



2025 United States Biochar Market Report

Benchmarking production, revenue, and growth in an expanding industry

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Letter from the American Biochar Institute

Why This Report Matters

The biochar industry in the United States continues to expand rapidly, driven by growing participation from biochar producers, equipment manufacturers, carbon market stakeholders, end-users, product developers, consultants, and service providers. At the same time, interest in the sector has increased substantially among investors, policymakers, researchers, feedstock suppliers, and other organizations seeking scalable solutions for carbon removal, biomass utilization, and climate-smart economic development.

The 2025 United States Biochar Market Report was developed to provide data-driven insights that support continued growth and informed decision-making across the industry. Most importantly, this report establishes national benchmarks for U.S. biochar production, revenue, market trends, and industry composition, creating a baseline for tracking the growth and evolution of the sector over time.

In addition to industry-wide metrics, the report presents detailed analyses across stakeholder groups, including biochar producers, equipment manufacturers, carbon market participants, distributors, agricultural users, consultants, and other industry participants.

About This Report

The 2025 United States Biochar Market Report, developed by the American Biochar Institute (ABI), was completed in fall 2025 as a follow-up to the 2023 Global Biochar Market Report. While the earlier report provided a global perspective on the biochar sector, this report represents the first effort focused specifically on benchmarking the United States biochar industry. As a result, data presented in this report are not directly comparable to the findings from the 2023 global survey which allocated data by continent.

The report is organized into several sections, beginning with an overview of industry composition, geographic distribution, production growth, and economic trends. Additional sections explore market development, carbon finance, production technologies, feedstocks, stakeholder group perspectives, and emerging end-use applications.

Together, these data provide insight into the opportunities, challenges, and emerging trends shaping the future of the U.S. biochar industry.

Highlights

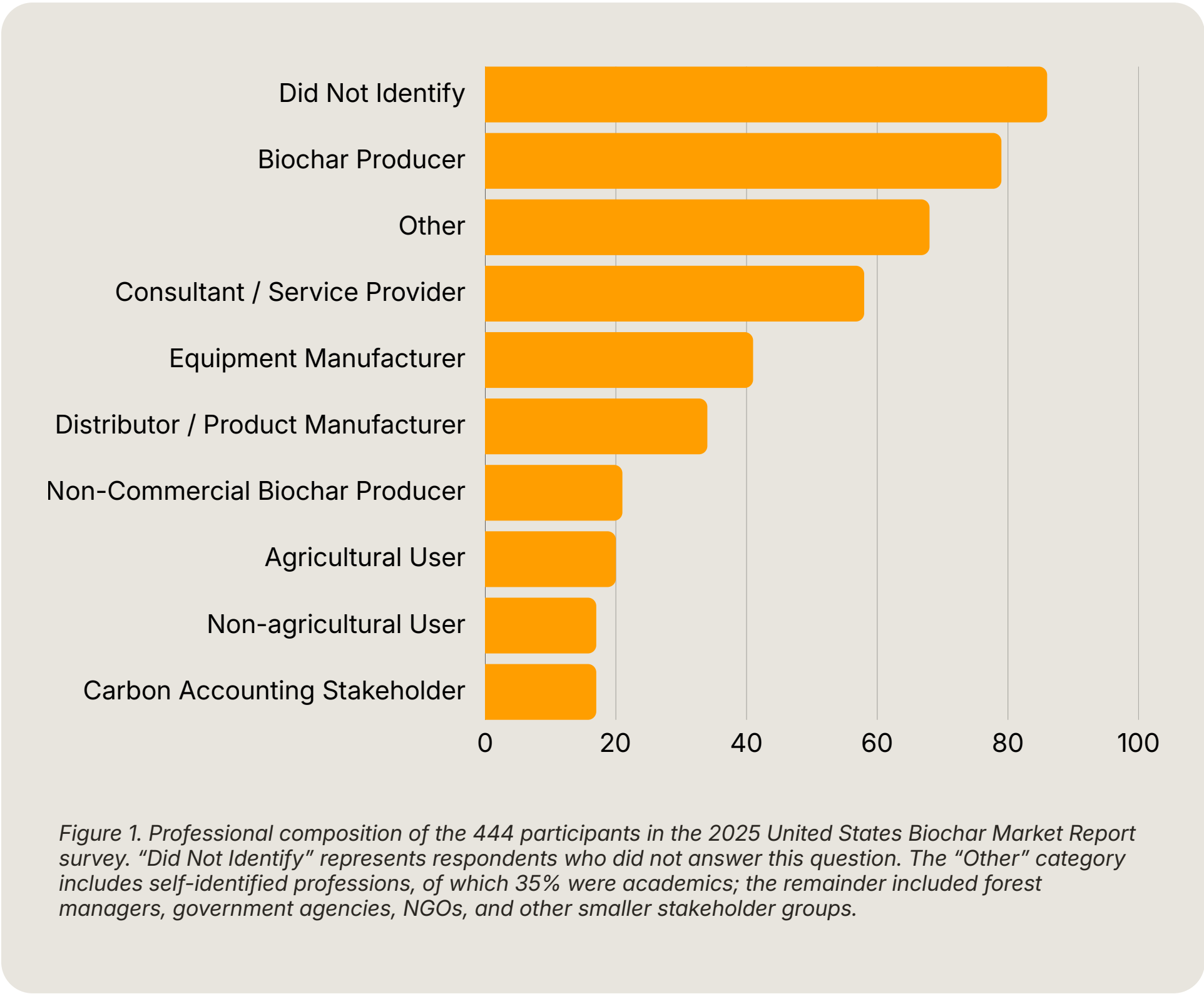
This report highlights the following six key findings in the United States.

1. **Estimated U.S. biochar production grew at a 32% CAGR**, increasing from 86,893 metric tonnes in 2023 to 151,329 metric tonnes in 2025, with producers projecting production could exceed 819,000 metric tonnes annually by 2027.
2. **The estimated economic value of the U.S. biochar industry grew even more rapidly**, increasing at a 71% CAGR from \$53.6 million in 2023 to approximately \$157 million in 2025, driven by rapid commercialization and capacity expansion.
3. **Carbon finance is becoming a major revenue source for many producers**, highlighting the growing importance and maturation of biochar carbon removal (BCR) markets in the United States.
4. **Agricultural uses remain the largest market for biochar**, while water filtration, environmental remediation, carbon sequestration, and industrial applications continue to emerge as important growth sectors.
5. **Woody biomass remains the dominant feedstock source for U.S. biochar production**, with stationary continuous auger and rotary kiln systems representing the leading production technologies.
6. **Respondents identified** market development, standards and specifications, education, and demonstration projects as **the highest priorities for accelerating industry growth and adoption**.

Commonly Used Acronyms in the Report

- BCR** - biochar carbon removal
- CAGR** - compound annual growth rate
- CDR** - carbon dioxide removal
- IBI** - International Biochar Initiative
- MRV** - measurement, reporting and verification
- mt** - metric tonnes
- ABI** - American Biochar Institute

Industry Composition



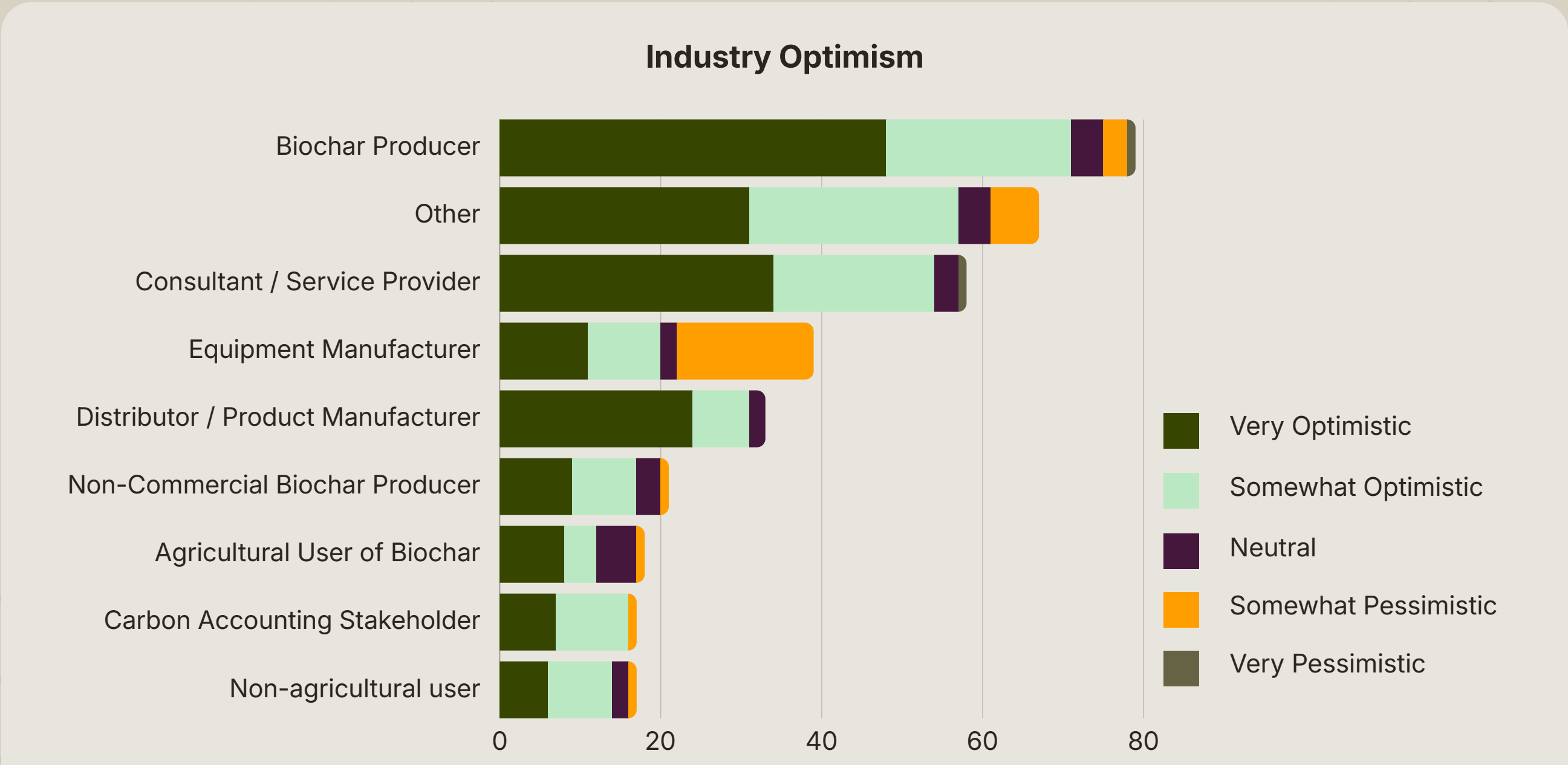
The 2025 United States Biochar Market Survey captured responses from 444 participants representing a broad cross-section of the domestic biochar industry.

Respondents categories included biochar producers, consultants, equipment manufacturers, distributors and value-added product manufacturers, agricultural users, carbon market stakeholders, and non-commercial practitioners, demonstrating the increasingly diverse industrial ecosystem in the United States.

Biochar producers represented the largest stakeholder group in the survey, reflecting the rapid expansion of commercial production capacity and growing industry participation nationwide. Strong participation from consultants, equipment manufacturers, and distributors also highlights the continued maturation of supporting infrastructure and service sectors required to scale the industry.

Industry Optimism by Stakeholder Group

The majority of survey participants across nearly all stakeholder categories reported being either “Very Optimistic” or “Somewhat Optimistic” about the future of the biochar industry, reflecting strong confidence in continued market growth and industry development.



