ELITE SITKA ECONOMICS

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ECONOMIC EVALUATION: APPROACH & ISSUES

- Simple: Compare Costs & Benefits
- Cost Identification Relatively Simple
- Benefit Identification More Challenging – Physical & Valuation Issues
- Constant Prices
- Forecasts of Improvements Obtained from Genetically Improved SS Planting Stock are in Relative Not Absolute Terms (QCI)
- Allow for Time Interval Between Costs & Benefits – Discount Rates!

INTEREST RATES

- Real Rates v Nominal
- Treasury: 3.5% Real
- Private Sector: Up to 5% Real
- Scenarios: Rate Ranges from 3.0 to 5.0% Real

COSTS OF SS PLANTING STOCK ASSUMPTIONS

Planting Stock	Cost		Relative to QCI Plants
	£ / 1000 Plants	£ / ha	£ / ha
QCI	140	350	-
Seed Orchard	180	450	+ 100
Veg. Prop	240	600	+ 250

Source: Christie-Elite Nurseries Ltd

N.B. Beating Up & Weeding Costs

BENEFITS: POTENTIAL PHYSICAL IMPROVEMENTS THAT WILL GIVE HIGHER INCOME FROM IMPROVED SS PLANTING STOCK

- More Volume?
- Better Form – More Green Logs & Less Branches?
- Higher Density - More Timber That Meets C16 & C24 Stress Grades?

ESTIMATED AVERAGE PHYSICAL GAINS RELATIVE TO QCI PLANTS

Physical Attribute	Seed Orchard Plants (1)	Veg. Prop. Plants
Diameter (2)	+ 20%	+ 20%
Form	+ 8%	+ 20%
Density	- 10%	- 0%

Source: Forestry Commission.

Footnote: (1) Supported by Kershope Forest Trial Results

(2) Based on Measurements at 15 years

DIAMETER GROWTH IMPLICATIONS FOR VOLUME

- FC Information Note 55 Suggests that Diameter Growth Measurements Might Give Volume Increases of 21% to 29% at Rotation End
- Increase in Average Growth Rate of 25% Appears Possible
- *Assumed* Increase of 1 YC (20%) in Calculations which Looks Certain, But Increase Probably Between I – 2 YC
- What Are the Financial Benefits of A Higher Growth Rate?

GROWTH RATE BENEFITS: PRACTICAL IMPLICATIONS OF PHYSICAL GAINS FROM IMPROVED PLANTING STOCK

- More Volume at Same Felling Age Relative to QCI Plants
- = Increased Growth Rate ⇨Greater Height at Same Age
- In UK Faster Height Growth ⇨ Sooner Critical Height
- Sooner Critical Height ⇨ Sooner Felling Age & Income
- Result: Approx Same Volume / Site But Received Earlier

GROWTH RATE BENEFITS: ASSUMED PHYSICAL IMPLICATIONS

Critical Height	10 m (HC6)	16 m (HC4)	22m (HC2)
Av Volume cu m / ha (1)	150	340	580
Age at which Reached by QCI Plants	22 years	32 years	43 years
Age at which Reached by Improved Plants	20 years	29 years	39 years

(1) Assumes YC 16 & No Thinning, but Ht / Volume Relationships do Not Vary Much with Growth Rate for Unthinned SS of Same Initial Spacing

GROWTH RATE BENEFITS: THEIR FINANCIAL IMPLICATIONS (NDR) OF EARLIER FELLING

Critical Height	10 m (HC6)	16 m (HC4)	22m (HC2)
Av Volume cu m / ha	150	340	580
Age at which Reached by QCI Plants	22 years	32 years	43 years
Age at which Reached by Improved Plants	20 years	29 years	39 years

3% D Rate	£48	£122	£204
4% D rate	£51	£121	£182
5% D Rate	£53	£113	£153

Assumes Standing Timber Price of £10 per cu m

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(2) Based on Measurements at 15 Years

IMPROVED FORM BENEFITS: PHYSICAL IMPLICATIONS

- Two Challenges:
  - How to Interpolate Form (+8% to +20%) into Log Quality Results?
  - What are Form Improvements Relative to?
- *Assumed* Form Measured by Green – Red Log Mix
- *Assumed* Present Average Green - Red Log Mix is 40:60
- *Assumed*: +8% Form = + 40% More Green Logs (1)
  +20% Form = + 80% More Green Logs

