GEOSPATIAL ANALYSIS OF BECCS DEPLOYMENT POTENTIAL IN THE U.S.

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Negative emissions from bioenergy with carbon capture and storage (BECCS) has been identified as a potentially important carbon mitigation technology. To date, much of the technical work and discussion on BECCS have focused on land use change and bioenergy potential, while the CCS components – including capacity, injectivity, and location of potential storage sites – have been overlooked. A geospatial analysis of biomass production and storage sites in the U.S. is conducted to discuss BECCS deployment in the U.S. across a range of biomass production scenarios.

U.S. Department of Energy provides national annual biomass production data from 2015 to 2040. Extrapolating the production trends across different yield scenarios to 2100 shows average annual CO_2 production from agricultural residue and energy crop of 720-1,220 Mt CO_2 yr^{-1} and cumulative production of 27-47 Gt CO_2. Considering that the estimated storage capacity in the U.S. is ~3,000 Gt CO_2, absolute storage capacity is not likely to be a constraint on BECCS. However, collocation of high-density biomass (>25 MW per 100×100 km^2) and high injection rate storage sites (>5 Mt CO_2 yr^{-1}) in 2040 yields biomass CO_2 injection potential of 140-360 Mt CO_2 yr^{-1}. This represents 9-39% of the total biomass feedstock in the U.S. To achieve a biomass CO_2 injection potential greater than 360 Mt CO_2 yr^{-1}, transportation networks of either biomass or CO_2 will be needed. The geospatial analysis conducted in this study highlights the importance of previously overlooked CCS components in global BECCS assessments and provides a framework for future studies.

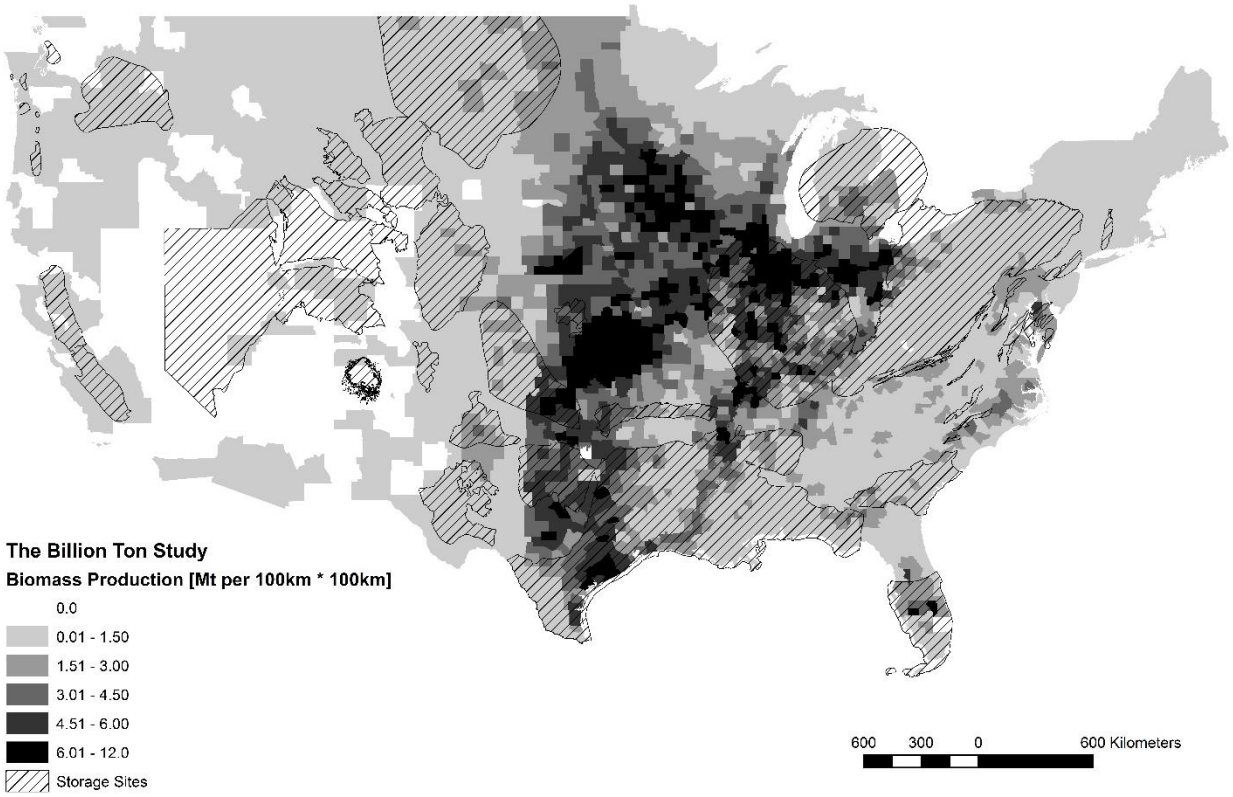

Figure 1 – Map of U.S. biomass production data and overlaying prospective storage sites.*
**Year 2040; 4% annual yield increase scenario*

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