STATE OF NEW YORK
DEPARTMENT OF STATE
OFFICE OF RENEWABLE ENERGY SITING

COMMENTS ON
Draft Regulations
Chapter XVIII, Title 19 of NYCRR Part 900
Subparts 900-1 – 900-14

On Behalf of Save Ontario Shores, Inc.
and named signatories across upstate, western and
the Southern Tier of New York

Appendix F

- Comments on the need to align the siting of large scale renewable energy projects with the siting of transmission improvements, in order to increase the ability of generation projects to make a meaningful contribution to the State's policy of reducing greenhouse gas emissions. Prepared by Gary A. Abraham, attorney.

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Draft ORES regulations, to implement Section 94-c of the New York State Executive Law
Comments on behalf of Save Ontario Shores, Inc.

New transmission capacity is needed to reduce carbon emissions by means of renewables

No large-scale renewable power projects are being sited in downstate communities. If upstate communities are to be made to sacrifice for the State's policy goals, they should be shown what they are sacrificing for. As a result of the combined effect of widespread transmission congestion in New York's electric system and the modest generation rates of renewable power projects, it is unclear that they would be sacrificing to achieve measurable or even identifiable reductions in greenhouse gas emissions.

Because their operations depend on the weather, large-scale wind energy projects in New York operate with an efficiency (capacity factor) of 26% on average compared to their design capacity,[1] and solar farms operate with less efficiency.[2] In addition, to be utilized on the grid, intermittent renewables must be substantially overbuilt. The latest study of how the New York electric system could achieve 70% emissions-free power by 2030 (the 70 X 30 CLCPA[3] scenario), assuming the CLCPA targets[4] are met (the expansion of energy storage, price demand response and generation targets) and 90% the state's transmission congestion is relieved, finds that the amount of renewable capacity needed is over 200% of electricity demand.[5] Even then, the grid will be unable to function unless as much as 22% of its capacity is supplied from a future non-intermittent and non-fossil "renewable natural gas".[6]

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1 New York Independent System Operator ("NYISO"), *2019 Load and Capacity Data Report* (Gold Book), 52-70 (Table III-2), available under "Planning Reports" at <https://www.nyiso.com/library>. Note that project sponsors modeling emissions displacement of their projects under PSL Article 10 assume capacity factors twice as large as NYISO reports. *See, e.g.*, *below*, page 6 (discussing the Bluestone Wind Project and the Alle-Catt Wind Energy project).

2 NYISO, *Power Trends 2020*, at 18, indicates that generally in New York, large-scale solar operates at 14% of its design capacity, large-scale wind at 29%, hydropower at 89%, and nuclear power at 95%.

3 The 2019 Climate Leadership and Community Protection Act ("CLCPA"), L. 2019, ch. 106 (July 18, 2019), revises New York's Clean Energy Standard ("CES") to require 70% carbon-free electricity by 2040 and 100% by 2050.

4 These targets are specifically identified in the Accelerated Renewable Energy Growth and Community Benefit Act, L. 2020, ch. 58, Part JJJ, §1(7)(a) ("at least 9 gigawatts of offshore wind electricity generation by 2035, 6 gigawatts of photovoltaic solar generation by 2025, and support 3 gigawatts of statewide energy storage capacity by 2030, as such policies may from time to time be amended").

5 P.J. Hubbard et al. (The Analysis Group), *Climate Change Impact Phase II: An Assessment of climate Change Impacts on Power system Reliability in New York State* (September 2020), 73, available under under "Planning Reports" at <https://www.nyiso.com/library>.

6 *Id.*, 28, 76, 78. This model of the 70 X 30 scenario assumes "renewable natural gas" from landfills and livestock manure could provide the needed "dispatchable and emissions-free resource" ("DE resource"). "The analysis does not identify exactly what the resource is." *Id.*, 32. A DE resource is posited only because with all the assumptions identified above in the text, including achieving the CLCPA targets, there remains a resource gap that must be filled somehow to maintain a reliable electrical system. *Id. See also* Brattle Group (for NYISO), *New York's Evolution to a Zero Emission*

Local and bulk transmission congestion requires upstate electricity to be used upstate, but demand for electricity is declining upstate. Recent transmission upgrades, including an addition to the Northern New York Project approved just last month,[7] fall far short of what is needed to transport upstate renewable energy downstate.