(1) Kershope Trial

IMPROVED FORM: ESTIMATED PERCENTAGES OF SAWLOGS

Critical Height	10m	16m	22m
Age	22 years	32 years	43 years
Est. Diam. NT	15cm	20cm	25cm
% Sawlogs 16cm ted NT (1)	20%	62%	83%
Assumed Vol cu m / ha	150	340	580
Est. Total Sawlog Volume / ha	30 m3	210 m3	480 m3

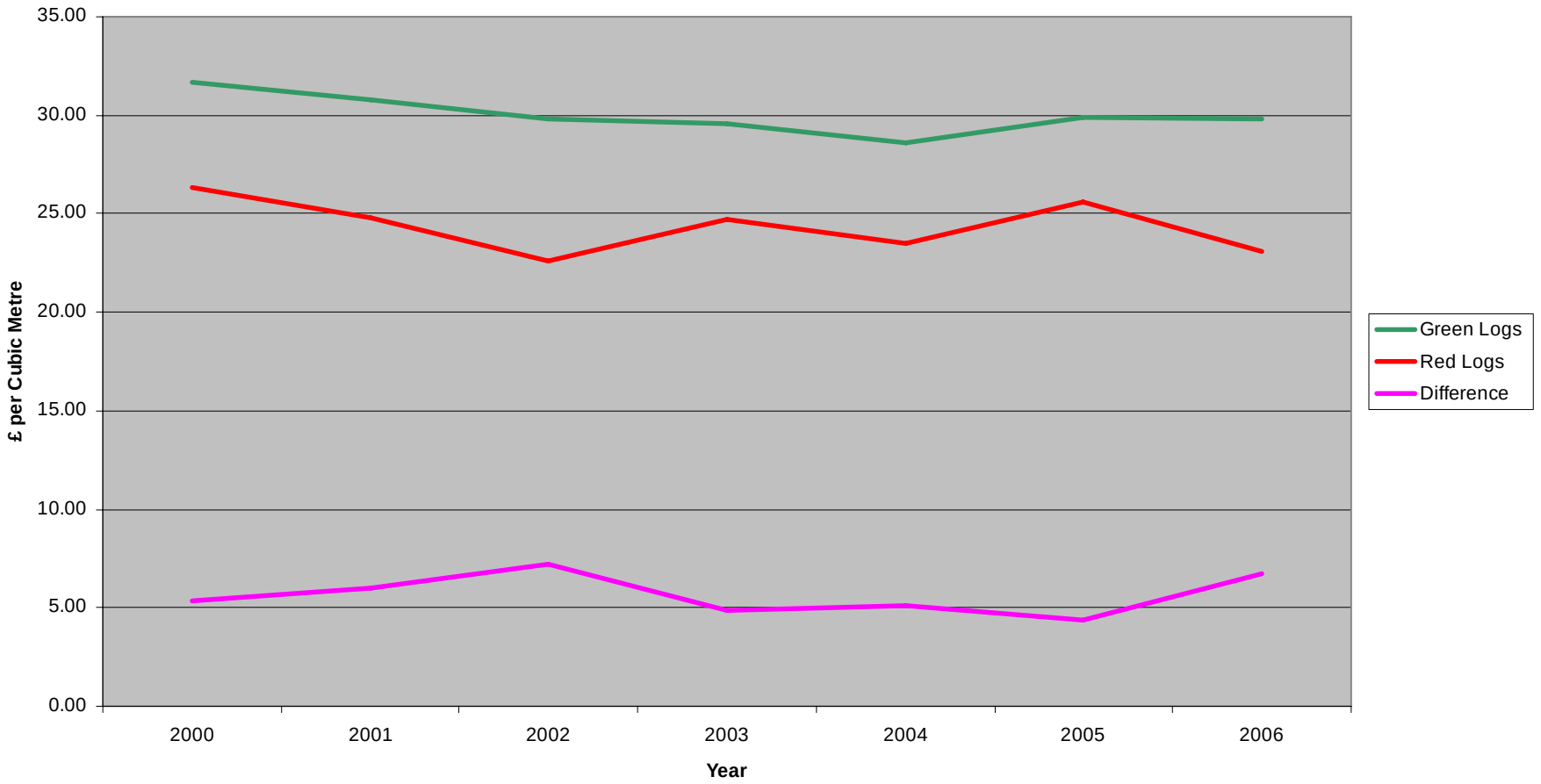
(1) FC Mensuration Handbook. t.e.d = Top End Diameter

