

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 diisocyanate). 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

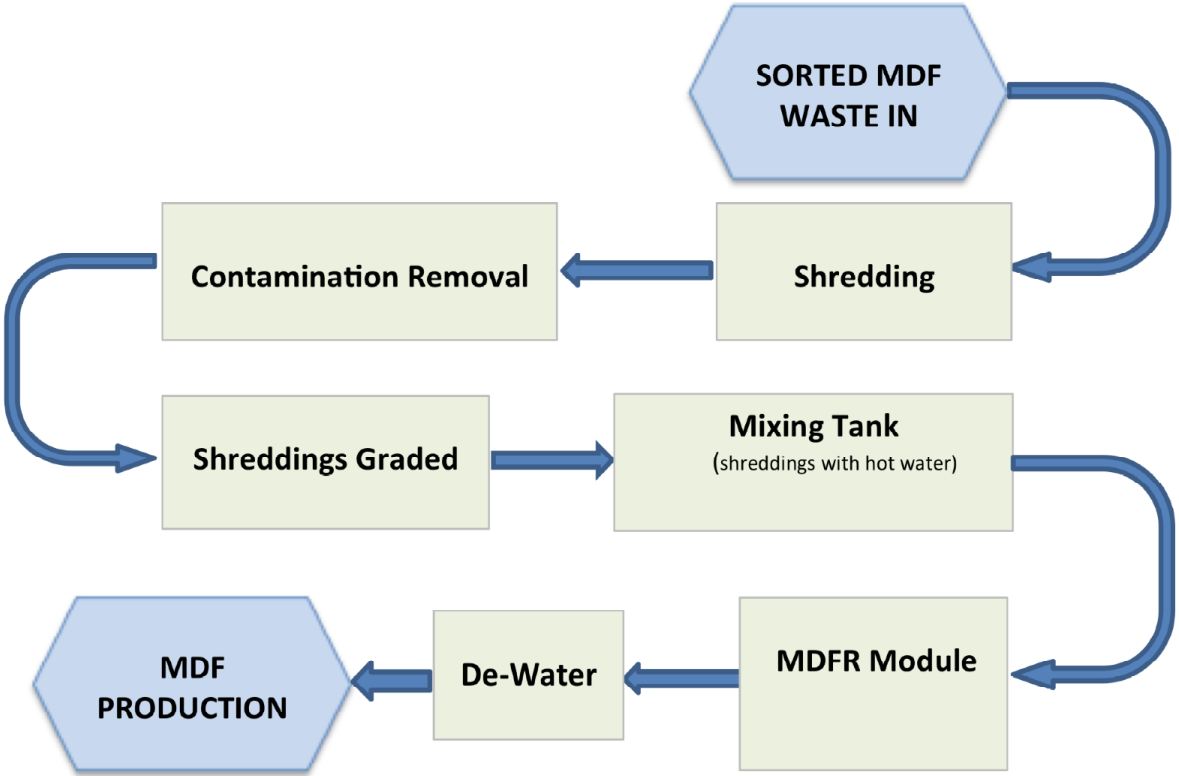
- 1 Reliable Feedstock Supply
- 2 Proven Technology for Recycling
- 3 End Markets for Fibres

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/m³, 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!