Taxonomy & Market Development

2022 North American Biochar & Bioenergy Conference

www.Biochar2022.com

Technical Session 1B - Biochar Production & Commercialization

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Agenda

- What is a taxonomy?
- Why is it important?
- 4 Step approach to assessing market opportunities
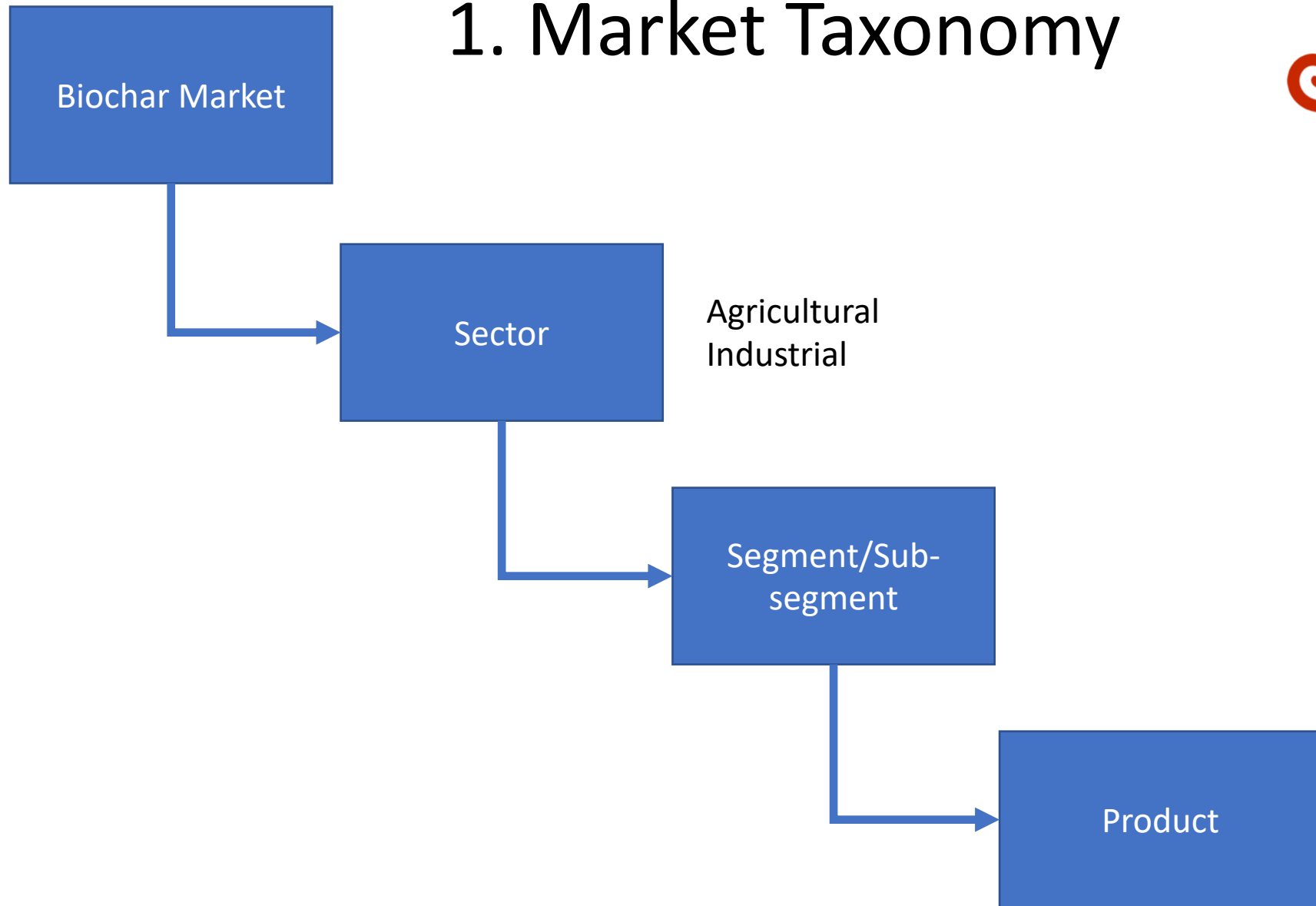- Thoughts on Biochar Industry Development
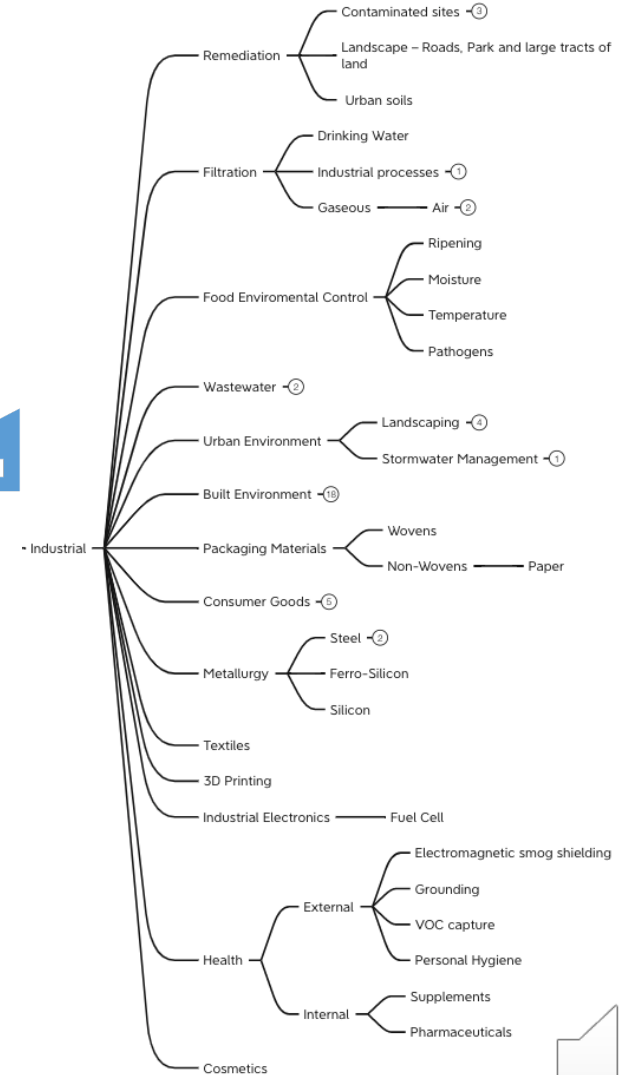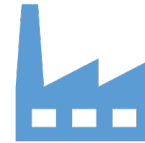
Market Taxonomy

