

**SENATE . . . . . No.**

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**The Commonwealth of Massachusetts**

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PRESENTED BY:

***Cynthia Stone Creem***

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*To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts in General Court assembled:*

The undersigned legislators and/or citizens respectfully petition for the adoption of the accompanying bill:

An Act relative to Massachusetts' carbon dioxide removal leadership.

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PETITION OF:

NAME:

*Cynthia Stone Creem*

DISTRICT/ADDRESS:

*Norfolk and Middlesex*

**SENATE . . . . . No.**

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**The Commonwealth of Massachusetts**

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**In the One Hundred and Ninety-Third General Court  
(2023-2024)**  
\_\_\_\_\_

An Act relative to Massachusetts' carbon dioxide removal leadership.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

1 SECTION 1. Chapter 23J of the General Laws, as amended by chapter 179 of the acts of  
2 2022, is hereby amended by inserting the following section:-

3 Section 16. (a) For the purposes of this section, the following terms shall have the  
4 following meanings unless the context clearly requires otherwise:

5 "Advance market commitment" means the purchase in advance of carbon dioxide  
6 removal.

7 "Annual removal target" means the minimum total volume of carbon dioxide removal,  
8 expressed in metric tons of carbon dioxide equivalent, for which the Authority will made  
9 advance market commitment and solicit bids in a given year, such amount to be increased by the  
10 portion of the annual removal target not met in the prior year.

11 "Center" means the Massachusetts clean energy center established in chapter 23J of the  
12 General Laws.

13 "Qualifying bid" means a bid fulfilling the requirements of subsection (d) of this section.

14 "Bid price" means the total price the bidder is willing to be paid in a given bid for  
15 providing carbon dioxide removal.

16 "Bidder" means a person, entity or entities qualified to submit a bid pursuant to the  
17 requirements set forth in subsection (d) of this section.

18 "Carbon dioxide equivalent", the amount of carbon dioxide by weight that would produce  
19 the same global warming impact as a given weight of another greenhouse gas, based on the best  
20 available science, including from the Intergovernmental Panel on Climate Change.

21 "Carbon dioxide removal" means removing greenhouse gas, measured in carbon dioxide  
22 equivalent emissions, from the atmosphere, and durably storing it in geological, terrestrial, or  
23 ocean reservoirs, or in long-lived products for a minimum period of 100 years.

24 "Carbon dioxide removal process" means the physical process by which greenhouse  
25 gases are removed from the atmosphere and durably sequestered or stored.

26 "Carbon dioxide removal project" means a specific project that delivers the carbon  
27 dioxide removal described in a given bid.

28 "Director of environmental justice" means the director of environmental justice in the  
29 executive office of energy and environmental affairs.

30 "Disadvantaged communities" means communities identified by the center that bear  
31 disproportionate burdens from environmental pollution and from the impacts of climate change,  
32 and which are comprised of high concentrations of low- and moderate-income households.

33 "Durability" or "durable" means the secure sequestration of carbon dioxide equivalent in  
34 the geosphere, in the ocean, in long-lived products, or otherwise, measured as a unit of time.

35 "Environmental justice and community engagement report" means a form developed by  
36 the director of environmental justice and completed by the bidder that documents evidence that  
37 residents of disadvantaged communities have been consulted and afforded the opportunity to  
38 provide comment and suggestions concerning the proposed project. All reports submitted by  
39 bidders must be reviewed and approved by the director of environmental justice as a condition of  
40 selection. The report shall include a description and quantification, where possible, of the  
41 proposed carbon dioxide removal project's effects on: (i) equity and environmental justice,  
42 including health and quality of life; (ii) the local ecosystem, including soil health, biodiversity,  
43 and water and air quality; and (iii) job creation and economic development.

