



Maintaining Traditional Markets While Growing New Markets for Biomass

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Key messages

Biomass markets complement, not replace, markets for traditional products

Government policies will affect biomass supply

- **New markets create incentives to increase supply**
- **Cost share programs, education, tax policy can support greater investment in silviculture**
- **Restrictions can have unintended consequences on supply of both biomass and traditional products**


Weyerhaeuser supports a broad definition of eligible biomass

We reinforce the role of states and voluntary certification in regulating environmental effects of forestry

- **Critical role for cooperative research on new practices**

State foresters are key players

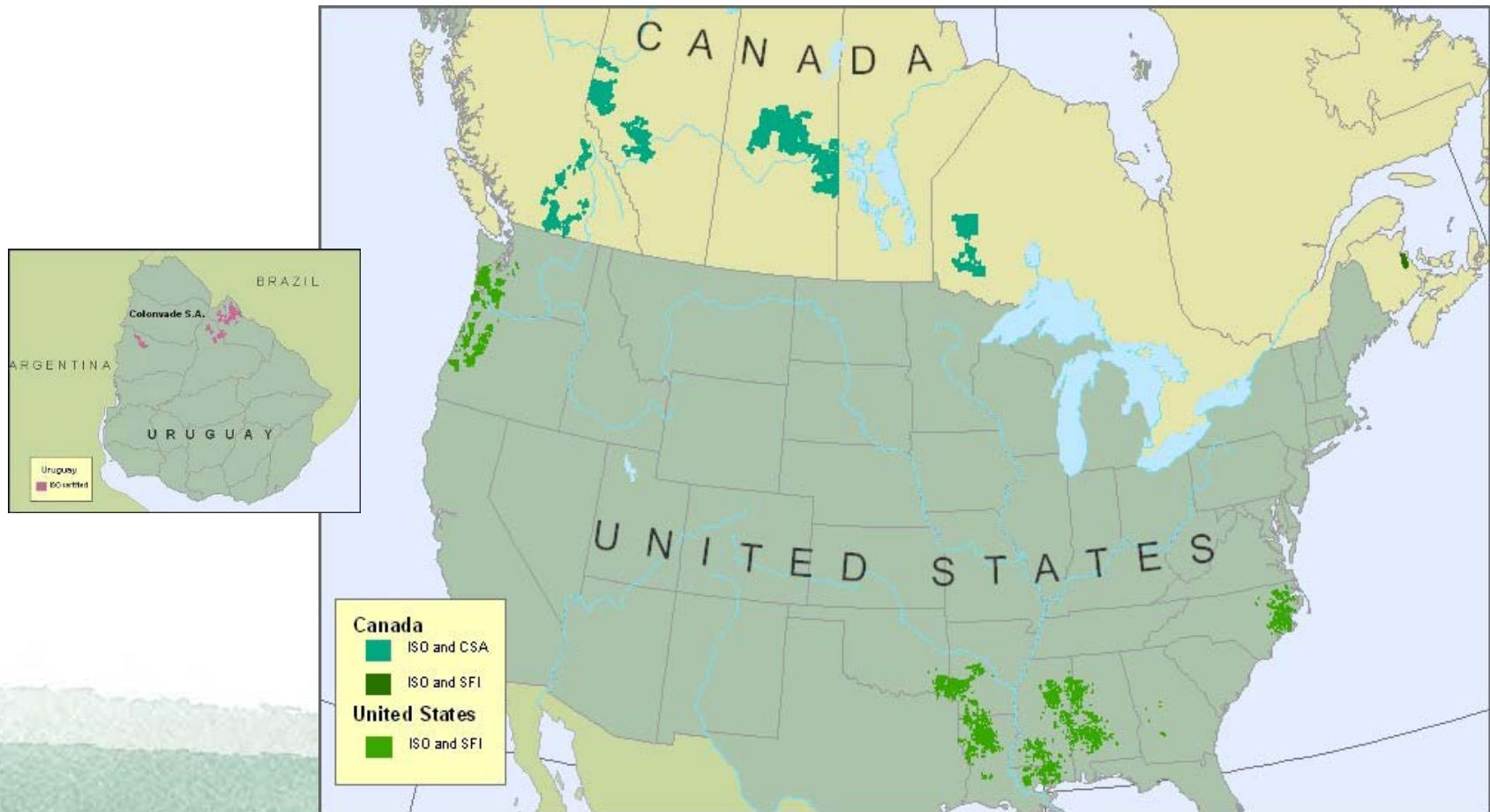
Weyerhaeuser – forest products leader



✓ Founded:	1900
✓ 2008 Revenues:	\$8 billion
✓ Fortune 500 Rank:	147
✓ Number of employees	19,000 in 10 countries
✓ Technology staff	350 scientists / engineers
✓ Forestland owned or managed	21.6 million acres
✓ Home offices	Federal Way, WA
✓ Sales and Support	Worldwide



Weyerhaeuser's certified forest lands

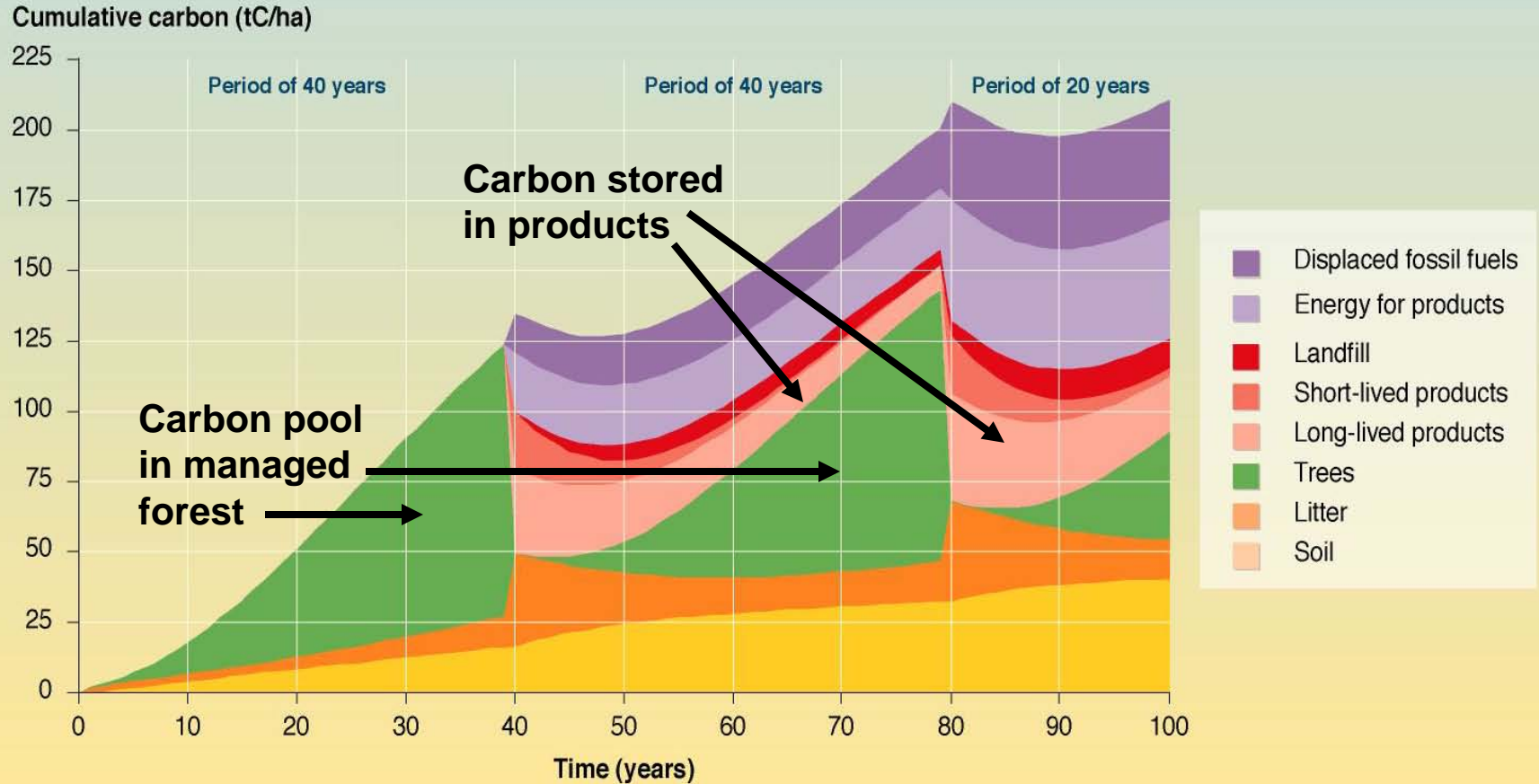


The importance of forests and forest products in climate change policies

"In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."