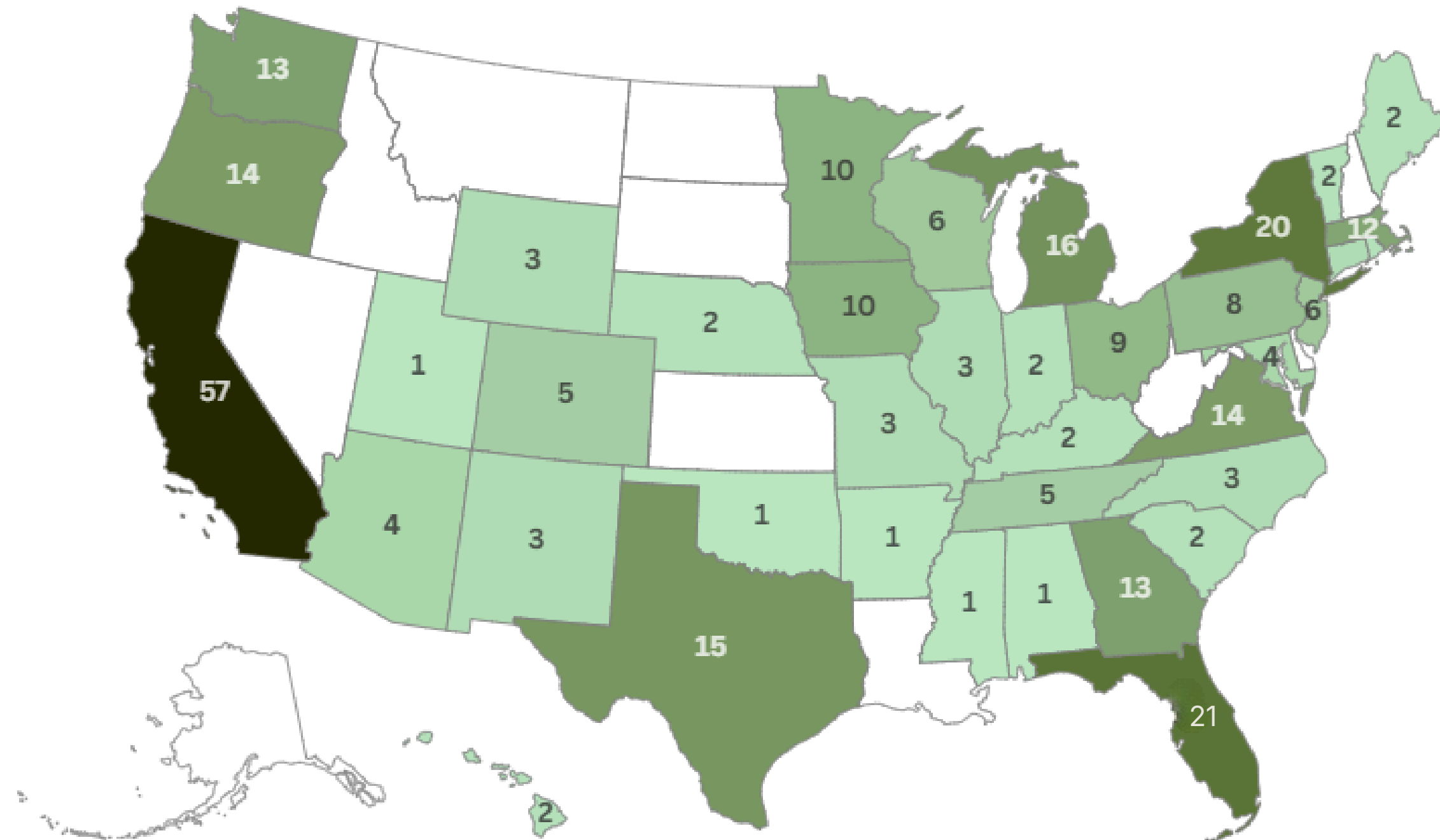
Among respondent categories, equipment manufacturers indicated the lowest optimism, spread across optimism levels.

This may reflect ongoing uncertainty related to slow capital investment cycles, project financing, and technology deployment timelines. It could also reflect a more nuanced view from a professional class close to the ground on developing and vetting complex business models associated with biochar companies.

Figure 2. Biochar industry optimism broken out by participant category.

States Represented

Of the 444 respondents to the 2025 United States Biochar Market Survey, 303 identified their location by state, representing participation from 41 states across the country.



California recorded the highest level of participation, while strong engagement was also observed across the West Coast, Southeast, Northeast, and Midwest regions. Relatively fewer respondents completed the survey in the Great Plains and Intermountain West.

The geographic diversity of respondents reflects the wide range of feedstocks, production systems, and market drivers shaping the U.S. biochar industry.

Figure 3. Biochar survey engagement by state.

Biochar Industry Growth

U.S. Biochar Production

Estimated U.S. biochar production increased from 86,893 metric tonnes in 2023 to 151,329 metric tonnes in 2025, representing significant near-term industry growth.

Survey respondents also projected production could exceed 819,000 metric tonnes annually by 2027, reflecting substantial planned capacity expansion. Though such rapid growth is unlikely, these strong forward-looking data suggest continued industry growth and strong optimism.

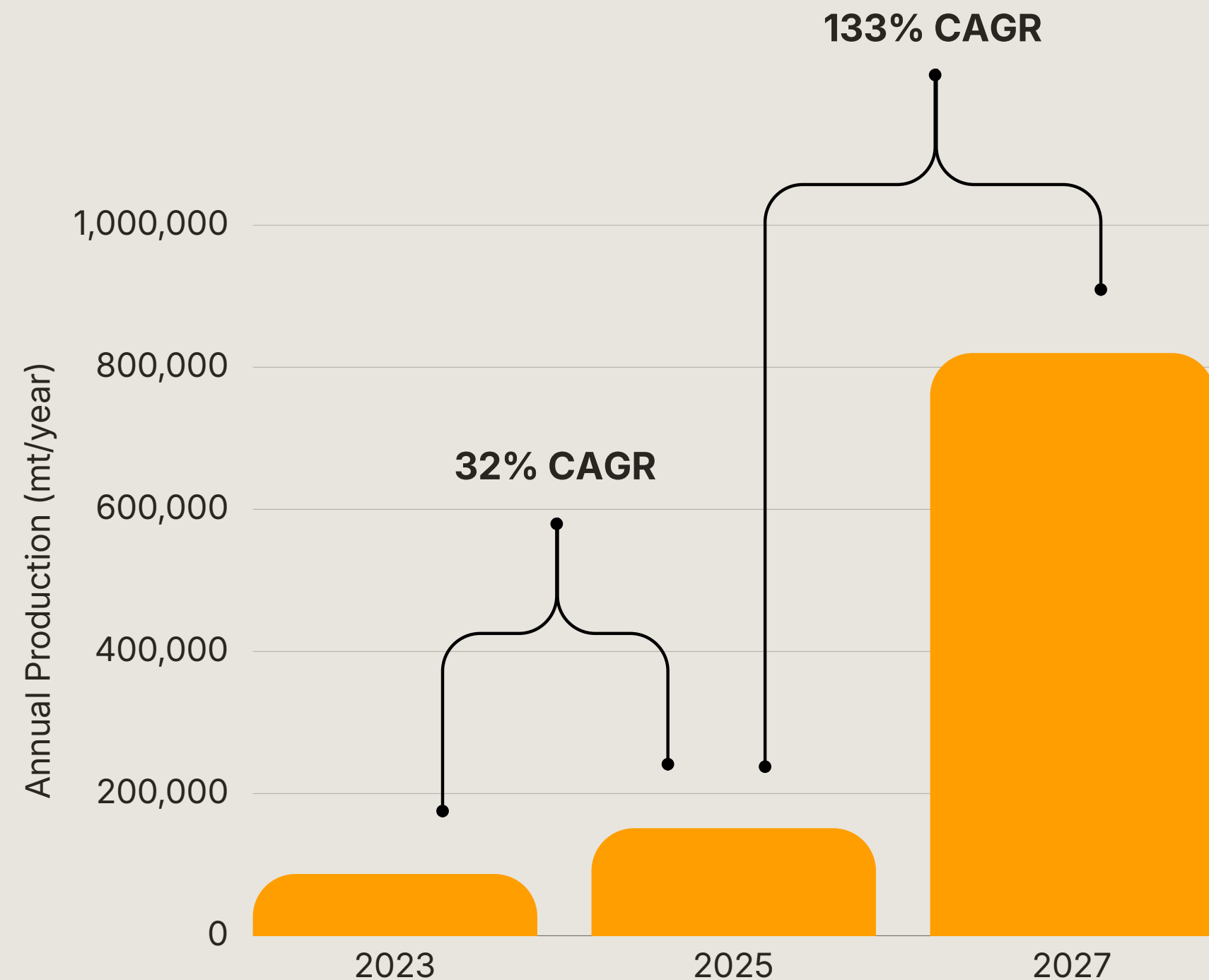


Figure 4. Estimated U.S. biochar production in metric tonnes (mt) by year based on values reported by Biochar Producer category respondents. 2023 production data was collected from survey respondents in 2025.

Biochar Industry Growth

U.S. Biochar Industry Total Economic Value

The estimated economic value of the U.S. biochar industry grew from \$53.6 million in 2023 to approximately \$157 million in 2025, with projected growth reaching more than \$440 million by 2027.

This rapid expansion reflects strong growth across biochar production, equipment manufacturing, consulting, and distribution activities, with the industry registering an estimated 71% CAGR between 2023 and 2025. Projections for future growth are equally robust, though planned output for 2027 may be overly optimistic.

Among categories, equipment manufacturers reported the greatest total revenue in 2025, reflecting an industry in a phase of rapid growth.

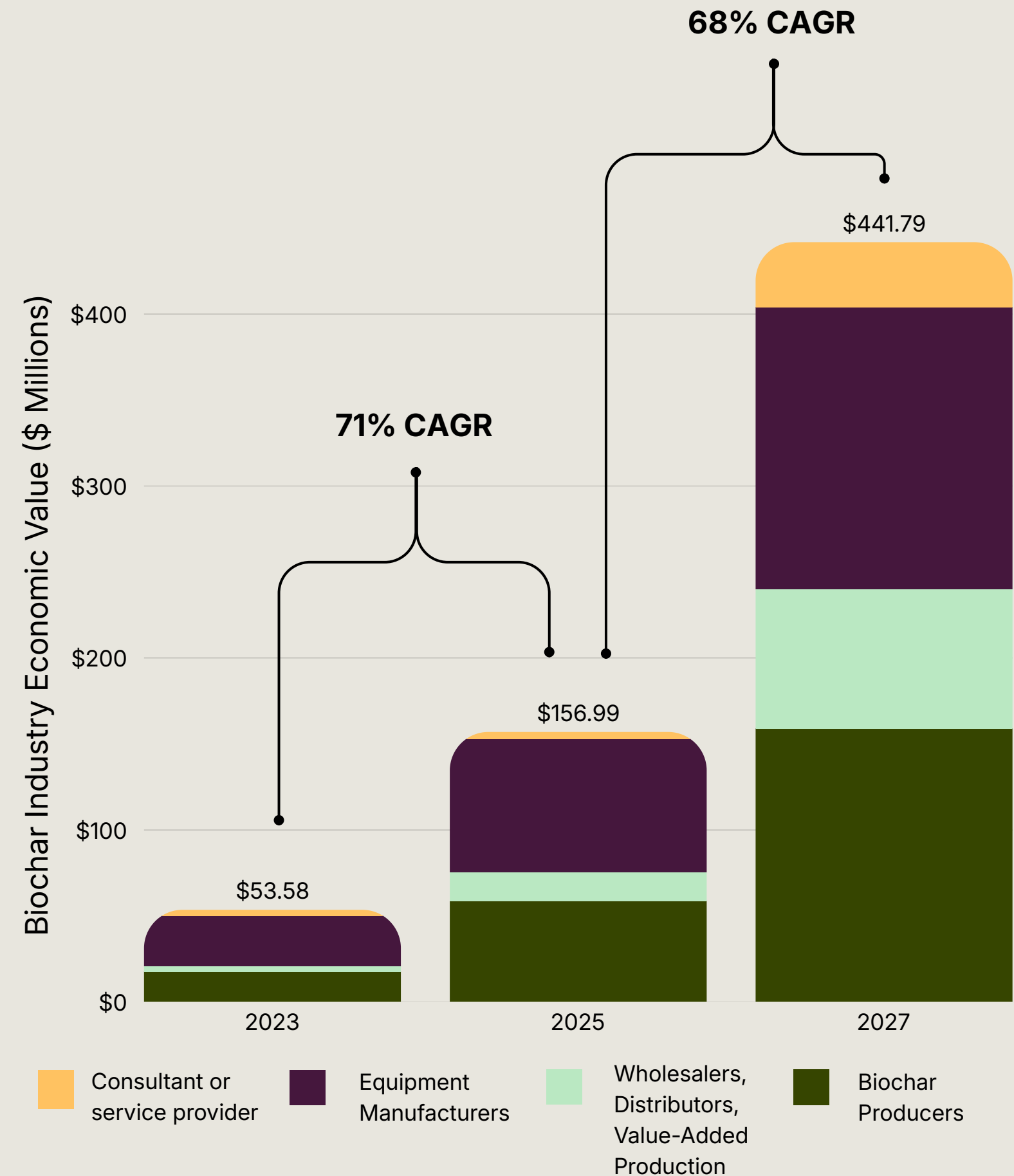
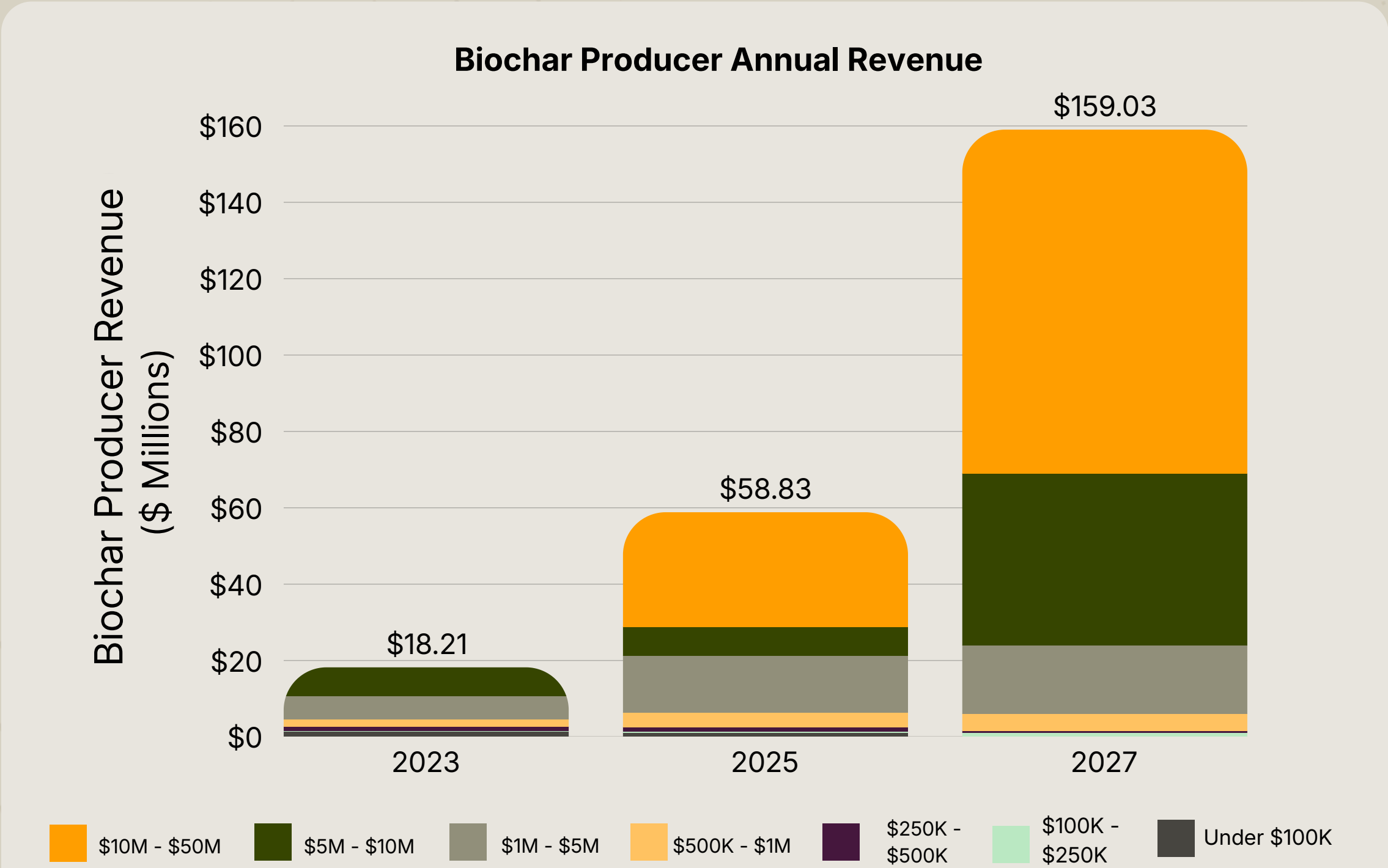