- What?
  - A taxonomy is a categorization that allows structured analysis of an information domain
- Why is this important?
  - Assess market opportunities in a structured manner
  - Develop some consensus on market segmentation and product groupings
  - Give clear visibility to customers and investors
  - Basis for gathering meaningful market statistics
- You don't have an industry if you can't measure it
  - Accurately
  - Comprehensively

1. Market Taxonomy

Biochar Market

Sector

Agricultural
Industrial

Segment/Sub-segment

Product

1. Main Market Sector Taxonomy Biochar

Agriculture
- Crop
  - TNNV
  - Grains
- Pasture
- Livestock
  - Feed
  - Manure management
    - Odour
    - Nutrients
- Forestry
  - Estate Management
    - Revegetation
    - Maintenance
  - Growth Media — Silviculture – nursery seedlings
  - Water quality
  - Erosion control
- Horticulture
  - Growth Media
  - Composts
  - Potting Mixes
- Gardeners
  - Growth Media
  - Composts
  - Potting Mixes

Industrial
- Remediation
  - Contaminated sites ③
  - Landscape – Roads, Park and large tracts of land
  - Urban soils
- Filtration
  - Drinking Water
  - Industrial processes ①
  - Gaseous — Air ②
- Food Enviromental Control
  - Ripening
  - Moisture
  - Temperature
  - Pathogens
- Wastewater ②
- Urban Environment
  - Landscaping ④
  - Stormwater Management ①
- Built Environment ⑱
- Packaging Materials
  - Wovens
  - Non-Wovens — Paper
- Consumer Goods ⑥
- Metallurgy
  - Steel ②
  - Ferro-Silicon
  - Silicon
- Textiles
- 3D Printing
- Industrial Electronics — Fuel Cell
- Health
  - External
    - Electromagnetic smog shielding
    - Grounding
    - VOC capture
    - Personal Hygiene
  - Internal
    - Supplements
    - Pharmaceuticals
- Cosmetics

Market Opportunity Assessment Process

- Step 1 – Market Taxonomy
- Step 2 – Volume
- Step 3 – Value
- Step 4 – Market Readiness
  - Step 4.1 – Technical Readiness
  - Step 4.2 - Barriers
  - Step 4.3 – Market Accessibility
- In parallel
  - Project Development - Customer Value Stacks

2. Volume Assessment

- Research
- Internet
- Market Studies – if they exist
- Industry Bodies
- Existing applications of carbon
- UN COMTRADE International Trade Statistics Database
- **Interviews with potential customers in each segment**
- Try and bring volume back to bone dry (bd BD) tonnes

