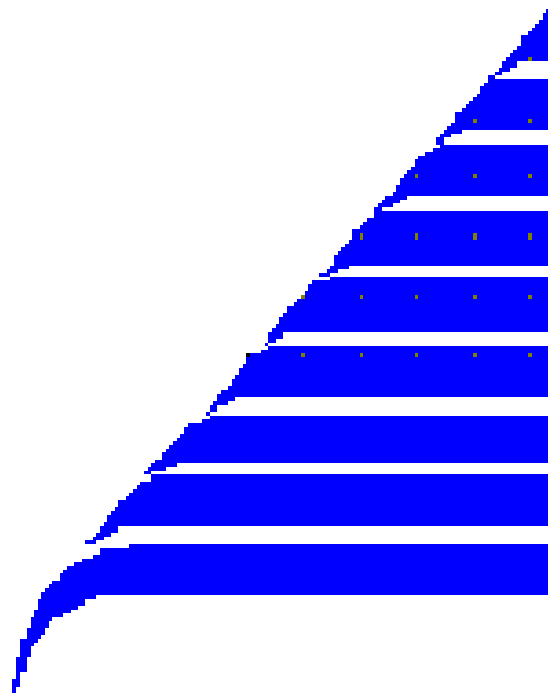


Forests and Energy: Growing Towards a Carbon Neutral Alberta



ALBERTA

NEWSPRINT

COMPANY

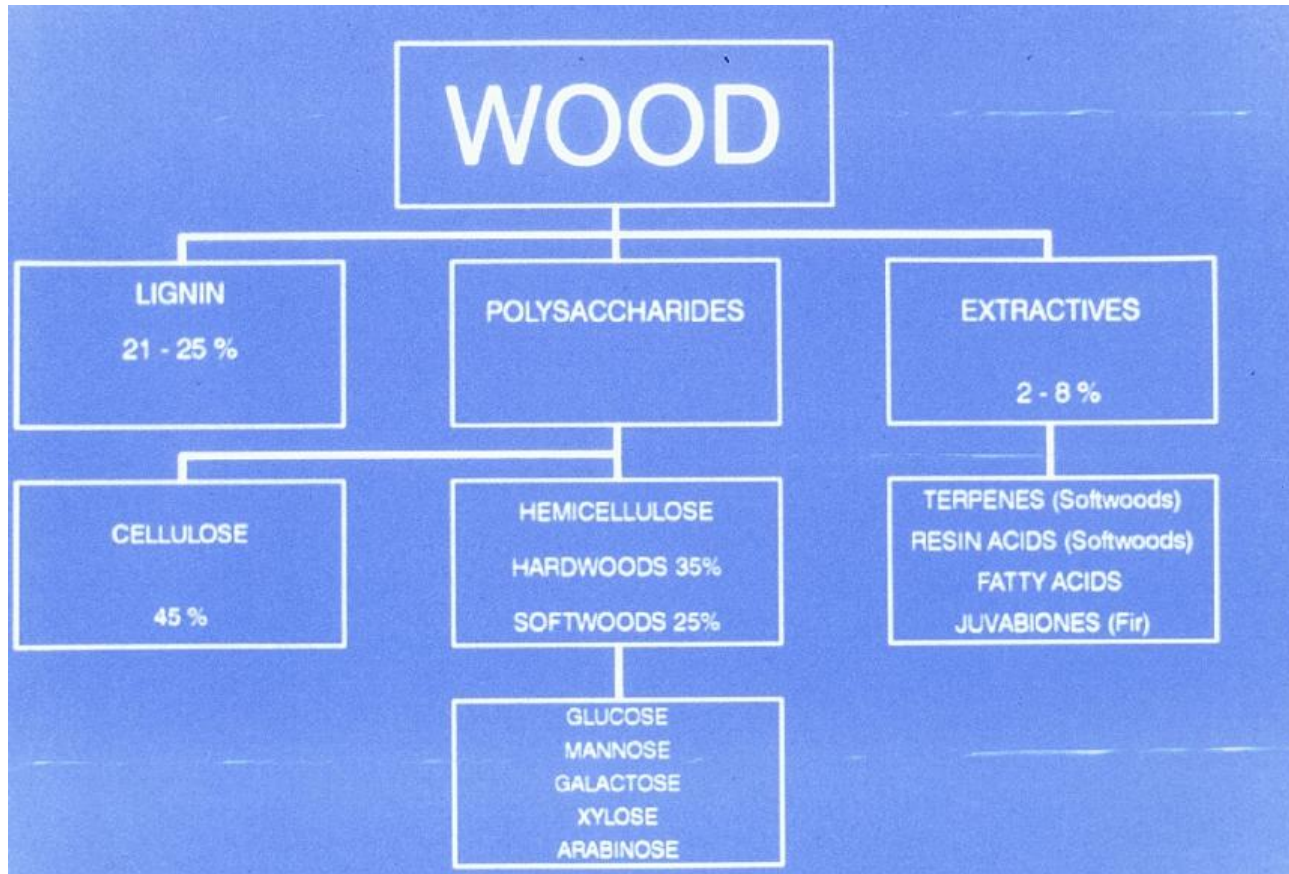
October 20,2010

ANC STORY

- ↓ Began Production in 1990
- ↓ Premium newsprint supplied to the Edmonton Journal, Calgary Herald, USA Today, Wall Street Journal, and others.
- ↓ 210 Full time employees, 125 FTE in woodlands, plus others
- ↓ On going capital reinvestment to ensure ANC's long-term viability and competitiveness
- ↓ Only paper mill in Alberta



Mechanical Pulping 92% Yield



TMP Refining



- ↓ Refiner Motors generate High Fiber Yields
- ↓ Minimal waste streams for co-generation opportunities
- ↓ Consume Significant Electricity- 95 Mega Watts

Rolls Leaving Winder



Alberta Electricity Deregulation Game Changer at ANC