Figure 5. Estimated economic value of the biochar industry based on self-reported revenue from biochar producers, wholesalers / distributors, equipment manufacturers, and consultants. 2023 economic value data was collected from survey respondents in 2025.

Biochar Industry Growth

U.S. Biochar Producer Revenue

Revenue reported by U.S. biochar producers increased from \$18.2 million in 2023 to \$58.8 million in 2025, with projected revenue reaching approximately \$159 million by 2027.



Most of the increase from 2023 to 2025 was driven by producers within the \$10 million to \$50 million revenue category, indicating the emergence of larger-scale commercial operations within the industry.

These trends suggest the U.S. biochar sector is transitioning from small-scale market development toward more mature industrial production and commercialization.

Figure 6. Total U.S. biochar producer revenue grouped by self-reported revenue categories. 2023 producer revenue data was collected from survey respondents in 2025.

Key Industry Drivers and Inhibitors

The overall trends for industry drivers and inhibitors were largely consistent between 2023 and 2025.

Awareness of biochar emerged as both the leading driver of industry growth and the most significant inhibitor, underscoring the critical role that education, outreach, and marketing continue to play in industry development. Waste biomass management, which was newly included in the 2025 survey, ranked as the second most important growth driver, highlighting the importance of biomass utilization and waste management solutions within the U.S. market, followed closely by carbon credit demand and climate change mitigation. As in 2023, industry growth remains constrained by insufficient demand for physical biochar products and the continued lack of widely adopted product standards and specifications, which were the second and third most reported inhibitors to growth.

Key Drivers and Benefits of Biochar

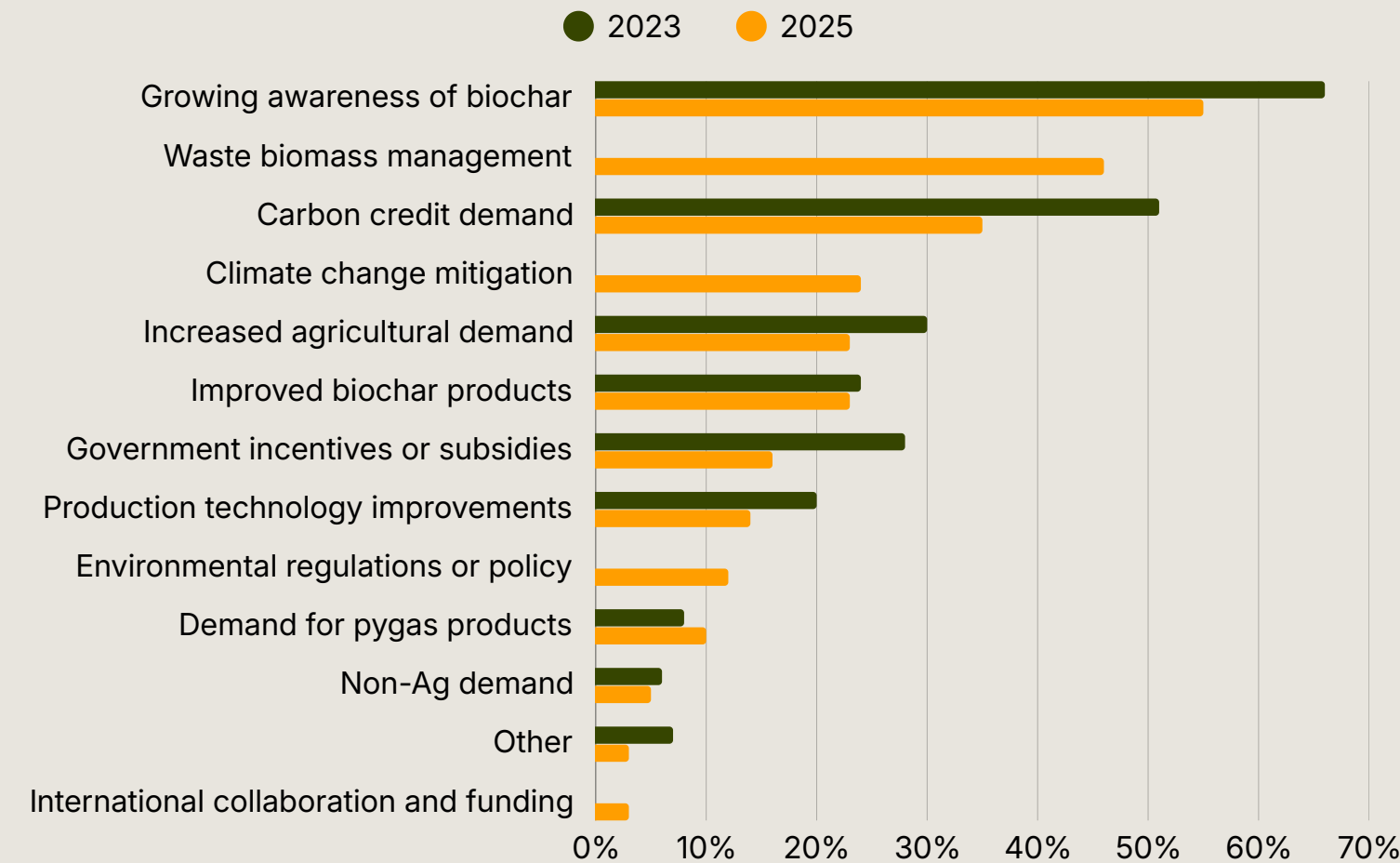


Figure 7. Top responses when asked “What do you believe are the primary factors driving the growth of the biochar industry in your country? (Please select up to top three)”. Percentages sum to more than 100% because respondents were allowed to select up to three responses.

Key Inhibitors to Growth

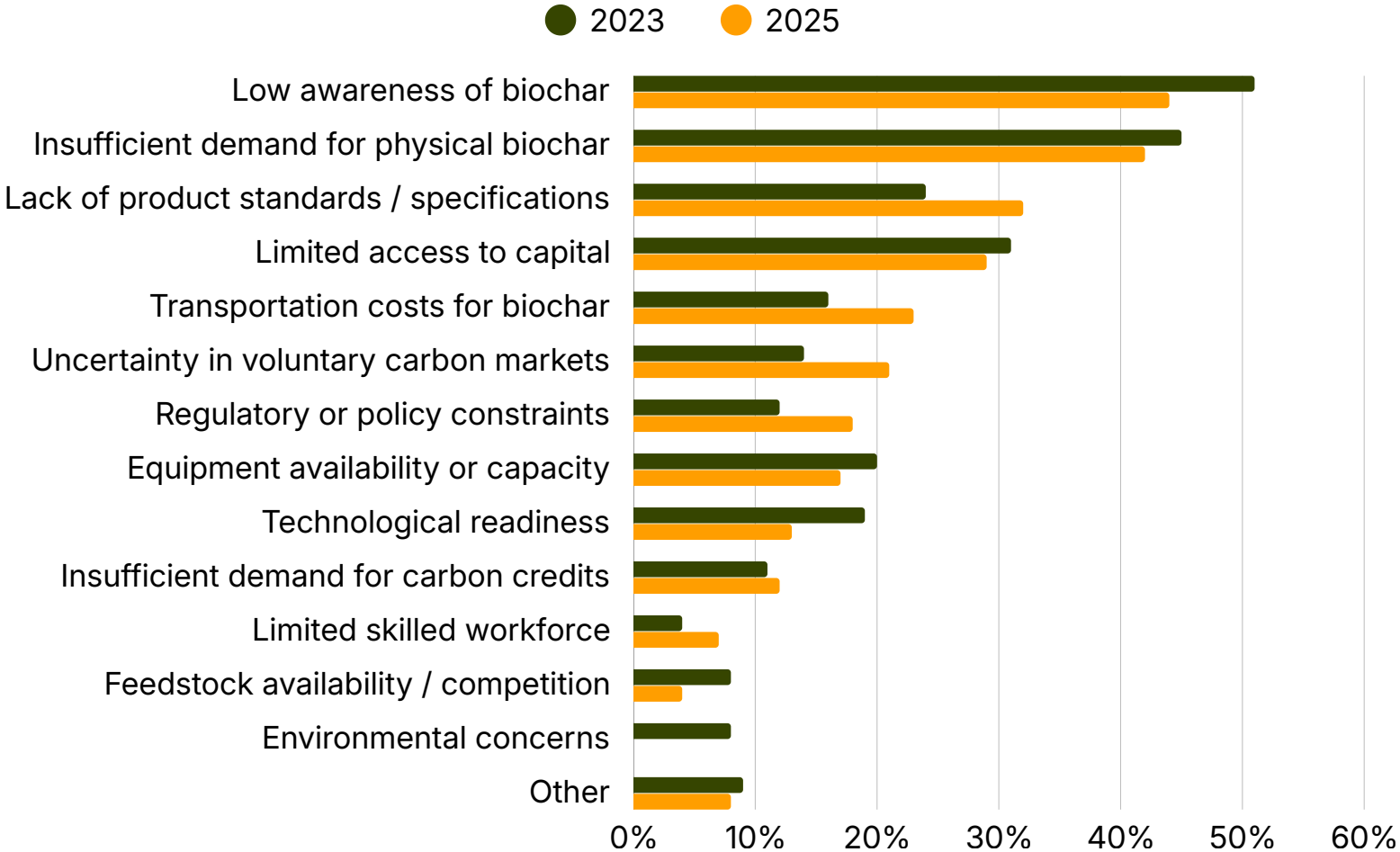


Figure 8. Top responses when asked “What do you perceive as the primary challenges or obstacles to expanding biochar production and use in your country? (Please select up to top three)”. Percentages sum to more than 100% because respondents were allowed to select up to three responses.

