



The Impacts of Carbon Trading on the Cotton Industry

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Carbon Trading is About Reducing CO₂e Emissions

- Polluter buys permits for emissions
- Sell Credits for sequestration (or to offset buying permits)
- Permits capped at a reducing rate over time & will become scarce and hence cost more

What is Cotton's Carbon Footprint?

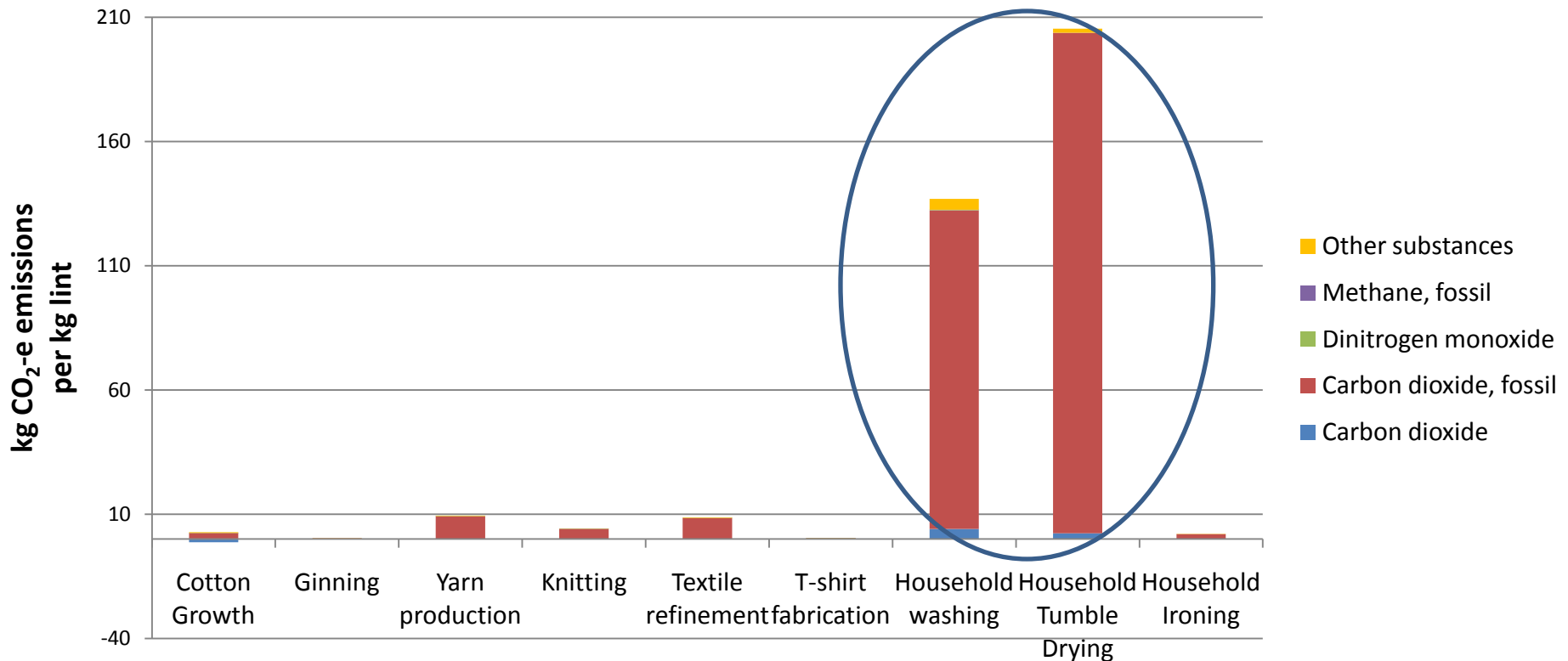
Example: Australian Cotton Life Cycle Assessment (LCA)

Component of Life Cycle	kg CO ₂ e per kg LINT
Plant Material (irrigated crop)	1.3 (ie. carbon is sequestered here)
Net Inputs (less sequestration) (fertiliser, chemicals, fuel/electricity etc.)	2.5
Ginning, spinning, knitting, dyeing, transport)	23.0
TOTAL - Growing and Manufacture	25.5
Use (washing, drying, ironing – <u>75 cycles</u>)	342.0
Use (1 cycle)	4.6

The “Use” Phase – Wash, Dry, Iron

- Dominates Life Cycle -> 75 wash-dry operations
 - 96% of whole of life-cycle impact
 - **342 kg CO₂e/kg textile**