- ↓ Alberta Deregulated in 2001 – market prices doubled
- ↓ ANC Hedged with Acquisition of PPA from Coal Fired Electricity Generators
- ↓ Alberta Carbon Tax in 2007 for major emitters

	GHG required for PPA (Tonnes)	GHG credit generated at ANC (tonne)	Bought from Market (Tonne)	\$\$ spent
2010 (estimated)	190,000	40,000	150,000	\$2.0 million
2009	166,000	22,000	144,000	\$1.84 million
2008	135,000	21,000	114,000	\$1.5million

Carbon Management at ANC

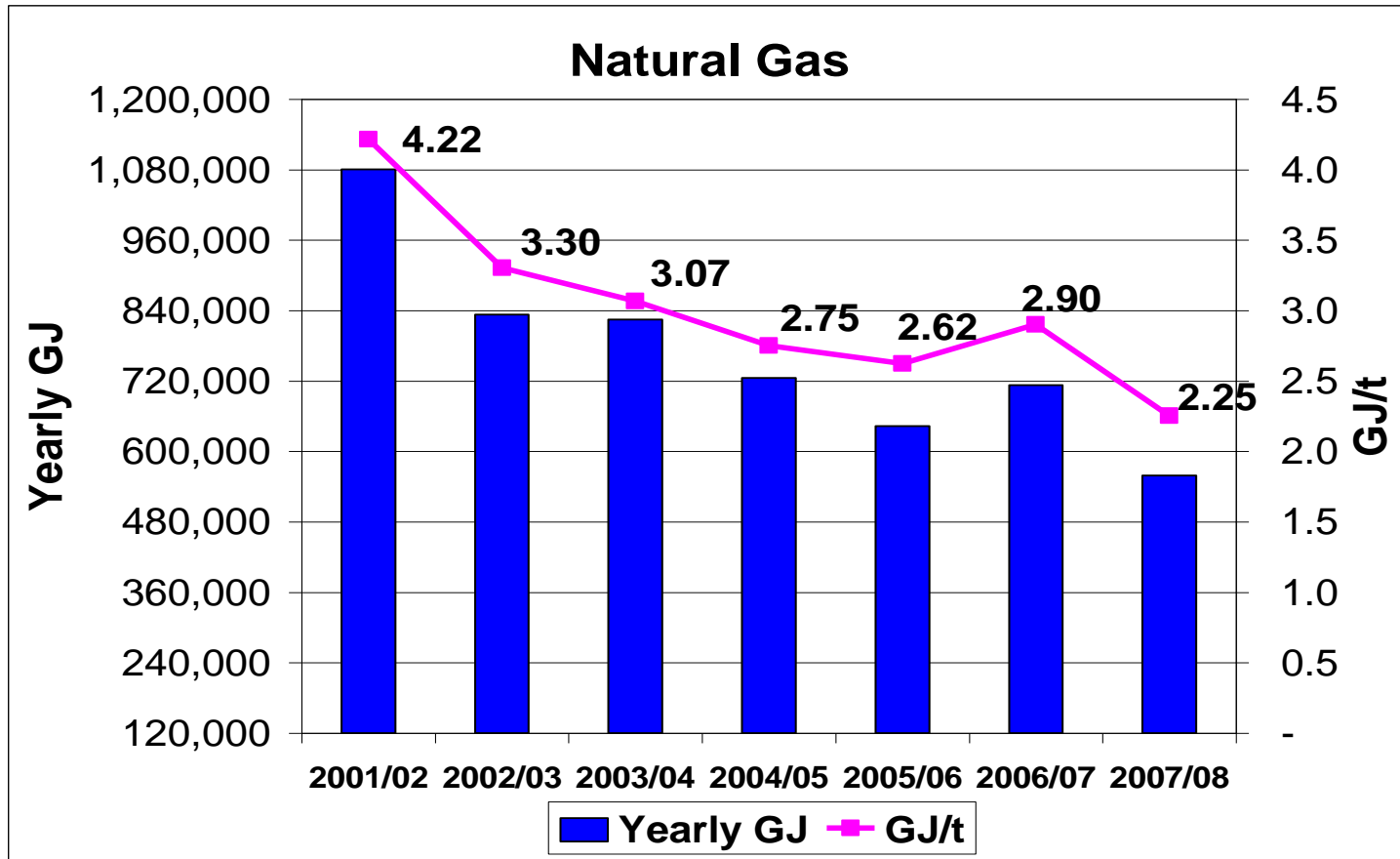
- Actively increasing carbon capture and storage with highly successful and prompt silviculture program
- Multifaceted approach beginning in 2004
- Forest Carbon Management a strategic goal in 2008
- Simple pragmatic target of securing a carbon credit from forest management activities in 2010.