The upstate grid today is 88-90% emissions-free.[8] Unbottling existing zero-emissions upstate power by itself would result in far more reductions in emissions faster than building more renewable capacity upstate. However, to relieve upstate-downstate transmission, New York ratepayers and taxpayers will need to shoulder billions in investment in transmission capacity.[9]

The time frame for implementing such a massive investment in transmission infrastructure is decades. During that time, bulk transmission projects to transport Canadian hydropower down the Hudson River valley to New York City, to transport offshore wind power to Long Island, and to develop much more energy storage downstate may render new transmission capacity unnecessary.

The purpose of siting more renewables upstate is to displace polluting power plants. However, there is very little carbon pollution in the upstate grid to displace, and there is nowhere else for upstate electricity to go. Because nuclear and hydropower cannot be curtailed, surges of intermittent renewable power upstate require increasing curtailment of older, less economic renewables. In 2019, upstate wind farms had to be curtailed 64 times.[10] The need for such curtailment will increase if the siting of large-scale renewables increases, eroding their already low efficiency and requiring substantial overbuilding of capacity.[11]

Power System: Modeling Operations and Investment Through 2040 Including Alternative Scenarios (June 22, 2020), 22, available at <https://www.nyiso.com/documents/20142/13245925/Brattle New York Electric Grid Evolution Study - June 2020.pdf/69397029-ffed-6fa9-cff8-c49240eb6f9d>.

7 Discussed *infra*, page 4.

8 NYISO, *Power Trends 2020*, Fig. 14 (in 2019 emissions-free power upstate was 88% emissions free: 7% wind, 40% hydropower, 41% nuclear power; downstate power is 29% emissions-free, but that includes 25% nuclear power currently being decommissioned). In 2018 upstate power was 90% emissions-free. NYISO, *Power Trends 2019*, Fig. 16.

9 *See* PSC *Case 20-E-0197, Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act*, Utility Transmission and Distribution Investment Working Group Report (November 2, 2020). Excluding bulk power transmission facilities, this report estimates that local transmission and distribution upgrades needed to achieve the CLCPA targets will cost over $16.5 billion. *Id.*, 6-7. All costs of local transmission and distribution upgrades would be allocated to the utility's customers. *Id.*, 15.n.22, 25. The report notes that achieving the CLCPA targets "will also require much more significant investments in bulk transmission, large scale renewables, and other resources to balance the system", and no decision has been made regarding "the pathway the State decides on to meet the State's clean energy and clean air mandates". *Id.*, 11.

10 NYISO, *Power Trends 2020*, Fig. 7 (p. 16).

11 Case 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, Supplemental Comments of the New York Independent System Operator, Inc. (July 8, 2016), 9-10, 11 (Table 1) (in order to achieve the previous Clean Energy Standard 50 X 30 goal, intermittent renewables must provide an increased Installed Reserve Margin, from between 15% and 18% currently to between 40% and 45%).

It has been apparent since at least 2002 that the state's transmission system is inadequate to fully utilize large-scale intermittent renewables. The State's 2002 energy plan noted that "significant transmission congestion" exists in New York,[12] noted that "wind farms" are constrained by existing transmission capacity limits, and recommended "clusters" of no more than 10 wind turbines be sited to avoid over taxing transmission infrastructure.[13] Transmission constraints

> limit the amount of electric power that can be transmitted between regions within the State. In particular, there are limitations on the amount of power that can be moved from upstate to downstate, and into either New York City or onto Long Island from surrounding areas. Because the system is operated in a manner that these constraints are not violated, reliability is not jeopardized; but there are economic impacts as evidenced by the normally higher prices in downstate regions compared to upstate/western areas.
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> . . . Because numerous in-state transfer limits are in a linear path from upstate to downstate, reinforcement of a single transmission interface may provide only marginal benefit because the next interface on that path will become the next most limiting element for power transfers. Therefore, to move more power from upstate to downstate could require reinforcements over most of the path, not just reinforcing a single weakest link.[14]

