Project Idea Note for Forest Carbon Capture

- Ljárskógar, Dalabyggð

YGG
YGGDRASILL CARBON

SKÓGAR KOLEFNI CO_2

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Introduction

Climate projects in the voluntary market are verified activities of forestry, restoration, energy efficiency or renewable energy, or other activities that reduce, avoid, or remove greenhouse gas emissions from the atmosphere and contribute to climate change mitigation. With verified carbon units, private financing is directed to climate action that would not otherwise get off the ground.

This project idea note presents an estimate of carbon sequestration in a proposed 50-year afforestation project on 104,7 ha area in Ljárskógar in Dalabyggð. A financial overview of the project is also provided. The project will follow the requirements of the Icelandic Forest Carbon Code and create certified carbon units that will be registered with the International Carbon Registry (ICR).

Icelandic Forest Carbon Code specifications

The production of certified carbon units for responsible carbon offsetting needs to be based on an approved standard, followed by the assessment of an independent certification body and the registration of units by an authorized carbon registry. [1] The Forest Carbon Standard was initiated by the Icelandic Forest Service for this purpose. Landowners and tenants participating in the project are committed to permanently secure the land for forestry. The standard applies to afforestation on previously non-forested areas. Afforestation needs to be supplementary to existing forestry projects.

The purpose of the Forest Carbon Standard is to ensure:

1. That all management activities will be sustainability oriented and according to the quality requirements of the Icelandic Forestry Service
2. The application of best practice in forest carbon accounting
3. The use of scientifically sound methods for forest carbon measurement protocols to guarantee consistency and accuracy in calculating the forest carbon sequestration.
4. Integrity through independent quality assurance, validation, and consistent verification
5. Open and transparent recording of projects, issuance, and tracing of carbon units

The principles of the Forest Carbon Standard are:

Permanence	**Transparency**	**Independent validation and verification**	**Additionality**
The management of the forest focuses on the permanence of sequestered carbon, to prevent its release back into the atmosphere. Should a reduction in carbon stocks occur, this will be counteracted by increased sequestration or by regenerating of the forest.	All carbon units will be registered in an accessible, accredited registry, ensuring that sequestered carbon units are not double-counted or counterfeited.	An active and approved system will be used for monitoring, reporting and verification, through an independent certification body.	The main incentive for new forestry projects is to produce carbon units. Each project should be a valid addition to sequestration that would otherwise have occurred.

[1] https://loftslagsrad.is/library/alit/Alit%20um%20abyrga%20kolefnisjofnun%20-%20Loftslagsrad%2026.%20oktober%202020.pdf

Key project information in Ljárskógar

The total project area in Ljárskógar in Dalabyggð covers approximately 198 hectares. The vegetation is scarce, with the main vegetation districts being mossland and wetland. The area is relatively flat and is not high over sea level. The afforestation area will cover 104,7 of the total 198 hectares when the wetlands, cultural sites, streams and ditches have been excluded.

Soil preparation needs to be implemented on 81 hectares of the area and fences are needed to keep the area free of sheep. Other site preparation is not needed.

The Icelandic Forest Service created the afforestation plan, and the species suitable in the area are Black cottonwood (18,6 ha), Siberian Larch (7,9 ha), Sitka Spruce (8,1ha) and Lodgepole pine (70,0 ha). Using three species will help maintain biodiversity in the area and hopefully add more diversity. Pine is the most suitable in scarce vegetation and is the main species in Ljárskógar. It will create vegetation cover and add to the carbon stock and fertility in the soil.

The estimation of the carbon sequestration in the next 50 years is generated using the Forest carbon calculator (**https://reiknivel.skogur.is/**), a forest growth model operated by the Icelandic Forest Service (IFS). The calculator is based on thousands of long-term studies on various tree species nationwide. It uses site quality classes for the main tree species in Iceland's forestry, based on the prediction of carbon sequestration, considering the mean sequestration and emissions on different site types. The forecast is presented in a graph showing how sequestration gradually increases with tree growth, reaches its peak, and then declines as tree growth slows. The calculator is under constant development as every research data added to the calculator results in a more accurate estimation of carbon sequestration.

Monitoring of the afforestation area will take place regularly during the 50 years. Snow, wind, and frost damage will be assessed in the first years, and replanting will occur if needed. Measurements of the carbon content of the trees, following the requirements of the Forest Carbon Code, will be implemented every ten years, followed by certification of the measurements and issuance of pending and mature certified carbon units.

Certified Carbon Units

The estimated number of verified carbon units in Ljárskógar is 33.605 units during the 50-year project time.