- Fourth Assessment Report of the Intergovernmental Panel on Climate Change (2007)

Carbon balance from a hypothetical forest management project



Weyerhaeuser's carbon cycle

1. In a sustainably managed forest, carbon is maintained



4. Manufacturing products emit CO₂



**Carbon
Neutral**

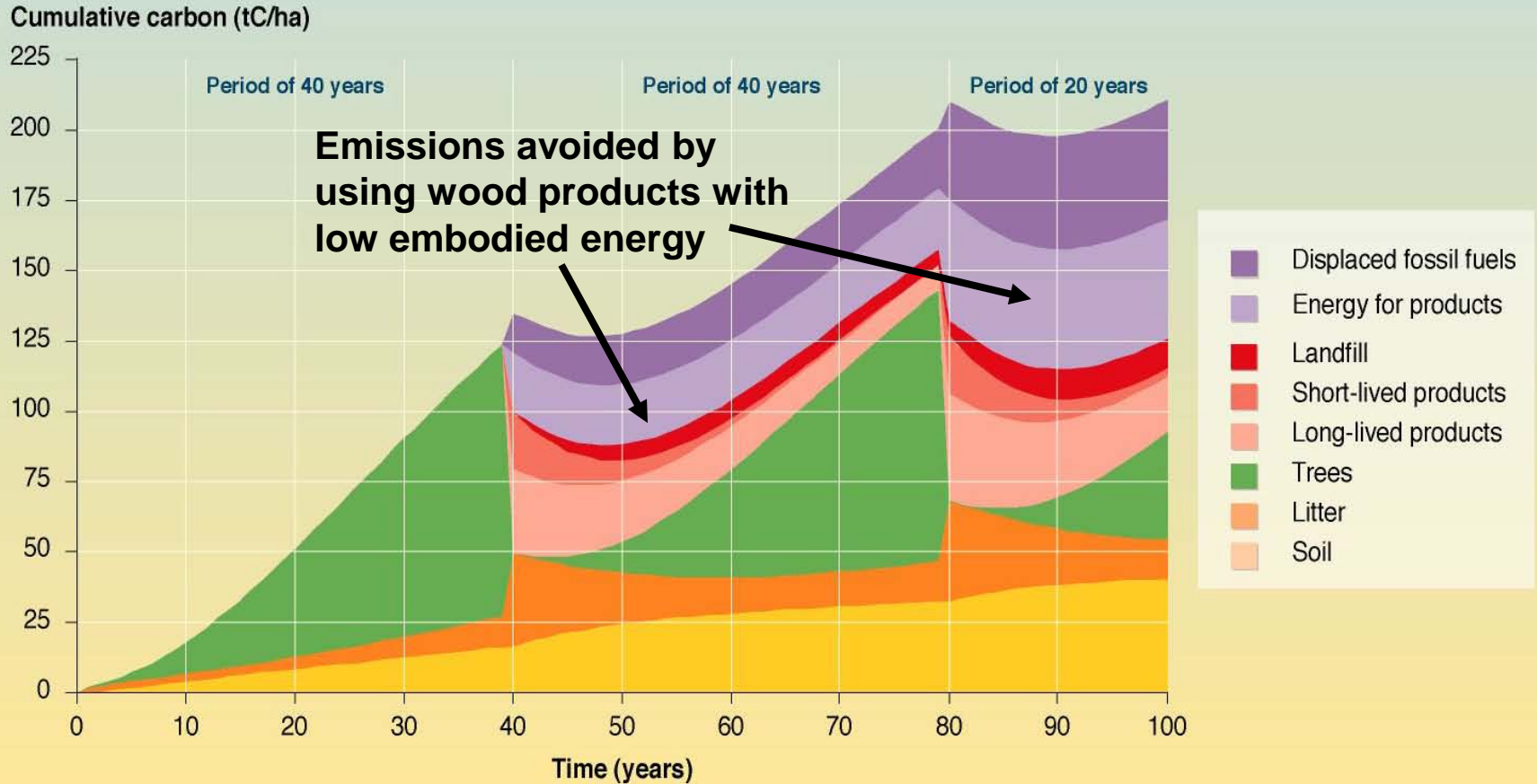
2. Wood products store carbon



3. Biomass burned closes the carbon cycle