A "Transmission Upgrade Scenario" was considered in the 2002 Plan, but no planning process to develop the scenario was identified.[15]

After New York's first wind farm was sited in 2008, the inadequate capacity of the state's transmission system forced the project to curtail operations.[16]

The State's 2015 Energy Plan noted that substantial investment in new and upgraded transmission is needed in order to accommodate large-scale renewables:

> New York's aging energy transmission and distribution infrastructure requires substantial investment in repair and modernization over the coming years. As previously noted, central generation facilities will continue to be the foundation of the State's energy system for the foreseeable future—the transmission network must be well maintained, secure, and in some cases enhanced in order to provide

12 NYS 2002 Energy Plan, at 3-150.

13 *Id.*, at 3-59 ("for locations with limited transmission capacity because cluster installations can be connected to the grid at a lower voltage compared to wind farms").

14 *Id.*, at 3-101, 3-103.

15 *See id.*, at 3-146.

16 Matthew L. Wald, Wind Energy Bumps Into Power Grid's Limits, *The New York Times*, August 27, 2008 (the Maple Ridge wind farm "has been forced to shut down even with a brisk wind blowing" at times because existing transmission infrastructure is inadequate to handle a surge in load).

> reliable service and to accommodate the addition of new large-scale renewable resources.[17]

On January 24, 2017, PSC ordered NYISO to "fully evaluate[ ]" four bulk transmission projects intended to relieve congestion between upstate and downstate, and to achieve greater access by the downstate zones to cross-state power flows.[18] Two of these projects were approved and are being built east of Albany and in western New York. However, NYISO has concluded that these projects are insufficient to avoid "jeopardizing achievement of 50% by 30 based on the projected build-out" of future renewable resources upstate, because these projects would not by themselves relieve upstate-downstate transmission congestion.[19] The 50 X 30 goal preceded the current CLCPA 70 X 30 goal. "In order to achieve 50% [renewable capacity] by [20]30, the bulk power transmission system must have the capability to deliver all renewable resources' energy production simultaneously."[20]

In tandem with bulk transmission improvements, NYISO advises that upgrades to local transmission and distribution lines are also needed if the state's emissions-reduction goals are to be achieved:

> Sub-transmission systems (i.e., 69 to 138 kV transmission facilities) will also require significant investment to bring the renewable energy from renewable resource sites to the bulk power transmission system. The sub-transmission system must have the capability to transfer intermittent renewable resources' full energy output to the bulk power system in order to fully utilize qualifying energy production from these resources. Undersized sub-transmission systems may result in renewable energy generation being curtailed to maintain local electric system reliability.[21]

Needed upgrades have been identified across all eleven NYISO control zones and, without these, during the winter transmission congestion will make "an average of 3,565 MW of renewable power in each hour unable to help meet load requirements (this is equivalent to 9.4 percent of total NYCA load)."[22]

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17 *The Energy to Lead: New York State Energy Plan*, Vol. 1 (2015), 36.

18 PSC Case 12-T-0502, *Proceeding on Motion of the Commission to Examine Alternating Current Transmission Upgrades*, and other cases (January 24, 2017), Order, at 19. In 2015, PSC approved a bulk transmission upgrade to receive congestion in western New York. *See* PSC Case 14-E-0454, *Order Addressing Public Policy Requirements for Transmission Planning Purposes* (July 20, 2015).

19 PSC Case 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, Supplemental Comments of the New York Independent System Operator, Inc. (July 8, 2016), at 4-5. More recently, NYISO learned that "if state polices shift more investment to offshore wind and energy storage in downstate areas, the benefits from the [Albany East transmission project] will be reduced." Potomac Economics, *NYISO Market Monitoring Unit Evaluation of the Proposed AC Public Policy Transmission Projects* (February 2019), 19. Further reduction in the benefits of upstate-downstate transmission relief would result from the Champlain Hudson Power Express transmission project (PSC Case No. 10-T-0139).

20 *Id.*

21 *Id.*, at 6.

22 P.J. Hubbard et al., *Climate Change Impact Phase II: An Assessment of Climate Change Impacts on Power System Reliability in New York State, Final Report*, *supra*, note 5, at 28.