One carbon credit equals one ton of sequestered carbon dioxide from the atmosphere. Several variables of the trees are measured and calculated to find the tree sequestration of CO2. The results are certified by an independent certification body, iCert in the case of Ljárskógar. When the validator has confirmed the results, the verified carbon units can be issued as mature or pending units.

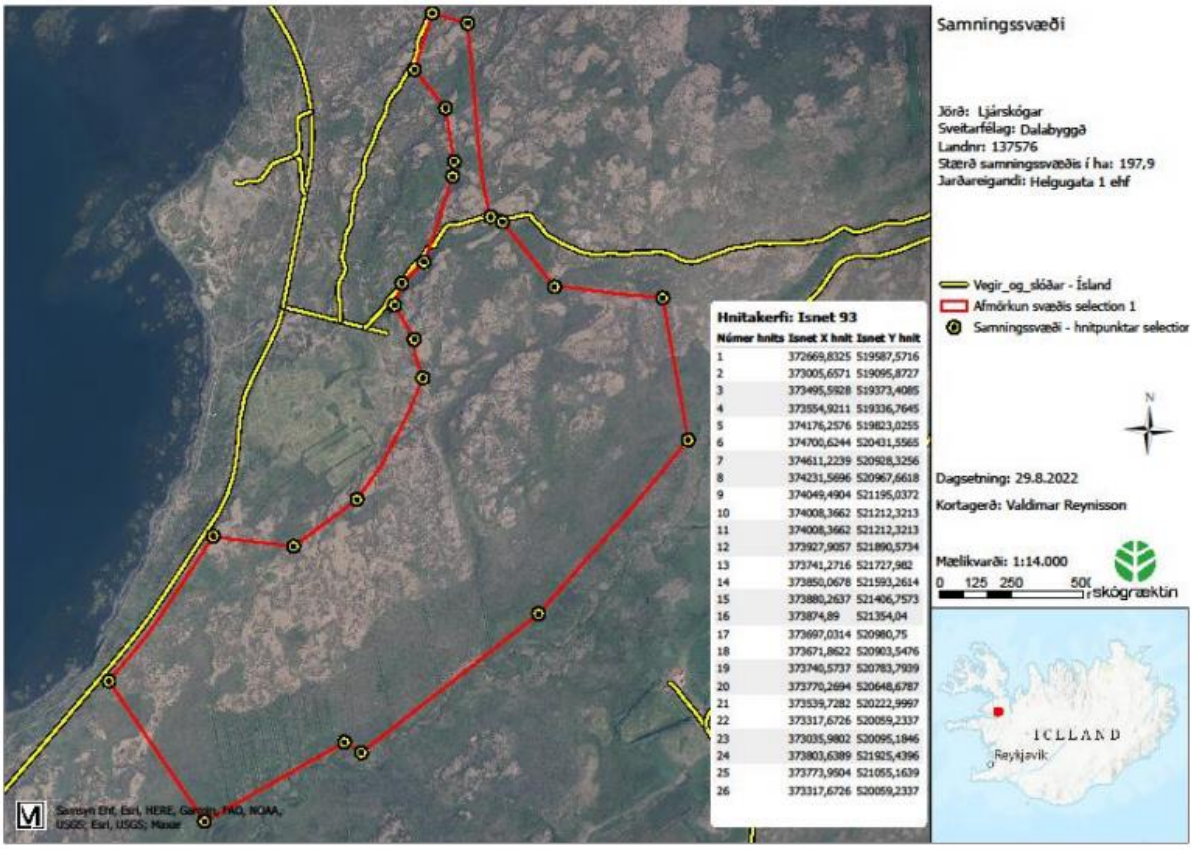
One of the prerequisites for relying on and trading carbon units is that they are registered in an approved database. The project in Ljárskógar is registered with the International Carbon Registry (ICR) and needs to meet detailed requirements by international principles for climate projects. The register charges fees to project owners for initial registration, for issuing pending carbon units, and again when they are converted to actual carbon units (see Project transaction costs). Each unit has an ID number in the ICR that shows whether it is pending, a valid unit that can be used to offset emissions or has been retired.

The value of certified carbon units can be expected to exceed all costs of preparation, forest establishment, audits, certification, and other fees for carbon sequestration projects in forestry. It

depends on the agreements between the landowners and project financers (if they differ) and how much value falls to each party.