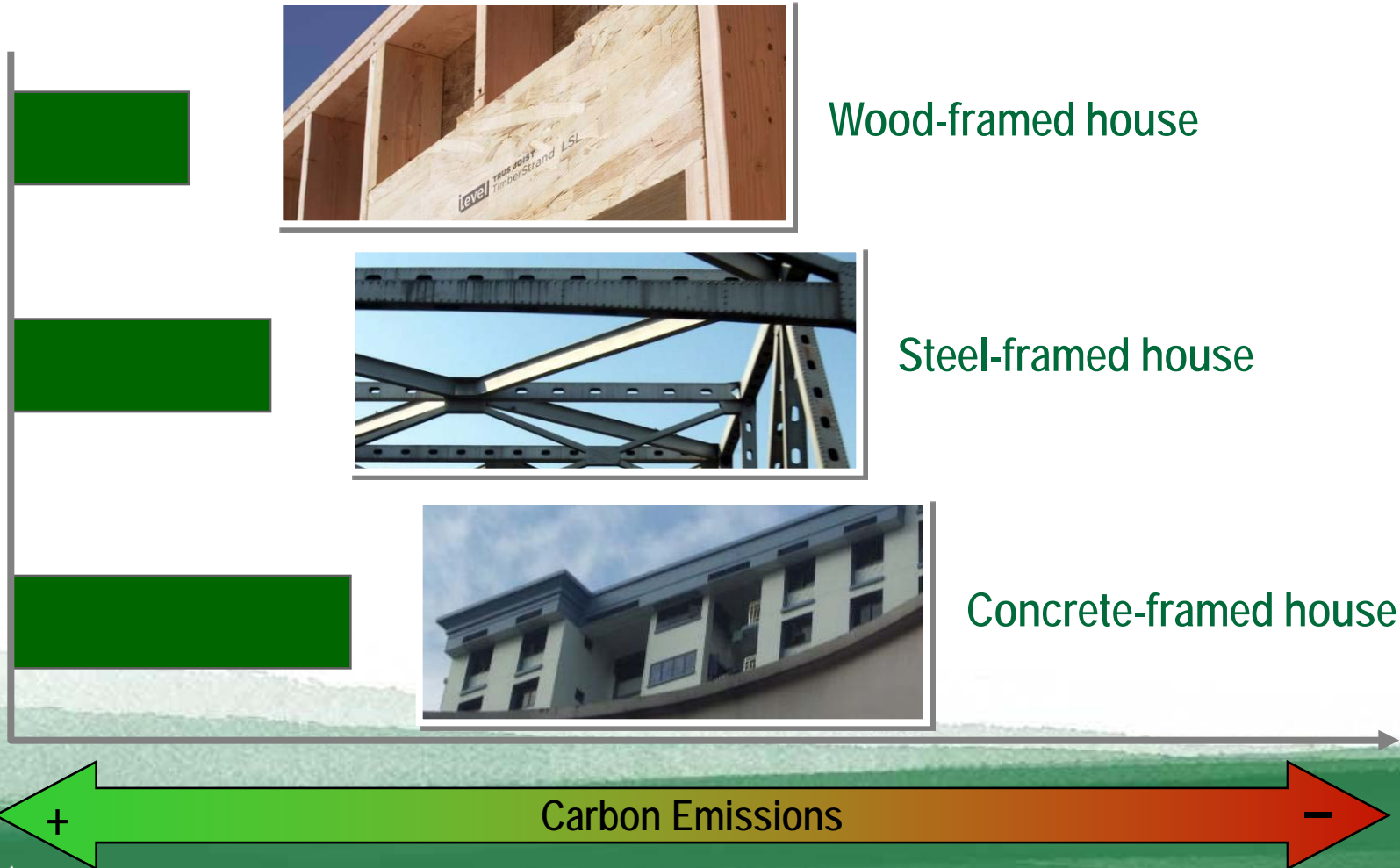


Carbon balance from a hypothetical forest management project



Wood products' role in green building

Lower Carbon Emissions & Carbon Stored for Decades



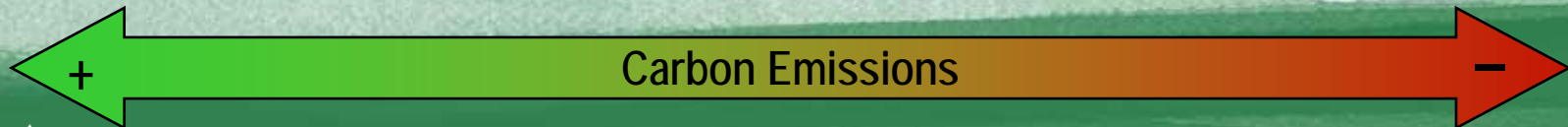
Wood-framed house



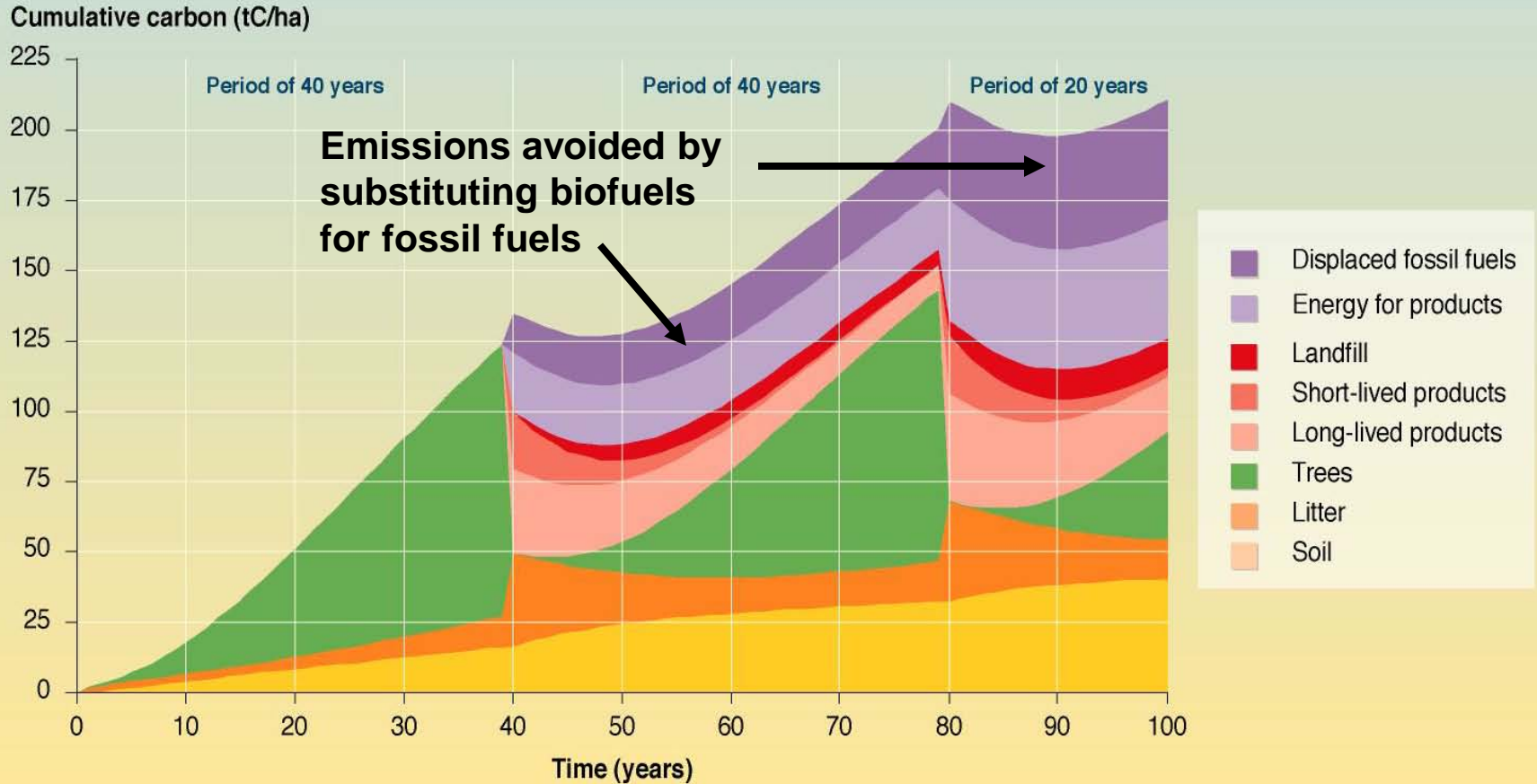
Steel-framed house



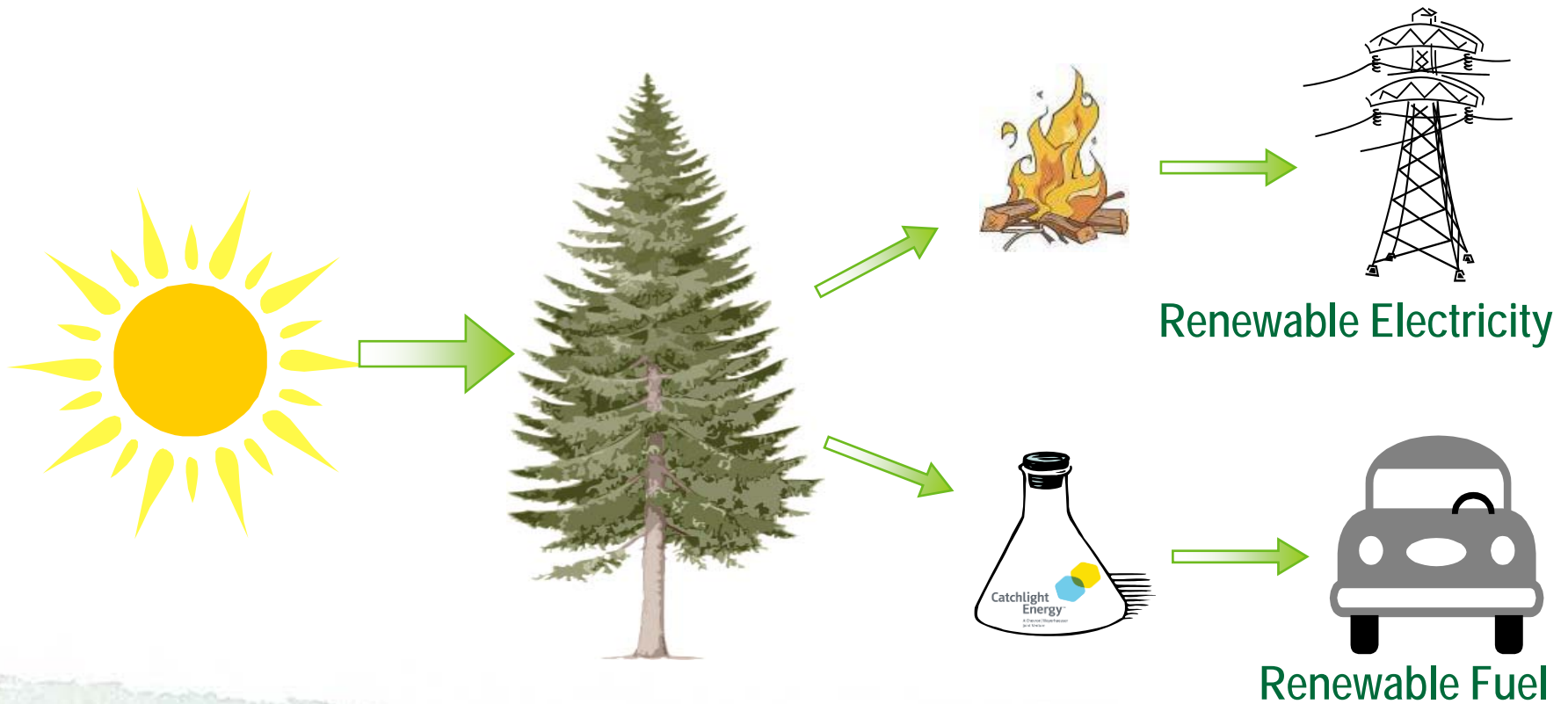
Concrete-framed house