The Draft ORES regulations continue New York's push to site large-scale renewable power projects upstate without regard to New York's ability to utilize more upstate renewable power. Despite poor prospects for success, ORES is obligated to pursue this path by law. Section 2 of the 2020 Accelerated Renewable Energy Growth and Community Benefit Act[23] requires the Public Service Commission ("PSC") to undertake "a comprehensive study for the purpose of identifying distribution upgrades, local transmission upgrades and bulk transmission investments that are necessary or appropriate to facilitate the timely achievement of the CLCPA targets". However, the Act also obligates ORES to determine applications for generation siting permits without regard to transmission needs.[24]

On October 15, 2020, the PSC approved the second half of the Northern New York Project, being built by the New York Power Authority since 2018.[25] However, PSC did not wait for the comprehensive transmission plan required under the Act.[26] Instead, PSC adopts the principle that new "priority transmission projects" mandated by the Act should be evaluated according to "how the timing of transmission development contributes to the expansion of renewable generation".[27]

The history of New York energy policy shows that transmission and generation capacity should be planned together since, when they are not, additional renewable capacity does not advance emissions reduction goals.[28] Fast-tracking large-scale renewable generation siting without aligning such decisions with transmission needs will predictably result in sub-optimum siting, as transmission will need to catch up with generation siting sometime in the future.

If ORES wants to enlist the support of upstate towns, it must be able to show them that new large-scale renewable generation projects are aligned with sufficient transmission capacity to effectively reduce New York power sector emissions. Without demonstrating such alignment, rural upstate communities' resistance to out-of-character industrial energy development and its adverse environmental impacts is unlikely to diminish.

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23 Exec. L. § 94-c, §2.

24 *Id.*, §4(3)(a).

25 PSC Case 20-E-0197, *Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act*, Order on Priority Transmission Projects (October 15, 2020).

26 Under the Act, "[transmission] projects for which the Commission has determined there is a need to proceed expeditiously to promote the state's public policy" are authorized, in addition to "public policy transmission" projects approved through NYISO, also meant to expedite implementation of the state's energy goals. Exec. L. §§ 7(3) and 7(4).

27 PSC Case 20-E-0197, Order on Priority Transmission Projects, *supra,* note 25, at 15.

28 As discussed above. For example, National Grid commented to PSC that "approximately 7.5 terawatt-hours (TWh) of renewables curtailments annually" is bottled in the North Country without this transmission upgrade. *Id.*, 10.

ORES siting regulations should require consideration of a project's net carbon benefit

ORES could better ensure renewable generation is effective in advancing New York's emissions reduction goals by requiring consideration of a project's net carbon benefit. It is surprising that the Draft regulations and standards do not include such a requirement.

The emphasis in Draft regulation §900-2.22 and §900-2.18 on a project's effect on system reliability threatens to get the state's priorities backwards. Maintaining a reliable electric system with a high penetration of renewables is feasible. The issue is whether the system is configured to ensure the theoretical carbon benefits of renewables are realized. Accordingly, §900-2.18 should require applications to provide:

A description of the impact electric transmission constraints would have on the facility's ability to displace carbon emissions elsewhere in the electric system, for the period of anticipated operations.

For example, it has been recognized for some time that increased reliance on fossil-fueled fast starting power plants is a result of a substantial build-out of intermittent renewables.[29] Even greater reliance on fast-starting power will result from New York's transmission-constrained electric system.[30] Reliance on gas-fired fast-starting power plants reduces wind and solar power's net displacement of CO_2.

Draft regulation §900-2.18 (Exhibit 17: Consistency with Energy Planning Objectives) is the obvious place to include a requirement to demonstrate a project's net carbon benefits. This Draft regulation tracks the regulation under PSL Article 10 (16 NYCRR § 1001.10). However, the principal concern of both regulations is limited to the reliability of the electrical system, defined as avoidance of a loss of load (blackout, or brownout). The cost of ensuring reliability generally increases with a significant penetration of large-scale renewables but, apart from added costs, reliability concerns are not significant. The real concern is that large-scale renewables may not be able to meaningfully advance New York's emissions reduction goals. Nowhere in the Draft regulations is this concern addressed.

