well.[147] The practical result was that electricity-only facilities could not receive renewable energy credits by using wood biomass to generate electricity, as such facilities could not achieve the required efficiencies.[148]

In 2019, Massachusetts' Department of Energy Resources ("DOER") began taking steps to amend the RPS eligibility requirements that were established in 2012 in order to make more room for electricity generated by the combustion of wood biomass.[149] According to news reports, the proposed changes would have waived the existing efficiency requirements for electricity

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[141] Congressional Research Service, "Biomass: Comparison of Definitions in Legislation" (27 June 2019) at pages 2, 5-12.
[142] Deborah S. Page-Gumroese *et al*, "Forest Biomass Policies and Regulations in the United States of America" *Forests* 13 (2022).
[143] Dennis R. Becker and Christine Lee, *State Woody Biomass Utilization Policies* (December 2008).
[144] Manomet Center for Conservation Sciences, *Biomass Sustainability and Carbon Policy Study* (June 2010).
[145] See ECEL *Forest Biomass Report* at pages 19-21 for a discussion of the Manomet study and its consequences for Massachusetts energy law and policy.
[146] *Ibid* at page 15.
[147] ECEL *Forest Biomass Report* at pages 19-21.
[148] See: Miriam Wasser, "Mass. Has Strong Rules About Burning Wood for Electricity. In 2021, It Plans To Roll Them Back" *WBUR* (22 December 2020).
[149] *Ibid.*

generation facilities that sourced at least 95% of their biomass fuels from "non-forest derived residues", which could potentially include "post-consumer waste, some agricultural products, trees cleared for agricultural uses, landscaping or storm debris and whole or partial trees cut down to maintain utility lines".[150] The proposed changes were staunchly opposed by concerned communities and public-interest advocates, in part due to climate change concerns, but perhaps in larger part due to concerns about high rates of respiratory illness in Massachusetts and the risk of aggravating the problem by introducing wood biomass combustion on a large scale.[151]

The Massachusetts administration's move to amend the RPS was not only met with public opposition but also incented counter-measures taken by the state Senate, which developed a legislative response that sought to exclude "woody biomass" entirely as an eligible energy source under the RPS and also under Massachusetts' Alternative Energy Portfolio Standard ("APS"). Public-interest advocacy organizations supported the Senate's response and sought to strengthen it. A March 2022 letter to the Senate President and Chairs of the Senate Committee on Ways & Means and Senate Committee on Telecommunications, Utilities & Energy, signed by more than one hundred organizations, wrote:

> As you are aware, S.2197 removes woody biomass from the list of technologies eligible for renewable energy incentives in the state's Renewable Energy Portfolio Standard (RPS) and Alternative Energy Portfolio Standard (APS). These ratepayer-funded programs are best used to incentivize clean, non-emitting energy technologies, such as wind and solar, *not* wood-burning technologies, which cause harmful air pollution while exacerbating climate change.
>
> […]
>
> The Baker administration is moving forward with its efforts to roll back MA's landmark 2012 RPS rules, with a public comment hearing scheduled for next week before the Department of Energy Resources (DOER). The existing science-based RPS rules were hailed nationally when they were adopted a decade ago, precisely because they ensured that electricity-only biomass power plants would *not* qualify for subsidies, due to their excessive greenhouse gas emissions and overall inefficiency. The APS regulations that Governor Baker's administration adopted in 2017 include weak emissions standard and weak forest protection guidelines for qualifying biomass heating systems.
>
> DOER now proposes weakening the RPS regulations to match the APS regulations, calling it "regulatory streamlining". The new rules would allow highly polluting stand-alone biomass power plants in Maine, New Hampshire and elsewhere to once again be eligible to qualify for Massachusetts ratepayer subsidies.
>
> Massachusetts ratepayers have already spent millions of dollars to promote wood-burning technologies through the APS. Under the RPS rules that have been in place for nearly a decade, only a few small, highly efficient combined heat and power biomass plants have been eligible for the Massachusetts RPS. The administration's RPS changes would funnel

[150] *Ibid.*
[151] *Ibid.*

> even more millions to a polluting industry by subsidizing utility-scale economically unviable wood-burning power plants throughout New England—plants whose smokestack CO_2 emissions are worse than coal per unit of energy generated.

Ultimately, the Senate and public-interest advocacy efforts were successful. In April 2022, the Massachusetts Senate passed bill S.2819, *An Act driving climate policy forward*, which was designed to remove "woody biomass" as a qualifying renewable energy under Massachusetts' RPS and APS and thereby end state subsidization of woody biomass under those programs.[152] Despite a veto and proposed amendments by the Massachusetts Governor that aimed to subvert the biomass amendments, the state Legislature moved forward with the bill and overrode the changes the Governor sought to impose.[153] In August 2022, the Massachusetts Governor signed the bill into law—an act that allowed public-interest advocates to proclaim Massachusetts as the first state in the US to end renewable energy subsidies for wood-burning electricity generation facilities.[154]

The *Forest Biomass Energy Policy in the Maritime Provinces* report that East Coast Environmental Law published in 2015 drew on the Massachusetts example as it stood at that time to recommend that the governments of New Brunswick, Nova Scotia, and Prince Edward Island introduce minimum efficiency requirements for wood biomass to qualify as a renewable energy resource within provincial electricity schemes.[155] The report explicitly recognized that implementing its recommendations could "reduce or eliminate the current economic incentives that favour forest biomass development for electricity".[156]

In light of the evolution that Massachusetts' renewable energy regime has undergone since 2015, the state now stands as an example of progressive change that excludes wood biomass entirely from the sources of renewable electricity that are recognized and supported by state law and policy.