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3. Value Assessment

- Do at same time as Volume Assessment using same sources
- Potential customer interviews are really valuable
- Current comparable products
- Channels
  - Online
  - Retail
  - Wholesale
  - Merchants
- Major product groupings across a number of applications

4. Readiness Assessment

- Readiness can be complex and can be assessed in a number of dimensions
  - Technical Readiness - can biochar be used in this application?
  - Barriers include Regulatory, Planning, Competitors, Capital Availability & Social License
  - Market Accessibility – Supply Chain and Sales Channels

4.1 Technical Readiness

- The ability to substitute biochar for another component in the product or service in question is a key measure of readiness

- Presents the lowest hanging fruit if biochar is cheaper than the incumbent component, or provides better functionality

Scenario	Readiness Ranking Technical
Material Substitute - Direct Replacement	High
Material Substitute - Needs R&D work done	Medium
New Product - total new application	Low

4.2 Market Readiness – Barriers

- Answers the Question – Is this Market addressable/accessible?
  - There may be specific barriers for each segment

Common Barriers - Market/Product
Product Demand
Product Price
Reliable Volume Supply to Market
Product Quality
Customer Awareness
Regulatory Approval - Product
Regulatory Approval – Manufacturing Process (EPA)
Regulatory Approval – Local Planning Approvals
Competition

Risk Assessment – High Level

Risk	Risk Description	Risk Rating	Mitigation	Residual Risk Rating
Risk title	**Description of the risk and consequence**	**Low Medium High**	**Description of risk mitigation**	**Low Medium High**

NOTE:

You can do a separate likelihood and consequence rating as well.

For this level of assessment, a single rating can be sufficient

4.3 Market Readiness – Market Accessibility

- Answers the Question – Is this Market addressable/accessible?
  - There may be specific barriers for each segment

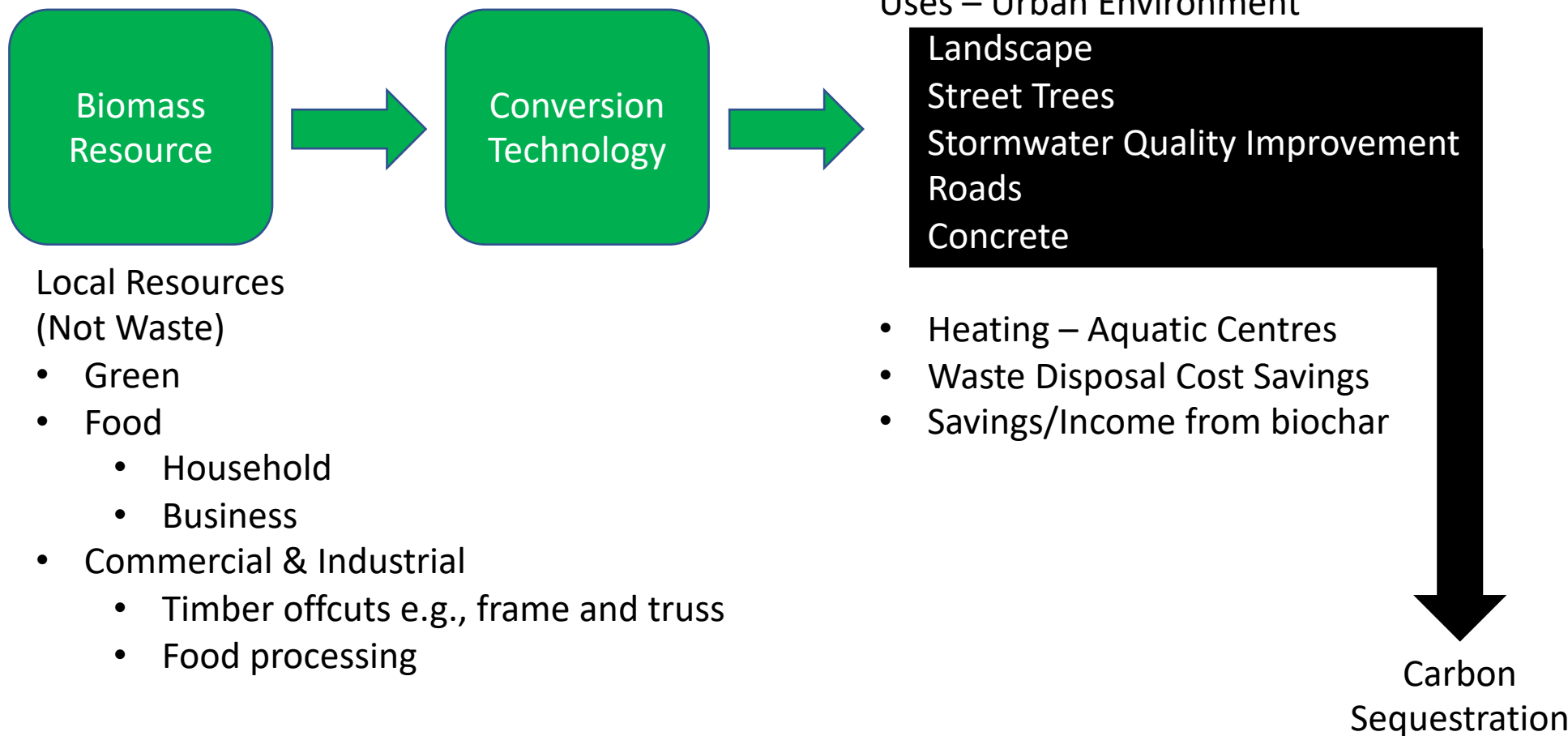| Accessibility - Market/Product |
|---|
| **Supply Chain** |
| **Merchant and Wholesale** |
| **Retail** |
| **Online** |