Trade can occur with both pending and actual carbon units, but once they have been used to offset carbon emissions, they are retired and can no longer be used in trade. Registration in the ICR ensures that a unit can only be used once in offsetting emissions in green accounting. The market for carbon units is evolving to encourage investment in successful and responsible climate projects.

Map of project area



Carbon calculator results

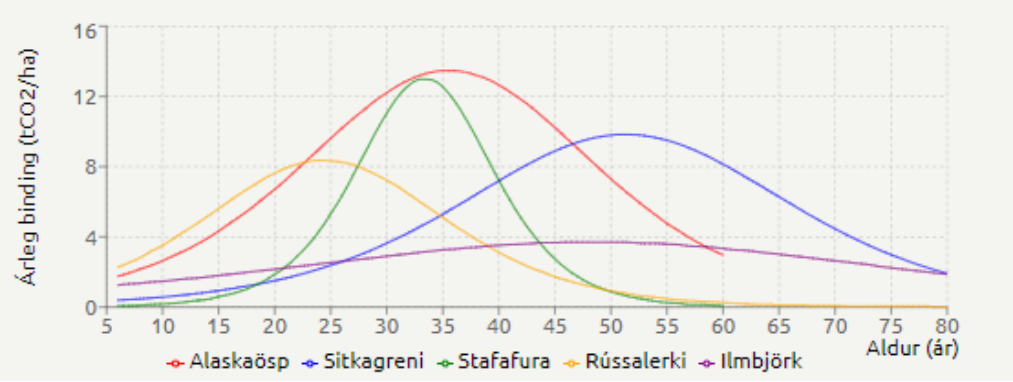
Hnit: 65,1353, -21,721

Hæðarbil: 0-150m

Svæði: Vesturland , Snæfellsnes - Dalir , Laxárdalur

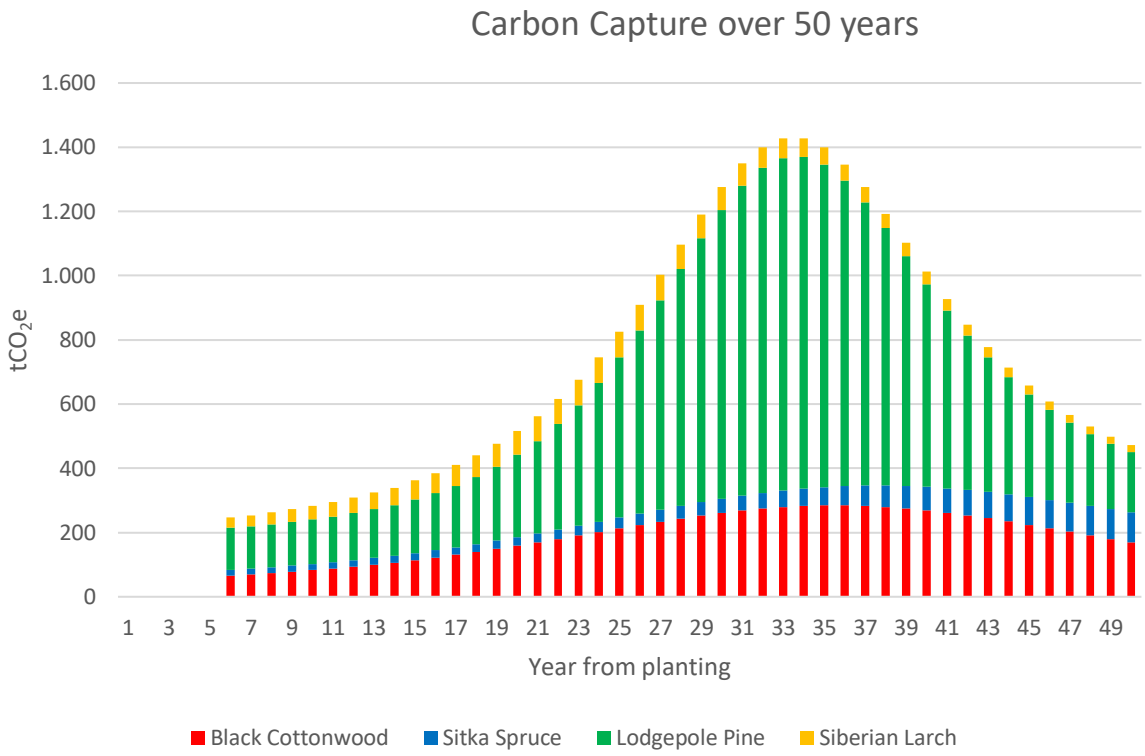
Skógarkolefnisreiknirinn gefur einungis upp væntа kolefnisbindingu nýskógræktar miðað við þá staðsetningu sem valin er að hverju sinni (sjá landshnit í efstu línu hér fyrir ofan). Ef verið er að skoða stór svæði þarf að velja fleiri staðsetningar til að fá nánari upplýsingar um svæðið og fylgjast þá með hvort að breyting verður á vaxtarskilyrðum trjátegunda. T.d. geta skilyrði breyst hratt með aukinni hæð yfir sjó en valið hæðarbil birtist í annarri línu hér fyrir ofan.