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[152] Partnership for Policy Integrity, "PFPI Applauds Senate Action to End Woody Biomass Subsidies in MA" (27 April 2022).
[153] See Partnership for Policy Integrity, "Governor Baker Tries to Sneak Biomass Into Climate Bill" (30 July 2022) and Partnership for Policy Integrity, "PFPI Applauds MA House & Senate for Standing Firm on Climate Bill" (1 August 2022).
[154] See Partnership for Policy Integrity, "Massachusetts First in the Nation to End Renewable Energy Subsidies for Wood-Burning Power Plants" (11 August 2022). The text of the bill and the amendments it makes to the RPS and APS are found in *An Act Driving Clean Energy and Offshore Wind*, 2022 Mass Acts 179 (11 August 2022) and Mass Gen Laws, c 25A §11F (2022).
[155] ECEL *Forest Biomass Report* at page 33.
[156] *Ibid* at page 34.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The research, analysis, and commentary presented in this report aim to demonstrate that there are significant shortcomings in Canadian regulation of wood biomass used to generate electricity. For regulation in this sphere to ensure the sustainability of harvesting and using wood biomass to generate electricity, there must be explicit interconnections between and strong coordination of electricity-sector and forestry-sector law and policy. Moreover, when determining if and how wood biomass will be allowed to support Canada's net-zero electricity future, the Government of Canada is expected to bear in mind its commitments, goals, and targets under international regimes such as the UNFCCC, UN CBD, *2030 Agenda for Sustainability*, and UNDRIP. Canada's renewable energy transition cannot come at the cost of deforestation, forest degradation, further loss of biodiversity, and associated harms to the rights of Indigenous peoples in Canada, and the treatment of wood biomass under the *CER* should reflect all of these considerations.

Although this report covers a considerable amount of material, it was not possible to explore all relevant topics and points of interest in depth. For example, while the report identifies the explicit interconnections (or lack thereof) between electricity-sector and forestry-sector laws and policies in Alberta, British Columbia, New Brunswick, and Nova Scotia, the available time and capacity could not allow for deeper analysis of how such interconnections work in practice and to what extent they help or hinder sustainable wood biomass regulation in Canada. Topics and points of interest introduced in this report but not covered in depth may be subjects for further study.

4.2 Recommendations for the *Clean Electricity Regulations*

Drawing on the research and analysis presented in this report, including best practices identified through comparative jurisdictional reviews, we present the following recommendations for the *CER*.

4.2.1 *Recommendation Addressing the Scope of the Clean Electricity Regulations*

Recommendation 1: The *CER* should not be scoped to apply exclusively to electricity generation facilities that combust fossil fuels. A restricted scope of this kind would not only exclude biomass-only generation facilities from the regulatory regime but could also have the unwanted effect of incenting the commissioning of new wood biomass burning facilities that would, in effect, get a regulatory "free pass".

4.2.2 *Recommendations Addressing the Application of an Emissions Performance Standard to Wood Biomass Used to Generate Electricity*

Recommendation 2: Electricity generated from the combustion of wood biomass should not be exempted from the emissions performance standard imposed by the *CER*.

Recommendation 3: The emissions performance standard imposed by the *CER* should not presume that wood biomass is a non-emitting or low-emitting fuel. At minimum, wood biomass used to generate electricity should be assigned a carbon intensity value that takes into account the GHG emissions associated with harvesting, producing, and transporting wood biomass fuel products. More stringently, a carbon intensity value reflecting the actual GHG emissions caused by burning wood biomass to generate electricity could be assigned.

Recommendation 4: In addition or as an alternative to assigning appropriate carbon intensity values for wood biomass used to generate electricity, the *CER* should impose GHG emissions saving requirements on electricity generation facilities combusting wood biomass fuel, requiring such facilities to demonstrate that the use of such fuel over time has actually lowered GHG emissions that would have been produced through the use of other fuel.

Recommendation 5: In addition or as an alternative to assigning appropriate carbon intensity values for wood biomass used to generate electricity, the *CER* should impose an energy efficiency standard for electricity generation facilities that combust wood biomass fuel. 60% efficiency is the minimum standard proposed (following the Massachusetts example), but a higher standard may be more appropriate.

Recommendation 6: In addition or as an alternative to assigning appropriate carbon intensity values for or imposing energy efficiency requirements on wood biomass used to generate electricity, the *CER* should require the use of BECC technologies where they are technologically feasible.

Recommendation 7: To support accurate and transparent information flows between electricity-sector and forestry-sector regulators, and to enable more accurate and transparent electricity-sector and forest carbon accounting, the *CER* should impose detailed reporting obligations that require the operators of regulated facilities to document the sources of all biomass fuel used to generate electricity.

4.2.3 *Recommendations Addressing Wood Biomass Electricity as an Eligible Offset in a Compliance Credit System*

Recommendation 8: Electricity generated by the combustion of wood biomass should not be an eligible source of offsets in a compliance credit regime established under the *CER*.

Recommendation 9: If electricity generated by the combustion of wood biomass is allowed to qualify as an eligible source of offsets in a compliance credit regime established under the *CER*, strict restrictions should be imposed on its use. Such restrictions should include some combination of: requirements limiting wood biomass feedstock sources to woody residuals and debris for which there are no higher and longer-lived uses (i.e., requirements implementing a "cascading biomass principle"); feedstock requirements designed specifically to prevent deforestation, forest degradation, and biodiversity loss; GHG emissions saving criteria; energy efficiency requirements; and, requirements to employ BECC technologies where they are technologically feasible.

Recommendation 10: If electricity generated by the combustion of wood biomass is allowed to qualify as an eligible source of offsets in a compliance regime established under the *CER*, the *CER* should impose detailed reporting obligations that require the operators of regulated facilities to document the sources of wood biomass used to generate electricity.

Recommendation 11: Recognizing that *CEPA* is the source of authority for federal promulgation of the *CER* and that contributing to "sustainable development" by preventing pollution is a core purpose of *CEPA*, the *CER*'s treatment of wood biomass should be designed taking into account and with an eye to furthering relevant SDGs set out in the *2030 Agenda for Sustainable Development*.