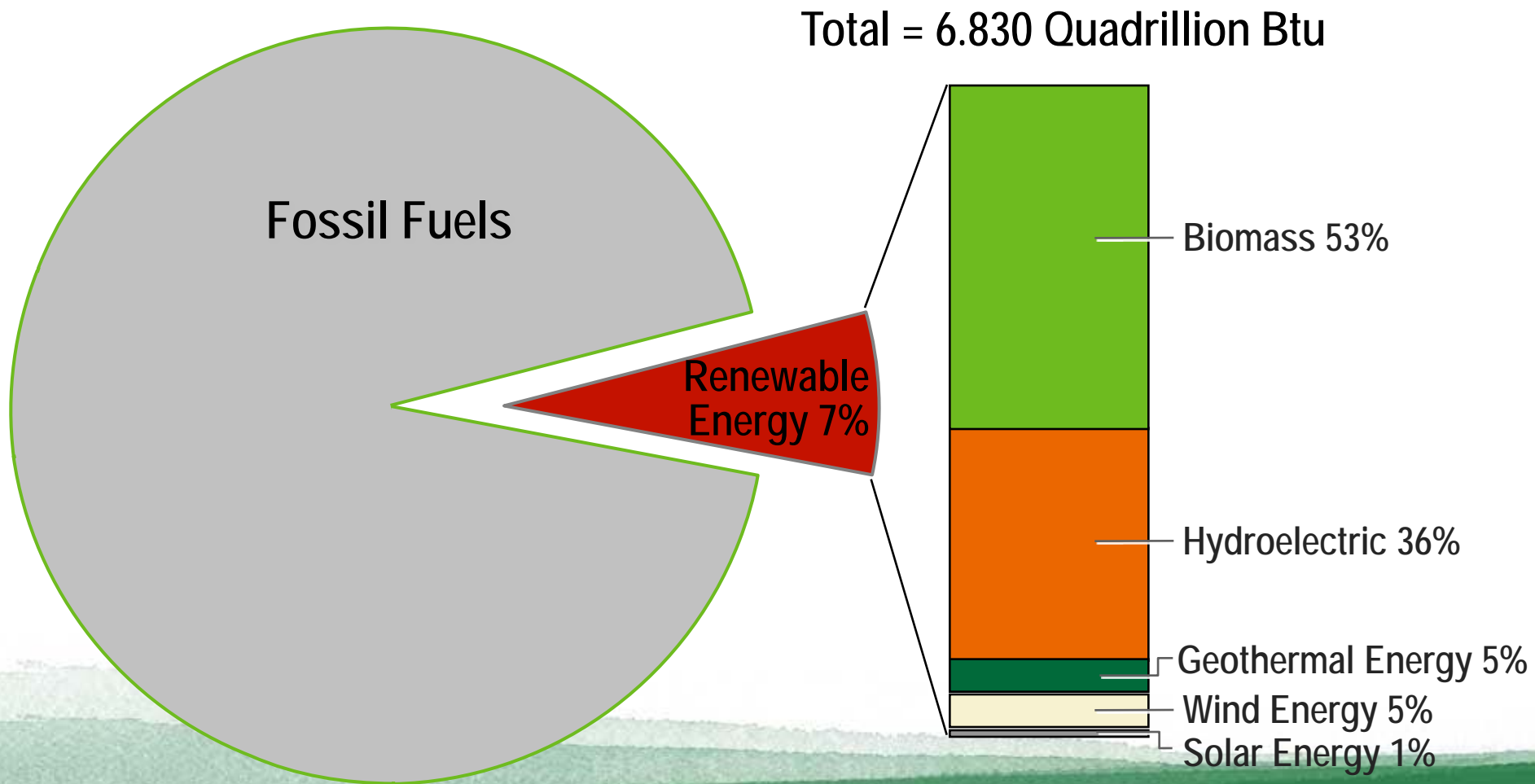
Carbon balance from a hypothetical forest management project



Bio-energy: it starts with the sun

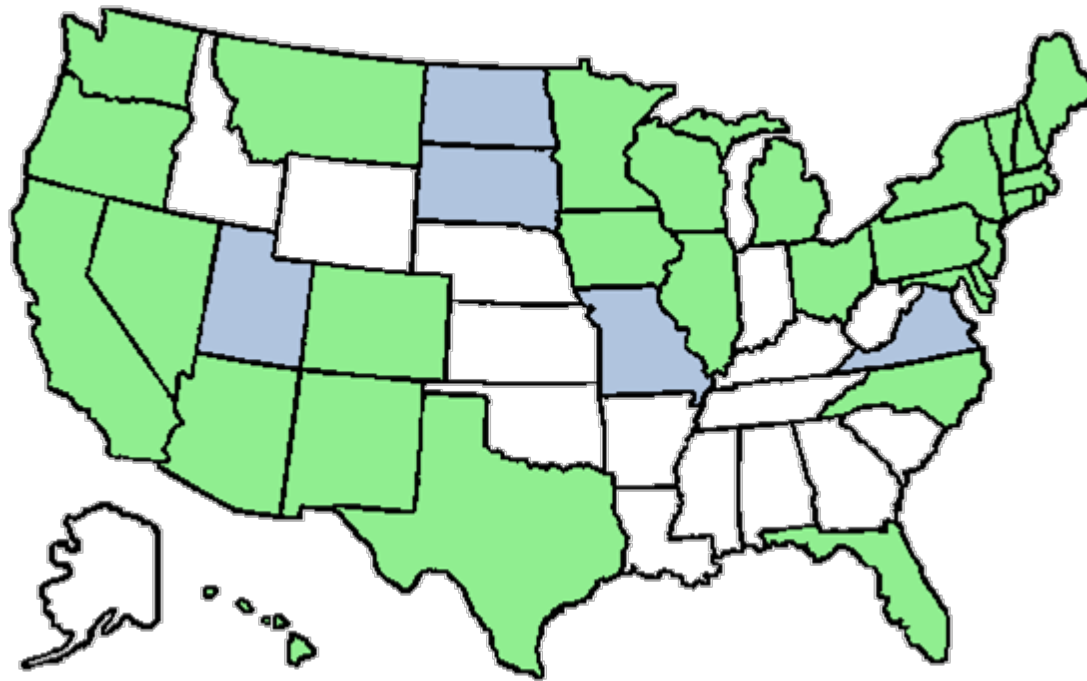




The role of renewable electricity



Source: EIA, Renewable Energy Consumption and Electricity Preliminary 2007 Statistics

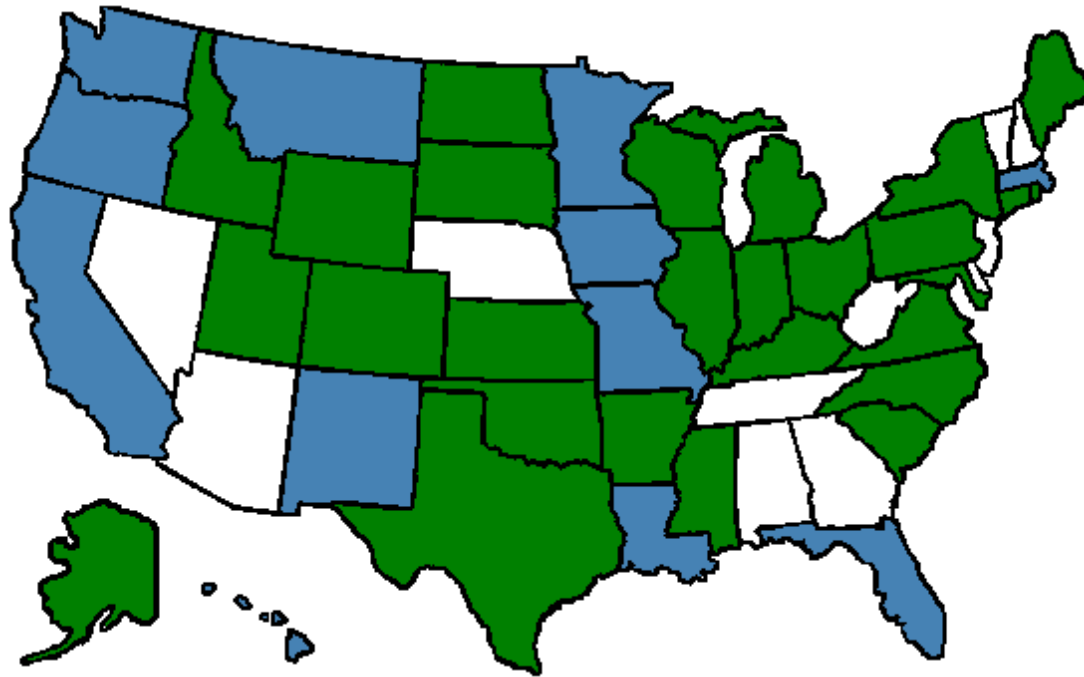
Policy driver: renewable electricity standards