Carbon Markets and the Biochar Industry

A quickly changing landscape

In the 2023 Global Biochar Market Report, most global biochar production (51%) was reported to generate no revenue from BCR credits.

In contrast, the 2025 U.S. survey data shows a markedly different distribution, with only 6% of reported production not associated with CDR credit production.

Based on 2025 data, 42% of reported production was associated with operations deriving 11–20% of revenue from BCR credits, and another 25% associated with producers deriving 71–80% of revenue from carbon credits.

This emerging bimodal distribution suggests that the U.S. biochar industry is transitioning toward multiple commercialization pathways, with some producers remaining primarily focused on physical biochar markets or other revenue streams while others are increasingly leveraging carbon finance as a major revenue stream. The shift also reflects the rapid maturation and growing influence of voluntary carbon markets within the U.S. biochar industry.

Carbon Credit Revenue Among Producers

Percent Revenue from BCR Credits	Total United States Production (tonnes)	Percentage United States Production
None	10,320	6%
<10%	11,980	7%
11%-20%	71,050	42%
21%-30%	1,960	1%
31%-40%	20,600	12%
41%-50%	45	0%
61%-70%	200	0%
71%-80%	41,100	25%
91%-100%	10,000	6%

Table 1. Total biochar production by percent of producer revenue generated by BCR credit sales. Production data reported in this table include values for biochar and biocarbon and are therefore greater than the total reported biochar production values.

Physical Biochar Markets

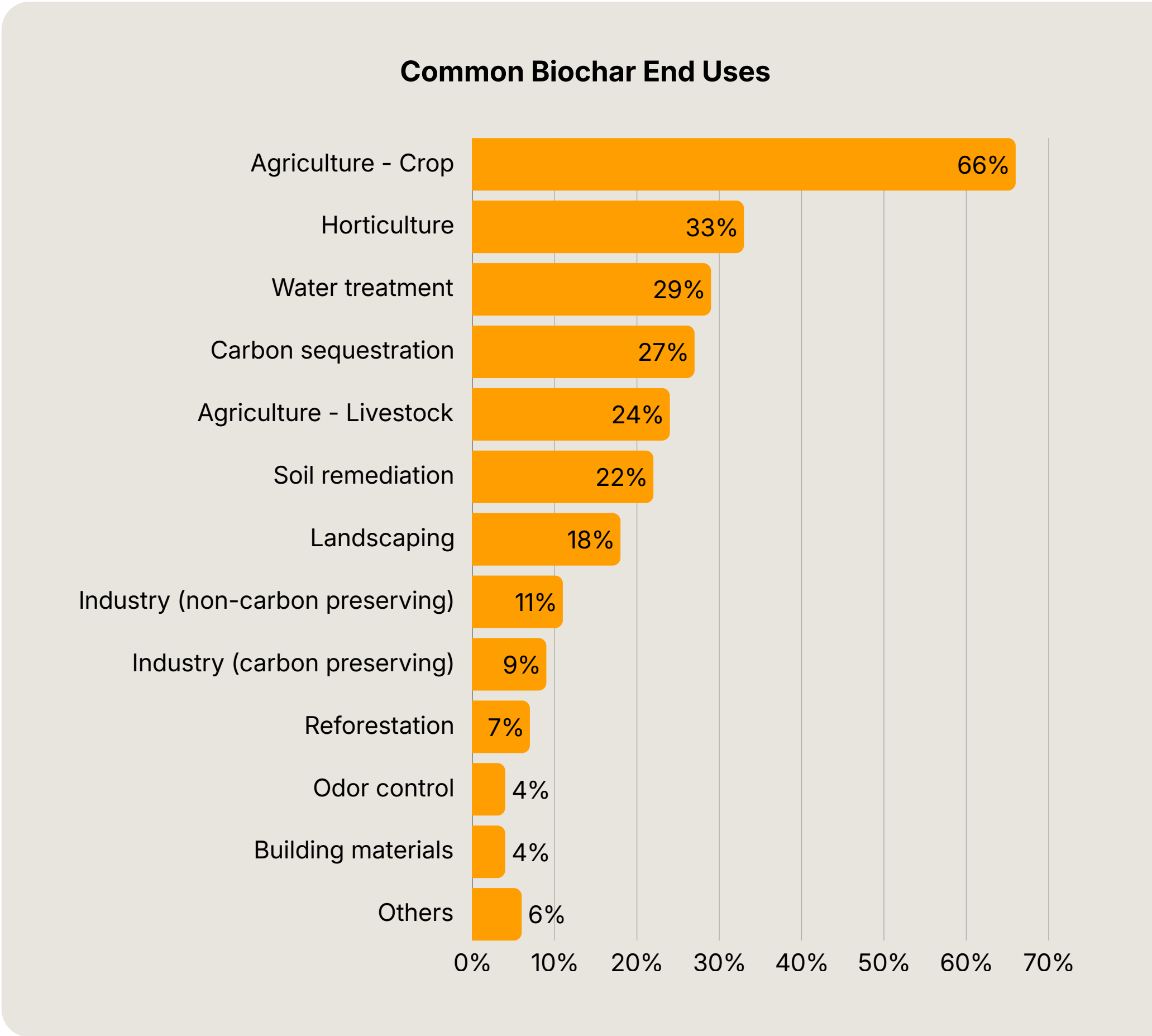
Existing End-Use Markets

While markets for biochar continue to expand, the development of strong, high-value markets for physical biochar products remains one of the primary challenges limiting broader industry growth.

Agricultural applications, including crop production, horticulture, and livestock uses, continue to represent the dominant end-use markets for biochar in the United States. Significant market activity is also emerging in water purification, carbon sequestration, soil remediation, and landscaping applications, but these are still relatively small end uses.

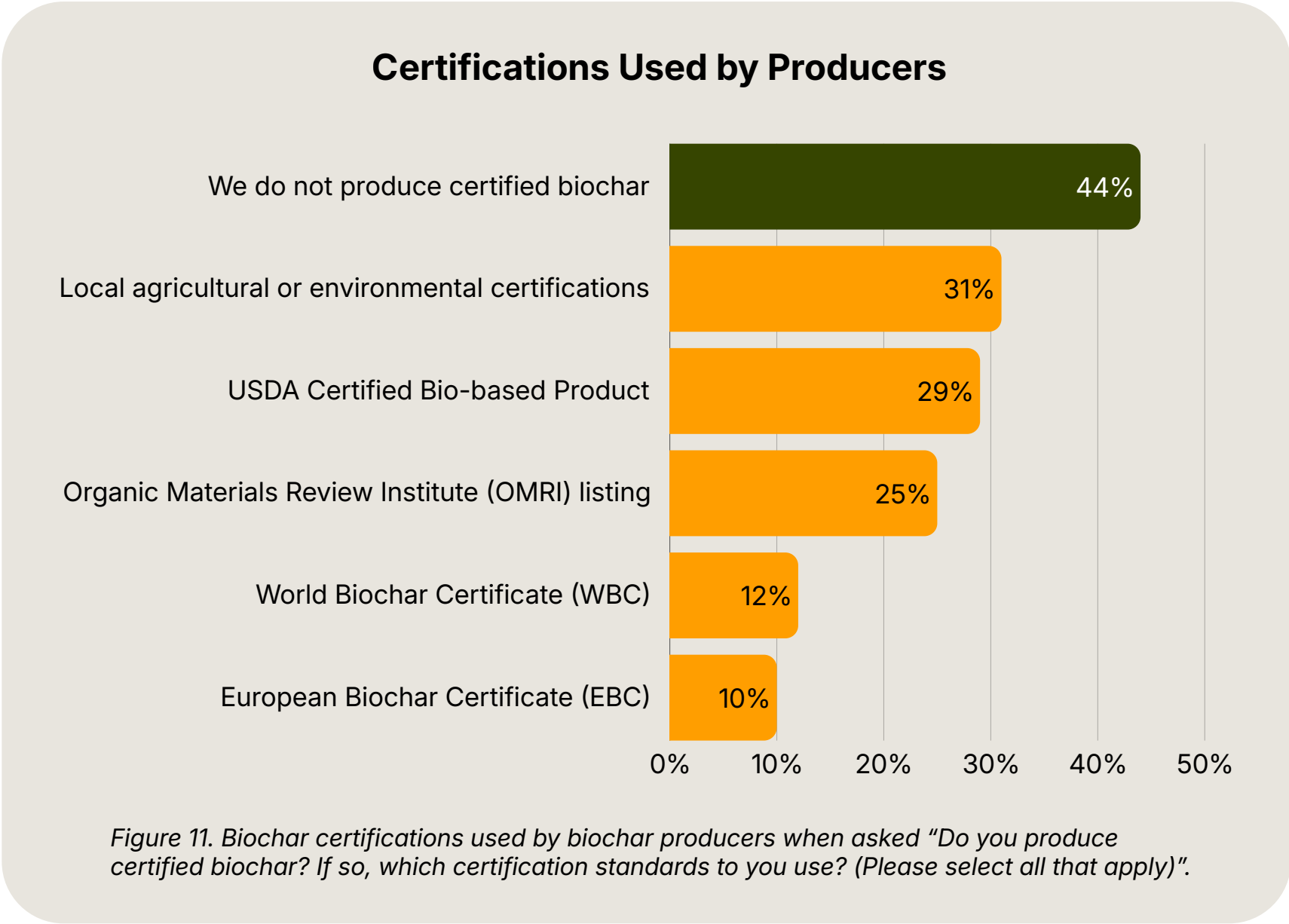
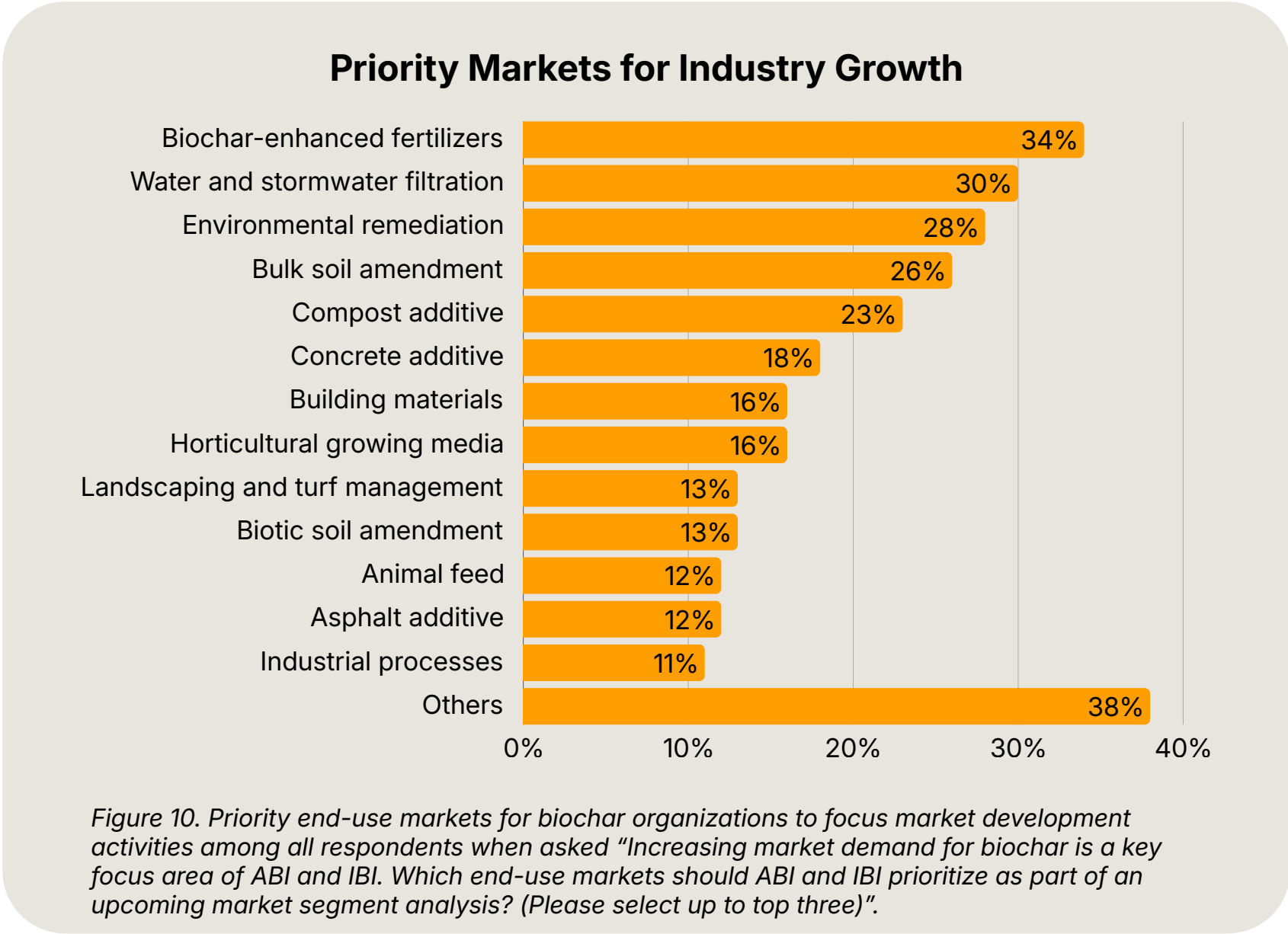
Industrial applications remain a smaller but growing segment of the U.S. market. Both non-carbon-preserving uses, such as metallurgical and industrial processes, and carbon-preserving applications, including building materials and specialty carbons, are gaining increasing interest as producers seek to diversify revenue streams and develop higher-value product markets.