Appendix A

Table 1: Treatment of "Biomass" and "Crops" under the *Clean Fuel Regulations*, Can Reg 2022-140 (under *CEPA*)

Section Number	Text	Commentary
1(1)	**"biomass"** means the biodegradable fraction of products, waste and residues of a biological origin — including plant and animal substances — originating from agriculture, forestry and other industries, such as fishing and aquaculture, as well as the fraction of waste, including industrial and municipal waste, of a biological origin.	
1(1)	**"crop"** includes a woody biomass crop with a rotational period that is not more than 25 years.	
1(1)	**"eligible feedstock"** means a feedstock that is eligible under section 46 and meets the requirements set out in sections 48 to 52, except if it is exempted under any of sections 53 to 55, as well as the requirements set out in section 57.	
46(1)	Subject to subsection (2) and sections 48 to 55, 57 and 58, the following feedstock is eligible: (a) feedstock that is not derived from biomass; (b) feedstock that is derived from (i) forest biomass derived from fire prevention and protection activities or from clearing activities that are not related to harvesting, such as infrastructure installation, pest and disease control and road maintenance, […] (iii) secondary forest residues that are by-products of industrial wood-processing operations, […] (c) feedstock that is derived from agricultural or forest biomass but is not derived from a material or source referred to in paragraph (b).	

Section Number	Text	Commentary
46(2)	A feedstock that is derived from agricultural or forest biomass and that is intentionally altered in order to meet any of the conditions set out in paragraph (1)(b) is considered not to be an eligible feedstock for the purposes of that paragraph.	
48(1)	It is not permitted to harvest feedstock referred to in paragraph 46(1)(c) from land located in an area that provides a habitat for any rare, vulnerable or threatened species.	**Not yet in effect**. This provision qualifies the eligibility requirement set out in paragraph 46(1)(c). A narrow exception to this prohibition is set out in subsection 48(2).
50(1)	A feedstock referred to in any of subparagraphs 46(1)(b)(ii) to (vi) or paragraph 46(1)(c) that is a crop, crop by-product or crop residue must be produced in a manner that does not create a high risk of an indirect change to land use that adversely affects the environment.	
50(2)	For the purposes of subsection (1), there is a high risk that the production of a feedstock will cause an indirect change to land use that adversely affects the environment if the value specified for that feedstock in the Annex to the Commission Delegated Regulation (EU) *2019/807 of 13 March 2019* is greater than (a) 1% in the column entitled "Average annual expansion of production area since 2008 (%)"; and (b) 10% in the column entitled "Share of expansion into land referred to in Article 29(4)(b) and (c) of Directive (EU) 2018/2001".	
51(1)	It is not permitted to harvest feedstock referred to in paragraph 46(1)(c) that is a crop from land that (a) has an area greater than 1 ha and was, at any time on or after July 1, 2020, (i) a forest that contains trees that are or are capable of reaching a height of 5 m and provide or are capable of providing a canopy cover of more than 10%,	**Not yet in effect.** Sections 53 and 54 establish some ministerial powers to allow exemptions from this requirement under certain conditions.

Section Number	Text	Commentary
	(ii) a wetland that is periodically saturated with water for a period that is long enough to promote biological activity that is adapted to a wet environment, or (iii) a grassland that is dominated by herbaceous or shrub vegetation that has not been cultivated for 10 years or more; or (b) was never cultivated before July 1, 2020 and was, at any time on or after that day, in a riparian zone.	
52	The harvesting of any feedstock referred to in paragraph 46(1)(c) that is derived from forest biomass must be carried out in accordance with a forest management plan that meets the following requirements: (a) it must be possible for a verification body to evaluate it; (b) it must be implemented, monitored and kept up to date, based on monitoring results, to promote adaptive management, by the person who is responsible for harvesting the feedstock; and (c) it must specify the practices to be followed to ensure that (i) the management of the land where the feedstock is harvested is carried out in a manner that promotes timely forest regeneration of that land to its pre-harvesting condition using species of trees that are ecologically suited to the site and drawn, if possible, from native species or local genotypes, (ii) adverse effects are prevented on naturally regenerated stands containing multi-layered canopies with trees near their maximum longevity as well as standing and fallen dead trees and forest debris at varying stages of decomposition, (iii) forest management and related activities in the areas where the feedstock is harvested are carried out in a manner that prevents or mitigates adverse effects on the quantity and quality of the soil, on the quantity and quality of surface and ground water resources and on biodiversity, and (iv) forest management and related activities in the areas where the feedstock is harvested are carried out in a manner that maintains the connectivity of watercourses.	**Not yet in effect.** Some ministerial powers to allow exemptions from these requirements are set out in sections 53-55.

Section Number	Text	Commentary
58(1)	A declaration made by a person referred to in subparagraph 57(2)(a)(v) must contain the following information: […] (f) the type of the feedstock; (g) the quantity of the feedstock that is sold, expressed in kilograms or cubic metres, as applicable; (h) a confirmation that the requirements set out in section 48 are met with respect to the feedstock or that the feedstock is the subject of an exemption granted under paragraph 55(1)(a); (i) a confirmation that the requirements set out in section 49 are met with respect to the feedstock or that feedstock is the subject of an exemption granted under paragraph 55(1)(b); (j) if the feedstock is a crop, a confirmation that it was not harvested on land described in section 51 or is the subject of an exemption granted under subsection 53(1) or 54(1); (k) if the feedstock is derived from forest biomass, a confirmation that (i) it was harvested in accordance with the requirements set out in paragraph 52(c)(i) or is the subject of an exemption granted under paragraph 55(1)(c), (ii) it was harvested in accordance with the requirements set out in subparagraph 52(c)(ii) or is the subject of an exemption granted under paragraph 55(1)(d), (iii) it was harvested in accordance with the requirements set out in subparagraph 52(c)(iii) as it relates to soil or is the subject of an exemption granted under paragraph 55(1)(e), (iv) it was harvested in accordance with the requirements set out in subparagraph 52(c)(iii) as it relates to surface and ground water resources or is the subject of an exemption granted under paragraph 55(1)(f), (v) it was harvested in accordance with the requirements set out in subparagraph 52(c)(iii) as it relates to biodiversity or is the subject of an exemption granted under paragraph 55(1)(g), and (vi) it was harvested in accordance with the requirements set out in subparagraph 52(c)(iv) or is the subject of an exemption granted under paragraph 55(1)(h);	**Not yet in effect.**