Customer Value Stacks

- Solve a customer problem
  - Known
  - Unknown

- Example - generic
  - Waste disposal cost reduction due to high and increasing waste disposal fees
  - Create another revenue stream(s)
    - waste to income – existing or new markets
    - Carbon emissions reduction
    - Carbon Capture
  - Value is not just monetary
    - Social License is key to brand reputation – increasingly so
    - Ecosystem benefits
    - Productivity benefits

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Local Government Value Stack

```
Biomass
Resource
```
→
```
Conversion
Technology
```
→

Uses – Urban Environment

Landscape
Street Trees
Stormwater Quality Improvement
Roads
Concrete

Local Resources
(Not Waste)

- Green
- Food
  - Household
  - Business
- Commercial & Industrial
  - Timber offcuts e.g., frame and truss
  - Food processing

- Heating – Aquatic Centres
- Waste Disposal Cost Savings
- Savings/Income from biochar

Carbon
Sequestration

Council Engagement for Biochar Market Development

- Proposition for councils
  - Circular Economy focus
  - Develop demand in Street Trees and Stormwater Remediation for biochar
  - Extend with utilisation of "waste" resources by proposing biochar production facilities to create a circular economy initiative in the local government area
  - Partner with local business who need their waste problem solved
  - Then extend into Parks and Gardens and potentially specification in use in Council Roads and concrete in building projects

Biochar Industry Development

Biomass Resource	→	Conversion Technology	→	Products	→	Markets
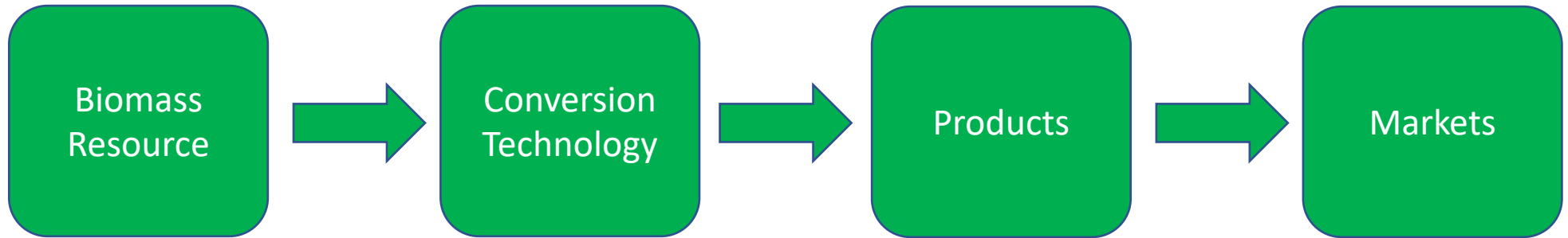
Opportunities

Vast Quantities	Mature	Vast Range	Vast Range
Low or no cost	Technology		High Value
Paid to take			

Risks

Cost increase	Availability	Product R&D	Market
With competition	Scale	Market Acceptance	Development

V0.2

Next Steps - Biochar Industry Development

- Connect Biochar to end uses
- Secure offtake for product
- Build supply chain and sales channels
- Create a supportive regulatory framework
- Most importantly

- Build Market Capacity – Production & Consumption

Contact Details & Plugs

2030 Biochar Industry Roadmap
Building the New Carbon Economy

- Working on

- https://anzbig.org/biochar-industry-2030-roadmap/
- Roadmap Summit in South Australia – 8th and 9th September 2022
- There will be wine – good wine and some stuff on biochar as well
- Limited spots

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