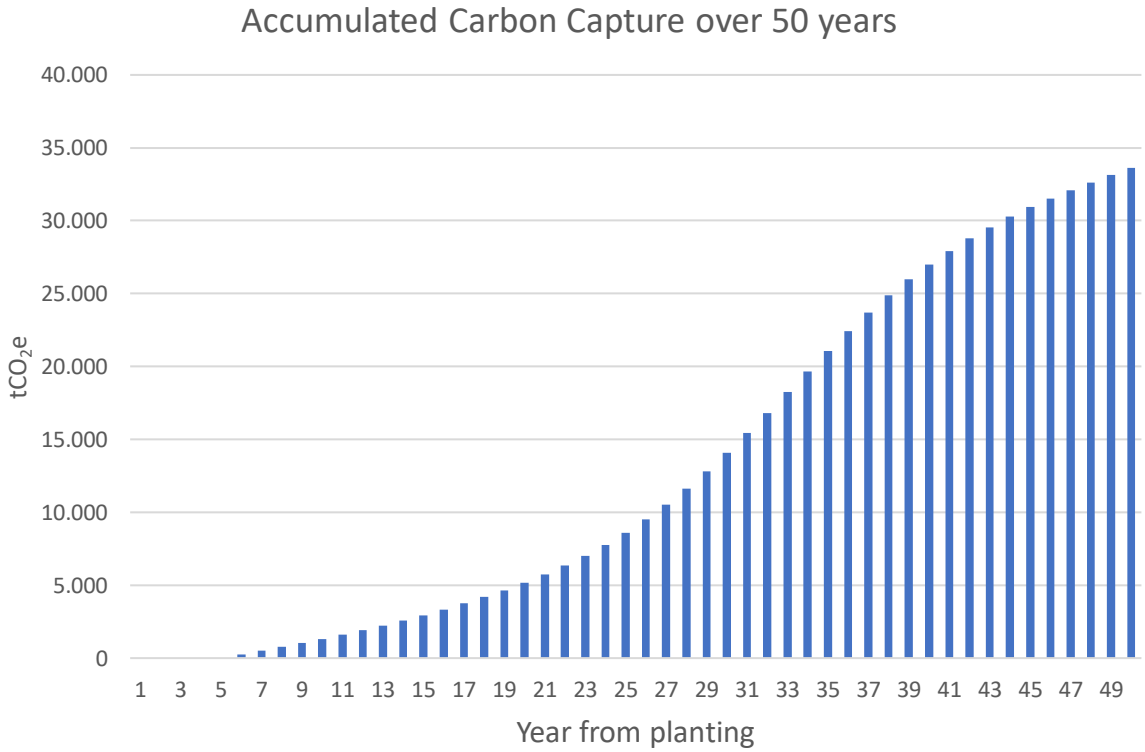
Mælingar og rannsóknir sýna að eftirfarandi trjátegundir eru lífvænlegar og að kolefnisbinding þeirra gæti orðið eftirfarandi.



Við þetta bætist losun eða binding í jarðvegi í mismunandi landi -2,2/1,3/1,9 tonn CO_2 ígildi á hektara og ári og binding í sópi 0,5 tonn CO_2 á hektara og ári. Velja þarf hvort borið er á plönturnar við gróðursetningu og aftur eftir fimm ár. Ef það er gert má búast við að heildarlosun gróðurhúsloftegunda vegna áburðargjafar verði 0,09 tonn CO_2 ígildi á hektara.

This is the yearly estimation of carbon sequestration per hectare (tCO2/ha) over 80 years' time, based on IFS research of this area. Red is Black cottonwood, blue is Sitka spruce, green is Lodgepole pine, yellow is Siberian Larch and violet is Downy birch.


Carbon Capture over 50 years
1.600
1.400
1.200
1.000
800
600
400
200
0
tCO2e
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
Year from planting
Black Cottonwood
Sitka Spruce
Lodgepole Pine
Siberian Larch


Accumulated Carbon Capture over 50 years
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
0
tCO2e
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
Year from planting