Figure 9. Top end-use markets for biochar among producers when asked “What are your primary end-uses for your biochar?” (Please select up to top three)”. Percentages sum to more than 100% because respondents were allowed to select up to three responses.



Physical Biochar Markets

While agricultural uses remain among the largest markets for biochar, respondents indicated that many smaller, higher-value market segments, such as fertilizers, water filtration and environmental remediation, compost, and concrete, warrant greater investment in market development and commercialization efforts. The high number of responses for other markets suggests that a portion of the industry is working to expand biochar uses into other markets. Less than half of producers reported that they do not currently certify their biochar products, while the remaining producers utilize one or more certification programs, reflecting increasing market demand for quality assurance and standardized product specifications.



Production Technology

Stationary continuous auger and rotary kiln systems dominate the U.S. biochar production landscape, representing more than 40% of reported production technologies among biochar producers who responded to this survey.

Portable kilns and other stationary continuous systems also account for a significant share of the market, reflecting the diversity of operational scales and feedstock strategies currently used across the industry.

While significant, the total number of small scale biochar producers utilizing kilns may be much larger than reported, however, many of those small scale producers likely did not complete this survey.

The range of technologies reported highlights a rapidly evolving sector that includes both small-scale decentralized systems and larger commercial production facilities.

Production Technologies Used by Biochar Producers

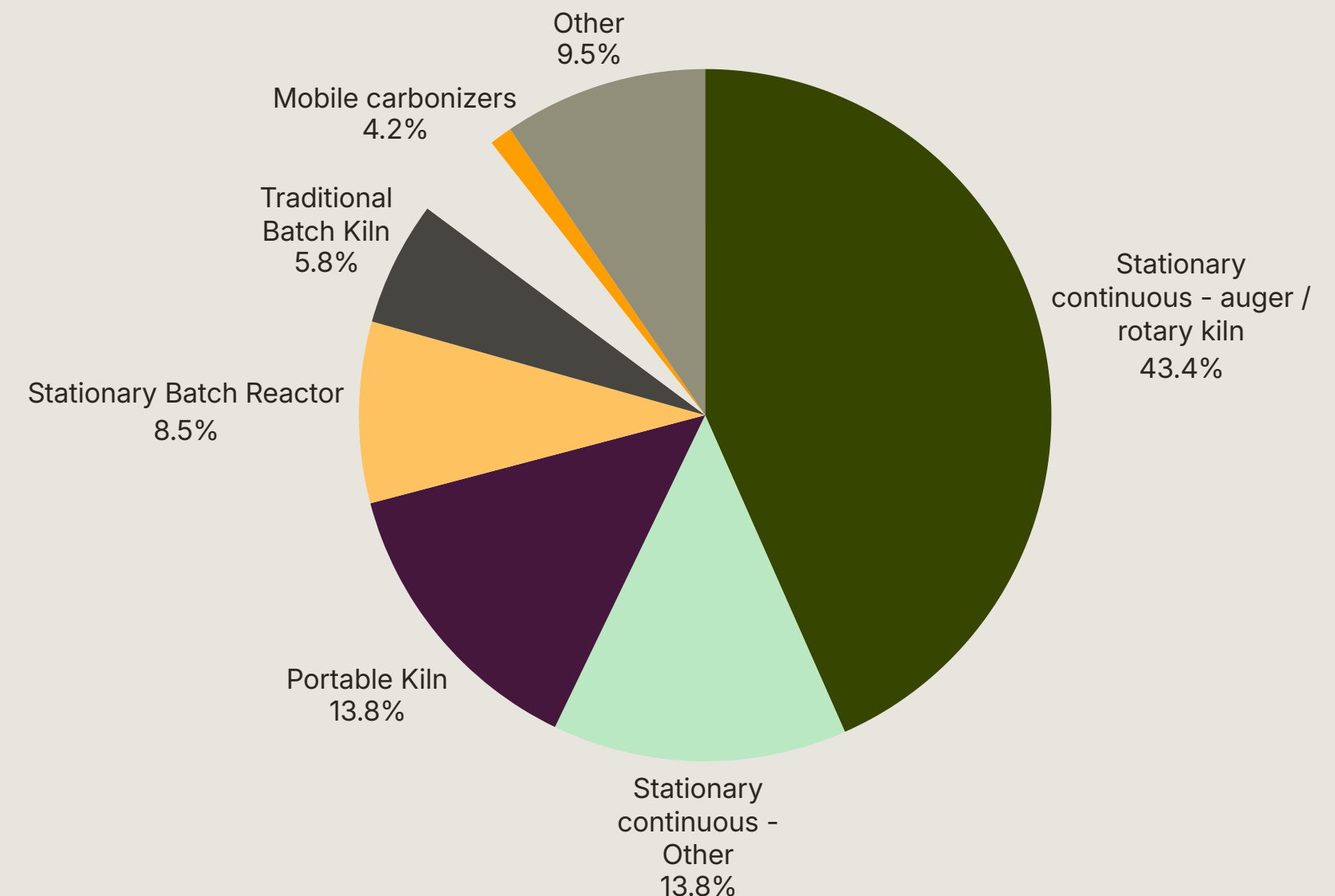


Figure 12. Production system types used by biochar producers. This chart shows the number of producers using each technology type

Annual Production by Technology

While a variety of technologies continue to be utilized across the industry, projected production growth is increasingly concentrated among larger continuous commercial auger and rotary kiln systems capable of scaling output efficiently.

Further, while high carbon fly ash extraction represents the largest single category in 2025, it represents a declining share compared to 2023 and is projected to shrink to a relatively small component of the industry by 2027. While high carbon fly ash extraction is one of the most economical ways to create biochar, these data suggest that there are a limited number of opportunities for increasing production from the existing fleet of biomass boilers.

While portable kilns represent the third-largest biochar production technology group in Figure 12, they contribute a negligible share of total production volume. This discrepancy highlights their primary role as a waste management tool that supports forest and ecosystem restoration, rather than as a technology designed for large-scale biochar production.

Overall, these trends reflect the broader industrialization of the U.S. biochar sector as producers expand capacity to meet growing demand for both carbon removal and physical biochar products.

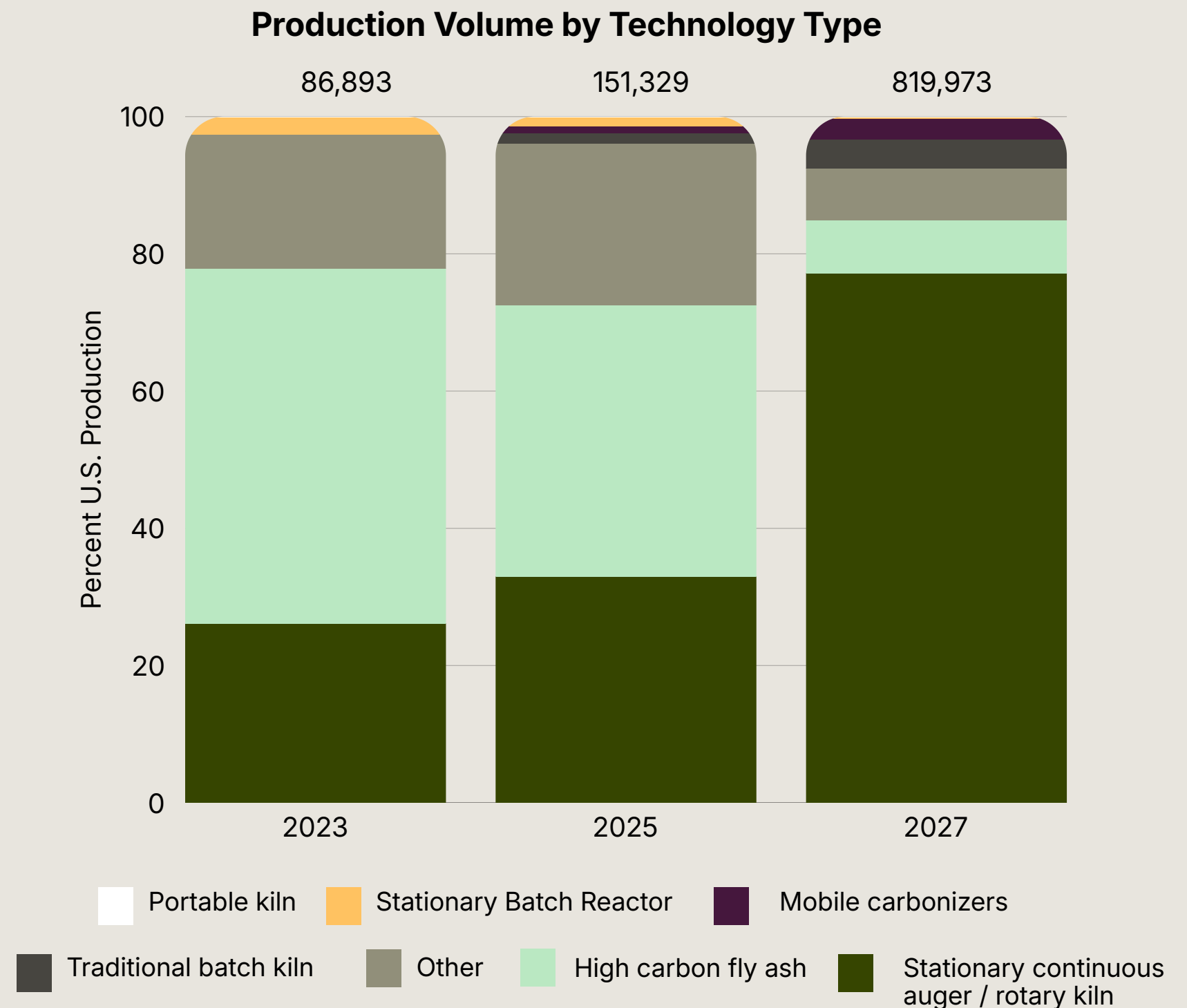
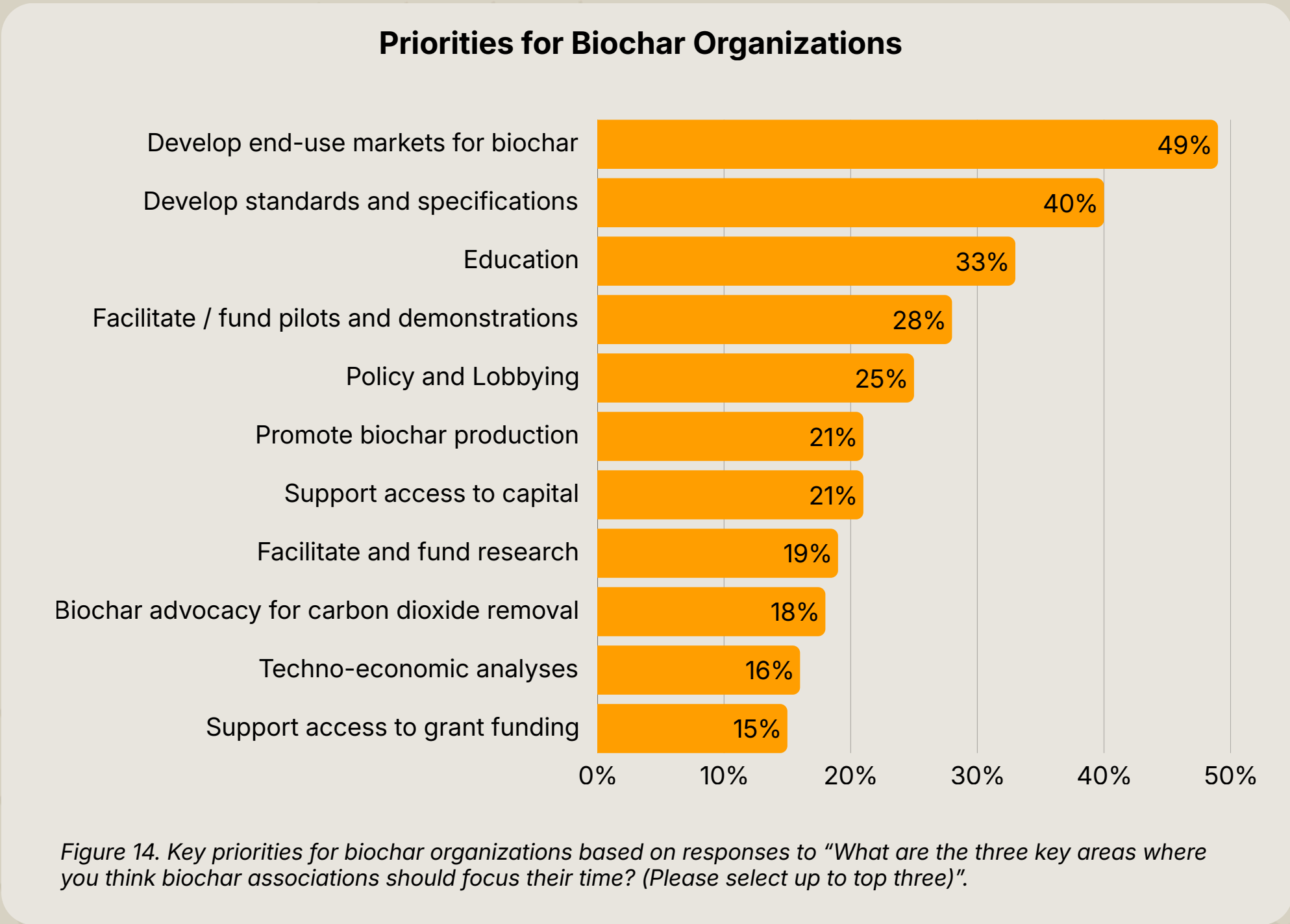


Figure 13. Percent of U.S. biochar production by production technology types based on responses from biochar producers. Values above stacked columns represent total production values (mt/year) for each year. Values for 2027 are projected values reported by biochar producers. Note that the values in this chart are for production volumes by technology type, not number of producers.

