

Bluesource

APPLICATION FOR STRIPE 2020 NEGATIVE EMISSIONS PURCHASE

Section 1: Project Info and Core Approach

1. Project name

*Doe Mountain Improved Forest
Management Project*

2. Project description. **Max 10 words**

*This project protects the carbon stock in the
forest.*

3. Please describe your negative emissions solution in detail, making sure to cover the following points:

- Provide a technical explanation of the project, including demonstrations of success so far (preferably including data), and future development plans. Try to be as specific as possible: all relevant site locations (e.g. geographic regions), scale, timeline, etc. Feel free to include figures/diagrams if helpful. Be sure to discuss your key assumptions and constraints.
- If your primary role is to enable other underlying project(s) (e.g. you are a project coordinator or monitoring service), describe both the core underlying technology/approach with project-specific details (site locations, scale, timeline, etc.), and describe the function provided by your company/organization with respect to the underlying technology/approach.
- Please include or link to supplemental data and relevant references.

Max 1,500 words (feel free to include figures)

a) Bluesource has worked with the Doe Mountain Recreation Authority to protect 8,485.58 acres of mixed hardwoods, oak-hickory, cove forest, and oak-pine in northeast Tennessee. It is among the largest contiguously owned forested parcel in the state and local region. Heavy, high-grade logging practices and parcelization threatens much of this region and has for a long time. Few private recreation and wildlife conservation opportunities to this scale remain in the state. Doe Mountain ownership seeks to earn profit through recreation opportunities (primarily ATV and mountain bike trails) and conservation activities (primarily carbon offsets) on the property. Without funding from the carbon project, alternative scenarios include intensive silvicultural practices or parcelization and sale of the forestland to owners for intensive management or development.

The project activity is improved forest management, with Doe Mountain's forest management practices representing a significant improvement in the carbon storage and conservation value than higher return, more aggressive management regimes of industrial private lands in the region, which are characterized by shorter, even-aged rotations. Management decisions of the forest focus on sustainable, natural forest growth and non-commercial maintenance harvests to reduce hazards for recreation users and promote forest health. The project ensures long-term sustainable management of the forests, which could otherwise undergo significant commercial

timber harvesting.

By committing to maintain forest CO2 stocks above the regional baseline level, the project will provide significant climate benefits through carbon sequestration. The aim of this project is also to ensure long-term continuance of all environmental benefits provided by the conservation of this forestland.

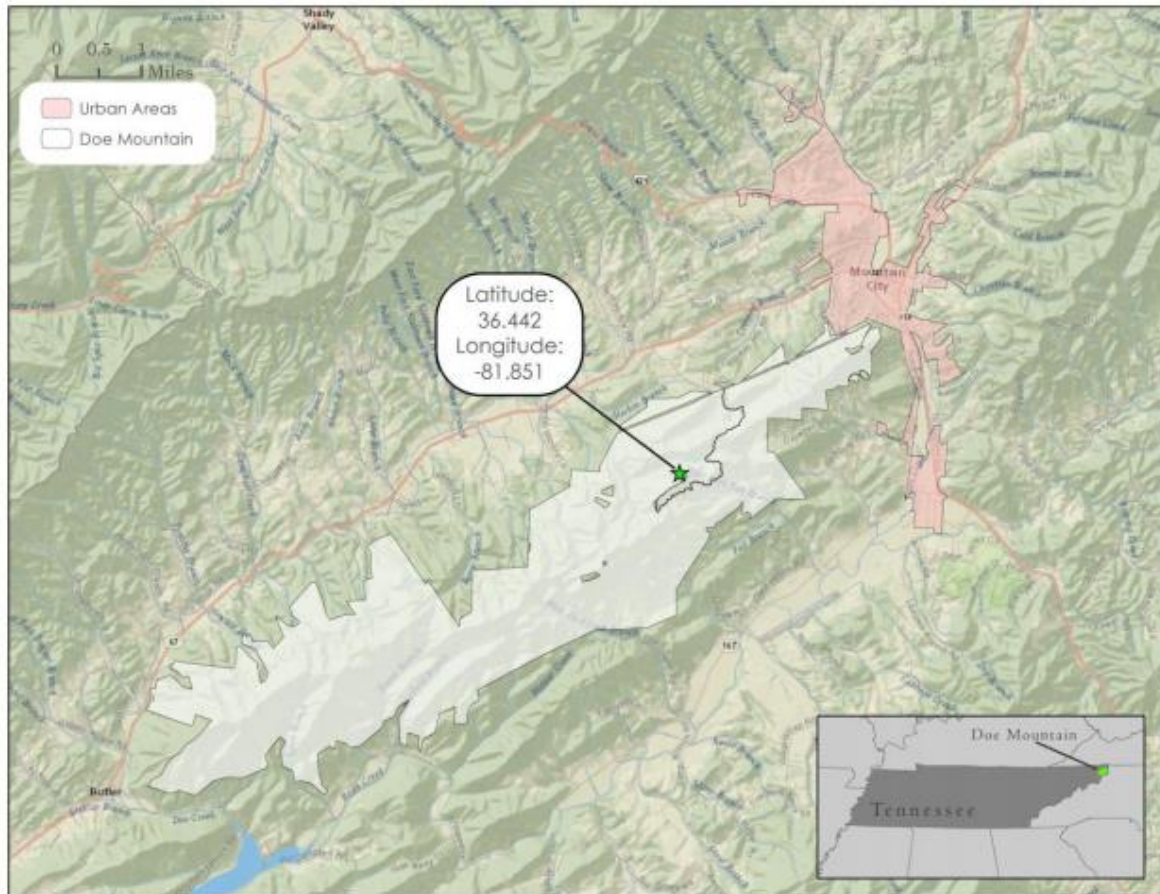
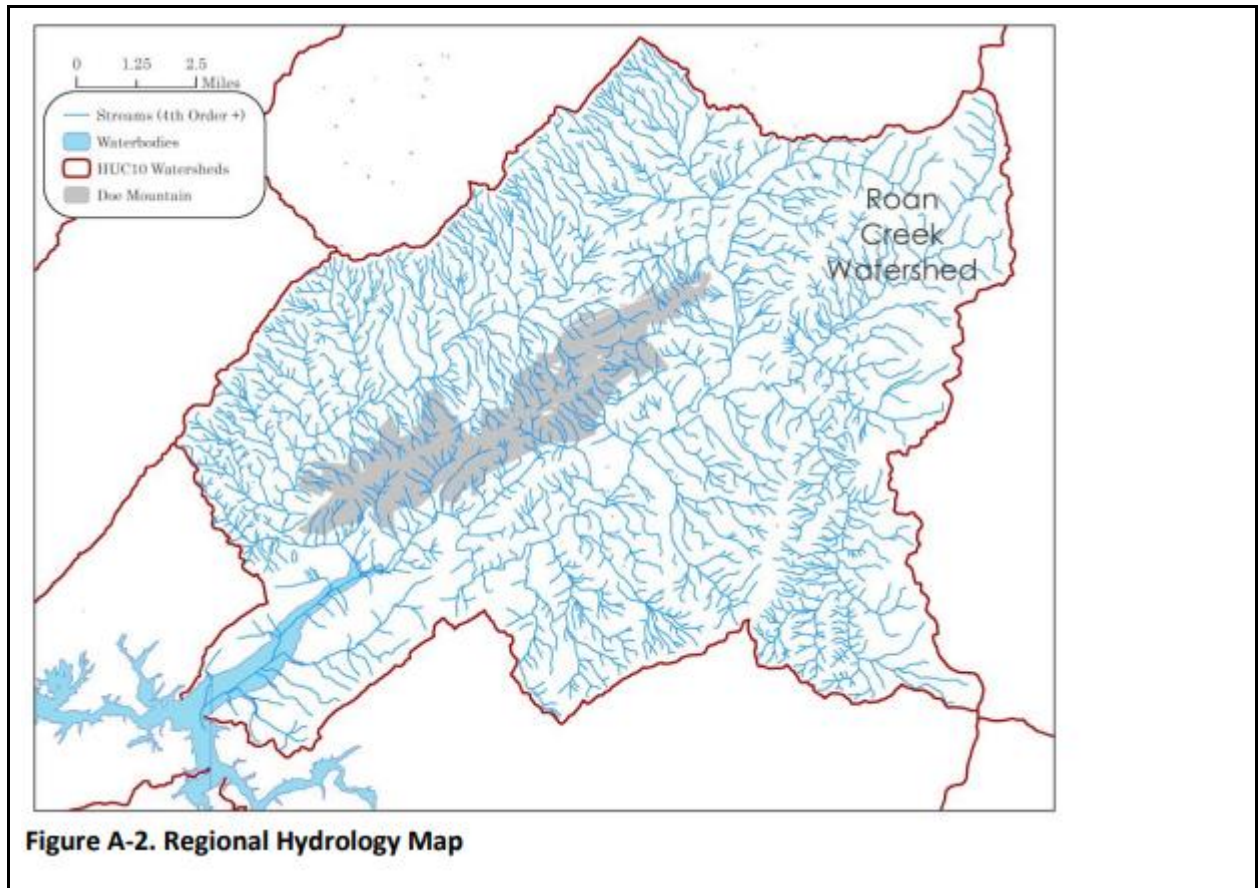