Business Case for Carbon Offsets

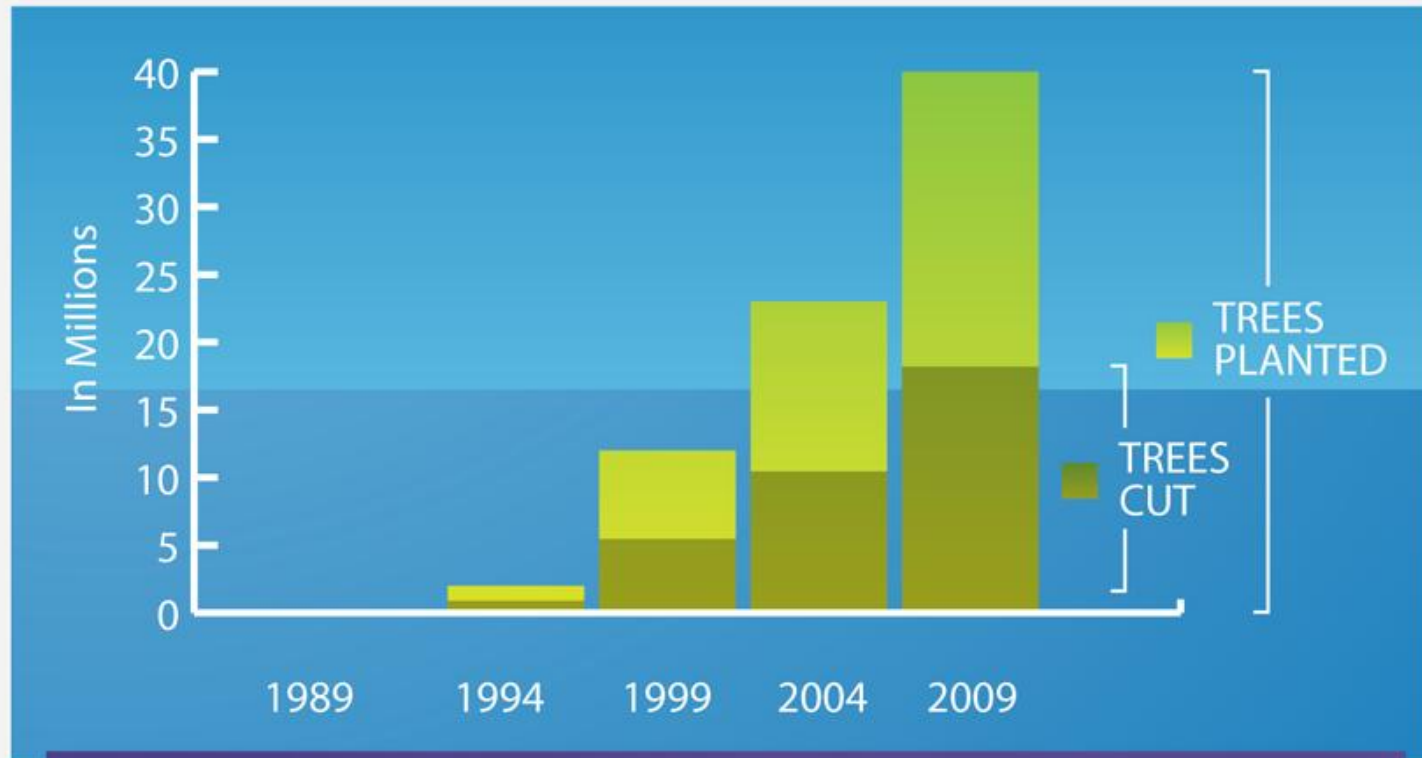
- ↓ Carbon is an emerging business threat and opportunity for ANC
- ↓ ANC is purchasing Alberta carbon credits – annual expenditures of \$2 million
- ↓ Afforestation and Reforestation represent a made in Alberta opportunity to offset rising offset expenses.