Section Number	Text	Commentary
	(l) if the feedstock is a crop, a confirmation that it meets the requirements set out in section 50; (m) the unique identifier for the declaration that they use for their internal accounting purposes; (n) the date on which the declaration is made; and (o) the signature of the person or their authorized agent.	
Schedule 6, section 2	The quantity of CO_2e that is associated with the extraction or production, as the case may be, of a feedstock is (a) 0 gCO_2e/MJ for a fuel or material input produced from a feedstock that is derived from one of the following: (i) forest biomass derived from fire prevention and protection activities or from clearing activities that are not related to harvesting, such as infrastructure installation, pest and disease control and road maintenance, (ii) crop residues or damaged crops, (iii) secondary forest residues that are by-products of industrial wood-processing operations[.]	Schedule 6 sets default carbon intensities.
Schedule 6, section 2	The quantity of CO2e that is released during the production of the fuel or material input from the feedstock, the transportation of the feedstock and intermediary products used to produce the fuel or material input and the distribution of the fuel or material input to end users is (a) 13 gCO_2e/MJ for a fuel or material input that is produced at a facility that (i) uses thermal energy and electricity where more than 50% of that energy is from non-fossil sources, electricity with a carbon intensity of less than 100 gCO_2e/MJ, hydrogen from renewable sources, hydrogen from natural gas with carbon capture and storage or a mix of those sources, and (ii) does not use liquid or solid fossil fuels in stationary applications[.]	

Appendix B

In Table 2, below, the column on the left shows the text of some especially pertinent passages of REDII, which is the EU Renewable Energy Directive that is currently in force; the column on the rights shows corresponding amendments agreed by representatives of the European Parliament and the European Council in the "compromise text" established as part of the RED revision process in March 2023. Passages in red in the right-side column reflect changes or additions to the text of REDII; passages that are bolded and italicized within the red text reflect agreed changes within the compromise text that modify the initial proposal drafted by the European Commission.

Table 2: Criteria Imposed on Forest Biomass under REDII and the Compromise Text of REDIII

Directive (EU) 2018/2001 ("REDII")	Revisions and Additions in Compromise Text
Article 3: Binding overall Union target for 2030	
3. Member States shall ensure that their national policies, including the obligations deriving from Articles 25 to 28 of this Directive, and their support schemes, are designed with due regard to the waste hierarchy as set out in Article 4 of Directive 2008/98/EC to aim to avoid undue distortive effects on the raw material markets. Member States shall grant no support for renewable energy produced from the incineration of waste if the separate collection obligations laid down in that Directive have not been complied with.	3. Member states shall take measures to ensure that energy from biomass is produced in a way that minimises undue distortive effects on the biomass raw material market and harmful impacts on biodiversity***, the environment and the climate.*** To that end, they shall take into account the waste hierarchy as set out in Article 4 of Directive 2008/98/EC and ***ensure the application of*** the cascading principle***, with a focus on support schemes and with due regard to national specificities.*** ***With a view to ensuring that woody biomass is used according to its highest economic and environmental value in the following order of priorities:*** ***(1) wood-based products;*** ***(2) extending their service life;*** ***(3) re-use;*** ***(4) recycling;*** ***(5) bio-energy; and*** ***(6) disposal;*** ***support schemes for energy from biofuels, bioliquids and biomass fuels shall be designed in a way to avoid incentivising unsustainable pathways and distorting competition with the material sectors.*** ***Member states may derogate from the cascading principle on the basis of the need to ensure security of energy supply. Member States may also***

Directive (EU) 2018/2001 (“REDII”)	Revisions and Additions in Compromise Text
	derogate from the cascading principle when the local industry is quantitatively or technically unable to use forest biomass according to a higher economic and environmental added value than energy, for feedstocks coming from: ***(a) necessary forest management activities, aiming at ensuring pre-commercial thinning operations or in compliance with national legislation on wildfire prevention in high-risk areas;*** ***(b) salvage logging following documented natural disturbances; or*** ***(c) harvest of certain woods whose characteristics are not suitable for local processing facilities.*** ***At most once a year, Member States shall notify the Commission of a summary of derogations to the application of the cascading principle as referred to in the first subparagraph, together with the justifications for such derogations and the geographical scale to which they apply. The Commission shall make public the notifications received, and may issue a public opinion on any of those notifications.*** Member states shall grant no ***direct financial*** support for: (***a***) the use of saw logs, veneer logs, ***industrial grade roundwood,*** stumps and roots to produce energy. (***b***) the production of renewable energy produced from the incineration of waste if the separate collection obligations laid down in Directive 2008/98/EC have not been complied with. ***Without*** prejudice to the obligations in the first sub-paragraph, Member States shall grant no ***new*** support ***nor renew any support*** to the production of electricity from forest biomass in electricity-only-installations, unless such electricity meets at least one of the following conditions: (***a***) it is produced in a region identified in a territorial just transition plan approved by the European Commission, in accordance with Regulation (EU) 2021/… of the European Parliament and the Council establishing the Just Transition Fund due to its reliance on