Figure A-1. Vicinity Map with Latitude and Longitude



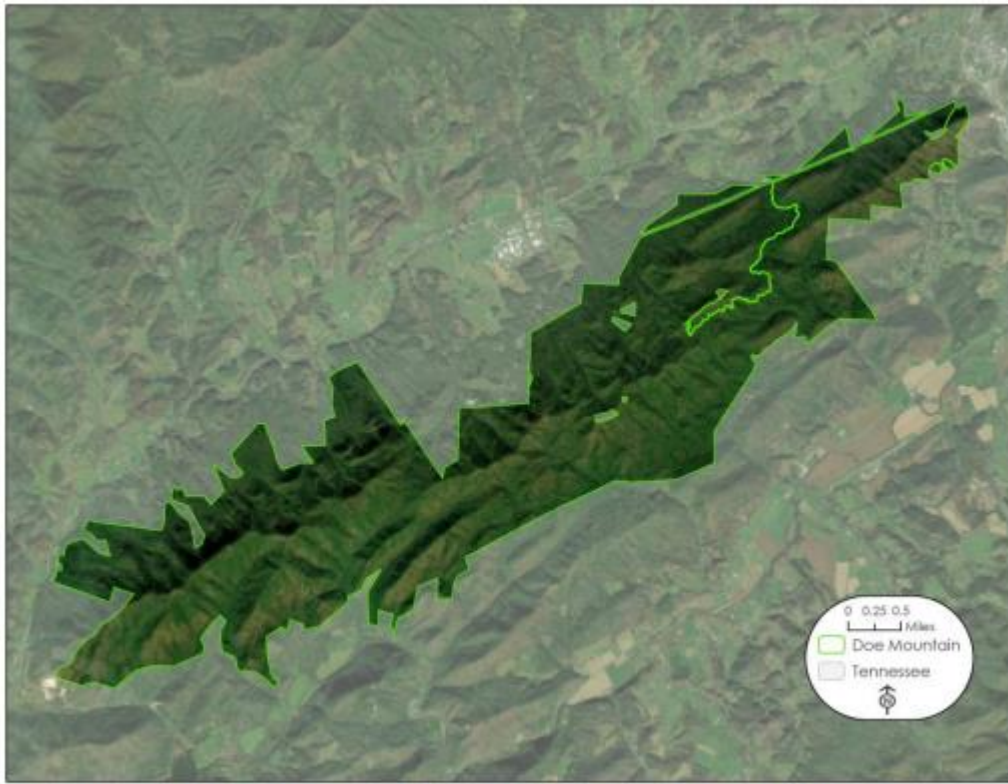


Figure A-3. Canopy Cover Map depicting greater than 10% canopy cover.