Role of Industry Organizations

Survey respondents identified the development of end-use markets for biochar, standards and product specifications, education, and pilot demonstrations as the highest priority focus areas for ABI and other biochar industry organizations.



ABI is currently prioritizing initiatives aligned with these top four industry needs, while the United States Biochar Coalition (USBC) is leading efforts focused on policy development and industry advocacy, which respondents identified as the fifth highest priority area for industry organizations.

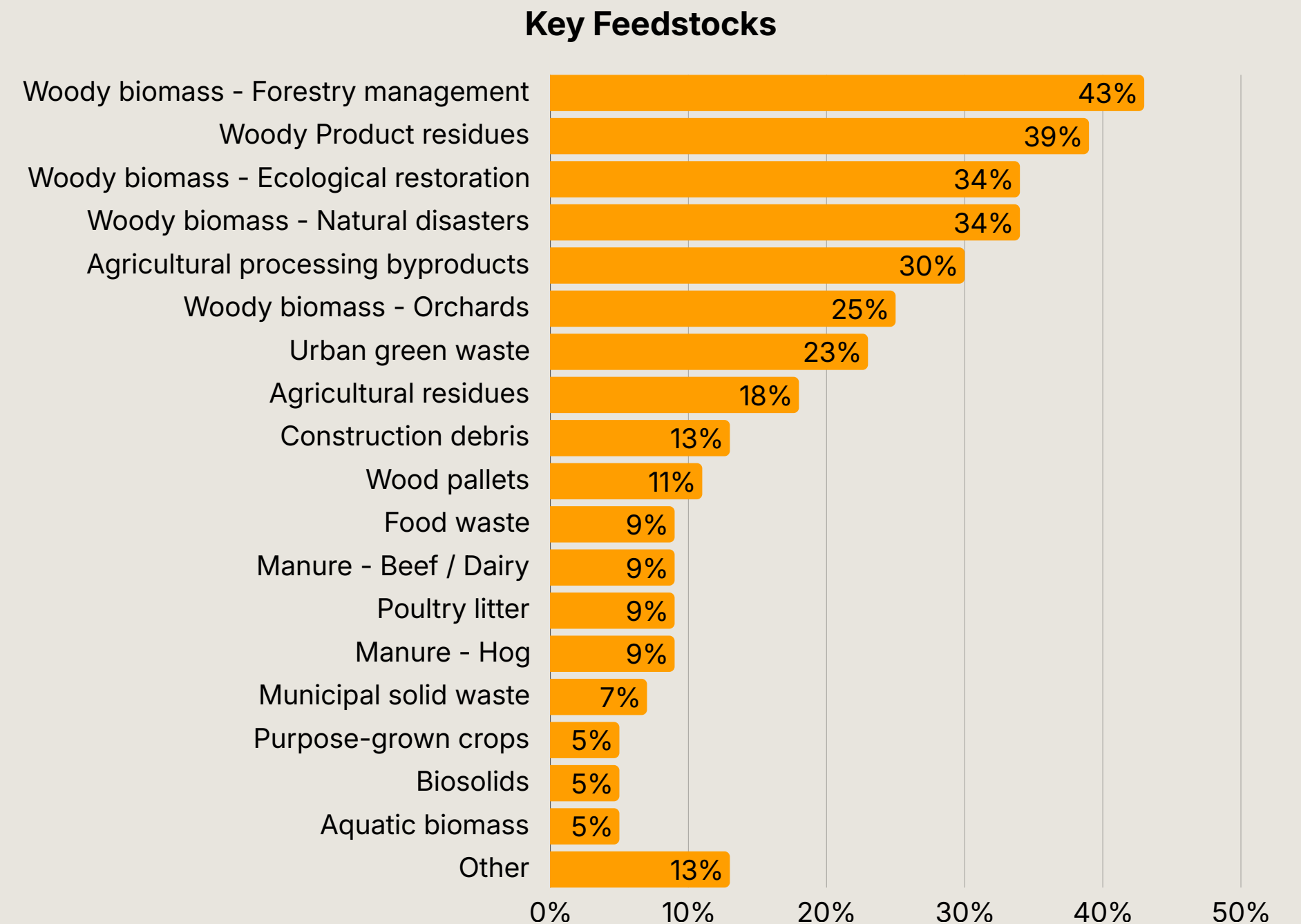
Stakeholder Analysis

Biochar Producers

Biochar producers reported that woody biomass remains the dominant feedstock source for biochar production in the United States, representing the top four feedstock categories.

Agricultural residues were identified as the second largest feedstock category, highlighting the growing role of agricultural waste streams within the expanding U.S. biochar industry.

Figure 15. Feedstock sources identified based on responses to "What type of feedstocks are used for your biochar? (Please select all that apply)". (n = 191)



Stakeholder Analysis

Biochar Producers

Most biochar producers reported adding value to raw biochar through the development of biochar-enhanced fertilizers, horticultural media blends, water filtration products, and other industrial applications. Only 22% of producers indicated that they do not currently add value to their biochar products. The survey also found that only 21% of producers do not utilize the heat or gas generated during biochar production. This trend likely reflects the ongoing transition toward larger-scale industrial production systems that are designed to capture and utilize pyrolysis co-products for process heat, energy generation, or additional value-added applications.

Adding Value to Raw Biochar

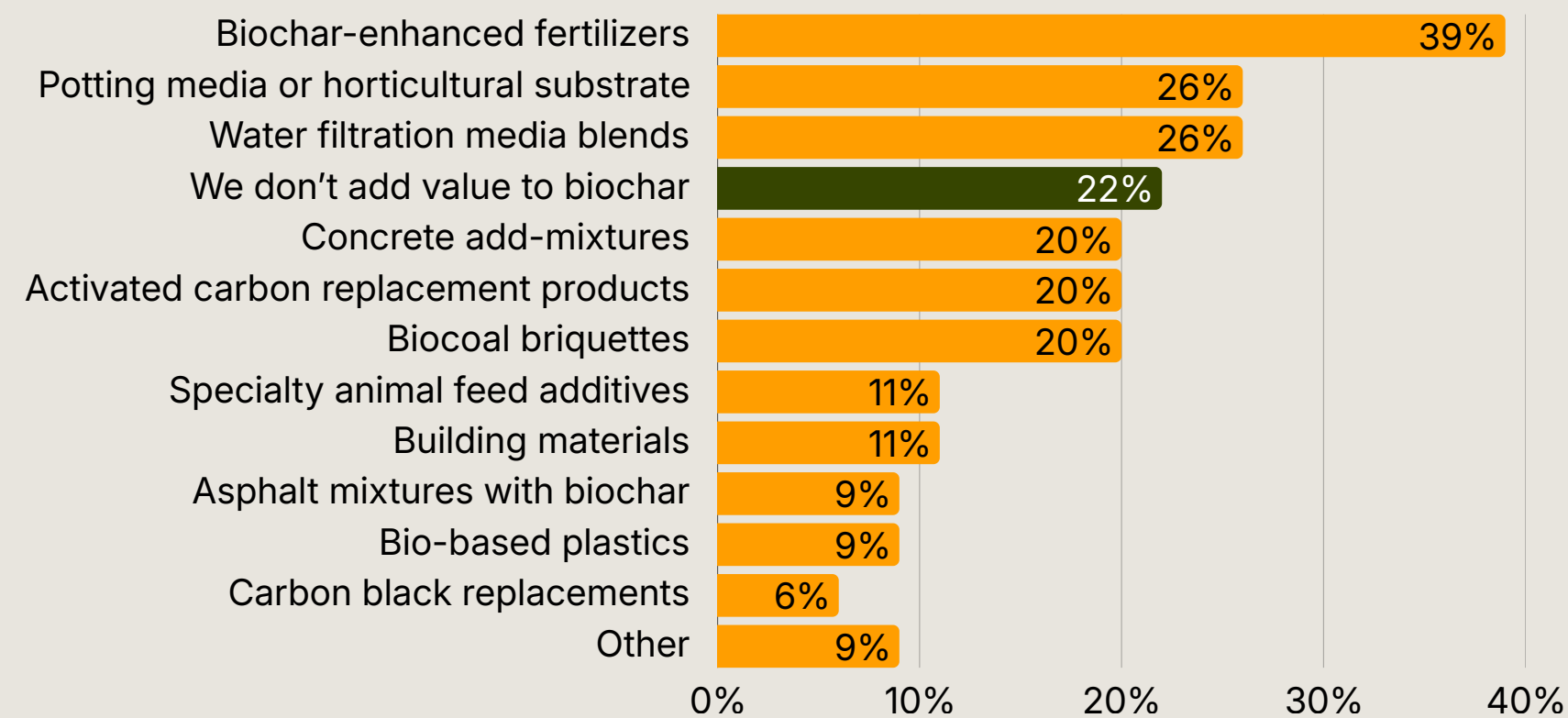


Figure 16. Biochar producer responses when asked “What post-production processes do you use to add value to the biochar you produce? (Please select all that apply)”. (n = 124)

Pygas Use

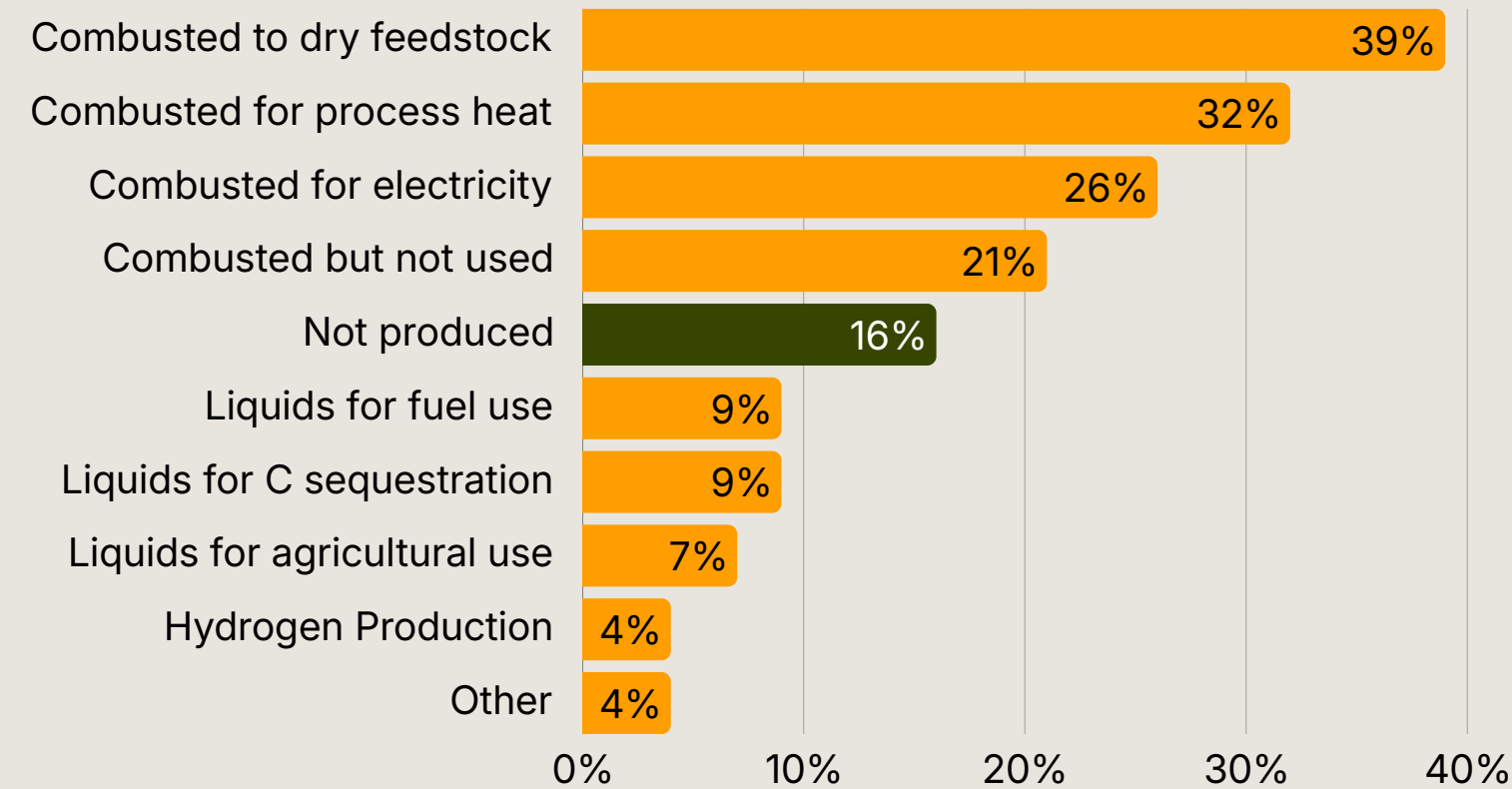


Figure 17. Pyrolysis gas end-use among producers when asked “How do you utilize pyrolysis gas in your biochar production process? (Please select all that apply)”. (n = 94)