Yearly Natural Gas Usage



TOTAL TREES PLANTED VS. TOTAL TREES CUT

DEVELOPED WITH  THE SILVADOM GROUP



2.2 TREES PLANTED FOR EVERY TREE HARVESTED

What Are the Results?



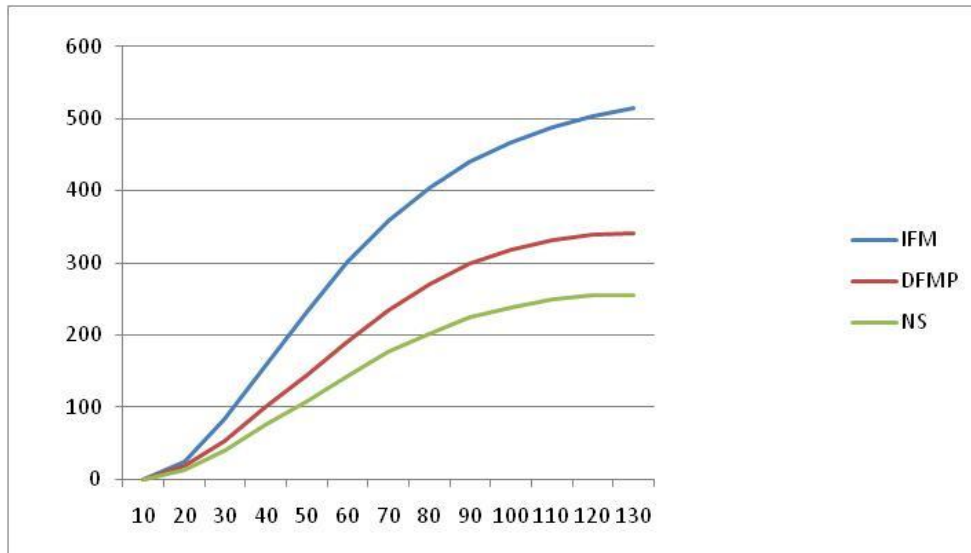
BEFORE – 2000
