

April 24, 2025

Dear Chair Sollman, Co-Chair Brock Smith, and members of the Senate Committee on Energy and Environment,

Thank you for the opportunity for DOGAMI and DSL to present on Geological Carbon Sequestration on April 23, 2025, and thank you to Senator Robinson for the following question: *What is the estimated range of costs per gigaton for geologic carbon storage by mineralization?*

The following section seeks to address this question. If you have additional questions, please contact DOGAMI's Legislative Coordinator, Christina Appleby, (christina.appleby@dogami.oregon.gov).

Response

Geologic carbon storage (GCS) by carbonate mineralization into basalt is currently in operation in Iceland and Kenya, and there are no current operations of this kind in the USA that would allow for a direct cost comparison. Here, we provide the cost in US dollars per metric ton of CO₂ (\$/tCO₂), which can be multiplied by one billion to provide a cost per metric gigaton (GtCO₂).

The Carbfix Project in Iceland has reported varying costs for two phases of operations of GCS in basalt, reflecting differences in infrastructure requirements between projects. The pilot project achieved relatively low costs of \$17/tCO₂ for transportation and shallow injection (400-800 m, ~1312-2625 ft) versus ~\$48.55/tCO₂ for deeper injection (>800 m, ~2625 ft) at a site that required new infrastructure and transport (Utonih and Viviana-León R., 2016). The Cella Project in Kenya reports a cost of \$10/tCO₂ for its GCS technology to store carbon in basalt (union.edu).

Broadening the comparison to include USA-based GCS in saline aquifers, in which CO₂ likely will not mineralize, the modelled potential range of onshore GCS is \$3 to \$15/tCO₂, whereas offshore GCS has a potential range of \$8 to \$25/tCO₂ (Schmelz et al., 2020).

References

Schmelz, W.J., Hochman, G. and Miller, K.G., 2020. Total cost of carbon capture and storage implemented at a regional scale: northeastern and midwestern United States. *Interface focus*, 10(5), p.20190065.

Utonih, Selma-Penna and Viviana León R., Vhelma, "Economic Assessment of the CarbFix CCS Method", *Iceland School of Energy*,
https://www.or.is/documents/871/03_selma_vhelma_economic_assesment_carbfix_uksWaTZ.pdf

<https://www.union.edu/news/stories/202308/rock-star-reponse-climate-change>