-  Mandatory RES
-  RES via Voluntary Utility Commitments

RES = RPS

Policy driver: renewable fuel standards



-  Tax Exemptions, Credits and/or Grants
-  Above + RFS with Biofuel Mandates

Generating plentiful biomass

A greater supply of biomass will lessen the impact of biomass energy on traditional forest products companies

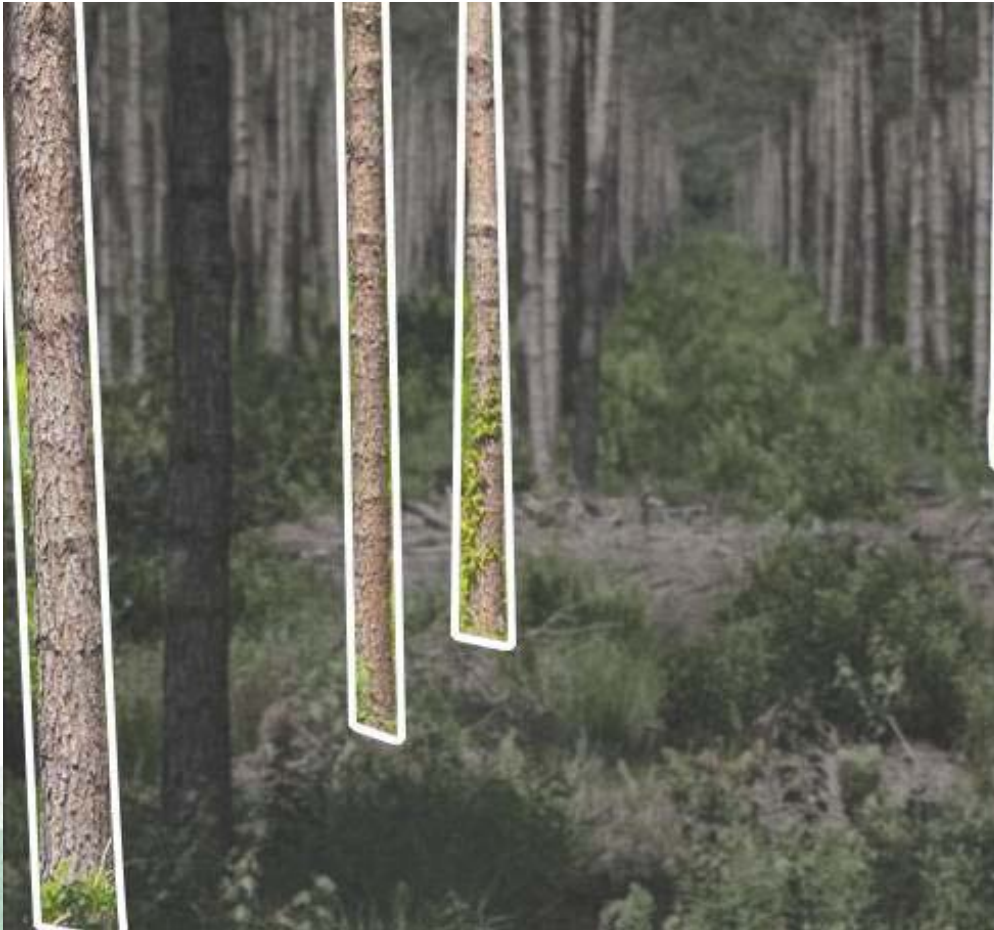
How to get there?

- **Improvements in biomass harvesting technology**
- **Improvements in silviculture**
- **Innovative ways to integrate biomass cultivation with forest management**
- **Supportive government policies**

Sources of forest-based biomass



Sources of forest-based biomass



Direct from forest

- Small logs, e.g., thinnings

Sources of forest-based biomass



Direct from forest

- Small logs, e.g., thinnings
- Slash/logging residues

Sources of forest-based biomass



Direct from forest

- Small logs, e.g., thinnings
- Slash/logging residues
- Interplanted energy crops

Sources of forest-based biomass



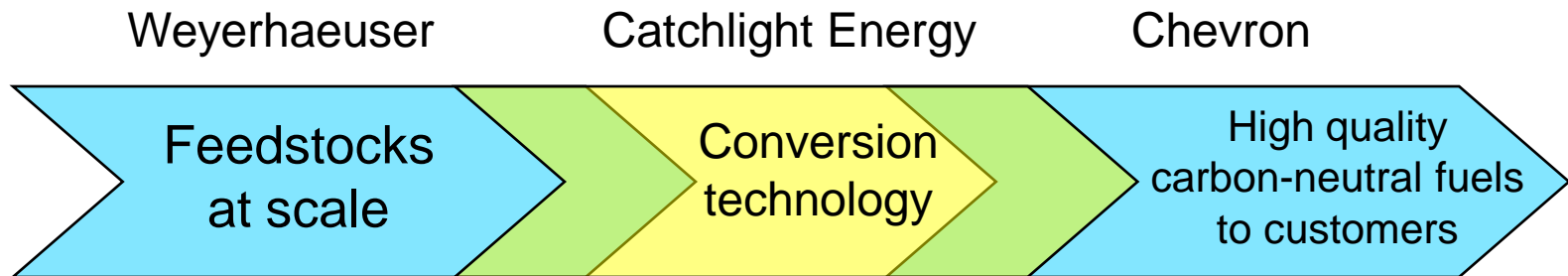
Direct from forest

- Small logs, e.g., thinnings
- Slash/logging residues
- Interplanted energy crops