44 "Greenhouse gas", any chemical or physical substance that is emitted into the air and that  
45 the department of environmental protection may reasonably anticipate will cause or contribute to  
46 climate change including, but not limited to, carbon dioxide, methane, nitrous oxide,  
47 hydrofluorocarbons, perfluorocarbons and sulfur hexafluorid

48 "Life-cycle analysis" means a complete, end-to-end analysis of the greenhouse gas  
49 emissions resulting from a carbon dioxide removal process, including, but not limited to,  
50 manufacturing, transportation, utilization, sequestration and other processes occurring prior to,  
51 during, or after, the carbon dioxide removal process which are required to achieve carbon  
52 dioxide removal.

53 "Measurement, reporting and verification" means the verified measurement and reporting  
54 of carbon dioxide removal using an objective, peer-reviewed and scientifically supported

55 accounting methodology and taking into account regionally appropriate sampling and data  
56 collection methods to quantify emissions and removals associated with the carbon dioxide  
57 removal process and durability of removal instead of solely model-based or statistical methods.

58 "Reverse auction" means a bidding process in which qualified bidders submit bids to  
59 remove and durably store a specified quantity of carbon dioxide equivalent emissions in  
60 exchange for payment by the state.

61 "Social cost" means a measure, in dollars, of the long-term damage done by a ton of  
62 carbon dioxide equivalent emissions in a given year.

63 "Ton" means a metric ton of one thousand kilograms.

64 "Total annual bid" means the total volume of carbon dioxide removal for which  
65 qualifying bids were submitted in a given year.

66 (b) Prior to the initiation of the reverse auction for the commonwealth's advance market  
67 commitment for carbon dioxide removal services, the center shall publish a survey of carbon  
68 dioxide removal opportunities within the commonwealth. Such survey shall include, but shall not  
69 be limited to: (i) data gathered by the center pursuant to carbon dioxide removal verification as  
70 required by subsection (f) of this section; (ii) a review of carbon dioxide removal processes in the  
71 commonwealth with 100,000 metric tons or greater scale potential this decade and 100-year or  
72 greater durability, with a description for each of water and land-use requirements, life-cycle  
73 analysis and energy requirements, potential harms and potential co-benefits, including job  
74 creation or loss, industrial development, ecosystem sustainability, and advancement or  
75 degradation of environmental equity or social justice. Following the publication of the survey,  
76 the center shall conduct regional direct engagement with members of disadvantaged

77 communities throughout the commonwealth in order for the center to provide information  
78 concerning the objectives, and intended benefits and outcomes of the carbon dioxide removal  
79 pilot program and enable members of the public to provide comment and suggestions related to  
80 the carbon dioxide removal pilot program's design, implementation and shared community  
81 benefits.

82 (c) Beginning in 2024, the center shall conduct an annual reverse auction for the  
83 commonwealth's advance market commitment. The center shall initiate the reverse auction on  
84 April 1 and close the reverse auction on June 30 in each year during which a reverse auction is  
85 held. The center shall conduct the reverse auction subject to the following requirements:

86 (1) the center shall select qualifying bids, based on the criteria outlined in subsection (e)  
87 of this section, sufficient to meet the annual removal target; provided, that if the total annual bid  
88 is less than the annual removal target, the center shall increase the annual removal target in the  
89 subsequent year by the difference between the annual removal target and the total annual bid;  
90 and

91 (2) at least 30 percent of the annual carbon removal target shall be met by carbon dioxide  
92 removal projects that each deliver a maximum removal volume that does not exceed 10 percent  
93 of the annual removal target, unless the center does not receive an adequate number of qualifying  
94 bids proposing such projects;

95 (3) at least 25 percent of the annual removal target shall be met by carbon dioxide  
96 removal projects that have a minimum durability of 1,000 years; at least 50 percent of the annual  
97 removal target shall be met by carbon dioxide removal projects that have a minimum durability  
98 of 250 years; and 100 percent of the annual removal target shall be met by carbon dioxide

99 removal projects that have a minimum durability of 100 years; provided, that if the center does  
100 not receive sufficient qualifying bids proposing carbon dioxide removal projects with 1,000- or  
101 250-year durability to meet the requirements of this paragraph, it may modify the requirements  
102 for projects with 1,000- or 250-year durability;