Block 810-1012



AFTER – 2008
Block 810-1012

IFM Example

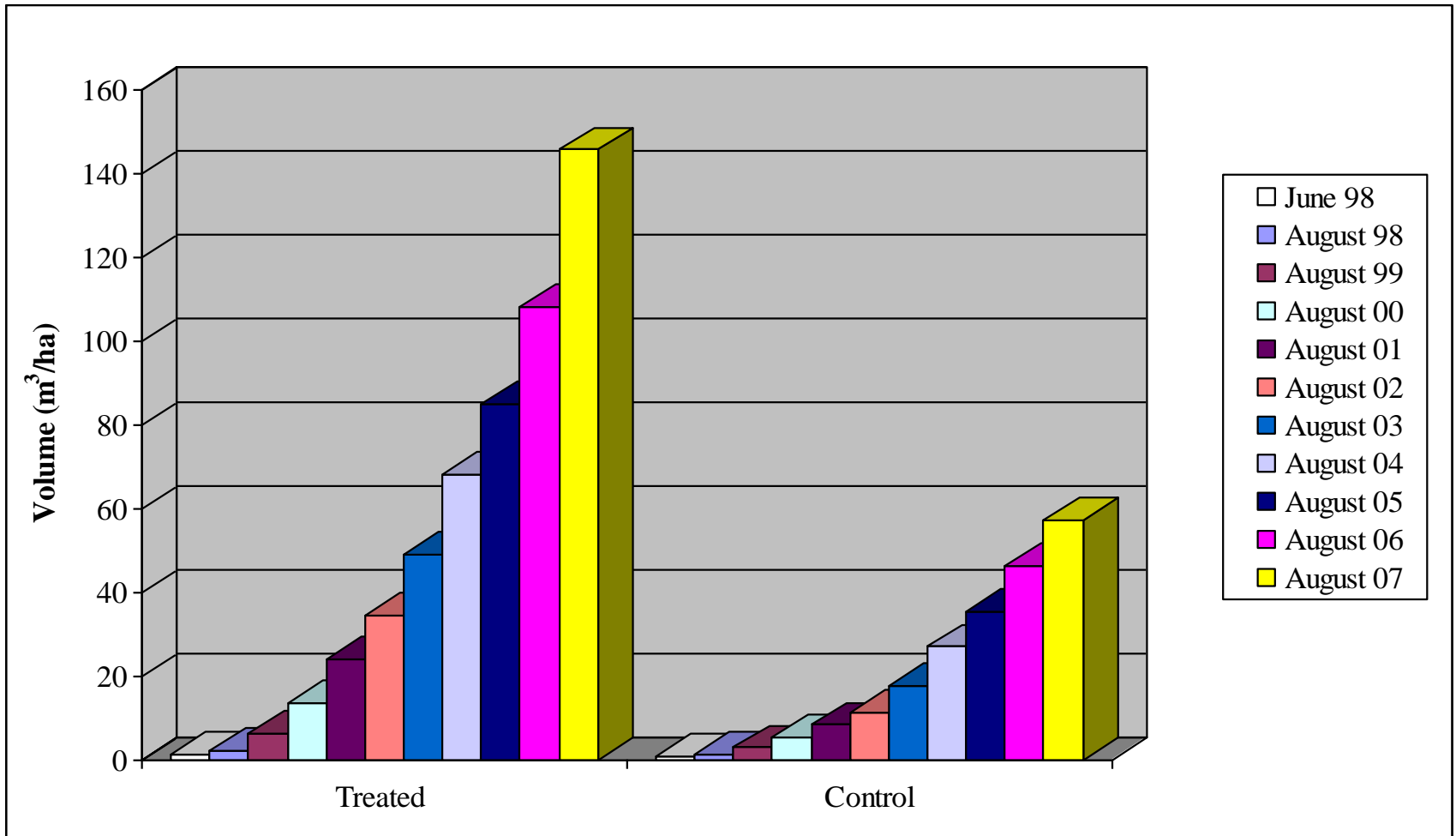
Real Data on 1030 ha



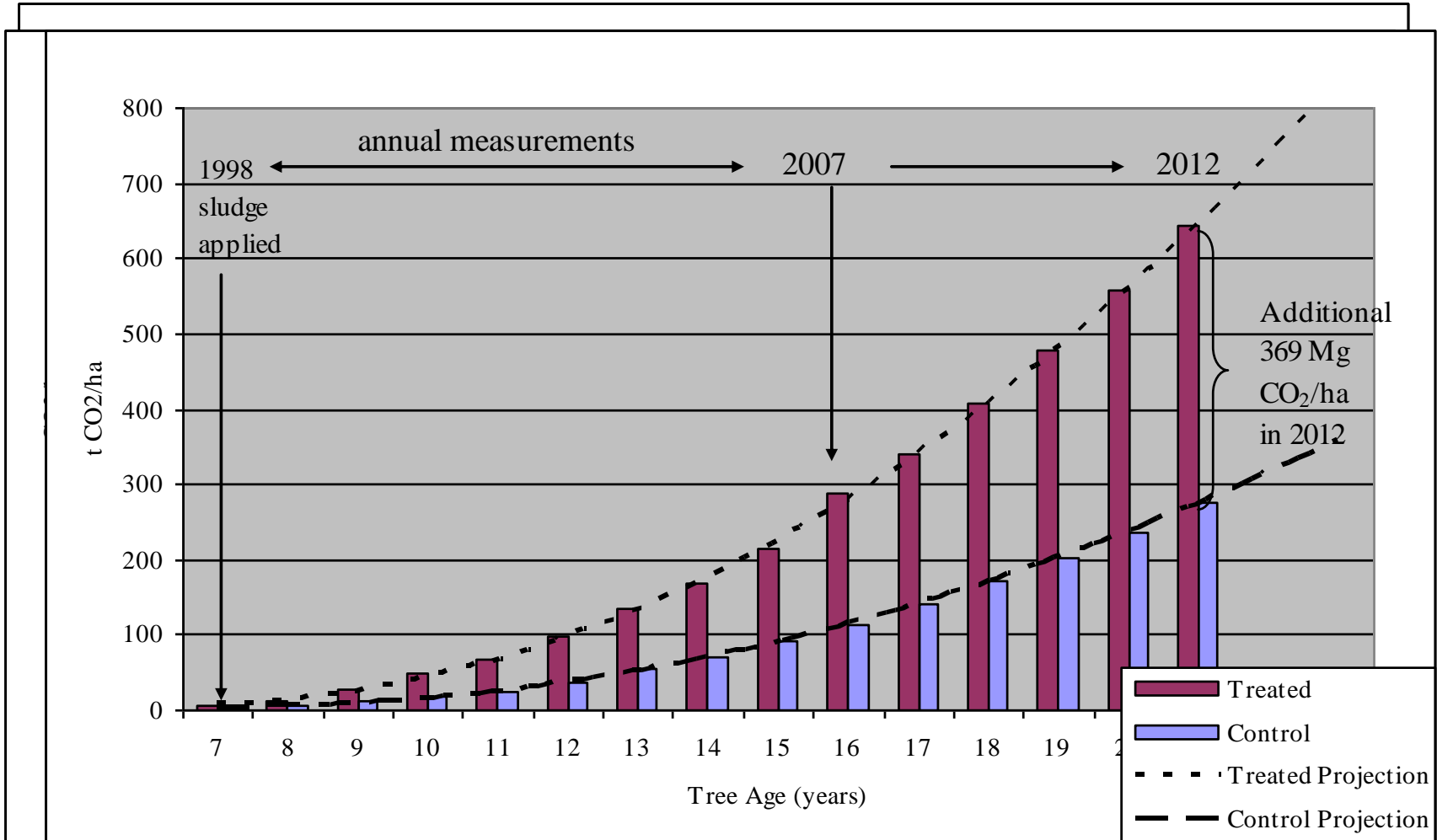
SLUDGE UTILIZATION

ACTIVITIES

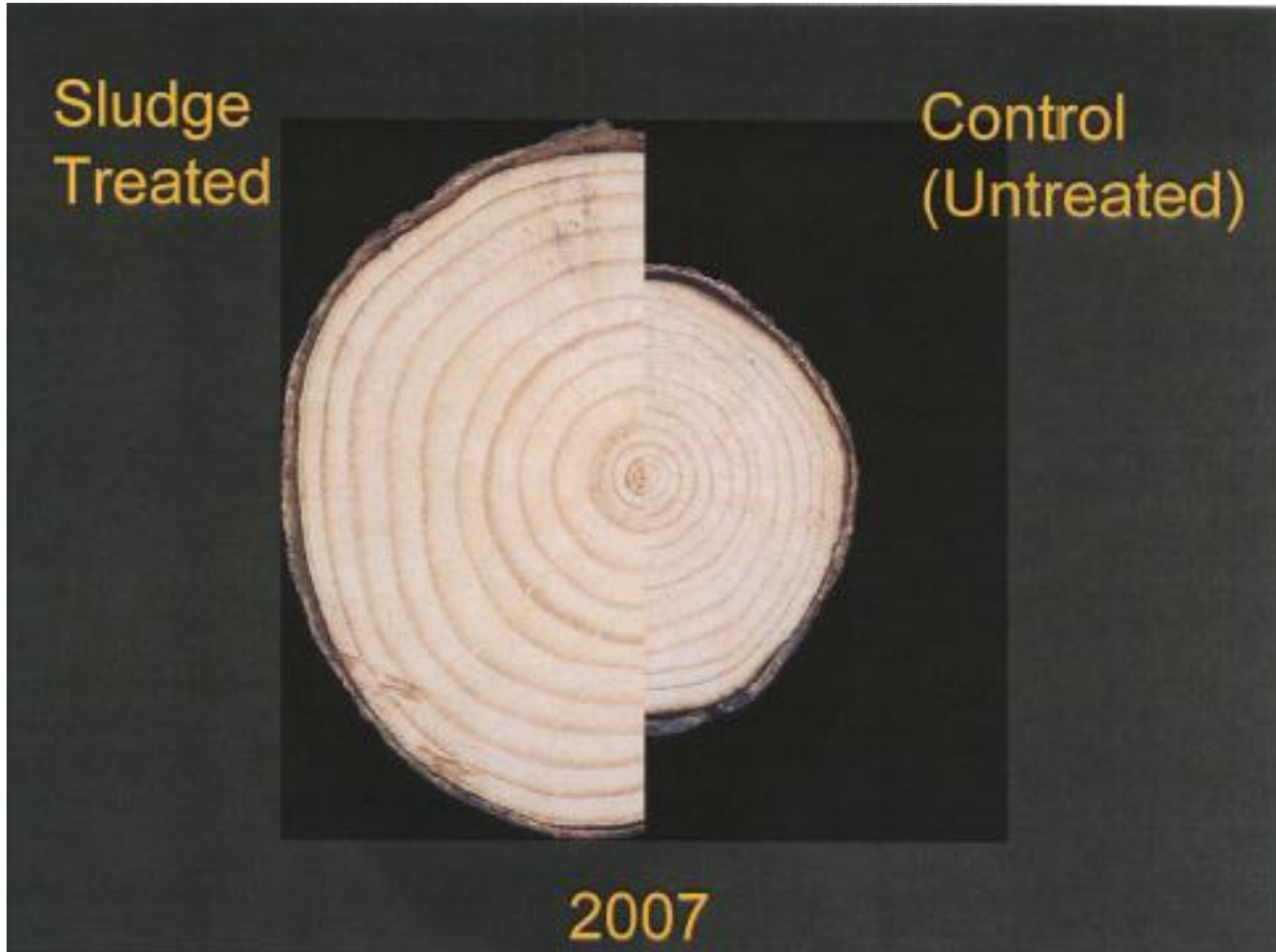
- ↓ Use of sludge for remediating contaminated sites
- ↓ Sludge spreading / forest productivity
- ↓ Greenhouse Gas Credits
- ↓ Sludge landspreading guidelines for pasture lands, hay lands, (non-incorporation)