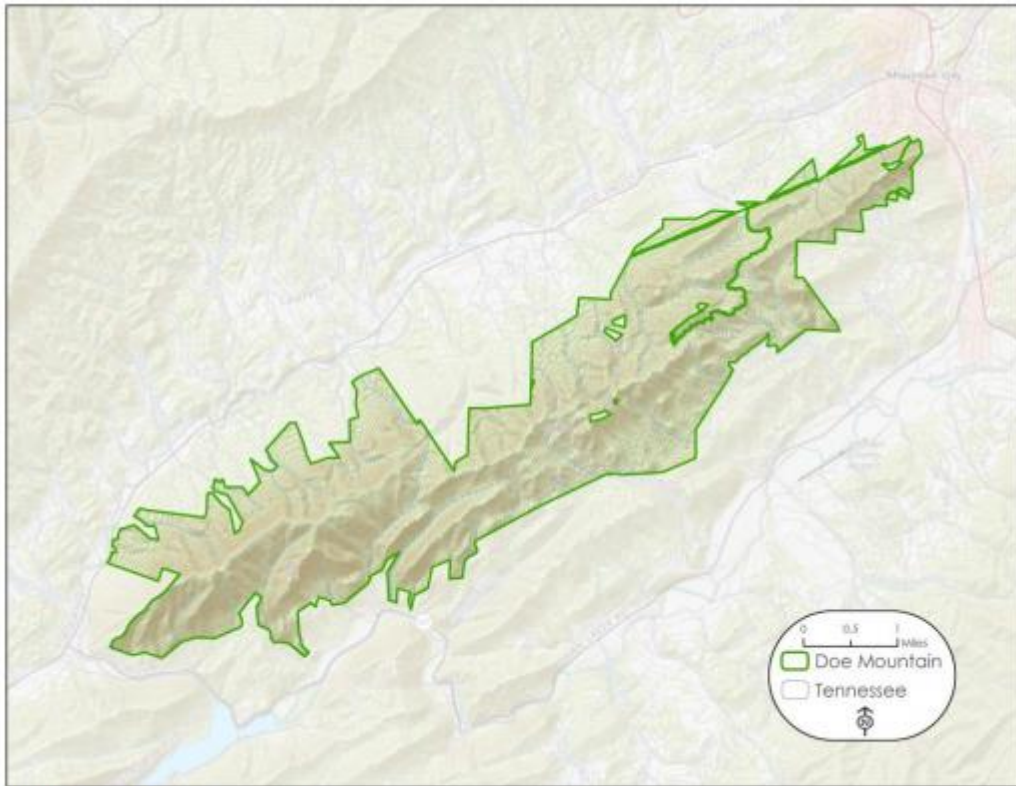


Figure A-4. Topography Map

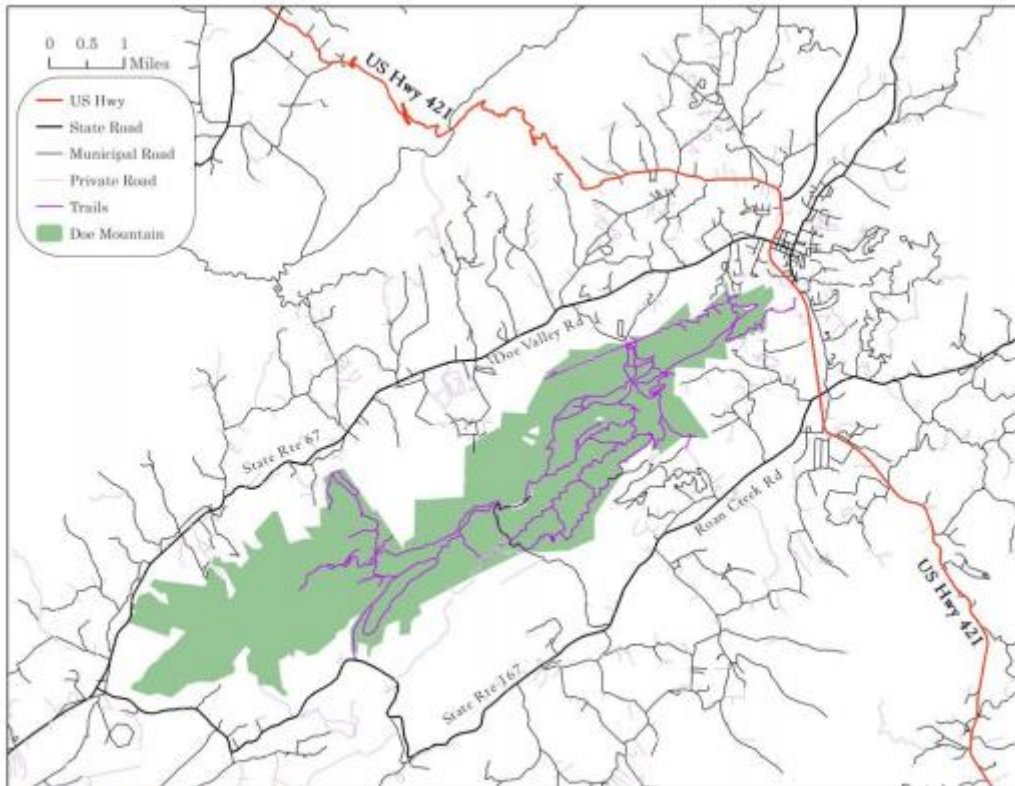


Figure A-5. Roads Map

b) Description of Project Technologies, Products, Services, and Expected Level of Activity: Project activity will be minimal as no commercial harvesting will take place. Managers will seek to maintain conditions of recreational trails for usability and safety. Outreach, education, and interpretation are a part of the Doe Mountain Recreation Authority mission, which are closely tied to the recreation opportunities available to the public.

Project Action: By committing to maintain forest CO₂ stocks above the baseline level, the project will provide significant climate benefits through carbon sequestration. The project action will allow the forest to progress naturally with no commercial harvesting. Bluesource – Doe Mountain Improved Forest Management Project will achieve GHG removals by sequestering more atmospheric CO₂ than a baseline scenario in live aboveground biomass, belowground biomass, dead wood, and soil.

c) You can find additional information on the project [here](#).

