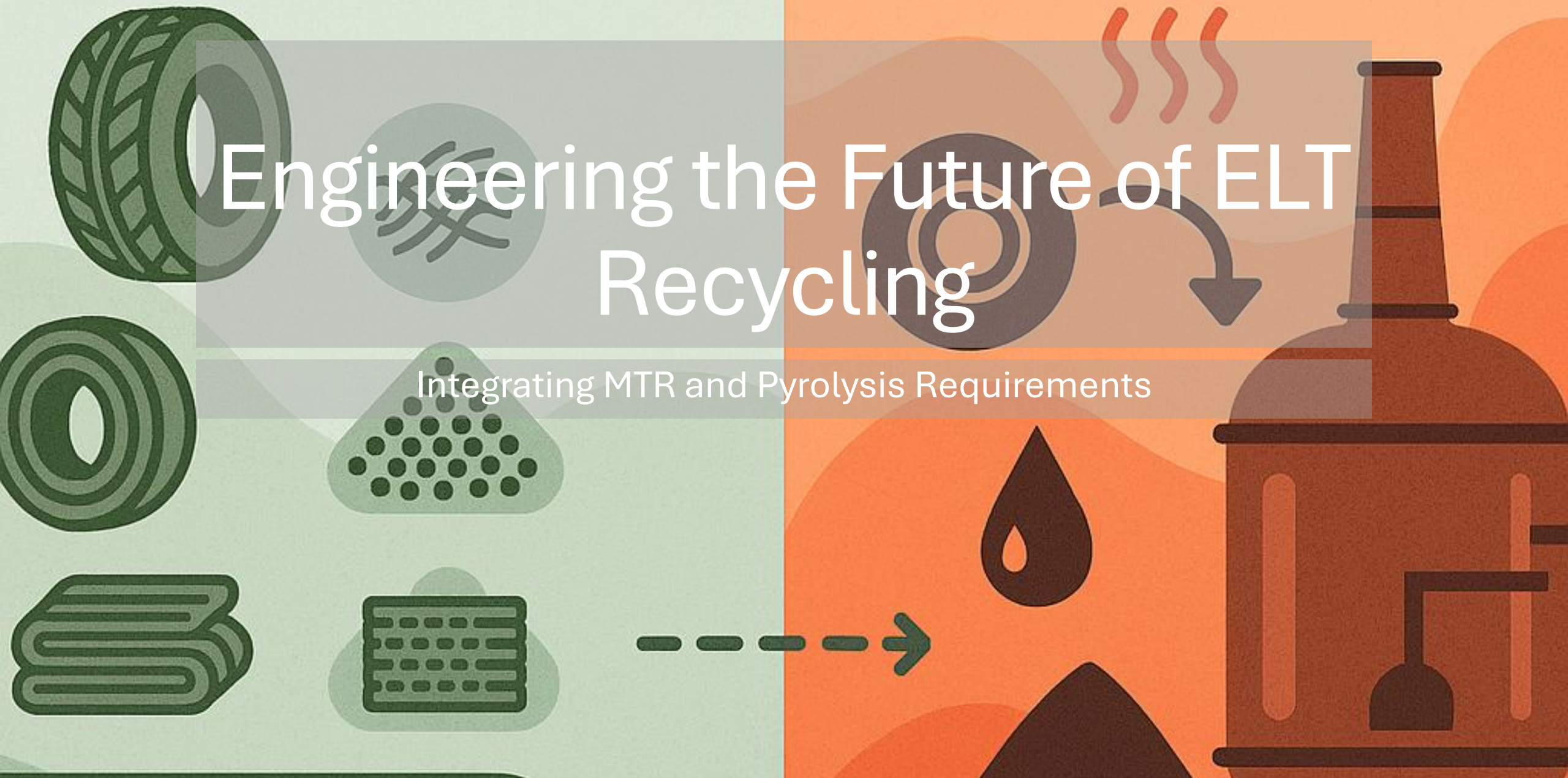