CO₂ Stored in Control and Sludge Amended Treatments*



Trees- Carbon Sink



Pine Trees with Increasing sludge application



- ↓ Current status – carbon credits not available to ANC
- ↓ Sludge application classified as business as usual.

Forestry and Oil & Gas Integration

- ↓ The forest industry has an abundance of forest residues (tops, limbs, slash, unmerchantable timber, Aspen, and potential for MPB killed wood).



Forestry and Oil & Gas Integration

- ↓ Transportation costs prohibit forest biomass material from being shipped long distances for use at central mill sites.
- ↓ Opportunities exist to replace traditional fossil fuels with renewable forest fuels. On the ANC FMA - the SemCAMS site offers a unique opportunity for a high efficiency cogeneration (CHP) plant utilizing both steam and electricity (supports the Provincial Energy Strategy).



Biofuel Recovery



Kaybob Oil and Gas Green Energy Partnership

↓ Prefeasibility Work
Completed



Biochar

↓ Carbonization (Biochar) Platform

- Carbonization process engineering (bioenergy and biochar production)
- Carbon (biochar) sequestration + crop yield and quality enhancement: horticultural or agricultural uses; solid fuel and other industrial applications
- Biochar technology scale-up and commercialization
- **Biochar**: carbon-rich solid produced by low-temperature (400 - 600° C) pyrolysis of biomass under complete or partial exclusion of oxygen.

↓ It is called **Biocoal** or **Biocarbon** when used as solid fuel.

Horticultural Markets for Biochar

↓ Horticultural Markets for Biochar

- **Hydroponic Growth Media Market:**Canada: equivalent to 17,360T/year of bone dry biochar (AB+BC=4,960T/yr, ON=12,400T/yr)
- USA: equivalent to 15,500T/yr of bone dry biochar
- **Other Horticultural Markets (Peat Moss Replacements):**Total peat moss mined in Canada: 1,200,000 -1,400,000T/year
- 120,000T/year consumed in Canada, the rest exported to USA

