Technology Development for Closed Loop Recycling
The Perspective of a Micro Company

BEACON – 3rd Annual Conference
25th March 2015, Cardiff
The Company Journey 2009 - 2018

• Early Stages:
  – Formed in 2009, ex furniture industry, 2 directors
  – No seed funding, savings and grants used to generate IP
  – UK Patent granted 2011, other territories pending

• Consolidation Phase:
  – Catch 22, no seed funding = no salary = no major grants, also limits on sub-contracts
  – Fortunate to join BEACON and access Innovation vouchers in 2012 – used to validate aspects of technology
  – Begin to attract angel funders, apply for TSB grants in 2014

• Growth Phase:
  – TSB Supply Chain Innovation for Circular Economy, 8 partners, £850k project, £535k grant, ends with proven prototype plant in March 2016
  – One employee, looking for three more
  – £400k of private investment alongside TSB

• Future:
  – £6M+ needed for insulation manufacture + parallel licensing
  – 24 employees by 2018
Medium Density Fibreboard

- Wood based panel board made up of wood (80%); water (8%); resin (10%); additives (2%). Expensive refining process.

- Resin is typically urea formaldehyde or MDI (Methylene Diphenyl di-isocyanate). Bio resins developed but expensive.

- 90% used in furniture and shop fitting sectors, other markets are DIY, construction, packaging and galleries / museums.

- Wood is either logs, chips or joinery residues – ALL VIRGIN TIMBER.

- Production is global – 62M m3 (Europe 22M; N Amer 5M; Others 35M)

- None is recycled – huge market opportunity! How to progress?
Supply Chain Approach Needed

1 Reliable Feedstock Supply
2 Proven Technology for Recycling
3 End Markets for Fibres

All three aspects being addressed in TSB project – “MDF: Enhancing Supply Chain Value”.
Feedstock

• No figures for MDF

• WRA estimate 4.5M tonnes of waste wood in UK, other estimates vary

• WRAP funded project with SITA UK suggests somewhere between 314k and 466k waste MDF available in UK

• MDFR commercial plant would use around 5% of this material. Segregation will be key. Closed loop interest from retail sector.

• London / South East waste companies will pay £25 - £50/t gate fee to divert MDF. Lower / zero gate fees further north.

• Operating licenses, calorific value, PB sector all reasons to remove MDF.
MDFR Technology Overview
MDFR Technology Summary

- Scalable design – stand alone or co-located (can utilise excess heat/steam from other processes).

- Technology has been independently validated at bench scale (C-Tech Innovation, UK).

- Simple, safe, continuous and robust process. Chemical free.

- IP protected.

- Operational pilot plant by end summer 2015.
Markets for Fibres

- Principal target market is thermal insulation. Tested at BC, excellent results.
- Aiming for batt product at circa 30 kg/m$^3$, suitable for loft, floor, wall and pitched roof applications.
- 20k ton plant will supply 2.6% of UK thermal insulation demand.
- MDF manufacturing interest primarily overseas although UK retail sector very keen for closed loop credentials.
- Horticulture – growing medium, customer approved.
- WPCs – early stage, limited UK manufacture, R&D in mixing and extrusion.
**BEACON IMPACT**

- Excellent for accessing expertise and equipment – real advantage to MDFR to be able to validate ideas.

- Useful to attract other funding such as High Potential Starts

- IP issues surrounding collaborative work will remain a barrier, contracts and admin are tiresome – can limit follow on work

- I’d like to see more brokering with end users – promoting links with larger companies

- Better understanding of the capabilities of all three institutions

- Hope the programme continues!