Directive (EU) 2018/2001 ("REDII")	Revisions and Additions in Compromise Text
	solid fossil fuels, and meets the relevant requirements set in Article 29(11); (***b***) it is produced applying Biomass CO2 Capture and Storage and meets the requirements set in Article 29(11), second subparagraph***;*** ***(c) it is produced in an outermost region, as referred to in Article 349 of the Treaty on the Functioning of the European Union, for a limited period of time with the objective of phasing down as much as possible the use of forest biomass without affecting access to safe and secure energy.*** By ***2027*** the Commission shall present a report on the impact of the Member States' support schemes for biomass, including on biodiversity***, the climate and the environment***, and possible market distortions, and ***shall*** assess the possibility for further limitations regarding support schemes to forest biomass.
Article 29: Sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels	
1. Energy from biofuels, bioliquids and biomass fuels shall be taken into account for the purposes referred to in points (a), (b) and (c) of this subparagraph only if they fulfil the sustainability and the greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10: (a) contributing towards the Union target set in Article 3(1) and the renewable energy shares of Member States; (b) measuring compliance with renewable energy obligations, including the obligation laid down in Article 25; (c) eligibility for financial support for the consumption of biofuels, bioliquids and biomass fuels. However, biofuels, bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, are required to fulfil only the greenhouse gas emissions saving criteria laid down in paragraph 10 in order to be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph. This subparagraph shall	1. Energy from biofuels, bioliquids and biomass fuels shall be taken into account for the purposes referred to in points (a), (b) and (c) of this subparagraph only if they fulfil the sustainability and the greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10: (a) contributing towards the renewable energy shares of Member States and the targets referred to in Articles 3(1), 15a(1), 22a(1), 23(1), 24(4), and 25(1) of this Directive; (b) measuring compliance with renewable energy obligations, including the obligation laid down in Article 25; (c) eligibility for financial support for the consumption of biofuels, bioliquids and biomass fuels. ***However, biofuels, bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, are required to fulfil only the greenhouse gas emissions saving criteria laid down in paragraph 10 in order to be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph. In the case of the use of mixed wastes, Member States may require operators to***

Directive (EU) 2018/2001 ("REDII")	Revisions and Additions in Compromise Text
also apply to waste and residues that are first processed into a product before being further processed into biofuels, bioliquids and biomass fuels. Electricity, heating and cooling produced from municipal solid waste shall not be subject to the greenhouse gas emissions saving criteria laid down in paragraph 10. Biomass fuels shall fulfil the sustainability and greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10 if used in installations producing electricity, heating and cooling or fuels with a total rated thermal input equal to or exceeding 20 MW in the case of solid biomass fuels, and with a total rated thermal input equal to or exceeding 2 MW in the case of gaseous biomass fuels. Member States may apply the sustainability and greenhouse gas emissions saving criteria to installations with lower total rated thermal input. The sustainability and the greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10 shall apply irrespective of the geographical origin of the biomass. 2. Biofuels, bioliquids and biomass fuels produced from waste and residues derived not from forestry but from agricultural land shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 only where operators or national authorities have monitoring or management plans in place in order to address the impacts on soil quality and soil carbon. Information about how those impacts are monitored and managed shall be reported pursuant to Article 30(3). 3. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from land with a high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status: (a) primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed; (b) highly biodiverse forest and other wooded land which is species-rich and not degraded, or has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the	***apply mixed waste sorting systems aimed at removing fossil materials. This subparagraph shall also apply to waste and residues that are first processed into a product before being further processed into biofuels, bioliquids and biomass fuels.*** Electricity, heating and cooling produced from municipal solid waste shall not be subject to the greenhouse gas emissions saving criteria laid down in paragraph 10. Biomass fuels shall fulfil the sustainability and greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10 if used***:*** (a) in the case of solid biomass fuels, in installations producing electricity, heating and cooling with a total rated thermal input equal to or exceeding ***7.5*** MW, (b) in the case of gaseous biomass fuels, in installations producing electricity, heating and cooling with a total rated thermal input equal to or exceeding 2 MW, (c) in the case of installations producing gaseous biomass fuels with the following average biomethane flow rate: (i) above 200 m3 methane equivalent/h measured at standard condition of temperature and pressure (i.e. 0°C and 1 bar atmospheric pressure); (ii) if biogas is composed of a mixture of methane and non-combustible other gases, for the methane flow rate, the threshold set out in point (i), recalculated proportionally to the volumetric share of methane in the mixture**.** Member States may apply the sustainability and greenhouse gas emissions saving criteria to installations with lower total rated thermal input or biomethane flow rate. 2. Biofuels, bioliquids and biomass fuels produced from waste and residues derived not from forestry but from agricultural land shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 only where operators or national authorities have monitoring or management plans in place in order to address the impacts on soil quality and soil carbon. Information about how those impacts are monitored and managed shall be reported pursuant to Article 30(3).

Directive (EU) 2018/2001 ("REDII")	Revisions and Additions in Compromise Text
production of that raw material did not interfere with those nature protection purposes; (c) areas designated: (i) by law or by the relevant competent authority for nature protection purposes; or (ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the first subparagraph of Article 30(4), unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes; (d) highly biodiverse grassland spanning more than one hectare that is: (i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or (ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the harvesting of the raw material is necessary to preserve its status as highly biodiverse grassland. The Commission may adopt implementing acts further specifying the criteria by which to determine which grassland are to be covered by point (d) of the first subparagraph of this paragraph. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 34(3). 4. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from land with high-carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status: (a) wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;	***3. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from land with a high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:*** ***(a) primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed; and old growth forests as defined in the country where the forest is located;*** ***(b) highly biodiverse forest and other wooded land which is species-rich and not degraded, and has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;*** ***(c) areas designated:*** ***(i) by law or by the relevant competent authority for nature protection purposes; or*** ***(ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the first subparagraph of Article 30(4),*** ***unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;*** ***(d) highly biodiverse grassland spanning more than one hectare that is:*** ***(i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or*** ***(ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that***