Section 2: 2020 Net-Negative Sequestration Volume

See Stripe Purchase Criteria 1: *The project has volume available for purchase in 2020.*

4. Based on the above, please estimate the **total net-negative sequestration volume** of your project (and/or the underlying technology) in 2020, in tons of CO₂. (Note: We're looking for the net negative amount sequestered here, net lifecycle emissions. In Section 3; you'll discuss your lifecycle and why this number is what it is).

Total projected GHG removal is
770,543mtCO₂e.

5. Please estimate how many of those tons are still available for purchase in 2020 (i.e. how many tons not yet committed). This may or may not be the same as the number above.

130,000 metric tons of CO2 reductions

6. (Optional) Provide any other detail or explanation on the above numbers if it'd be helpful. **Max 100 words.**

The total projected GHG removal is 770,543mtCO₂e, but this estimate does not include the risk buffer deduction. With this deduction of 18% or 138,698 mtCO₂e, the total projected removal is 631,845 mtCO₂e over the first crediting period of 20 years (including GHG removal from long-term wood products). The table below describes the expected reductions each year.

Project year	Year	Estimated GHG emissions reductions (tons CO ₂)
0	2017	Start year
1	2018	153,475
2	2019	139,593
3	2020	139,593
4	2021	139,593
5	2022	0
6	2023	7,555
7	2024	14,268
8	2025	14,268
9	2026	14,268
10	2027	14,268
11	2028	15,440
12	2029	15,440
13	2030	15,440
14	2031	15,440
15	2032	15,440
16	2033	11,292
17	2034	11,292
18	2035	11,292
19	2036	11,292
20	2037	11,292

Please note that the bulk of the carbon reductions are quantified in years 1-4 as the carbon stock in the existing forest is credited during that time. In the subsequent years, the forest growth is the only carbon that is credited.

Section 3: Life Cycle Analysis

See Stripe Purchase Criteria 2: The project has a carbon negative complete lifecycle (including energy use, etc).

7. Provide a life cycle analysis of your negative emissions solution demonstrating its carbon negativity, as complete as possible given limited space, and making sure to cover the following points:

- a) Include a flow sheet diagram of direct ingoing and outgoing flows (GHG, energy, materials, etc) that bear on the LCA.
- b) Please be explicit about the boundary conditions of your LCA, and implications of those boundaries on your life cycle. Let us know why the conditions you've set are appropriate to analyze your project.
- c) Make sure to identify assumptions, limitations, constraints, or factors that relate to ingoing and outgoing flows, citing values and sources (for example: land and resource scarcity, limitations on a required chemical, energy requirements). Also identify key sources of uncertainty in determining these values.
- d) If your solution results in non-CO2 GHG emissions, please be sure to separately specify that (e.g. in units of GWP 20 or 100 years, ideally both).
- e) For solutions that rely on modular components (for example: incoming energy flows or outgoing CO2 streams), feel free to cite values associated with those interfaces instead of fully explaining those components. For these values, please identify the upstream and downstream life cycle emissions of the component.
- f) Explain how you would approach a more comprehensive LCA by citing references and underlying data needed for the analysis.

Max 1,000 words (feel free to include figures or link to an external PDF)

The project activities result in very few greenhouse gas emissions, and we do not have a flow sheet diagram to show the ingoing and outgoing flows due to these minimal emissions.

For the first verification and every subsequent five years, verifiers are required to go on onsite to ground truth the data about forest carbon sequestration. During this time, verifiers visit 98 randomly generated plots to calculate the carbon in these plots. They also return to a series of the same plots to measure the growth of particular marked trees over time.

The flights associated with Bluesource and the verifiers, as well as emissions from ground transport or helicopters to reach plot sites, is minimal compared to the carbon sequestered by the project. To estimate these emissions for one verification, they are equal to 5.092 metric tons. (This estimate assumes that two verifiers and two Bluesource employees fly from San Francisco to Atlanta and back and then drive from Atlanta to Northeast Tennessee at the project location in two cars. The flights are responsible for 4.7 metric tons, while the 586 round-trip drive for two vehicles is responsible for .392 metric tons total.)

Since the project lifetime is 40 years, that would necessitate 8 onsite verifications. Therefore, the total project emissions are 40.736 metric tons of CO2e.

Between onsite verifications, desk verifications are conducted where no greenhouse gases, other than those for the normal business operations of an office, are emitted.

8. Based on the above, for your project, what is the ratio of emissions produced as any part of your project life cycle to CO2 removal from the atmosphere? For true negative emissions solutions, we'd expect this ratio to be less than 1.

40.7 mtCO₂/631,845 mtCO₂ (reductions after buffer deduction) = 0.0000644

Section 4: Permanence and Durability

See Stripe Purchase Criteria 3: The project provides durable, long-term storage of carbon.

9. Provide an upper and lower bound on the likely durability / permanence of sequestered carbon provided by your project, in years:

82% likelihood of permanent storage

10. Please provide a justification for your estimates, and describe sources of uncertainty related to: the form of storage, effects of environmental or climatic variability, difficulty in monitoring or quantification, etc. Specifically, discuss the risks to permanence for your project, the estimated severity/frequency of those risks (e.g. 10% of the acres of forest in this forest type are burned by fire over a 100 year period), and the time-horizon of permanence given those risks.

Max 500 words

Bluesource used the American Carbon Registry's Tool for Risk Analysis and Buffer Determination to find that the project-specific risk is 18%. Therefore, credits equal to 18% of the project's issuance are set aside in a buffer pool to cover any unintended reversals that may occur during the project's life.

All Project types must claim a value from risk categories A, B and C. Additional values that must be selected by project type include: Forestry projects claim one value from each:

D Conservation Easement (if applicable)

E Fire

F Disease/pest

G Levee failure/water table changes (required only if forested wetlands comprise more than 60% of project area)

H Other natural disaster risk scores.