103 (4) selected carbon dioxide removal projects will be compensated for carbon dioxide  
104 removal provided over a maximum contract term of 10 years; payment shall be made on an  
105 annual basis and contingent upon successful, complete and verified removal of the agreed upon  
106 carbon dioxide from the atmosphere;

107 (5) the maximum average price per ton of carbon dioxide removal shall be 350 dollars in  
108 2024, and shall decrease by at least 5 percent each year, adjusted for inflation; the center shall  
109 not accept qualifying bids causing the average price per ton of carbon dioxide removal to exceed  
110 the maximum average price per ton for the year;

111 (6) during the authorized 5-year term of the pilot program, the center will make an  
112 advance market commitment to purchase carbon dioxide removal in the following quantities: (i)  
113 10,000 tons of carbon dioxide equivalent emissions in 2024; (ii) 20,000 tons of carbon dioxide  
114 equivalent emissions in 2025; (iii) 30,000 tons of carbon dioxide equivalent emissions in 2026;  
115 (iv) 40,000 tons of carbon dioxide equivalent emissions in 2027; and (v) 50,000 tons of carbon  
116 dioxide equivalent emissions in 2028;

117 (7) the center shall publicly announce the winning bids, publicly release the winning  
118 bidders' proposals and scorecards, and contract with the winning bidders no later than September  
119 30 of each year in which reverse auction is held.

120 (d) (i) Each bid submitted to the center shall contain the following information: (1) the  
121 legal name, address, contact information and history of prior participation in the carbon dioxide  
122 removal reverse auction, or other public or private-market purchases of carbon removal services,  
123 for each entity or person submitting a bid; (2) the total volume of carbon dioxide removal to be  
124 achieved pursuant to the bid; (3) when carbon dioxide removal will commence, and the delivery  
125 term the proposed carbon dioxide removal project; (4) a description of the carbon dioxide  
126 removal process and the carbon dioxide removal project; (5) a full life-cycle analysis of the  
127 proposed carbon dioxide removal project, which demonstrates that the project will remove  
128 carbon dioxide from the atmosphere and store it securely and durably in at least the quantity and  
129 for at least the period committed to in the bid; (6) the and area and water volume which would be  
130 required by the proposed carbon dioxide removal project; (7) a completed environmental justice  
131 and community engagement report (8) a declaration that the carbon dioxide removal project will  
132 not cause adverse impacts to the environment or disadvantaged communities; (9) a description of  
133 the measurement, reporting and verification the bidder will employ for the carbon dioxide  
134 removal project, from an independent third-party deemed acceptable by the center that verifies  
135 all requirements of this section; (10) a legally binding attestation by each bidder that the  
136 information provided is accurate and that all requirements of this section are met; and (11) any  
137 additional information the center reasonably requests to assess the bid.

138 (ii) All carbon dioxide removal and material operations of each proposed carbon dioxide  
139 removal project submitted by bidders must be located within the commonwealth or waters within  
140 fifty nautical miles of the commonwealth.

141 (iii) Carbon dioxide removal project proposals shall not incorporate enhanced oil  
142 recovery or otherwise facilitate the extraction, refinement or delivery of fossil fuel energy



143 sources including petroleum, natural gas and coal, or which serve to perpetuate fossil fuel use in  
144 any sector of the economy in the commonwealth, the United States or globally.

145 (iv) The carbon dioxide removal project for which the bid is submitted shall be unique to  
146 this transaction and additional to any prior or otherwise existing or planned carbon dioxide  
147 removal, may not be used as part of any other private or public transaction for carbon dioxide  
148 removal, and shall create new and additional climate benefit, and not take credit for climate  
149 benefit that would occur in a no-intervention scenario.

150 (v) Carbon dioxide removal project proposals shall demonstrate the ability to commence  
151 carbon dioxide removal no later than 2 years following the entering into contract with the center.