Directive (EU) 2018/2001 ("REDII")	Revisions and Additions in Compromise Text
(b) continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds *in situ*; (c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds *in situ*, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in Part C of Annex V is applied, the conditions laid down in paragraph 10 of this Article would be fulfilled. This paragraph shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008. 5. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil. 6. Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall meet the following criteria to minimise the risk of using forest biomass derived from unsustainable production: (a) the country in which forest biomass was harvested has national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place ensuring: (i) the legality of harvesting operations; (ii) forest regeneration of harvested areas; (iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected; (iv) that harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and (v) that harvesting maintains or improves the long-term production capacity of the forest;	***the harvesting of the raw material is necessary to preserve its status as highly biodiverse grassland; or*** ***(e) heathland.*** ***Where the conditions set in paragraph 6 point (a)(vi) and (vii) are not met, the first subparagraph, with the exception of point (c), also applies to biofuels, bioliquids and biomass fuels produced from forest biomass.*** ***The Commission may adopt implementing acts further specifying the criteria by which to determine which grassland are to be covered by point (d) of the first subparagraph of this paragraph. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 34(3).*** 4. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from land with high-carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status: (a) wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year; (b) continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds *in situ*; (c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds *in situ*, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in Part C of Annex V is applied, the conditions laid down in paragraph 10 of this Article would be fulfilled. This paragraph shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008. ***Where the conditions set in paragraph 6 point (a)(vi) and (vii) are not met,*** the first subparagraph with the exception of points (b) and (c), and the second subparagraph also apply to biofuels, bioliquids and biomass fuels produced from forest biomass.

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(b) when evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 if management systems are in place at forest sourcing area level ensuring: (i) the legality of harvesting operations; (ii) forest regeneration of harvested areas; (iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected unless evidence is provided that the harvesting of that raw material does not interfere with those nature protection purposes; (iv) that harvesting is carried out considering the maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and (v) that harvesting maintains or improves the long-term production capacity of the forest. 7. Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall meet the following land-use, land-use change and forestry (LULUCF) criteria: (a) the country or regional economic integration organisation of origin of the forest biomass: (i) is a Party to the Paris Agreement; (ii) has submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC; or (iii) has national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals;	5. Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in paragraph 1, first subparagraph, points (a), (b) and (c), shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil. ***Where the conditions set in paragraph 6 point (a)(vi) and (viii) are not met, this paragraph also applies to biofuels, bioliquids and biomass fuels produced from forest biomass.*** 6. Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall meet the following criteria to minimise the risk of using forest biomass derived from unsustainable production: (a) the country in which forest biomass was harvested has national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place ensuring: (i) the legality of harvesting operations; (ii) forest regeneration of harvested areas; ***(iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands, grassland, heathland and peatlands, are protected with the aim of preserving biodiversity and preventing habitat destruction;*** (iv) that harvesting is carried out considering maintenance of soil quality and biodiversity ***according to sustainable forest management principles,*** with the aim of ***preventing*** negative impacts, in a way that avoids harvesting of stumps and roots, degradation of primary forests***, and of old growth forests as defined in the country where the forest is located***, or their conversion into plantation forests, and harvesting on vulnerable soils; ***is compliant with maximum thresholds for large clear-cuts as defined in the country where the forest is located and with locally and ecologically appropriate retention*** thresholds for deadwood extraction and ***ensures*** requirements to use logging systems that minimise impacts on soil quality, including soil compaction, and on biodiversity features and habitats; (v) that harvesting maintains or improves the long-term production capacity of the forest.

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(b) where evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 if management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. 8. By 31 January 2021, the Commission shall adopt implementing acts establishing the operational guidance on the evidence for demonstrating compliance with the criteria laid down in paragraphs 6 and 7 of this Article. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 34(3). 9. By 31 December 2026, the Commission shall assess whether the criteria laid down in paragraphs 6 and 7 effectively minimise the risk of using forest biomass derived from unsustainable production and address LULUCF criteria, on the basis of the available data. The Commission shall, if appropriate, submit a legislative proposal to amend the criteria laid down in paragraphs 6 and 7 for the period after 2030. 10. The greenhouse gas emission savings from the use of biofuels, bioliquids and biomass fuels taken into account for the purposes referred to in paragraph 1 shall be: (a) at least 50 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations in operation on or before 5 October 2015; (b) at least 60 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 6 October 2015 until 31 December 2020; (c) at least 65 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 1 January 2021; (d) at least 70 % for electricity, heating and cooling production from biomass fuels used in installations starting operation from 1 January 2021 until 31 December 2025, and 80 % for installations starting operation from 1 January 2026. An installation shall be considered to be in operation once the physical production of biofuels, biogas consumed in the transport sector and bioliquids,	***(vi) that forests in which the forest biomass is harvested do not stem from the lands that have the statuses mentioned in paragraph 3 points (a), (b), (d) and (e), paragraph 4 point (a), and paragraph (5), respectively under the same conditions of determination of the status of land specified in these paragraphs; and*** ***(vii) that installations producing biofuels, bioliquids and biomass fuels from forest biomass, issue a statement of assurance, underpinned by company-level internal processes, for the purpose of the audits conducted pursuant to Article 30(3), that the forest biomass is not sourced from the lands referred to in point (vi).*** (b) when evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 if management systems are in place at forest sourcing area level ensuring: (i) the legality of harvesting operations; (ii) forest regeneration of harvested areas; ***(iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands, grassland, heathland and peatlands, are protected with the aim of preserving biodiversity and preventing habitat destruction, unless evidence is provided that the harvesting of that raw material does not interfere with those nature protection purposes;*** (iv) that harvesting is carried out considering the maintenance of soil quality ***according to sustainable forest management principles,*** and biodiversity with the aim of ***preventing*** negative impacts, in a way that avoids harvesting of stumps and roots, degradation of primary forests***, and of old growth forests as defined in the country where the forest is located,*** or their conversion into plantation forests, and harvesting on vulnerable soils; ***is compliant with maximum thresholds for*** large clear-cuts ***as defined in the country where the forest is locted, and with locally and ecologically appropriate retention*** thresholds for deadwood extraction and ***ensures*** requirements to use logging systems that