1. Management and Governance Risks: All project types must select one value from each risk category that applies:

A Financial	<ul style="list-style-type: none"> • 4% Default Value • 3% US Public and Tribal Lands
B Project Management	<ul style="list-style-type: none"> • 4% Default Value • 3% US Public and Tribal Lands
C Social/Policy	<ul style="list-style-type: none"> • 2% Default Value • 5% if project is located outside of the US • 3% if project is located outside of the US and demonstrates community engagements through ACR-approved mechanism
D Conservation Easement Deduction	<ul style="list-style-type: none"> • -2% Default value • -3% if there is regular onsite monitoring of activities related to carbon-specific conservation activities

2. Natural Disaster Risks: Select one value from each risk category that applies:

E Fire	<ul style="list-style-type: none"> • 8% if project is located in an area where fire greater than 1000 acres has occurred within 30 mile radius of project area in prior 12 months • 4% if project is located in high fire risk region • 2% if project is located in low fire risk region (verifiable evidence must be provided) • 1% for agriculture and grassland projects only
F Diseases and Pests	<ul style="list-style-type: none"> • 8% if epidemic disease or infestation is present within project area, or within 30 mile radius of project area • 4% Default Value
G Levee Failure and Water Table Changes	<ul style="list-style-type: none"> • 2% Default for all wetland projects (and for forest projects where more than 60% of the project area is a forested wetland)
H Other Natural Disaster Events	<ul style="list-style-type: none"> • 2% Default Value for all sequestration projects

Calculated Risk Score Section 1 (A + B + C + D) + Section 2 (E + F + G + H) = Total Risk score %
 Section 1 (4 + 4 + 2 + 0) + Section 2 (2 + 4 + 0 + 2) = 18%

NOTE: E. Project area is in a majority low fire risk region, especially compared to the lower half of the state. According to the Wildfire Hazard Potential (WHP) map provided by the USFS.

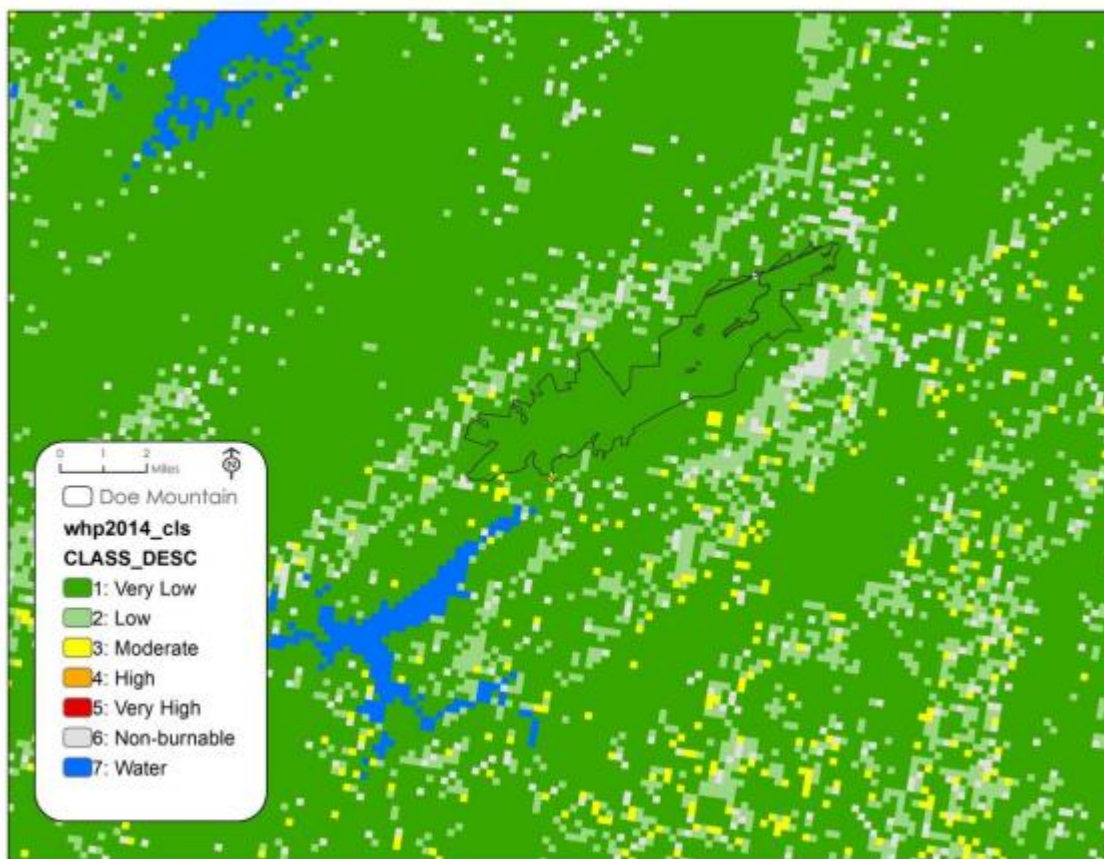


Figure B-1. Bluesource –Doe Mountain IFM Wildfire Hazard Potential Map.

Buffer Pool Contribution (Total Risk score %) * (Total ERTs generated for reporting period) = Buffer pool contribution in ERTs at time of issuance. $18\% * 770,543 = 138,698$ credits of buffer pool contribution (rounded up)

Section 5: Verification and Accounting

See Stripe Purchase Criteria 4: *The project uses scientifically rigorous and transparent methods to verify that they're storing the carbon that they claim, over the period of time they claim to.*

11. Provide detailed plans for how you will measure, report, and verify the negative emissions you are offering. Describe key sources of uncertainty associated with your monitoring, and how you plan to overcome them.

Max 500 words

For measurement of the negative emissions, Bluesource followed the ACR Improved Forest Management protocol, which involves quantification of carbon stocks on the property by tree species and age. As required by the ACR protocol, we used our inventory measurements to estimate CO₂e stocks in three pools: 1) aboveground live biomass, 2) belowground live biomass, and 3) aboveground standing dead biomass. The ACR conservatively omits belowground dead biomass and dead biomass lying on the forest floor. We estimated aboveground live and dead biomass using the species-specific allometric equations of Jenkins et al. (2003). The details of the quantification procedures can be found in the GHG Plan [here](#).

For the monitoring of the carbon stock in the forest, a detailed monitoring plan is put in place. Please see the GHG plan [here](#) for the monitoring parameters.