IMPROVED FORM: ASSUMED INCREASED VOLUMES OF GREEN LOGS

Critical Height	10m	16m	22m
Assumed Vol cu m / ha	150	340	580
Est. Total Sawlog Volume / ha (1)	30 m3	210 m3	480 m3
40% More Green (2) Logs / ha than QCI	5 m3	34 m3	77 m3
80% More Green Logs / ha than QCI	10 m3	68 m3	144 m3

(1) FC Mensuration Handbook (2) Assumes 40% Green Logs from QCI plants

GB : Average Prices Received by FC at Roadside



Assume Green Log : Red Log Differential is £5 / cu m

IMPROVED FORM: FINANCIAL IMPLICATIONS FOR SEED ORCHARD PLANTS

Critical Height	10 m (20 years)	16 m (29years)	22 m (39 years)
Extra 40% Sawlogs / ha	5 m3	34 m3	77 m3
Extra Income / ha	£25	£170	£385
NDR / ha 3%	£14	£72	£122
NDR / ha 4%	£12	£55	£83
NDR / ha 5%	£10	£41	£57

VEG PROP: If Extra 80% Green Sawlogs will Double Financial Returns

ESTIMATED AVERAGE PHYSICAL GAINS RELATIVE TO QCI PLANTS

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Diameter (2)	+ 20%	+ 20%
Form	+ 8%	+ 20%
Density	- 10%	- 0%

Source: Forestry Commission.

Footnote: (1) Supported by Kershope Forest Trial Results

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WOOD DENSITY IMPACT

- No gains from Tree Breeding – Possibly Some Loss of Density?
- Timber Buyers Are Not Presently Factoring Wood Density into the Prices They Pay For Logs
- This May Come When the Technology is Available!
- No Allowance in Calculations for Changes in Wood Density, Either Positive or Negative

SUMMARY OF POTENTIAL FINANCIAL BENEFITS

VALUE OF AVERAGE POTENTIAL ADDITIONAL BENEFITS	NDR OF POTENTIAL GAINS £/HA					
	WHC 6 - 10m CRITICAL HT		WHC 4 - 16m CRITICAL HT		WHC 2- 22m CRITICAL HT	
	3%	5%	3%	5%	3%	5%
FASTER GROWTH RATE @ £10 /M^3	£48	£53	£122	£133	£204	£153
FORM - GREEN LOGS + 40% (Seed Orchard Plants)	£14	£10	£72	£41	£122	£57
FORM - GREEN LOGS + 80% (VP Plants)	£28	£20	£144	£82	£244	£114
SEED ORCHARD PLANTS	£62	£63	£194	£174	£326	£210
V P PLANTS	£76	£30	£266	£215	£448	£267

Price of Seed Orchard Plants : QCI Plants + £100 / ha. Price of VP Plants : QCI Plants + £250/ha.

OTHER FACTORS AFFECTING ECONOMICS

- Assumes the Grower Gets A Sale Price at Time of Felling to Reflect Benefits from Investment in Improved Planting Stock
- If Improved Stock Used then Woodland Prices Need to Reflect This
- Benefits of Improved Stock for Landscape Planning Not Allowed For
- Risks: Where Damage - Higher Costs for Owner

CONCULSIONS

- There are Numerous Factors that Need to be Taken into Account in Deciding on Whether It's Financially Attractive to Use Improved Planting Stock
- It is Not Financially Viable to Use Improved Planting Stock on Very High Wind Hazard Sites Based on Projected Physical Benefits & Current Timber Prices
- As Site Stability Increase It Becomes More Attractive to Do So. HC 4 Onwards. The Greatest Potential Financial Gains Are On The Most Stable Sites
- As Timber Prices Rise It Becomes More Financially Attractive to Use Improved Plants & Less So If Prices Fall
- If Physical Gains are Greater then Averages Projected, Financial Returns Will Be Better

CLOSING COMMENTS

Reflections of John Ruskin:

"It is unwise to pay too much, but it is worse to pay too little. When you pay too much you lose a little money – that's all. When you pay too little, you sometimes lose everything, because the thing that is bought is incapable of doing the thing it was bought to do".

"There is hardly anything in the world which someone can't make a little cheaper – and people who consider price alone are this man's lawful prey."