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29 *See* National Academy of Sciences, ENVIRONMENTAL IMPACTS OF WIND-ENERGY PROJECTS (2007), 35, 52, 63-64, available at <http://www.nap.edu/openbook.php?isbn=0309108349>; Richard S. Courtney (Center for Science and Public Policy, Washington, D.C.), *Wind Farms Provide Negligible Useful Electricity*, March 2006, p. 13, <http://ff.org/centers/csspp/pdf/ 20060331_wind.pdf> ("large use of wind farms provides no reduction to the need to operate conventional thermal power stations and makes little or no reduction to emissions from them"); Michael J. Trebilcock (Professor of Law and Economics, University of Toronto), *Wind power is a complete disaster*, NATIONAL POST (Canada), April 8, 2009 ("recent academic research shows that wind power may actually increase greenhouse gas emissions in some cases, depending on the carbon-intensity of back-up generation required because of its intermittent character."); Tyndall Centre for Climate Change Research, *Security assessment of future UK electricity scenarios*, July 2005, pp. 5, <http://www.tyndall.ac.uk/research/ theme2/final_reports/t2_24.pdf> ("Due to a relatively small capacity contribution of intermittent sources [in particular, wind energy sources] a considerable number of conventional plants might be running at low output levels over a significant proportion of their operational time to accommodate this intermittent energy. Consequently these plants will have to compromise on their efficiency resulting in increased levels of fuel consumption as well as emissions per unit of electricity produced."). As previously discussed, NYISO's September 2020 CLCPA 70 X 30 study finds that a substantial need for liquid "renewable" fuels remains after the CLCPA targets are met. *See above* page 1, and note 6.

30 NYISO, *2019 Congestion Assessment and Resources Integration Study* (CARIS) (July 2020), 9.

Electrical system modeling is another area where it would be appropriate to address net carbon benefits. However, Draft regulation §900-2.22 (Exhibit 21: Electric System Effects and Interconnection) weakens Article 10's requirement that applicants provide electric system production modeling (16 NYCRR § 1001.8). PSL Article 10 requires an applicant to demonstrate its proposed project would not simply be displacing low- or no-emissions power sources like combined cycle natural gas plants, hydropower plants, or other wind farms[31]—in other words, to demonstrate the project does not only inject its electricity into the grid but that, by doing so, it actually reduces emissions from other power plants. The Draft ORES regulations do not require any such demonstration.

Article 10 applicants have not modeled carbon emissions impacts of their projects for the period of anticipated operations. In its Article 10 application, the Bluestone Wind Project predicts it will reduce New York's carbon dioxide emissions by about 0.26%.[32] The Alle-Catt Wind Energy project—at 106 square miles, the largest project area in the state—predicts its project will reduce New York's carbon dioxide emissions by about 1.16%.[33] However, these estimates address only the first year of operations.

The ability of a renewable energy project to reduce emissions ordinarily declines over time as the carbon intensity of the grid declines. As more low- and zero-emissions generators are sited, there are less carbon emissions in the electric system to reduce. However, the anticipated decline in ability to reduce emissions is magnified in New York, where a bottled upstate grid has already achieved 88-90% zero emissions. The Draft ORES regulations should require modeling of energy system impacts over the project's expected lifetime, taking into account the actual timeframe for any planned transmission upgrades that would enhance the project's emissions benefit, and a realistic assessment of the number and type of electric generation projects likely to be put into service during the project's lifetime.

By tying new generation projects to planned additions of transmission and generation capacity, ORES would have a much more accurate assessment of a project's carbon benefits. Just as importantly, if transmission constraints prevent a proposed project from achieving meaningful net carbon benefits over its anticipated lifetime, that project should be discouraged until adequate transmission capacity can be anticipated. This will increase the likelihood that both new transmission and generation capacity is sited where they can be best utilized. The Draft regulations do not require consideration of a renewable generation project's ability to achieve its theoretical environmental benefits.

Net carbon benefits should include negative effects on emissions reduction goals

The Draft ORES regulations should require consideration of a project's negative effects on emissions. Negative effects include the relatively large materials burden of large-scale

31 16 NYCRR § 1001.8(a)(8).

