From the Lab to the Field:
Putting Bio and Agri-char into Business
Mind the Gap

• Breakthroughs in the lab need to get out of the lab!
• Two companies who have done exactly this:
  – Ignite Energy Resources: a producer of char
  – Licella: a potential user of char
Perry Toms

- Business development consultant to Ignite
- CEO of Licella
- A unique perspective - of producer and potential customer
Hydrothermal Treatment/ Supercritical Technology

- A fourth state of matter
- Supercritical reactors
- Well-proven process
- Innovative adaptation
- Multiple uses
Real World Applications

• Two companies
• The energy race
• Expanding the fossil fuels we have left: Ignite Energy Resources
• Exploring alternatives: Licella
• Where does char come into this?
Ignite Energy Resources

- Using supercriticality to create liquid fuels from lignite - or brown coal
- Supercritical reactor: the water literally blows the lignite apart
- Halving the CO2 intensity
- Leaving a solid product
- Char
Before: lignite

Lignite Particle 1, Untreated – Dense Structure

- Approximate composition wt% C = 72%, O=26.5%, Ca=.4%, Al=.2%, Si = .3%, S=.3%, Cl=.1%, Na=.1%
Char Particle 1 — Treated, Open Structure, like Agrichar!

Highly Porous.
Observation would indicate 40-50% of mass lost.

Approximate Composition
C = 79%,
O = 18%,
Na = 2%,
Ca = 0.3%,
Si = 0.15%
S = 0.1%, Al = 0.1%
Ignite: the Pilot Plant
• Converting biomass into fuels, food products and chemicals
  – Supercritical technology
  – Enzyme development
  – Fermentation
Licella: a Bio-refinery

**Biomass:**
- Woody wastes
- 20-35% Hemicellulose
- 20-45% Cellulose
- 20-35% Lignin

**Separation:**
- Hemicellulose 20-35%
- Cellulose 20-45%
- Lignin 20-35%

**Processing:**
- Enzymatic breakdown
- Fermentation
- Super-critical water
- Sub-critical water

**Products:**
- Solid Cellulose
- Lignin
- Fuel
- Food
- Super-critical Ethanol
- Fuel octane boosters (aromatic alkyl ethers)
- Xylitol, mannitol, arabinol - food additives

**Costs:**
- $40/tonne
- $800/tonne
- $850/tonne
- $3000/tonne

**Ignite Energy**
Licella: the Pilot Plant
Ignite: Vertically Integrated

- Owning the resource: EL4416
- Owning the process
- Controlling the product
- Marketing the product
Licella: Seeking Vertical Integration

- Non-food biomass feedstocks
- Feedstocks include fast-growing plant species and cropping systems
- Why not grow own?
- Control over quantity and quality
- Sustainable approach
Commercialising a Brilliant Idea

• Ignite and Licella
• Licella and Ignite
• Licella, Ignite and you?
• Synergy: the key to successful commercialisation
Contact Ignite or Licella

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under construction – look for them in late September