For the initial validation of the carbon and continual verification of the plots, a representative sample of 98 fixed radius permanent inventory plots were established across the project area. The plot network provided enough data to keep total project uncertainty below 10% of the net anthropogenic greenhouse gas removals by sinks across the project, thereby avoiding any uncertainty deductions in the quantification process. All permanent plots will be re-inventoried at least twice over the following decade to calibrate forest growth models and improve carbon sequestration projections.

The heavily monumented and well-maintained plot design gives forest managers the opportunity to consistently track the growth and development of specific trees over an extended timeline and allows for improved ease of plot location during field work and site verifications. All plots will be re-measured in a manner consistent with the Inventory Methodology, provided separately for verification. 3 In addition to the full inventory update of the entire property that will be conducted on all plots every 5 years, inventories of select portions of the Project Area will be updated periodically in response to natural disturbance or significant forest management activities. Following natural disturbance events, affected project stands will be assessed for damage. If damage is significant, the affected areas will be re-inventoried and project scenario models will be adjusted to reflect onsite carbon stocks.

12. Explain your precise claim to ownership of the negative emissions that you are offering. In particular, explain your ownership claim: 1) in cases in which your solution indirectly enables the direct negative emissions technology and 2) when, based on the LCA above, your solution relies on an additional upstream or downstream activity before resulting in negative emissions. Please address the notion of “double counting” if applicable to your project, and how you’ll prevent it.

Max 200 words

1) For this project, the ownership of the emission reduction claims are solidified by proof of title of the land. The forest owner’s clear title to the land ensures that no other entity can claim the emission reductions. Forestlands included in the project are owned directly by the project proponent, Doe Mountain Recreation Authority, which holds full legal titles and thus have long term control of the land. The title to the land are reviewed by the verifier before credits are issued. The contractual agreement between Bluesource and the forest owner determines how proceeds of the credits created are split.

2) There can be no double counting of emissions from this project because all offsets created through the American Carbon Registry are issued on a public registry where each offset can only be retired on behalf of one entity that is specified in the public registry.

Section 6: Potential Risks

This section aims to capture Stripe Purchase Criteria 5: The project is globally responsible, considering possible risks and negative externalities.

13. Describe any risks or externalities, any uncertainties associated with them, and how you plan to mitigate them. Consider economic externalities, regulatory constraints, environmental risk, social and political risk. For example: does your project rely on a banned or regulated chemical/process/product? What’s the social attitude towards your project in the region(s) it’s deployed, and what’s the risk of negative public opinion or regulatory reaction?

Max 300 words

There is little economic or societal risk associated with this project since the project is supported by the community as it provides an economic engine for residents who own horseback riding and mountain biking businesses built around the recreation on the site.

Without the carbon revenues, these businesses would be in danger of closing as the site has faced significant economic pressure to log to face budget shortfalls. The carbon revenue now allows the project to operate and employ an Executive Director to manage the land without the need to log.

The project has procedures that have been put in place to ensure its permanence. Each year, the Project Proponent shall submit a signed attestation that:

- Confirms the continuance of project activities;
- Confirms that ownership remains clear and uncontested;
- Discloses any negative environmental or community impacts or claims of negative environmental and community impacts, and documents plans to mitigate any reported negative environmental or community impacts; and
- Addresses any significant change in external conditions that would affect the quality or environmental integrity of the project.

Section 7: Potential to Scale

This section aims to capture Stripe Purchase Criteria 6: The project has the potential to scale to high net-negative volume and low cost (subject to the other criteria).

14. Help us understand how the cost and net-negative volume of your solution will change over time. Note that we aren't looking for perfect estimates. Instead, we're trying to understand what the long-term potential is and what the general cost curve to get there looks like. (Note: by "cost" here we mean the amount Stripe or any other customer would pay for your solution):

	Today	In ~5 years	In ~20 years
Est. Cost per net-negative ton (in \$)	\$8.00 (This price assumes a purchase of 100,000 credits or more.)	~\$10.00-\$15.00	~\$20.00-\$50.00
Est. Net-negative volume (in tons of CO2)	~130,000	~426,334	~469,138 (The bulk of the carbon stock in the forest is credited in years 1-4.)

15. What are the drivers of cost? Which aspects of your costs could come down over the next 5 years, and by how much? Do you think your eventual scale potential is limited by cost or by volume? Why? Refer to any relevant constraints from question #7, like land or materials scarcity, and specify the boundary conditions for which you consider those constraints.

Max 300 words

Our current cost of these offsets is somewhat dependent on the timber revenues that the landowner could earn for the property since this is the alternate possible use of the land. Timber revenues are much more valuable than the carbon revenues, which makes this project financially additional; however, the landowner does need to realize

Our costs are expected to go up as the need for carbon offsets increases and the value of them also increases over time. Also, many of the voluntary offsets will be eligible for use under future regulatory schemes like the International Civil Aviation's CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) market

and the Paris Agreement's Article 6 and in more demand in for California's Environmental Quality Act for land developers who must compensate for the emissions of their developments.

There are also limited plots for suitable forestry projects, and this scarcity in the market may drive prices up.

Section 8: Only for projects with significant land usage

See Stripe's Purchase Criteria 2: *The project has a net cooling effect on the climate (e.g. carbon negative complete life cycle, albedo impact, etc.)* **This section is only for projects with significant land usage requirements: Forest, Soil, and BECCS/Biochar/Biomass sequestration projects.**

16. Location: Please provide baseline information about the geographic location(s) of your project; and link shapefile(s) of project area(s).

Max 100 words

The project is located in Johnson County, 1203 Harbin Hill Rd, Mountain City, TN 37683.

