

BECCS - Northmore Gordon

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BECCS stands for Bioenergy with Carbon Capture and Storage. The process captures energy from biomass via pyrolysis, producing electricity or heat as energy outputs along with biochar—a stable solid rich in CO₂. BECCS is classified as a negative emissions technology because it removes and stores carbon dioxide from the atmosphere, with the removal occurring during the growth phase of the biomass source. When biochar is applied to soil, it sequesters the CO₂ contained within it for thousands of years, creating a long-term carbon storage mechanism alongside the immediate energy benefit.

Related guidance

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Certificate trading

Measurement and verification

What does BECCS stand for and how does it function?

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What is biochar and what are its practical applications?

Biochar is a stable solid produced from the BECCS pyrolysis process that is carbon-rich. Beyond its role in carbon sequestration, biochar has practical soil applications: when applied to soil, it improves soil health while simultaneously storing CO₂ for thousands of years. This dual benefit makes biochar valuable both as a soil amendment for agricultural and environmental purposes and as a mechanism for long-term carbon removal. The stability of biochar ensures that the carbon storage persists across multiple generations.

Why is BECCS considered a negative emissions technology?

BECCS qualifies as a negative emissions technology because it physically removes and stores carbon dioxide from the atmosphere. The removal process occurs during the growth phase of the biomass source, as plants absorb CO₂ during photosynthesis. When that biomass is subsequently processed

through pyrolysis in the BECCS system, the captured carbon is converted into biochar and ultimately sequestered in soil for thousands of years. This combination of atmospheric carbon removal and long-term storage distinguishes BECCS from conventional renewable energy systems that simply avoid emissions rather than removing existing atmospheric carbon.

How does BECCS differ from conventional renewable energy in terms of carbon outcomes?

Unlike conventional renewable energy systems such as solar or wind that avoid emissions by displacing fossil fuels, BECCS actively removes carbon from the atmosphere. The distinction is critical in carbon accounting: emission avoidance means preventing a future emission, while carbon removal involves extracting CO₂ that is already in the atmosphere. BECCS delivers both outcomes—it generates renewable energy while simultaneously removing atmospheric carbon through biomass growth and storing that carbon in biochar for millennia. This dual function makes BECCS particularly relevant for organisations pursuing net-zero or carbon-negative strategies beyond simple emissions reduction.

What carbon accounting considerations apply to BECCS projects?

BECCS projects require careful carbon accounting to distinguish between different physical outcomes. The terminology matters: carbon removal (extracting CO₂ from the atmosphere) differs from emission avoidance (preventing an emission). BECCS claims must specify the storage process and accounting basis, as carbon storage and removal involves processes requiring documented specification. When reporting BECCS outcomes, organisations should maintain clear boundaries identifying the energy generated, the biochar produced, and the carbon sequestered separately. This prevents double-counting and ensures claims are supported by traceable evidence of the physical processes and their timing.

How do environmental certificates apply to BECCS projects?

BECCS projects may generate environmental certificates depending on their jurisdiction and specific design. In Australia, BECCS could potentially be assessed under carbon credit schemes such as the ACCU (Australian Carbon Credit Unit) Scheme, though eligibility depends on the applicable method and project characteristics. Different sectors—bioenergy, carbon storage and removal, and renewable heat—are identified for environmental certificate assessment. Projects must undergo eligibility assessment through a project brief submission, with scope and services defined separately for each pathway. We provide support for certificate-related work including project registration, certificate creation and trading, helping organisations navigate the specific requirements of their chosen scheme.

What measurement and verification requirements might apply to a BECCS project?

BECCS projects involving energy output and carbon storage typically require robust measurement and verification to establish credible claims. This includes project-boundary selection to define what is included in the assessment (energy generated, carbon captured, biochar produced), baseline modelling to establish pre-project conditions, savings or removal calculations, and reporting that demonstrates traceability. For certificate schemes, M&V requirements are scheme-specific and must be defined early. We provide measurement and verification services including these components, helping organisations establish the documented boundaries, activity data, factors and calculations necessary to support verified claims about energy delivery and carbon sequestration.

What role does transition planning play in BECCS adoption?

Transition planning for BECCS involves defining implementation options, assumptions, dependencies, ownership and financial implications of deploying the technology. Organisations considering BECCS should assess it within their broader decarbonisation pathway, considering factors such as biomass sourcing reliability, energy output requirements, soil application feasibility for biochar, capital investment, operating costs and expected carbon removal rates. Transition planning also addresses

how BECCS fits with other emissions reduction measures and reporting obligations. We offer transition planning services that connect technical assessments with commercial decisions, helping organisations develop staged implementation pathways and transition strategies for technologies like BECCS.

How should organisations assess BECCS as part of their carbon strategy?

Organisations evaluating BECCS should begin with a carbon and energy strategy assessment that clarifies their emissions baseline, reduction targets and technology priorities. This involves understanding the organisation's current energy use, available biomass sources, suitable locations for biochar application, and how BECCS compares financially and operationally to alternative decarbonisation options. A diagnostic workshop can clarify strengths, gaps and next steps. The assessment should separately evaluate energy generation economics, biochar market value, carbon credit potential and soil-amendment benefits. We provide carbon advisory services including diagnostic workshops, opportunity assessment and feasibility studies to help organisations evaluate emerging technologies like BECCS within their specific operational and financial contexts.

What information should be prepared before pursuing BECCS project development?

Before developing a BECCS project, organisations should prepare a project brief documenting the business problem, decision required, operational requirements and target timeline. Key information includes site location and characteristics, available biomass feedstock and its reliability, energy demand that the system will serve, soil or land availability for biochar application, any prior studies or quotes, and the intended certificate or funding pathways. The brief should clearly distinguish what is already committed from what remains to be decided. We recommend assembling this information early and identifying gaps rather than delaying until complete data exists, enabling a proportionate assessment to scope the engagement and determine the next decision required.