From manufacturing

- Sawdust and chips
- Pulping liquor

Increasing sustainable supply: Catchlight Energy

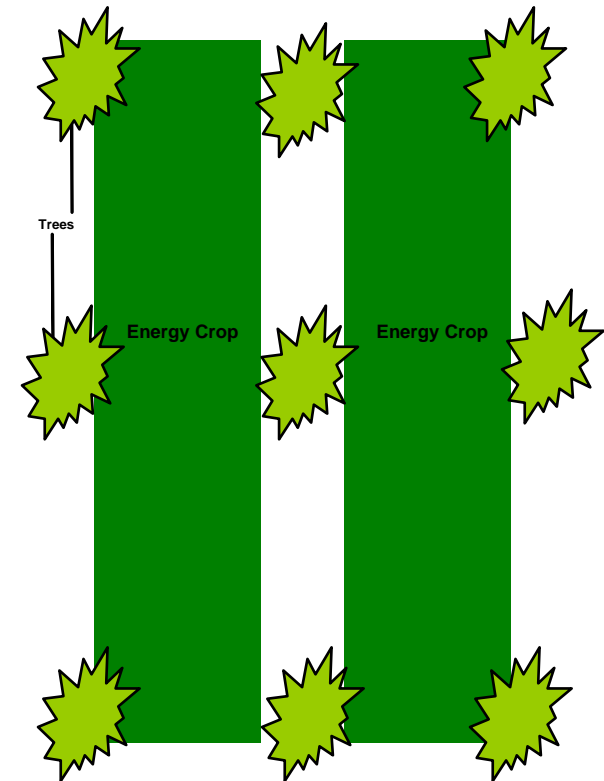


End-to-end value chain solution
Unique in the market

Applied research: Intercropping dedicated energy crops

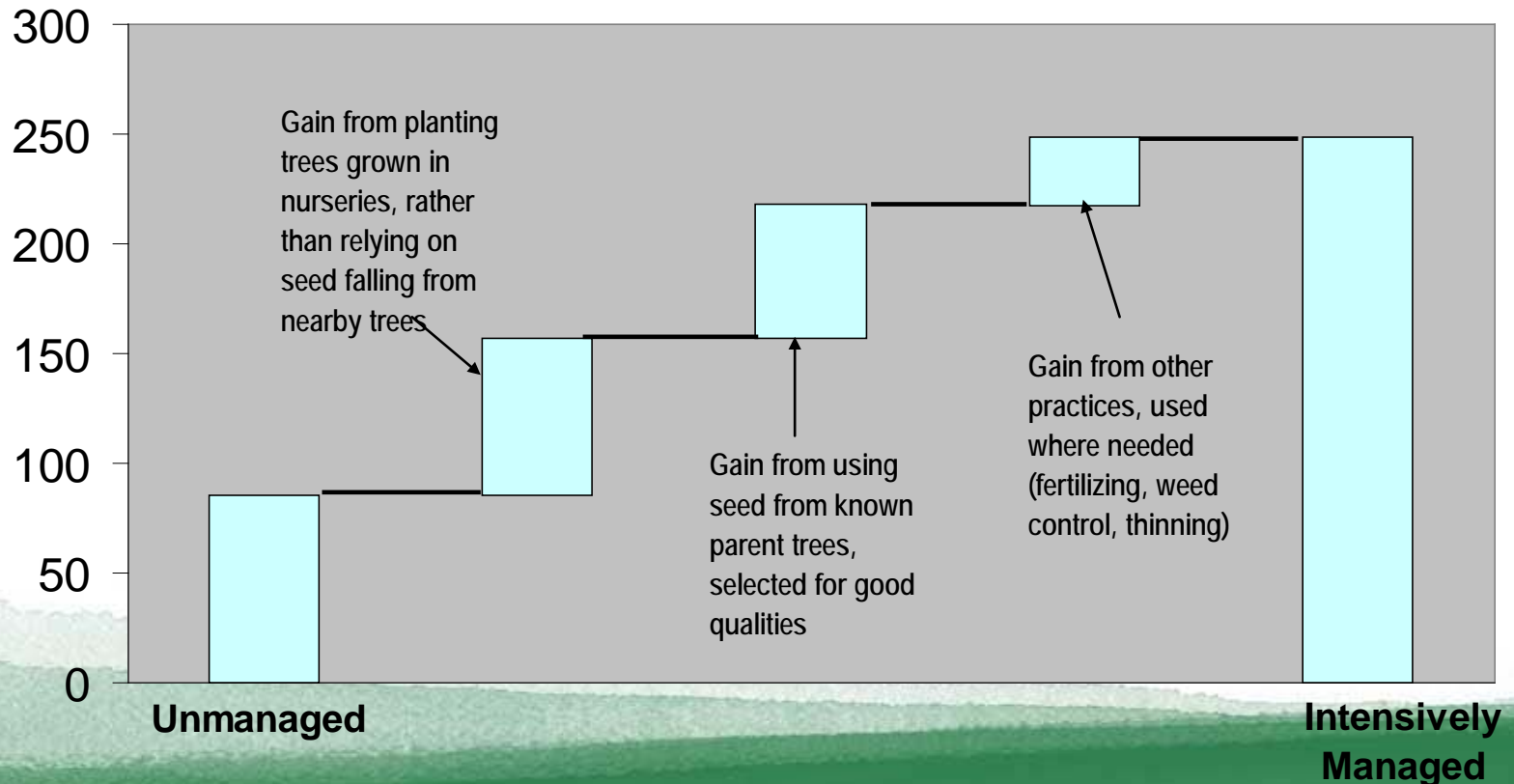
How this may work

- Grow strips of pine trees and an energy crop
- Perennial energy crop harvested annually for a number of years
- Trees managed for wood products and fiber



Increasing sustainable supply: intensification

Improved Productivity with Silviculture Average Conifer Growth (Cubic Feet/Acre/Year)

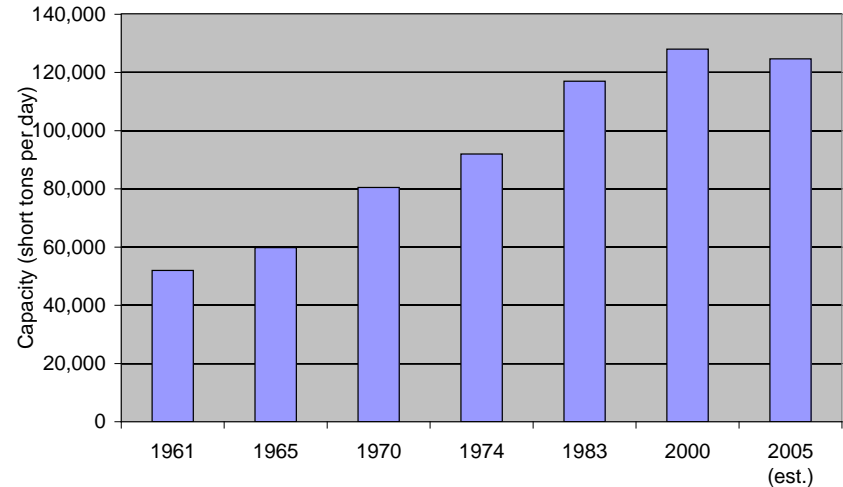


US South: history shows the potential

Substantially increased production – pulp and solid wood

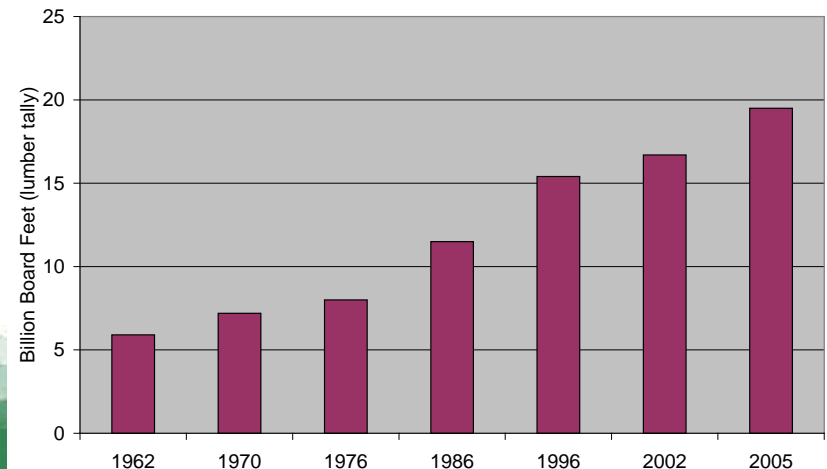
Where did it come from?

US South Pulp Output Processing Capacity



source: USDA USFS, RISI

US South Softwood Lumber Production



source: USDA USFS, RISI

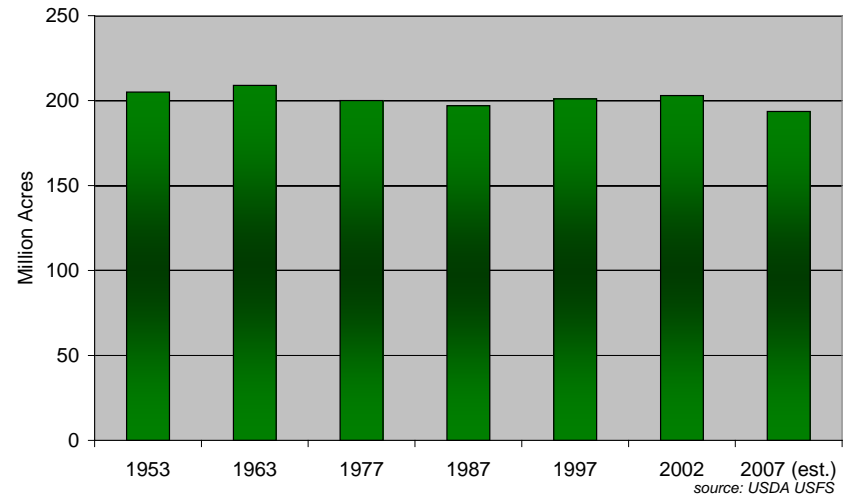
US South: history shows the potential

Not from finding more land – the forest land base has been stable

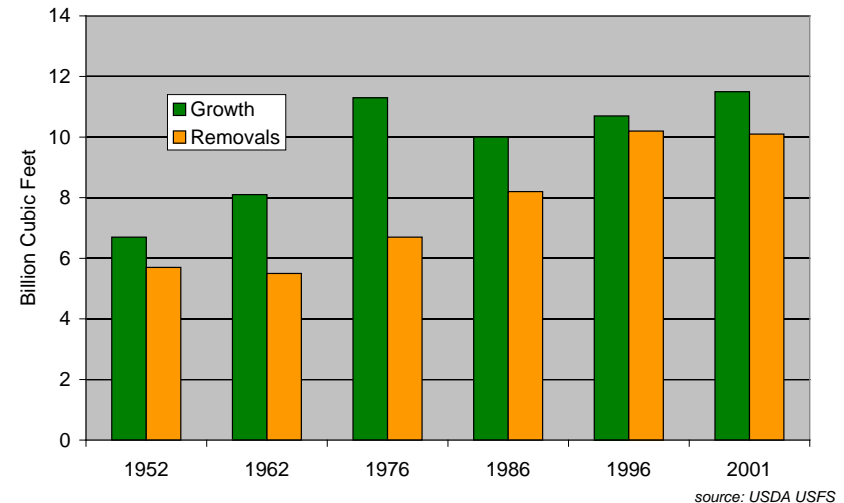
It came from the forest – harvest volumes increased