GHG emissions for the whole life cycle

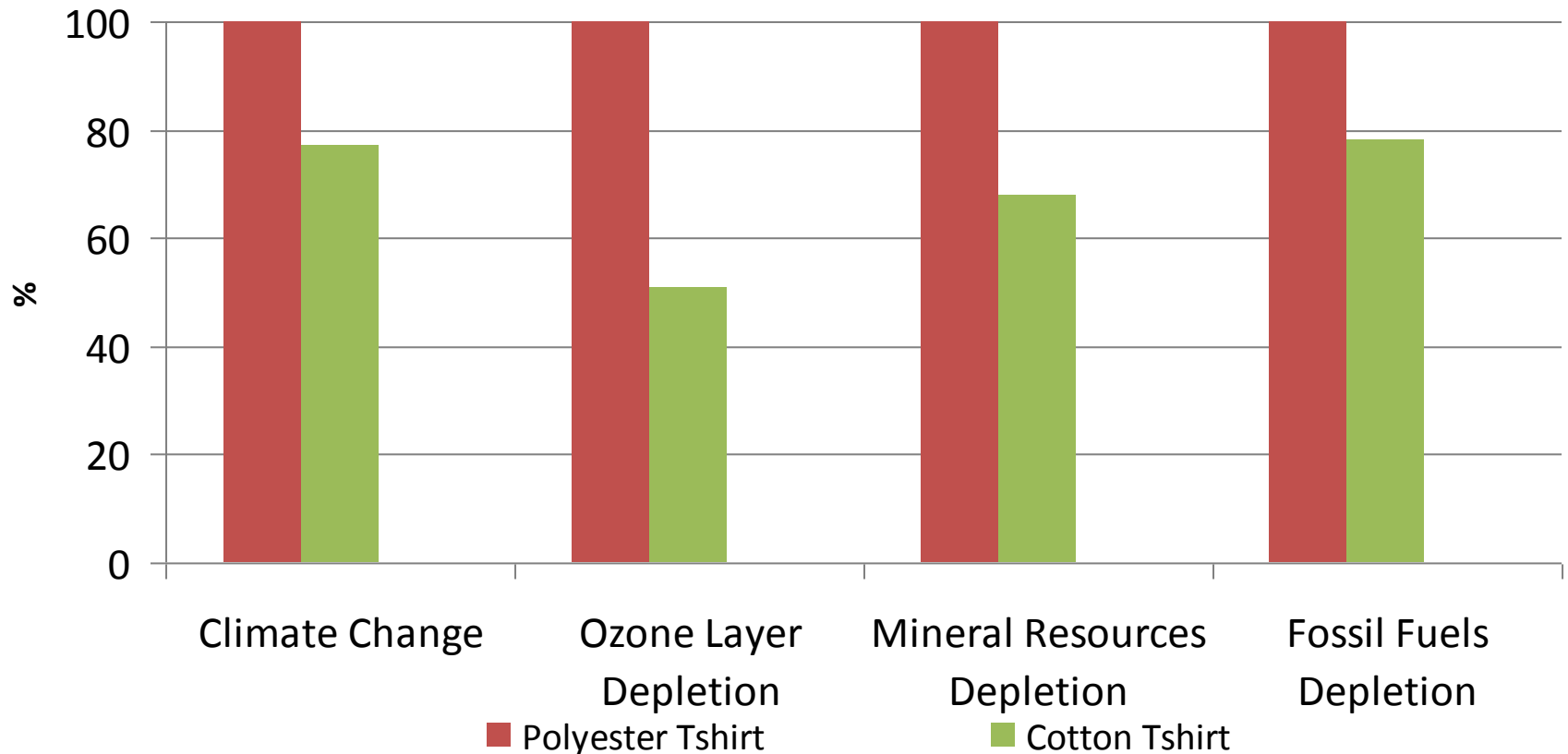


Cotton vs. Polyester

- Estimated GHG emissions:

Cotton: **25 kg CO₂e/kg textile** = 6 kg CO₂e/t-shirt

Polyester: **31 kg CO₂e/kg textile** = 7.8 kg CO₂e/t-shirt



Conclusions - Cotton

- Cotton contributes less than polyester to global warming.
- On-farm emissions are low compared to whole of life emissions
- Soil C sequestration may offset some on-farm emissions, if significant (& consistent) tonnages can be maintained.
- Improving N use efficiency is compatible with reducing N₂O emissions – BMP's
- Improving energy use efficiency will reduce costs and emissions
- Reducing the impact of textile use phase could reduce emissions the most?
- Bio-fuel potential of cotton residues/seed is small but requires further investigation.
- Recycling used textiles may have greater scope – pyrolysis, insulation etc.

Conclusions – International Trading Rules

- Kyoto not particularly “agriculture friendly”
- Kyoto II/Copenhagen needs to give agriculture more scope for offsets
- Alternative trading schemes may offer potential (eg. Chicago Carbon Exchange)

Some Recommendations

- What are our emissions?
 - *More LCAs needed for different cotton systems (countries, production systems, soil types, climate, manufacturing, use patterns)*
 - *Better capacity to measure emissions needed*
 - *More R&D on nitrogen management, emissions and soil sequestration needed*
 - *Standardise methodologies, share data*
- Campaigns to reduce impact of use phase?
- Recycling opportunities (pyrolysis, bio-fuel)?
- Lobby for better deal for agriculture post-Kyoto

Australian Cotton Greenhouse Gas Emissions Research

(Prof. Peter Grace QUT, Dr Ian Rochester CSIRO)



N₂O Emissions

Average
Measured
= 0.5% of
N applied

(instead of
UN benchmark
1.25%)

Accepted as
a Tier 2
Methodology

Cotton Footprints by Country

Some “Preliminary” Estimates

Component of Life Cycle	Country A	Country B	Country C	Country D	Country E
Production or On Farm Emissions (kg CO2e per kg lint)	4.78	10.65	8.8	5.62	3.27
Production plus Manufacturing Emissions (kg CO2e per kg lint)	20.7	34.6	30.8	9.66	25.64