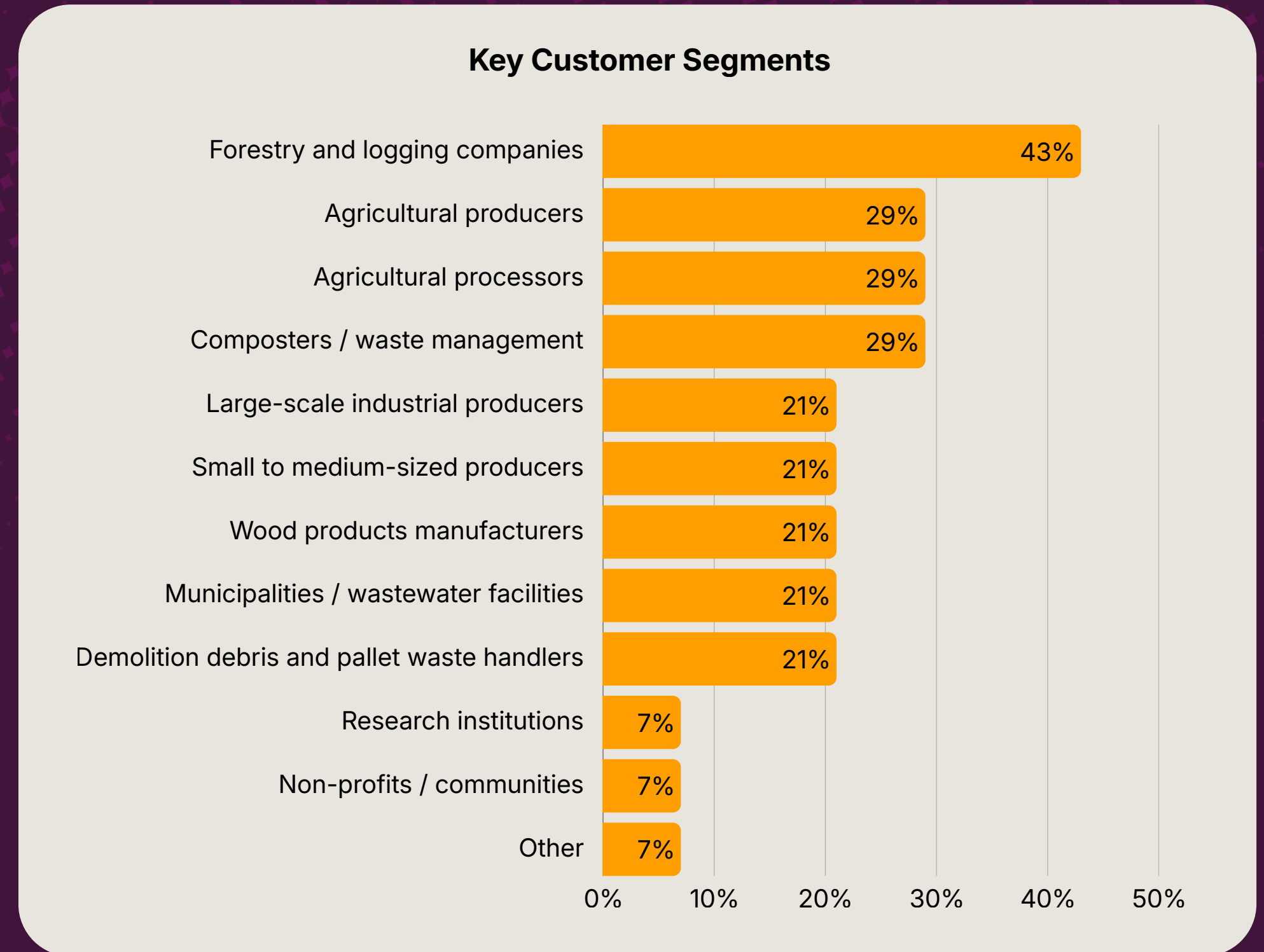
Stakeholder Analysis

Equipment Manufacturers

Equipment manufacturers reported that forestry and logging companies are their largest customer segment, followed by agricultural producers, agricultural processors, composters, and waste management companies.

The diversity of customer segments highlights the broadening commercial applications for biochar production technologies across forestry, agriculture, waste management, and industrial biomass utilization sectors. These results also reflect the growing role of biochar systems as integrated solutions for waste management, carbon removal, and biomass valorization.

Figure 18. Leading customers among biochar equipment manufacturers when asked "What are your key customer segments? (Please select up to top three)". (n = 36)



Stakeholder Analysis

Distributor and Value-Added Product Manufacturers

Direct sales to end-users remain the dominant distribution channel for biochar and biochar-containing products in the United States, although online sales platforms, distributors, agricultural suppliers, and retail partnerships also play important roles in market access.

Carbon content, particle size distribution, and feedstock were identified as the most important product specifications when sourcing biochar, reflecting increasing market emphasis on product consistency, performance, and quality assurance. These results suggest that the U.S. biochar market is continuing to mature as downstream users place greater importance on standardized material properties and application-specific product performance.

Distribution Channels

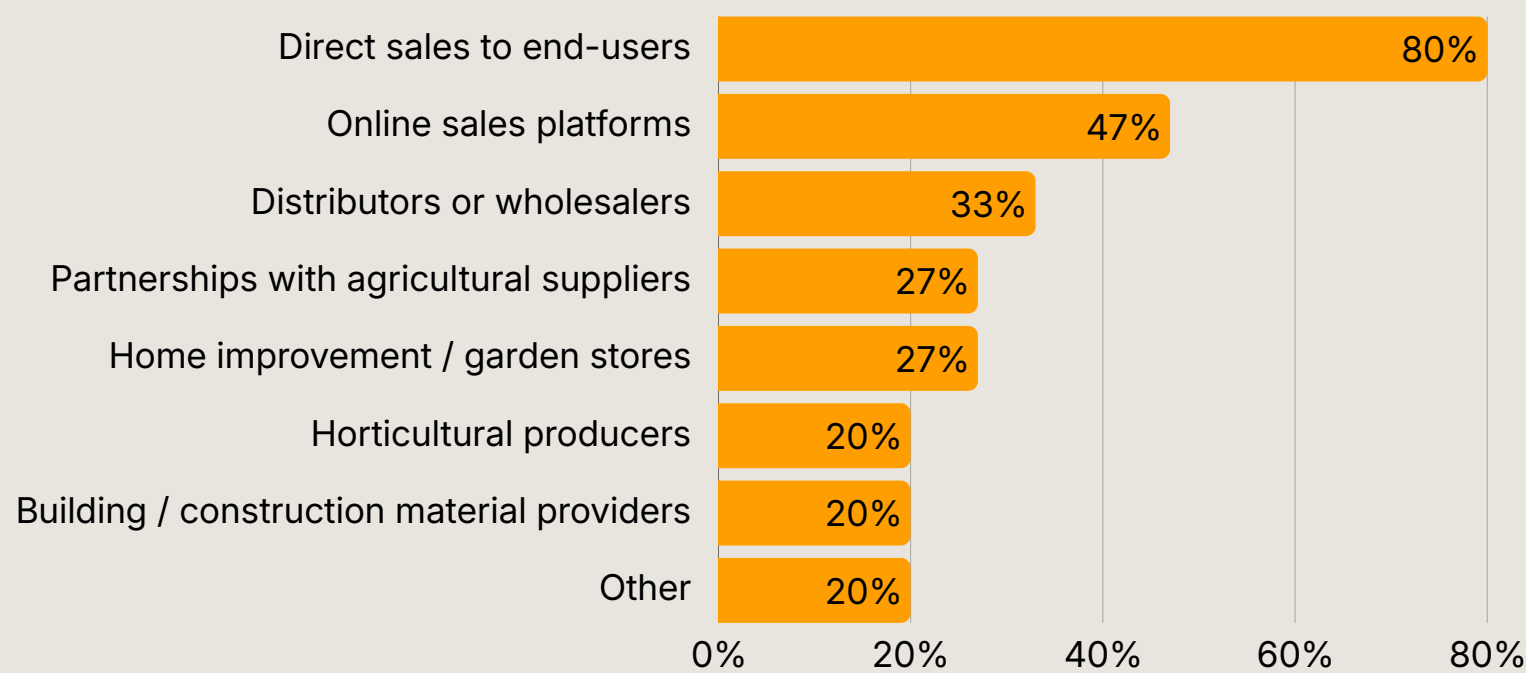


Figure 19. Primary product distribution channels reported by distributors and value-added producers when asked “Through which channels do you distribute your biochar and biochar containing products (select all that apply)”. (n = 41)

Product Specifications

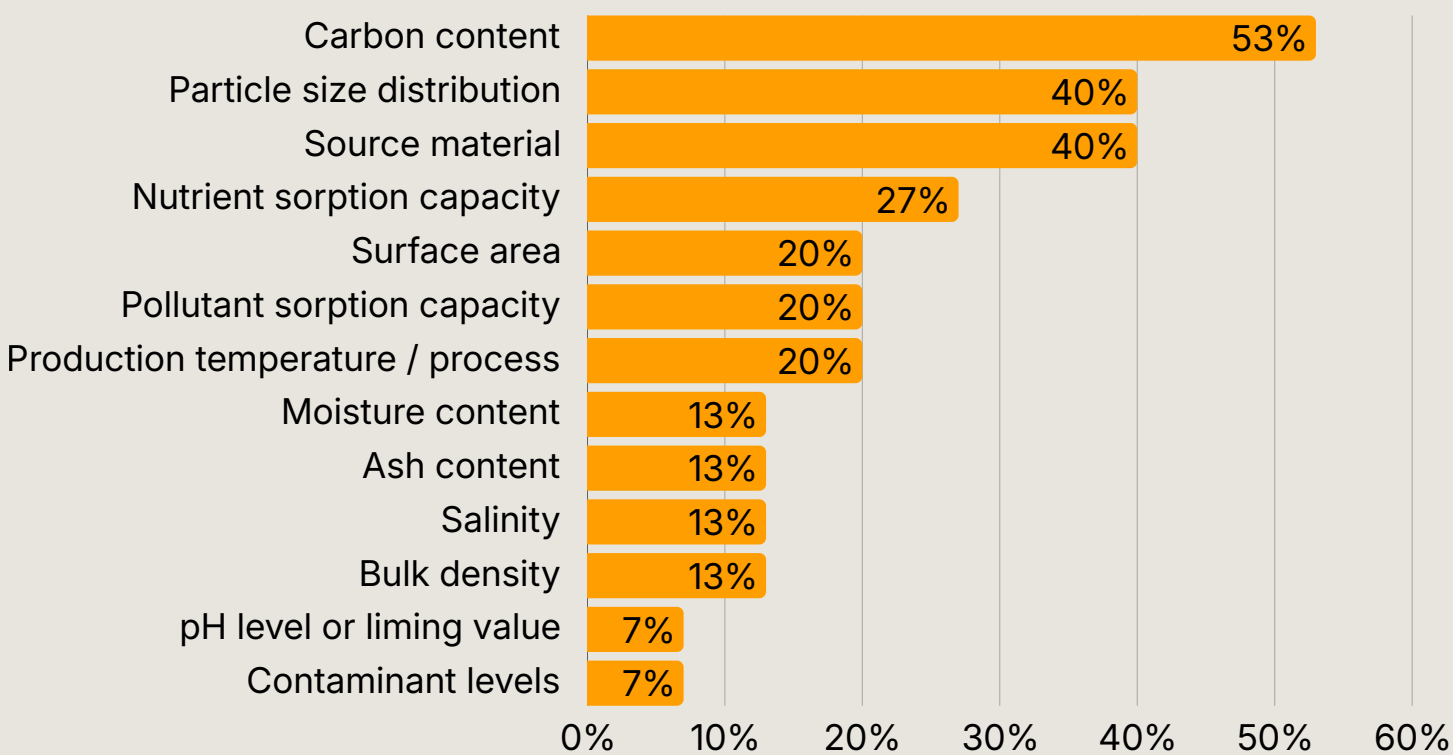


Figure 20. Key product specifications for biochar distributors and value-added producers when asked “What product specifications do you consider when sourcing biochar? (Please select up to top three)”. (n = 43)

Stakeholder Analysis

Carbon Finance

Carbon market stakeholders identified changing BCR methodologies, data collection logistics, measurement complexities and biochar quality variability as the leading challenges associated with MRV for biochar carbon credits. Respondents also noted that skepticism surrounding the scalability and durability of BCR remains the most common misconception within carbon markets, alongside limited understanding of biochar’s broader co-benefits.

