



UNIVERSITY OF LEEDS

This is a repository copy of *Potential for large-scale CO₂ removal via enhanced rock weathering with croplands*.

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/163140/>

Version: Accepted Version

Article:

Beerling, DJ, Kantzas, EP, Lomas, MR et al. (18 more authors) (2020) Potential for large-scale CO₂ removal via enhanced rock weathering with croplands. *Nature*, 583 (7815). pp. 242-248. ISSN 0028-0836

<https://doi.org/10.1038/s41586-020-2448-9>

© The Author(s), under exclusive licence to Springer Nature Limited 2020. This is an author produced version of a journal article published in *Nature*. Uploaded in accordance with the publisher's self-archiving policy.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

Table 1. Carbon dioxide removal (CDR) targets for enhanced weathering with croplands in 2050. Relative contribution of each nation is determined by their peak CDR capacity*. Values are means of both the ‘business-as-usual’ and ‘2°C’ energy scenarios; see main text for details.

Target	Cropland area	National CDR	Silicate demand	Cost
0.5 Gt CO₂ yr⁻¹	(%)	(Gt CO₂ yr⁻¹)	(Gt yr⁻¹)	(US\$ t CO₂⁻¹ yr⁻¹)
China	10	0.13	0.77	102.1
USA	11	0.11	0.63	160.3
India	11	0.15	0.84	78.4
Brazil	10	0.041	0.22	123.8
Indonesia	10	0.017	0.091	54.3
Canada	10	0.022	0.13	177.6
Mexico	10	0.013	0.073	97.5
<i>Europe</i>				
France	10	0.017	0.085	158.1
Germany	11	0.012	0.066	167.8
Italy	11	0.0070	0.039	181.9
Spain	10	0.012	0.066	192.8
Poland	10	0.0085	0.050	171.6
Target 1.0 Gt CO₂ yr⁻¹				
China	23	0.26	1.59	109.3
USA	24	0.21	1.26	168.5
India	23	0.24	1.50	79.9
Brazil	23	0.083	0.45	116.4
Indonesia	25	0.033	0.18	57.5
Canada	16	0.030	0.20	191.7
Mexico	23	0.025	0.15	103.1
<i>Europe</i>				
France	24	0.034	0.17	160.4
Germany	25	0.025	0.14	171.7
Italy	23	0.014	0.083	191.0
Spain	17	0.018	0.10	190.9
Poland	17	0.012	0.081	170.9
Target 1.5 Gt CO₂ yr⁻¹				
China	38	0.40	2.48	114.5
USA	39	0.32	1.99	173.1
India	36	0.37	2.35	80.2
Brazil	36	0.13	0.71	110.5
Indonesia	41	0.050	0.28	58.6
Canada	25	0.045	0.35	207.3
Mexico	37	0.038	0.23	105.6
<i>Europe</i>				
France	38	0.050	0.26	159.5
Germany	39	0.037	0.20	173.6
Italy	37	0.021	0.13	194.1
Spain	28	0.026	0.17	189.3
Poland	27	0.019	0.13	171.3

Table 1. Continued.

Target 2.0 Gt CO₂ yr⁻¹	Cropland area (%)	National CDR (Gt CO₂ yr⁻¹)	Silicate demand (Gt yr⁻¹)	Cost (US\$ t CO₂⁻¹ yr⁻¹)
China	55	0.53	3.46	120.7
USA	55	0.42	2.72	176.7
India	51	0.49	3.30	80.9
Brazil	51	0.17	0.98	106.2
Indonesia	59	0.067	0.38	59.4
Canada	35	0.060	0.51	220.3
Mexico	52	0.050	0.33	106.8
<i>Europe</i>				
France	54	0.067	0.36	157.1
Germany	57	0.050	0.28	175.9
Italy	55	0.029	0.18	193.3
Spain	41	0.035	0.25	190.7
Poland	38	0.025	0.19	175.4

*For each country i , we assigned its contribution to a CDR target as

$$CDR_{Contr}(i) = CDR_{Target} \frac{CDR_{MAX}(i)}{\sum_{j=1}^{Countries} CDR_{MAX}(j)}$$

Where CDR_{MAX} the maximum CO₂ achievable/attainable by a country.