



A new generation of trees is already growing.

Building on pioneering photosynthesis research to
improve what trees can do for people and the planet.

Independent nonprofit plant biotechnology.



Two years of growth.

Photosynthesis enhanced hybrid aspen



Populus tremula × *alba* “Deer”

A breakthrough that captured international attention.

The earlier work, much of it carried out at Living Carbon, progressed from laboratory photosynthesis research to field plantings and drew serious independent scientific and international attention.

Selected independent coverage, 2022–2023

Science

To fight climate change, a biotech firm has genetically engineered a very peppy poplar

The New York Times

For the First Time, Genetically Modified Trees Have Been Planted in a U.S. Forest

The Guardian

Could superpowered plants be the heroes of the climate crisis?

WIRED

A Bold Idea to Stall the Climate Crisis—by Building Better Trees

MIT Technology Review

Inside the quest to engineer climate-saving 'super trees'

Nature Biotechnology

GM forests for carbon removal planted in US

From the laboratory
to landscapes
across America.

Thousands

of photosynthesis enhanced trees were planted across the United States within larger, mixed species reforestation projects spanning hundreds of acres, including degraded former minelands.

At Taylor Yard in Los Angeles, engineered aspens were also planted on contaminated industrial land as part of an ecological restoration and phytoremediation effort.



Taylor Yard phytoremediation project, Los Angeles
Earlier Living Carbon planting program

Why faster growing trees matter.

A tree becomes shade over a playground, shelter along a field, habitat for wildlife, or wood for a home.

All of these things
take time to grow.

We also need to remove some of the enormous amount of carbon dioxide we've already put into the atmosphere. Trees do this naturally, using sunlight to capture CO₂ and incorporate its carbon into wood, roots, and leaves.

By improving photosynthesis, we can help trees capture more CO₂ and grow more rapidly, bringing their many benefits sooner and increasing the rate they remove carbon from the atmosphere and store it in living forests and durable materials.

The possibilities reach far beyond forests.

Deer is one example of the broader possibilities of improving plant biology.

Photosynthesis sustains the food we eat, the forests we depend on, and much of the living world.

Improving its efficiency could help us grow more food, produce more wood and other products of plant biomass, in addition to capturing more carbon from the atmosphere.

Plant biotechnology can also help restore damaged landscapes. Trees engineered to tolerate contaminated soils or accumulate pollutants offer possibilities for phytoremediation, including on former industrial and mining sites.



Capturing carbon is only half the story.

Trees remove CO₂ as they grow. What happens to the carbon afterward matters just as much.

By improving photosynthesis, biological durability, and how biomass is managed and used, we can work toward systems that remove more carbon dioxide and retain its carbon for longer.

Biological durability

Our earlier research produced copper-accumulating hybrid aspen with increased resistance to fungal decay, demonstrating how metal uptake and biological durability could contribute to both phytoremediation and longer-term carbon storage.

Forest management

Forest management provides another lever: trees can be managed for productive growth, harvest, and regeneration.

Materials and biochar

Harvested biomass can also store carbon in long lived materials or be converted into biochar. Carbocene already produces biochar on site using locally grown biomass.

What productive forests can supply.

Greater biological productivity can improve the economics of several established uses of wood.

The opportunity is to
produce useful wood
sooner.

Mass timber and engineered wood

Sawlog volume, recoverable lumber, wood quality and mill prices determine value. Hybrid-poplar CLT has already undergone structural testing.

Feedstock, biochar and bio-oil

Smaller wood and residual biomass can supply fiber and conversion plants. Hybrid aspen is exceptionally well suited to short rotation coppice, with repeated harvest and regrowth greatly increasing biomass productivity over standard management. Margins turn on dry tonnes, transport, processing yields and product markets.

Rapid reforestation

Where ecologically suitable, faster establishment can reduce the time to canopy, shelter and useful biomass. Survival, site preparation and long-term stewardship drive costs.

A Fully Licensed Technology



Carbocene research greenhouse,
Oakland

Carbocene Industries holds a perpetual noncommercial license to use and distribute Deer, preserving access to this pioneering photosynthesis-enhanced tree while developing new technologies to improve photosynthesis and carbon storage.

Our greenhouse maintains living photosynthesis enhanced trees and provides a foundation for propagation, experimentation, and the development of new genetic constructs.

The next steps are to engineer and evaluate new photosynthetic pathways, measure how enhanced trees perform over time, and establish new field experiments.

We are also planning a five acre experimental coppice system, where trees will be grown, harvested, and regenerated over successive cycles. This will allow us to study biomass production, regeneration, and how management and uses of harvested biomass, including biochar, affect carbon storage.

The next generation is already planting trees.



Piedmont Avenue Elementary, Oakland CA, April 25, 2025

At Piedmont Avenue Elementary in Oakland, a photosynthesis enhanced aspen grows in the schoolyard, offering students a living record of growth, pruning, and regeneration, and enabling them to visualize carbon removal directly.



Macomb Township parks, Macomb MI April 28, 2023

In Michigan, students from the International Academy of Macomb worked with their township to plant 100 photosynthesis enhanced aspens in public parks, launching an ambitious youth led environmental initiative.

Science that can safeguard the environment for generations.

Planting an engineered tree is only the beginning. Living Carbon subsequently abandoned its historical planting sites and ceased collecting data, leaving their long-term scientific potential largely unrealized.

Carbocene Industries is an independent nonprofit research organization, preserving and advancing pioneering plant biotechnology. We maintain living engineered trees, develop new technologies, and investigate how improved plants can benefit forests, agriculture, and ecological restoration.

What additional support could make possible.

Different levels of support open different research and field capabilities.

~\$50K

Keep the research operating

Approximately six months of greenhouse operations, living tree care and propagation; essential supplies and research time while pursuing longer-term support.

~\$100K–\$250K

Preserve and extend the living research

Continuity for living tree collections, greenhouse propagation and skilled scientific work; better longitudinal records and focused bench experiments.

~\$250K–\$750K

Develop and compare new engineered lines

Sustained construct design, transformation and selection; replicated greenhouse evaluations, instrumentation and preparation for carefully controlled field studies.

~\$750K–\$2M+

Establish field and product evidence

Replicated field and coppice research, repeated yield and regrowth measurement, independent wood and biomass-conversion tests, and deployment-feasibility studies.

Help us build the next generation of plant biotechnology.

Years of pioneering science have already brought thousands of photosynthesis enhanced trees to reforestation sites and communities. Today, Carbocene is carrying that research forward with very limited funding.

We are seeking philanthropic partners to sustain these living trees, develop new photosynthetic pathways, and investigate plant growth, regeneration, and carbon storage.

We need your help to bring its potential to the world: faster growing trees, forests that store carbon for longer, and more productive plants for the resources people depend on.

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Carbocene Industries - 501(c)(3) nonprofit - EIN 33-1631522