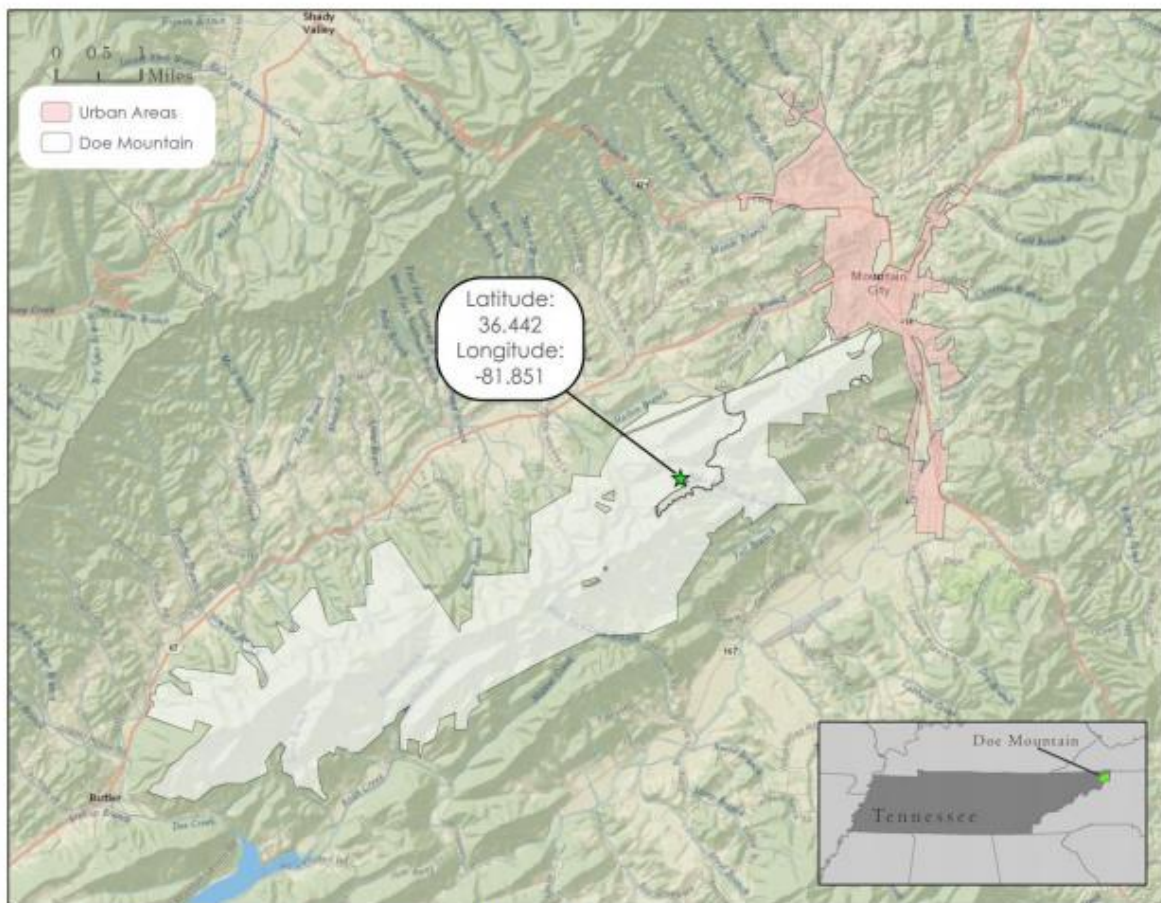
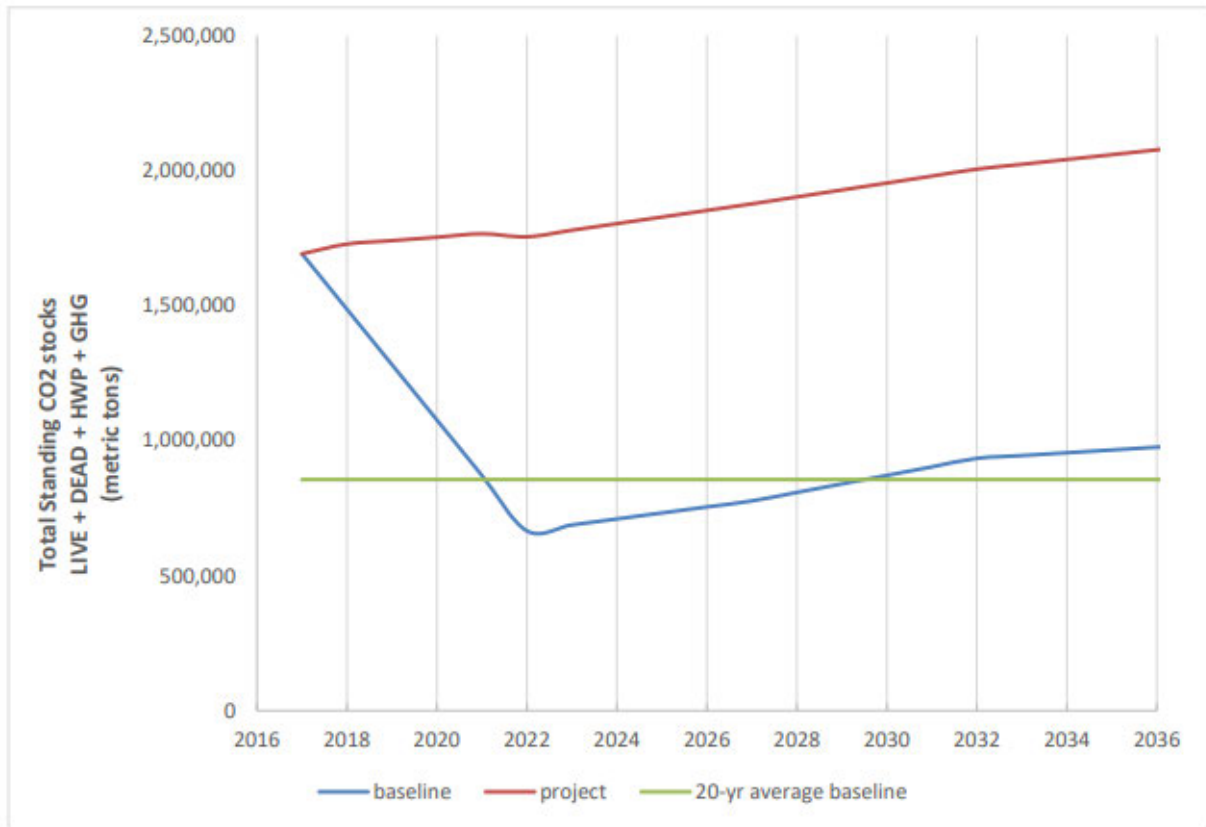


Figure A-1. Vicinity Map with Latitude and Longitude

The figure below shows how the carbon offsets are quantified as the delta between the baseline and project scenario.