... but so did growth

US South Timberland Area



US South Growth versus Removals

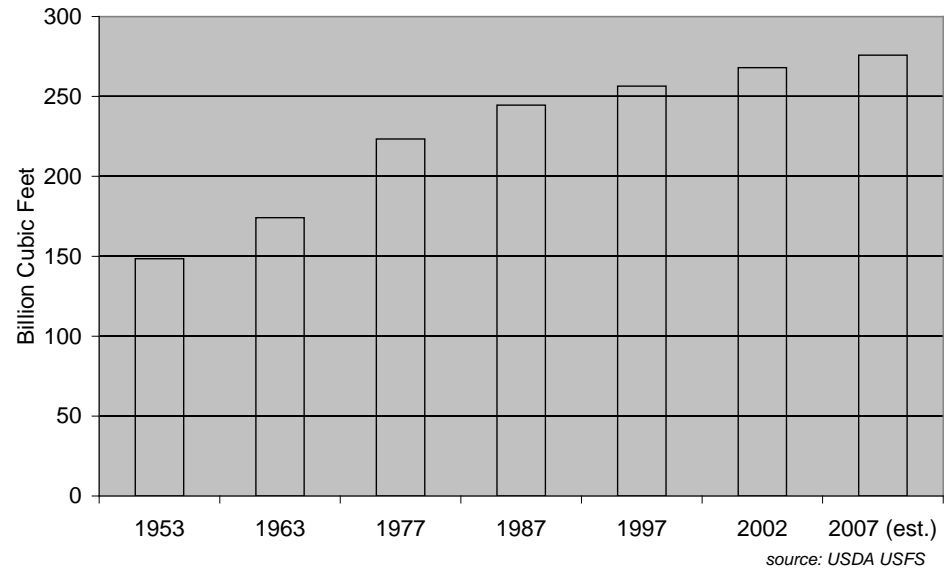


US South: history shows the potential

Leading to
increased
inventory

. . . so the new
harvest levels
are sustainable

US South Timber Inventory Volume

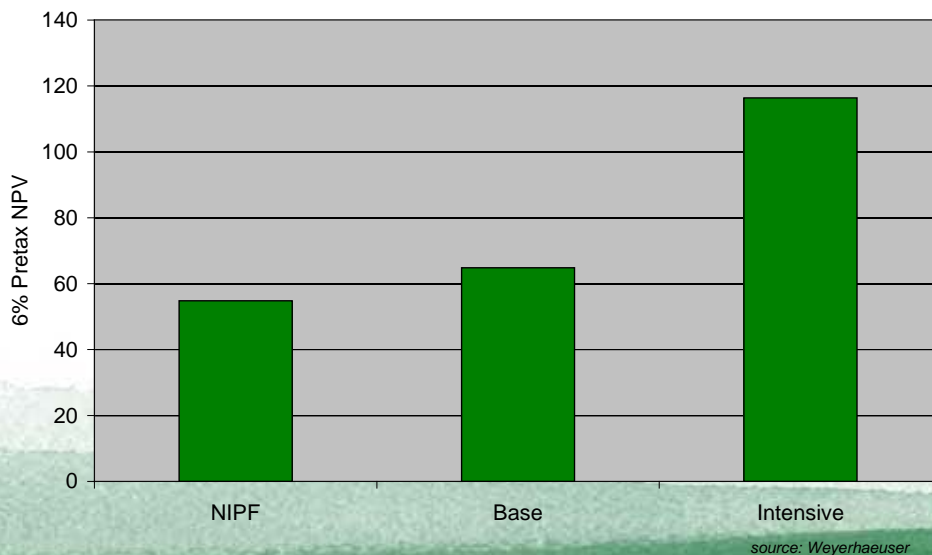


US South: markets support traditional products as well as biomass

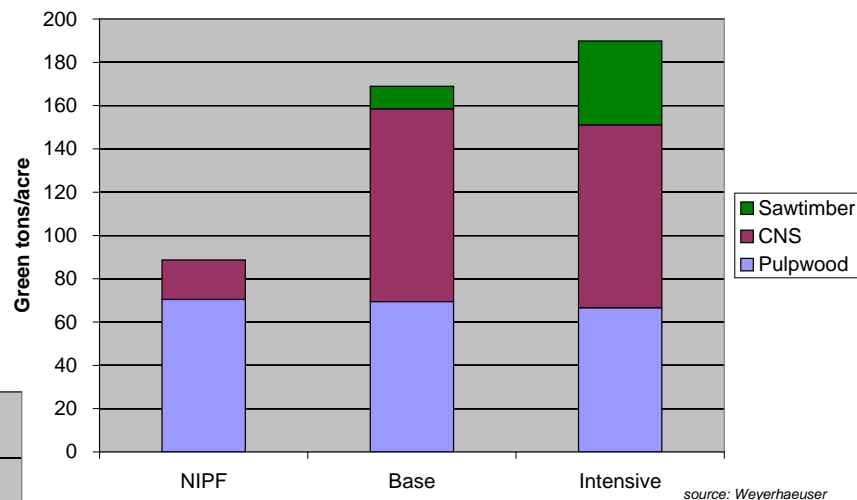
More intensive practices produce:

- More sawtimber
- More fiber residuals

Financial Effect of Intensification



Volume Production Effect of Intensification



Better financial returns

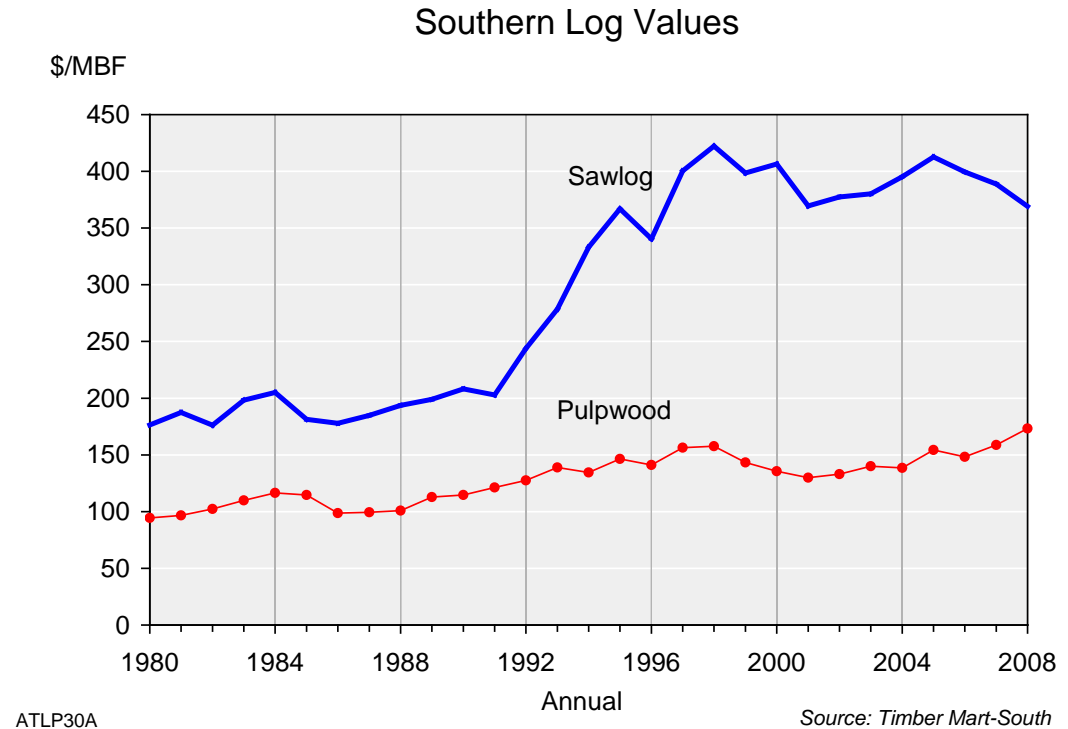
- Depend on retaining strong customers for all products