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and the physical production of heating and cooling and electricity from biomass fuels has started. The greenhouse gas emission savings from the use of biofuels, biogas consumed in the transport sector, bioliquids and biomass fuels used in installations producing heating, cooling and electricity shall be calculated in accordance with Article 31(1). 11. Electricity from biomass fuels shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 only if it meets one or more of the following requirements: (a) it is produced in installations with a total rated thermal input below 50 MW; (b) for installations with a total rated thermal input from 50 to 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, meeting an energy efficiency level associated with the best available techniques (BAT-AEELs) as defined in Commission Implementing Decision (EU) 2017/1442 [*reference omitted*]; (c) for installations with a total rated thermal input above 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, achieving an net-electrical efficiency of at least 36 %; (d) it is produced applying Biomass CO_2 Capture and Storage. For the purposes of points (a), (b) and (c) of the first subparagraph of paragraph 1 of this Article, electricity-only-installations shall be taken into account only if they do not use fossil fuels as a main fuel and only if there is no cost-effective potential for the application of high-efficiency cogeneration technology according to the assessment in accordance with Article 14 of Directive 2012/27/EU. For the purposes of points (a) and (b) of the first subparagraph of paragraph 1 of this Article, this paragraph shall apply only to installations starting operation or converted to the use of biomass fuels after 25 December 2021. For the purposes of point (c) of the first subparagraph of paragraph 1 of this Article, this paragraph shall be without prejudice to support granted under support schemes in accordance with Article 4 approved by 25 December 2021. Member States may apply higher energy efficiency requirements than those referred in the first subparagraph to installations with lower rated thermal input.	minimise impacts on soil quality, including soil compaction, and on biodiversity features and habitats***; and*** (v) that harvesting maintains or improves the long-term production capacity of the forest. 7. Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall meet the following land-use, land-use change and forestry (LULUCF) criteria: (a) the country or regional economic integration organisation of origin of the forest biomass: (i) is a Party to the Paris Agreement; (ii) has submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC; or (iii) has national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals; (b) where evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 if management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. ***7a. The production of biofuels, bioliquids and biomass fuels from domestic forest biomass shall be consistent with Member States' commitments and targets as defined in Regulation (EU) 2018/841 and with the policies and measures described by the Member State in their National Energy and Climate Plans submitted pursuant to Article 3 and 14 of Regulation (EU) 2018/1999.***

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The first subparagraph shall not apply to electricity from installations which are the object of a specific notification by a Member State to the Commission based on the duly substantiated existence of risks for the security of supply of electricity. Upon assessment of the notification, the Commission shall adopt a decision taking into account the elements included therein. 12. For the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 of this Article, and without prejudice to Articles 25 and 26, Member States shall not refuse to take into account, on other sustainability grounds, biofuels and bioliquids obtained in compliance with this Article. This paragraph shall be without prejudice to public support granted under support schemes approved before 24 December 2018. 13. For the purposes referred to in point (c) of the first subparagraph of paragraph 1 of this Article, Member States may derogate, for a limited period of time, from the criteria laid down in paragraphs 2 to 7 and 10 and 11 of this Article by adopting different criteria for: (a) installations located in an outermost region as referred to in Article 349 TFEU to the extent that such facilities produce electricity or heating or cooling from biomass fuels; and (b) biomass fuels used in the installations referred to in point (a) of this subparagraph, irrespective of the place of origin of that biomass, provided that such criteria are objectively justified on the grounds that their aim is to ensure, for that outermost region, a smooth phase-in of the criteria laid down in paragraphs 2 to 7 and 10 and 11 of this Article and thereby incentivise the transition from fossil fuels to sustainable biomass fuels. The different criteria referred to in this paragraph shall be subject to a specific notification by the relevant Member State to the Commission. 14. For the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1, Member States may establish additional sustainability criteria for biomass fuels. By 31 December 2026, the Commission shall assess the impact of such additional criteria on the internal market, accompanied, if necessary, by a proposal to ensure harmonisation thereof.	***7b. As part of their final updated national energy and climate plan to be submitted by 30 June 2024 pursuant to Article 14(2) of Regulation (EU) 2018/, Member States shall include:*** ***(a) an assessment of the domestic supply of forest biomass available for energy purposes in 2021-2030 in accordance with the criteria laid down in Article 29;*** ***(b) an assessment of the compatibility of the projected energy use of forest biomass with the Member States' targets and budgets for 2026-2030 as defined under [add reference to newly amended LULUCF Regulation]; and*** ***(c) a description of the national measures and policies ensuring compatibility with those targets and budgets.*** ***Member States shall report to the Commission on the measures and policies referred in point (c) as part of their biannual integrated national energy and climate progress reports submitted pursuant to Article 17 of Regulation (EU) 2018/1999.*** 8. By 31 January 2021, the Commission shall adopt implementing acts establishing the operational guidance on the evidence for demonstrating compliance with the criteria laid down in paragraphs 6 and 7 of this Article. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 34(3). 9. By 31 December 2026, the Commission shall assess whether the criteria laid down in paragraphs 6 and 7 effectively minimise the risk of using forest biomass derived from unsustainable production and address LULUCF criteria, on the basis of the available data. The Commission shall, if appropriate, submit a legislative proposal to amend the criteria laid down in paragraphs 6 and 7 for the period after 2030. 10. The greenhouse gas emission savings from the use of biofuels, bioliquids and biomass fuels taken into account for the purposes referred to in paragraph 1 shall be: (a) at least 50 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations in operation on or before 5 October 2015;