Figure E1.a Total standing (Live + Dead) CO₂e under baseline and project scenarios.



17. Land ownership: Please describe the current (and historical as relevant) land ownership and management for the area(s) provided in (16). If your project is not the landowner, describe your relationship to the landowner.

Max 150 words

The history of the entire property is not well documented as ownership has changed hands throughout years of active forest management. The last large-scale commercial timber harvest on Doe Mountain began in the late 1960s and ended in 1972. There have been no commercial timber harvests on the property since then. During that large-scale operation, most of the mountain was logged except for the steepest and rockiest areas.

Doe Mountain Recreation Authority controls the timber rights on the forestland and can legally harvest. Doe Mountain is a State of Tennessee funded entity governed by a Board of Directors, the Doe Mountain Recreation Authority. According to a DMRA Tennessee General Assembly Report⁴, "The Authority was created by the Tennessee State Legislature to protect and conserve the natural resources of Doe Mountain, a 8,600 acres tract of mountain land located in Johnson County, Tennessee through planning, promoting, financing, constructing, managing, and developing multi-use recreational opportunities for public participation and enjoyment that will create jobs and facilitate economic development." The Board of DMRA holds monthly board meetings that are open to the public where stakeholders including landowners, business owners, locals, and more can observe the on-goings of DMRA.

18. Land use: For forest projects, please provide details on forest composition as well as forest age and basal crop area/density. For soil projects, please provide details on land use and crop type (if agricultural), soil organic carbon baselines, and regenerative methodology. For BECCS, biochar, or wooden building materials projects, please provide details on biomass crop type and methodology as applicable.

Max 500 words

Forest types throughout the property include mixed hardwoods, oak-hickory, cove forest, and oak-pine. Predominant tree species include chestnut oak, red maple, scarlet oak, sourwood, eastern white pine, yellow poplar, sweet birch, northern red oak, blackgum, pitch pine, black oak, white oak, hickory, magnolia, and eastern hemlock. Wildlife present on site include deer, black bear, turkeys, and many mountain bird and mammal species. Wildlife on site benefit from contiguous, undisturbed forest that hosts several different forested types throughout. Mature forests with hollow or dead trees provide roosting and denning sites. The hard mast (nut) crops from oak and hickory species are a valuable food source for deer, bear, turkeys, and squirrels. Soft mast, such as fruit and berries from cherry, serviceberry, dogwood, black gum, sassafras, muscadine grape, poison ivy and Virginia creeper, are eaten by a wide variety of songbirds and animals.

An inventory of the specific trees in the 98 plots sampled can be found in the GHG Plan [here](#).

19. Net effect on climate: Please discuss the non-CO2 impacts of your project that may not be covered in your LCA, such as your impact on albedo.

Max 150 words

Managing the forest for carbon, rather than timber, allow for significant co-benefits such as watershed protection, wildlife habitat, and recreation. Also, the local economy benefits from the fact that the people can have thriving horseback riding and mountain biking businesses centered around this recreation area.

With regards to other non-CO2 impacts on climate, the area is in a geography that does not receive much snow. In boreal forests at latitudes far from the equator, [some studies](#) have shown that forest cover can sometimes absorb more of the sun's energy than a non-forested landscape that in the winter is white and has a high albedo. This project, however, is located in Tennessee where the ground is typically not covered in snow in the winter. Therefore, there is no chance that the trees absorb more of the sun's energy and lead to heating of the earth in the winter.

Section 9: Other

20. What one thing would allow you to supercharge your project's progress? This could be anything (offtakes/guaranteed annual demand, policy, press, etc.).

Max 100 words

Convincing landowners to rely on carbon revenue from voluntary markets, with prices that fluctuate, is difficult since the landowner must trap up his/her ability to develop or log the land for 40-100 years in the future. Therefore, a price on carbon that is significant (and has price collars to ensure that markets do not bottom out) through a national cap-and-trade program would help sway landowners and allow for more negative emission projects and the protection of more forests.

21. (Optional) Is there anything else we should know about your project?

Max 500 words

This project is a unique one in that it exists on state land. Eventually, we will need to move towards carbon markets that operate at the national scale and allow for projects on federal land. Since both state and federal land can be logged, grazed, and mined, it is essential that we allow this land to participate in carbon markets to protect the

carbon stock. At this point, federal land is not allowed for these types of projects, and logistical and policy barriers prevent much state land from participating. This project paves the way for more state land to host carbon negative projects and creates a model for the federal government to follow.

Section 10: Submission details

*This section **will not** be made public.*

22. Please insert below the name and title of the person submitting this application on behalf of your company (or, if you are submitting this application on your own behalf, your own details). By submitting this application, you confirm that you have read and accept the Project Overview ([available HERE](#)), as well as the further conditions set out below. As a reminder, all submitted applications will be made public upon Stripe's announcement. *Once you've read and completed this section, submit your application by March 20th by clicking the blue "Share" button in the upper right, and share the document with **nets-review-2020@stripe.com**.*

Name of company or person submitting this application

Name and title of person submitting this application (may be same as above)

Date on which application is submitted

We intend to make the selection process as informal as possible. However, we do expect that (a) the content of your application is, to the best of your knowledge, complete and correct; (b) you do not include any content in your application that breaches any third party's rights, or discloses any third party's confidential information; (c) you understand that we will publicly publish your application, in full, at the conclusion of the selection process. You also understand that Stripe is not obliged to explain how it decided to fund the projects that are ultimately funded, and - although extremely unlikely - it is possible that Stripe may decide to not proceed, or only partially proceed, with the negative emissions purchase project. Finally, if you are selected as a recipient for funding, Stripe will not be under any obligation to provide you with funding until such time as you and Stripe sign a formal written agreement containing the funding commitment.