152 (vi) Methods of carbon dioxide removal may include, but are not limited to: (1) terrestrial  
153 mineralization or enhanced rock weathering; (2) terrestrial biomass-based pathways such as  
154 biochar; (3) ocean-based pathways including electro-chemical alkalinity enhancement, marine  
155 permaculture, deep-ocean sequestration of biomass, and coastal enhanced weathering; (4)  
156 construction materials and products, the production of which directly contribute to the  
157 sequestration of carbon dioxide or other greenhouse gases, including mass timber; and (5) direct  
158 air capture with durable geologic sequestration, or durable sequestration in the built environment  
159 including in concrete.

160 (e) The center shall create a scorecard to evaluate the bids received based on the  
161 following factors: (i) the price per ton of carbon dioxide removed; (ii) the extent to which the  
162 project will promote equity or environmental justice within the commonwealth, including by  
163 generating economic benefits to one or more disadvantaged communities (iii) the conservation  
164 efficiency of the project in its use of water, land, and energy resources, with explicit preference

165 for projects with low water, land, and energy requirements and projects that exclusively employ  
166 renewable energy; (iv) the number of jobs created by the project in the commonwealth; (v)  
167 whether the project will employ at least one bona fide labor organization that is actively engaged  
168 in representing employees providing necessary operations and maintenance services for the  
169 project; (vi) whether and to what extent the project will involve the purchase of equipment and  
170 supplies from businesses located in the commonwealth; (vii) whether the project will generate  
171 significant agricultural, ecological, or ecosystem co-benefits or harms; (viii) the scale potential of  
172 the carbon dioxide removal process; (ix) the durability of the proposed carbon dioxide removal  
173 process; and (x) the delivery term for the proposed project, with a preference for carbon dioxide  
174 removal that is delivered more quickly.

175 (f) The center shall require each winning bidder to provide periodic verification from an  
176 independent third party deemed satisfactory by the center that the volume of carbon dioxide  
177 removed from the atmosphere and stored meets or exceeds the amount described in the bid and  
178 that there has been no carbon dioxide equivalent leakage and no reduction in carbon dioxide  
179 removal durability.

180 A winning bidder, its successors, assigns, and transferees of responsibilities, liabilities,  
181 rights or economic benefits of the carbon dioxide removal, shall be liable for the social cost, as  
182 determined by the center, of any carbon dioxide equivalent leakage or reduction in carbon  
183 dioxide removal durability.

184 During the project contract period, carbon dioxide removal projects may be subject to  
185 audit and review by the director of environmental justice to determine whether the winning

186 bidder is fulfilling and complying with all terms and stipulations in the environmental justice and  
187 community engagement report approved by the director of environmental justice.

188         Upon a failure by the winning bidder to provide the verification required by the center or  
189 to fulfill or comply with all terms and stipulations in the environmental justice and community  
190 engagement report approved by the director of environmental justice, the center may take action  
191 to penalize the winning bidder, including, but not limited to: (i) termination of the contract; (ii)  
192 levying fines or penalties against the bidder to recoup funds paid pursuant to the bid; or (iii)  
193 rejection of future bids by the bidder.

194         (g) Nothing in this section shall relieve any person, entity, or public agency of  
195 compliance with other applicable federal, state, or local laws or regulations, including state air  
196 and water quality requirements, and other requirements for protecting public health or the  
197 environment.

198         (h) If any word, phrase, clause, sentence, paragraph, section, or part of this section shall  
199 be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect,  
200 impair, or invalidate the remainder thereof, but shall be confined in its operation to the word,  
201 phrase, clause, sentence, paragraph, section, or part thereof directly involved in the controversy  
202 in which such judgment shall have been rendered.

203         (i) Funding for the administration of this section and for the authorized five-year reverse  
204 auction period, beginning in 2024 and ending in 2028, shall be derived entirely from state  
205 revenues that have been accrued in preceding tax years from certain reinstated taxes on sales of  
206 aircraft or sales of repair or replacement parts exclusively for use in aircraft or in the significant  
207 overhauling or rebuilding of aircraft or aircraft parts or components on a factory basis.

208 (j) The center shall promulgate regulations for the administration and enforcement of this  
209 section.

210 SECTION 2. Section 6 of said Chapter 64H of the General Laws, as appearing in the  
211 2020 Official Edition, is hereby amended by striking out subsections (uu) and (vv).