MRV Challenges

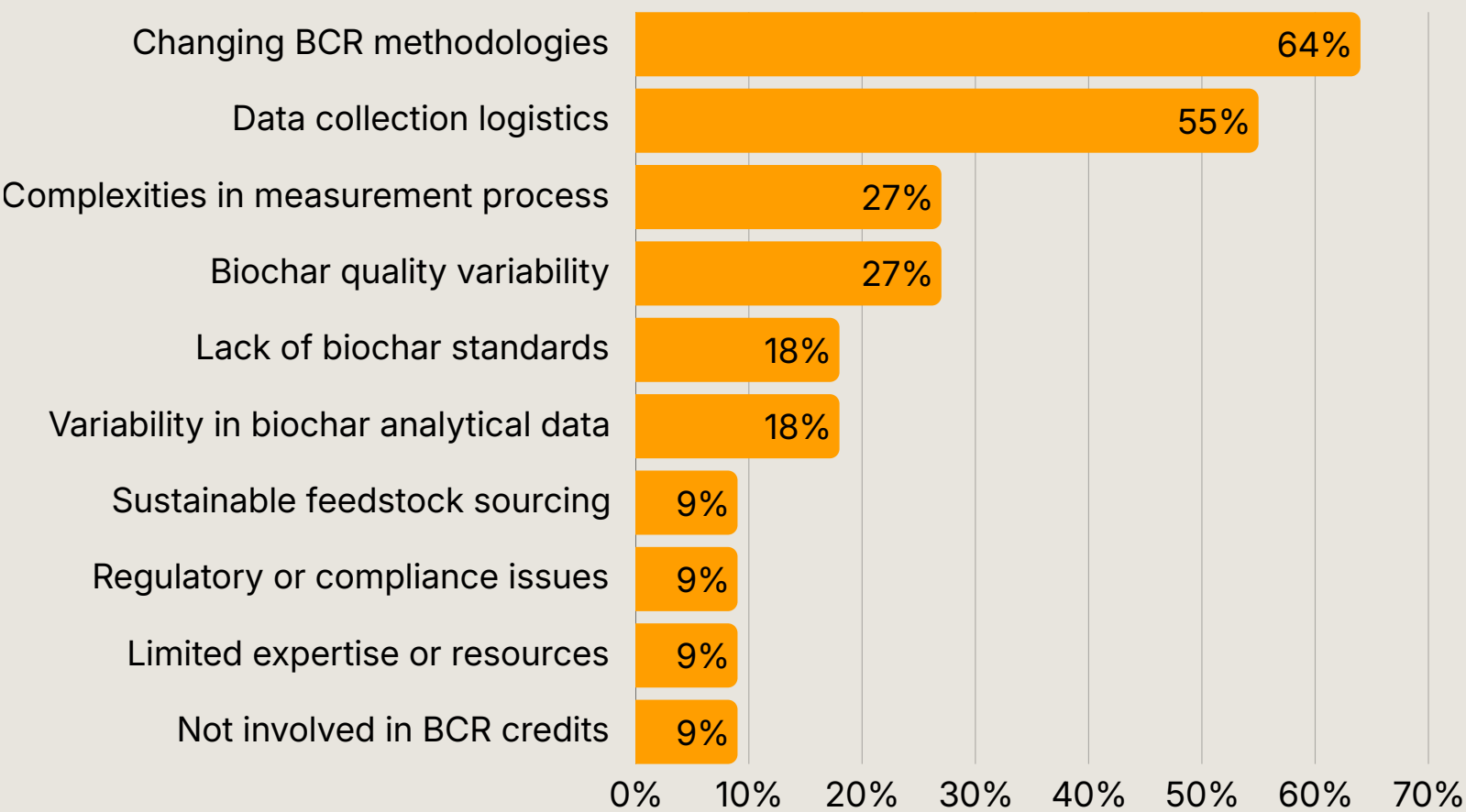


Figure 21. Challenges in monitoring, reporting, and verification for BCR credits reported by carbon industry members when asked? “What challenges do you encounter in the MRV process for biochar carbon removal credits? (Please select up to top three)”. (n = 27)

Misconceptions about Biochar in Carbon Markets

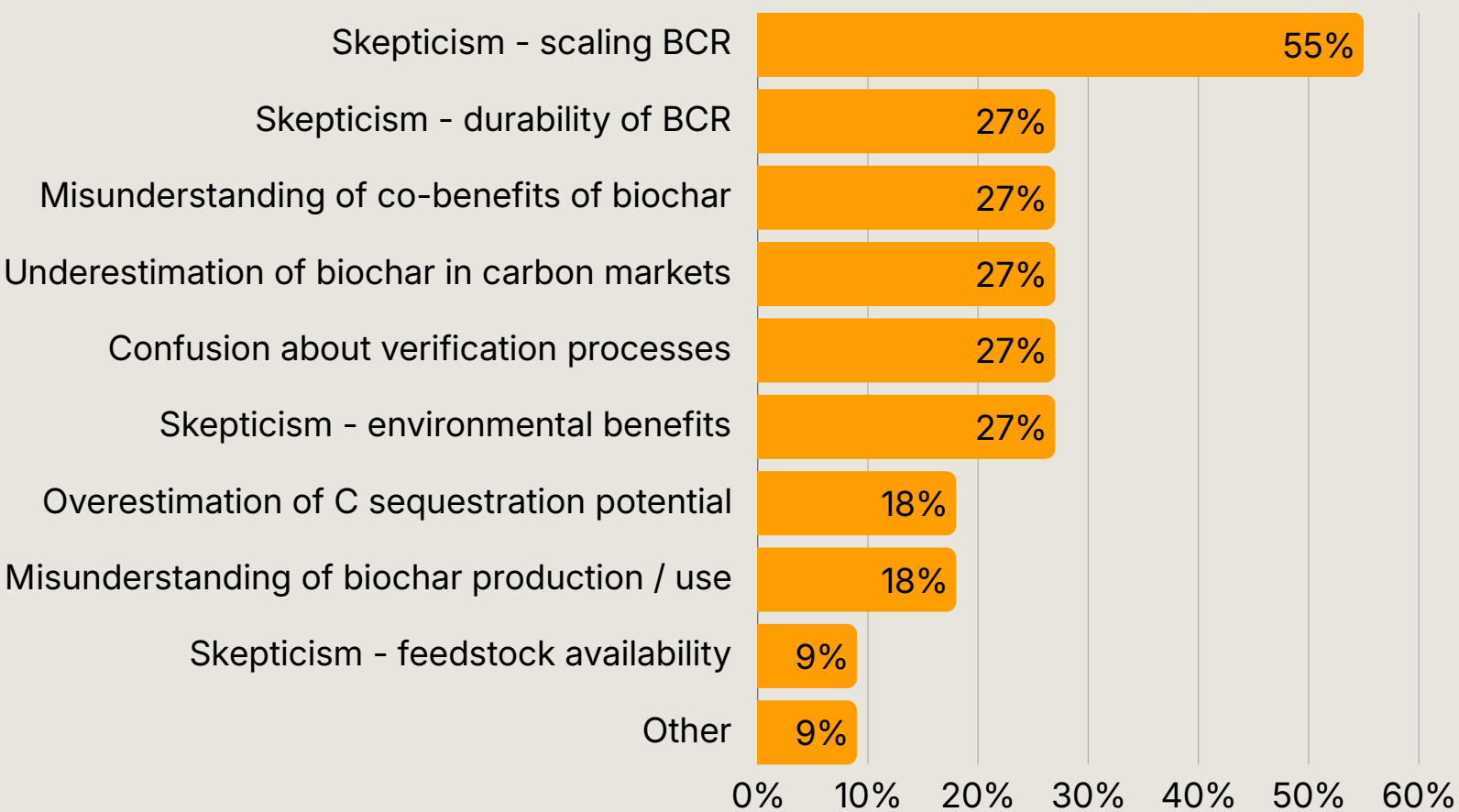


Figure 22. Misconceptions about biochar in carbon markets reported by carbon industry members when asked? “What are the common misconceptions about biochar in carbon markets? (Please select up to top three)”. (n = 27)

Methodology

The 2025 United States Biochar Market Report was derived from data collected as part of the broader 2025 Global and U.S. Biochar Market Survey using an anonymous web-based survey administered to stakeholders across the biochar industry. This survey was a collaboration between ABI, IBI, and the State of CDR Report.

Survey participants were invited through direct outreach by ABI and IBI, live announcements at conferences and industry events, LinkedIn and other social media platforms, and additional online communications. The survey was designed for completion within approximately 20 minutes, with key information collected early in the process to accommodate potential respondent drop-off. Tailored survey pathways were developed for each stakeholder group to ensure respondents were only presented with questions relevant to their role within the industry. The survey instrument was optimized for both desktop and mobile browsers and made available in English, French, Spanish, and Chinese.

The survey was conducted between September and November 2025. In total, 444 responses were received relevant to the United States, including both complete and partially completed surveys. Responses relevant to the United States included those responses completed in the United States, those reporting a United States location, and those companies located outside of the United States but doing some amount of business in the United States. Biochar production values were reported in the Biochar Producer category by country of production, so values reported for the United States represent only biochar produced in the United States.

Data collection methodologies differed between the 2023 and 2025 surveys, limiting direct comparisons in some areas. Where meaningful and methodologically sound comparisons were possible, they have been included. Going forward, the adoption of a consistent data collection framework will enable more robust year-over-year comparisons across future surveys.

Stakeholder group analyses are based on smaller subsets of the overall survey dataset, and trends within these groups may therefore be less robust than those observed across the full respondent pool. These results are presented as directional insights to inform and guide the industry, with the sample size for each stakeholder group indicated as (n = x).

The survey platform, respondent IDs, and resulting datasets were managed by CTRS Market Intelligence, an independent market research firm. Prior to providing the dataset to ABI, CTRS anonymized and regionalized all respondent information to protect participant confidentiality. ABI has retained the anonymized data solely for reporting and analysis purposes and maintains strict data security protocols to prevent unauthorized access or distribution.

ABI conducted limited validation of the anonymized dataset to identify and remove clearly erroneous entries, particularly reports of exceptionally large biochar production volumes associated with small-scale production technologies. Biochar producers were also asked to report the percentage of biochar used in non-carbon-preserving applications, such as biocarbon for metallurgical applications. These values were excluded from reported biochar production totals so that production estimates presented in this report reflect biochar intended for long-term biochar applications.

The research was conducted by CTRS Market Intelligence in collaboration with ABI staff members Myles Gray and Tera Lewandowski, who led the analysis and preparation of the report. Lauren Boritzke Smith, Heartseed Creative, led report design and compilation.



Acknowledgements

The 2025 United States Biochar Market Report was developed to provide a current snapshot of the rapidly evolving U.S. biochar industry, highlighting production trends, market development, economic opportunities, carbon removal potential, and emerging end-use applications. The results from this effort are intended to benchmark the industry to support long term industry tracking, with the data collected in 2025 representing the initial baseline.

ABI is grateful to the U.S. Forest Service and the U.S. Endowment for Forestry and Communities for their generous support and funding of this effort. Gratitude is also extended to Luisa Marín (IBI), Valeria Araico (IBI), and Kirsty Harrington (The State of CDR) for their involvement and partnership in the development of the survey.

The findings presented in this report are based on survey responses collected in fall 2025. The authors would like to sincerely thank all survey participants who generously shared operational data and market perspectives. Their participation provides valuable insight into the opportunities and challenges shaping the U.S. biochar industry today.

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