Hydroponic Gardening

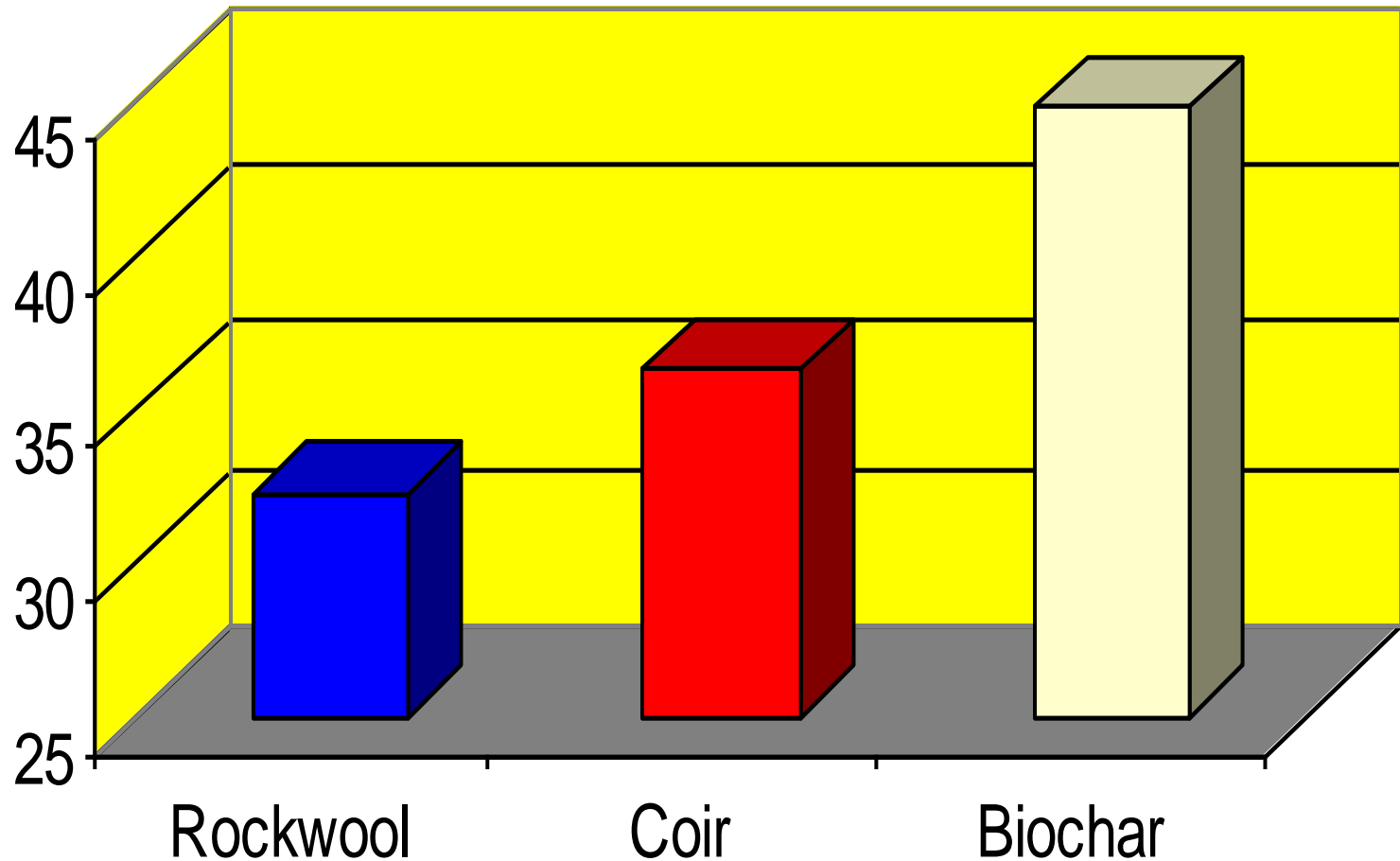


Biochar

Sawdust

Coir

Effect of Various Substrates on Yield of Tomatoes in 2009, Number of Tomatoes/plant



Biochar as Soil Amendment/Carbon Sequestration – Huge Potential Area

- ↓ Assumption: 5 t Biochar/ha
- ↓ Arable land in Canada: 50×10^6 ha
- ↓ Potential Biochar on arable land: 250×10^6 t
- ↓ CO₂ equivalent: 880×10^6 t
- ↓ Canada's total CO₂ emissions: 640×10^6 t/year

Biochar is a potential storage of carbon to reduce GHGs.

Additional Projects

- ↓ Biochar (pyrolysis of wood and biosolids)- horticultural products processed and bagged at ANC
- ↓ Biochar sequestering for carbon credits
- ↓ Waste wood streams to Enerchem Edmonton- gasification for fuel streams
- ↓ Biofuels- Integrated to SemCAMS
- ↓ Plug Screw Feeder Filtrate and air effluent stream characterization for hemicellulose and terpenes extraction for value added feedstock
- ↓ Ongoing support and participation in Afforestation Protocols with C3 for application on public land.

Additional Projects

Mountain Pine Beetle Management and CO₂ Dynamics in
the Central Alberta Region

Conclusion

- ↓ “On two previous occasions when the atmosphere contained very high levels of carbon dioxide, the early Carboniferous and Cretaceous periods, beginning about 350m and 150m years ago respectively, they were reduced by the expansion of carbon-sequestering plants. Industrial burning of the fossil fuels laid down in the Carboniferous period, in the form of decaying plant-matter, is the main reason why there is now more carbon in the atmosphere than there has been for 4m years.” The Economist –Sept 23,2010
- ↓ Forests can play a role in the carbon neutral Alberta
- ↓ Integrated practical carbon management strategies will be of strategic importance but are not for the faint of heart.