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	(b) at least 60 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 6 October 2015 until 31 December 2020; (c) at least 65 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 1 January 2021; (d) for electricity, heating and cooling production from biomass fuels used in installations ***having started operation after the entry into force of this directive***, at least 80 %***;*** ***(e) for electricity, heating and cooling production from biomass fuels used in installations with a total rated thermal input equal to or exceeding 10 MW having started operation from 1 January 2021 to the entry into force of this Directive, at least 70 % until 31 December 2029, and at least 80% from 1 January 2030;*** ***(f) for electricity, heating and cooling production from gaseous biomass fuels used in installations with a total rated thermal input equal to or lower than 10 MW having started operation from 1 January 2021 to the entry into force of this Directive, at least 70 % before they reach 15 years of operation, and at least 80% once they reach 15 years of operation;*** ***(g) for electricity, heating and cooling production from biomass fuels used in installations with a total rated thermal input equal to or exceeding 10 MW having started operation before 31 December 2020, at least 80% once they reach 15 years of operation, at the earliest from 1 January 2026 and, at the latest, from 31 December 2029;*** ***(h) for electricity, heating and cooling production from gaseous biomass fuels used in installations with a total rated thermal input equal to or lower than 10 MW having started operation before 31 December 2020, at least 80% once they reach 15 years of operation and at the earliest from 1 January 2026.*** An installation shall be considered to be in operation once the physical production of biofuels, biogas consumed in the transport sector and bioliquids, and the physical production of heating and cooling and electricity from biomass fuels has started. The greenhouse gas emission savings from the use of biofuels, biogas consumed in the transport sector, bioliquids and biomass fuels used in

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	installations producing heating, cooling and electricity shall be calculated in accordance with Article 31(1). 11. Electricity from biomass fuels shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 only if it meets one or more of the following requirements: (a) it is produced in installations with a total rated thermal input below 50 MW; (b) for installations with a total rated thermal input from 50 to 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, meeting an energy efficiency level associated with the best available techniques (BAT-AEELs) as defined in Commission Implementing Decision (EU) 2017/1442 [*reference omitted*]; (c) for installations with a total rated thermal input above 100 MW, it is produced applying high-efficiency cogeneration technology, or, for electricity-only installations, achieving an net-electrical efficiency of at least 36 %; (d) it is produced applying Biomass CO_2 Capture and Storage. For the purposes of points (a), (b) and (c) of the first subparagraph of paragraph 1 of this Article, electricity-only-installations shall be taken into account only if they do not use fossil fuels as a main fuel and only if there is no cost-effective potential for the application of high-efficiency cogeneration technology according to the assessment in accordance with Article 14 of Directive 2012/27/EU. For the purposes of points (a) and (b) of the first subparagraph of paragraph 1 of this Article, this paragraph shall apply only to installations starting operation or converted to the use of biomass fuels after 25 December 2021. For the purposes of point (c) of the first subparagraph of paragraph 1 of this Article, this paragraph shall be without prejudice to support granted under support schemes in accordance with Article 4 approved by 25 December 2021. Member States may apply higher energy efficiency requirements than those referred in the first subparagraph to installations with lower rated thermal input. The first subparagraph shall not apply to electricity from installations which are the object of a specific notification by a Member State to the Commission based on the duly substantiated existence of risks for the security of supply of

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	electricity. Upon assessment of the notification, the Commission shall adopt a decision taking into account the elements included therein. 12. For the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 of this Article, and without prejudice to Articles 25 and 26, Member States shall not refuse to take into account, on other sustainability grounds, biofuels and bioliquids obtained in compliance with this Article. This paragraph shall be without prejudice to public support granted under support schemes approved before 24 December 2018. 13. For the purposes referred to in point (c) of the first subparagraph of paragraph 1 of this Article, Member States may derogate, for a limited period of time, from the criteria laid down in paragraphs 2 to 7 and 10 and 11 of this Article by adopting different criteria for: ***(a) installations located in an outermost region as referred to in Article 349 TFEU to the extent that such facilities produce electricity or heating or cooling from biomass fuels and bioliquids or produce biofuels; and*** ***(b) biomass fuels and bioliquids used in the installations referred to in point (a) of this subparagraph and biofuels produced in those installations, irrespective of the place of origin of that biomass, provided that such criteria are objectively justified on the grounds that their aim is to ensure, for that outermost region, access to safe and secure energy and a smooth phase-in of the criterial laid down in paragraphs 2 to 7 and 10 and 11 of this Article and thereby incentivise the transition from fossil fuels to sustainable biofuels, bioliquids and biomass fuels.*** The different criteria referred to in this paragraph shall be subject to a specific notification by the relevant Member State to the Commission. 14. For the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1, Member States may establish additional sustainability criteria for biomass fuels. By 31 December 2026, the Commission shall assess the impact of such additional criteria on the internal market, accompanied, if necessary, by a proposal to ensure harmonisation thereof. ***15. Until 31 December 2030 at the latest, energy from biofuels, bioliquids and biomass fuels may also be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 of this Article, where***

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	(a) support was granted before … [the entry into force of this amending directive] in accordance with the sustainability and greenhouse gas emissions saving criteria set out in Article 29 of Directive (EU) 2018/2001 in its version in force on 29 September 2020; and ***(b) the respective support was granted in the form of a long-term support for which a fixed amount has been determined at the start of the support period and provided that a correction mechanism to ensure the absence of overcompensation is in place.***