Timber price behavior

Private owners respond to financial incentives

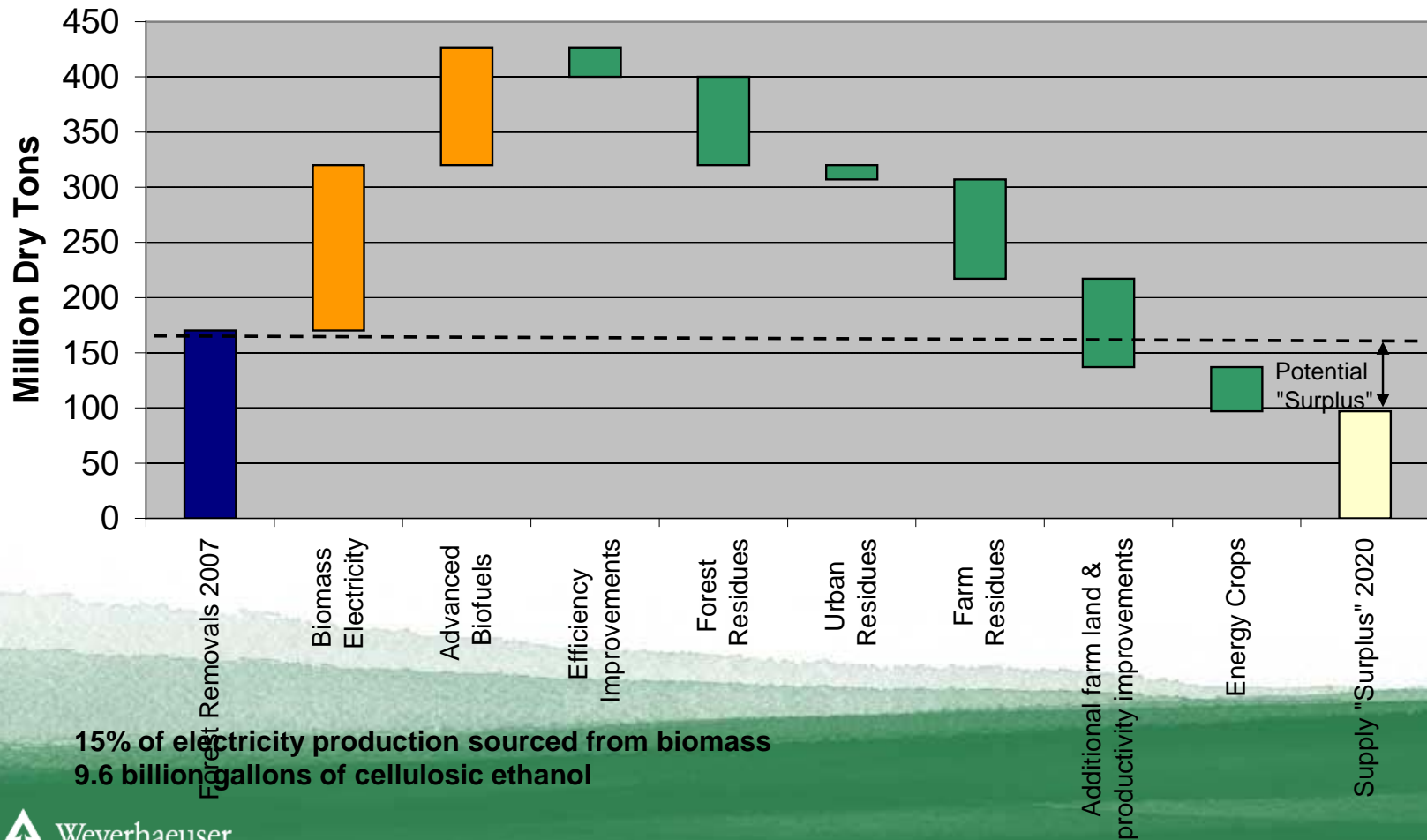
Sawlog prices are much higher than pulpwood prices

Thus, sawlog values are the primary driver for more intensive forest management



With the right incentives there can be enough supply for traditional and new markets

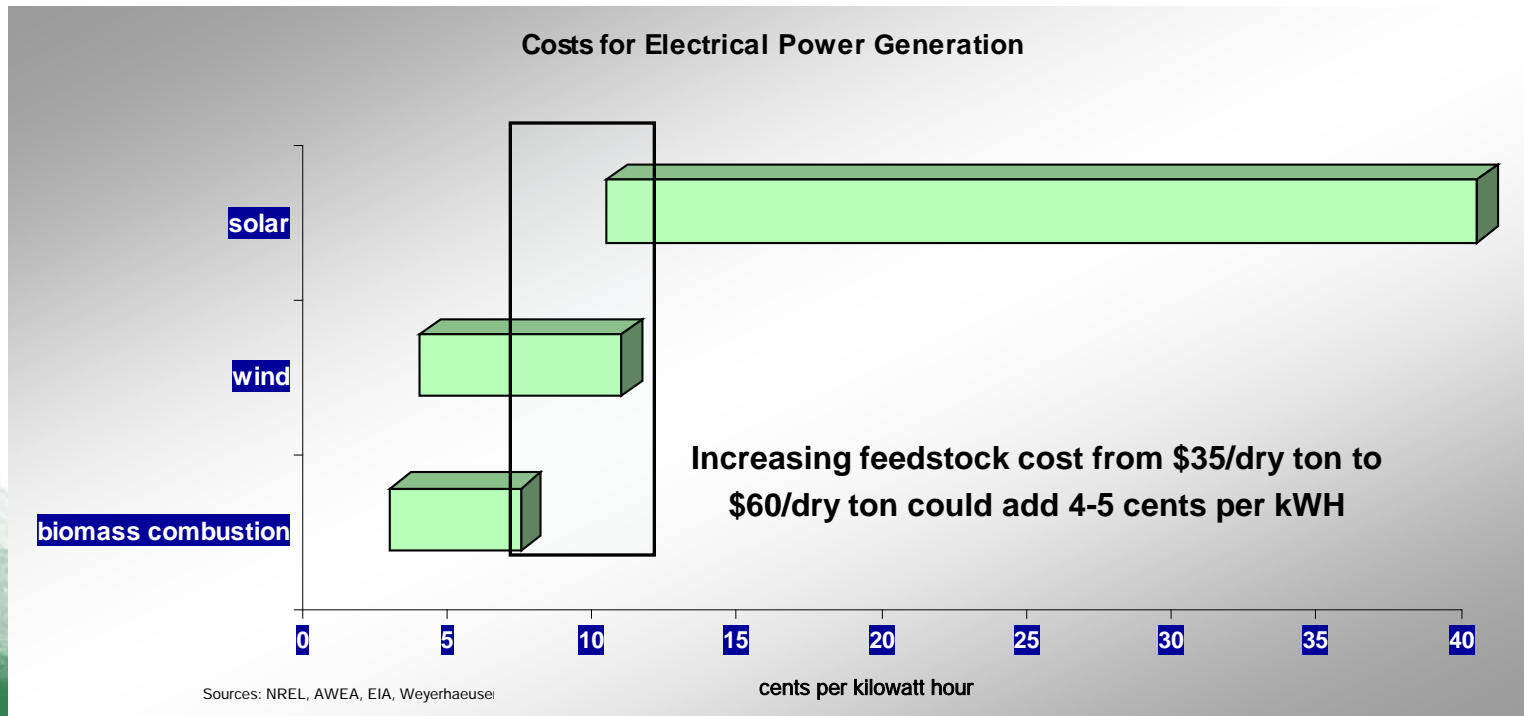
Illustration of Plausible Demand/Supply Balance



Biomass costs will be bounded by competing technologies

Other technologies become competitive if biomass costs rise significantly from today's levels

Biomass for energy will develop over a number of years with ample opportunity to adjust course



Key research questions for biofuel production on forest lands

Identifying the effects of growing and harvesting large amounts of biomass for fuel and energy on:

- Water quality & quantity
- Plant biodiversity
- Wildlife
- Soil productivity

Life cycle analysis

- Carbon storage and flux
- Food v. fuel
- Forest land use / conversion

Major cooperative research installations in NC, MS, LA, OR



Conclusions

Markets are best served with strong, competitive customers for timber *and* biomass

Sawlog values drive forestry, producing abundant fiber and biomass as joint products

Forest supplies are growing due to greater investment, and can respond to increases in demand

Ability to sell biomass provides an additional source of revenue for landowners – an incentive to keep land forested

Help we need from the State Foresters:

- **Understand the importance of efficient markets**
- **Promote production from sustainably managed forests**
- **Reinforce state-based controls, including voluntary certification and outreach programs, in addressing environmental issues**
- **Support a broad definition of eligible biomass**
- **Support cooperative research on new practices**



Weyerhaeuser

Growing Ideas™