32 PSC Case 16-F-0559, *Application of Bluestone Wind, LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 for Construction of the Bluestone Wind Farm Project Located in the Towns of Windsor and Sanford, Broome County*, Exhibit 8, Table 8-1 (September 18, 2008).

33 PSC Case 17-F-0282, *Application of Alle-Catt Wind Energy LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 for a Proposed Wind Energy Project, Located in Allegany, Cattaraugus, and Wyoming Counties, New York, in the Towns of Arcade, Centerville, Farmersville, Freedom, and Rushford*, Exhibit 8, Appx., Table 2.

renewables, compared to combined cycle gas-fired power plants and zero-emissions nuclear power plants.[34] Large-scale renewables generally increase the adverse impacts of energy supply chains. Mineral and metal mining needs for solar panels, wind turbines, and grid-scale batteries are multiples of mineral and metal mining needs for other forms of energy. Moreover, mining critical energy minerals for renewables occurs mostly in foreign lands, requiring substantially more transportation than minerals mined domestically for other forms of energy. Compared to domestic mining, foreign mining for new sources of minerals has serious impacts on remote or biodiverse places.[35]

Forest clearing is another potentially significant negative emissions effect. To achieve a zero-emissions economy, the CLCPA requires the state to cut greenhouse gas emissions to 85% below 1990 levels by 2050 and offset the remaining 15% with measures such as planting forests and capturing carbon for storage underground. Carbon capture remains for now technologically beyond reach, but maintaining and increasing New York's forests is not. Forests provide two carbon benefits: they absorb approximately 2.855 tons of CO_2 from the atmosphere per acre annually,[36] and they sequester 216.5 tons of CO_2 per acre in their biomass.[37] Renewable energy projects sited in forests should be discouraged.

The Bluestone Wind and Alle-Catt Wind estimates, for example, do not account for the emissions impacts of lost forested land. The Alle-Catt Wind Energy project in western New York would remove 1,550 acres of mature forest, with the result that New York loses the ability to remove 4,425 tons of carbon annually, and releases a substantial portion of the 335,575 tons of CO_2 in biomass. A 1,550-acre solar farm, if sited in a forested area, could have the same result.

Since the purpose of the ORES regulations is to achieve a societal and global benefit, the carbon emissions generated by the extraction and processing of materials wherever they are located should be taken into account in the assessment of a project's net emissions benefits. The Draft regulations lack any requirement to evaluate the emissions impacts of land and materials required for a project, beyond the visible activities taking place onsite at the generating facility. Without such an evaluation, ORES may be approving projects that make little or no contribution to New York's emission reduction goals.

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34 *Cf.* L. Stevens, *The Footprint of Energy: Land Use of U.S. Electricity Production* (June 2017), available at <https://strata.org/pdf/2017/footprints-full.pdf>.

35 A. Stumvoll, Are there potential downsides of going to 100 percent renewable energy?, *Pacific Standard* (Australia), June 20, 2019, available at <https://psmag.com/environment/what-are-the-downsides-to-renewable-energy> (discussing two reports, Earthworks (Washington, D.C.), Making Clean Energy Clean, Just & Equitable, and Institute for Sustainable Futures (University of Technology, Sydney), Responsible Minerals Sourcing for Renewable Energy, *see* <https://www.earthworks.org/campaigns/making-clean-energy-clean/>).

36 USDA, *New York Forests 2012* (October 2015), 63 ("Aboveground biomass of all live trees in New York's forests . . . averages 59 tons per acre."); Pearson, TR; Brown, SL; Birdsey, RA, Measurement guidelines for the sequestration of forest carbon, Northern Research Station, Department of Agriculture (2007), available at <https://www.fs.usda.gov/treesearch/pubs/13292> (carbon stock in forests can be converted to tons of CO2 equivalent by multiplying acres by 44/12, or 3.67).

37 Canadian Council of Forest Ministers, *Fact Sheet: Canada's Forests: CO2 Sink or Source?*, available at <https://www.sfmcanada.org/images/Publications/EN/C02_Sink_EN.pdf>.