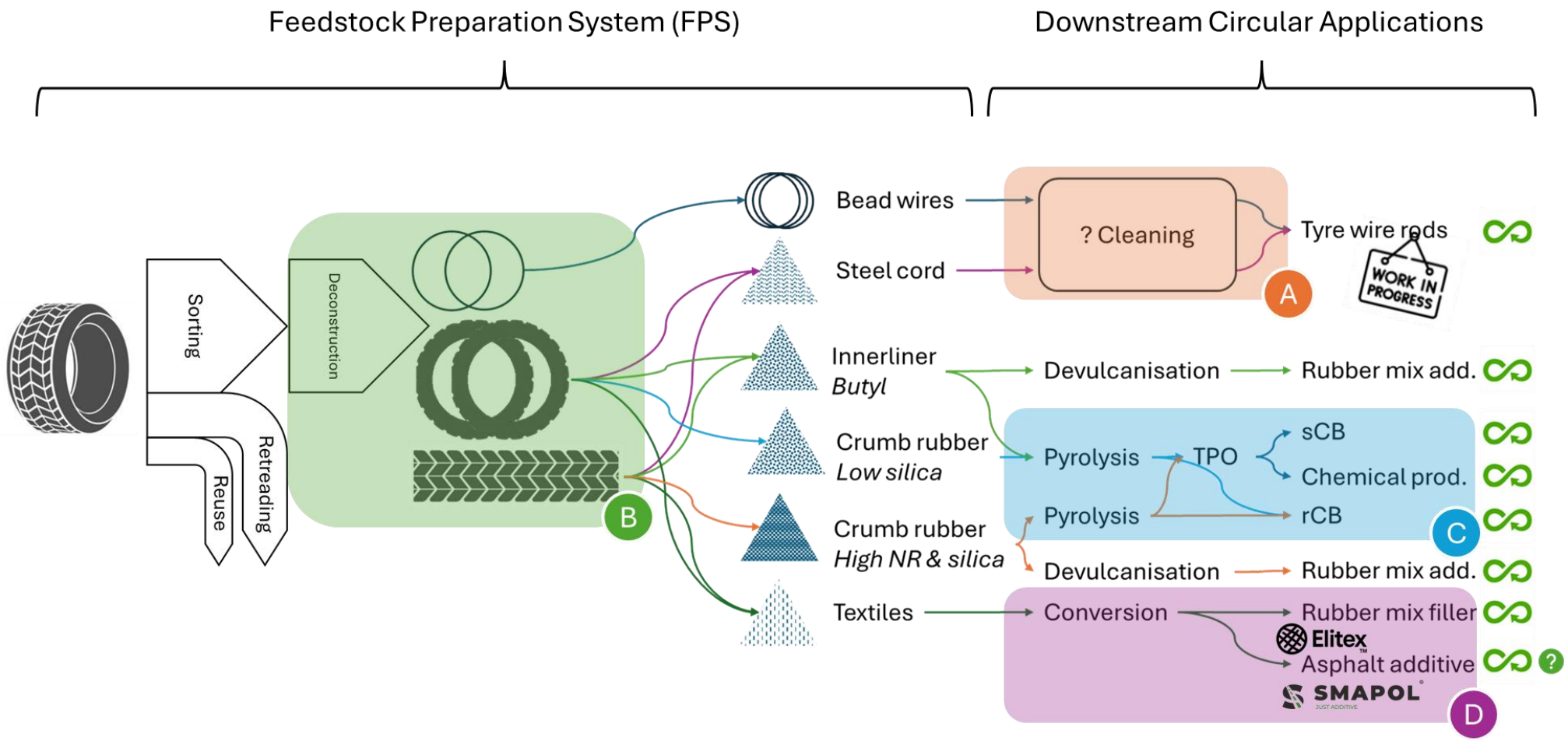
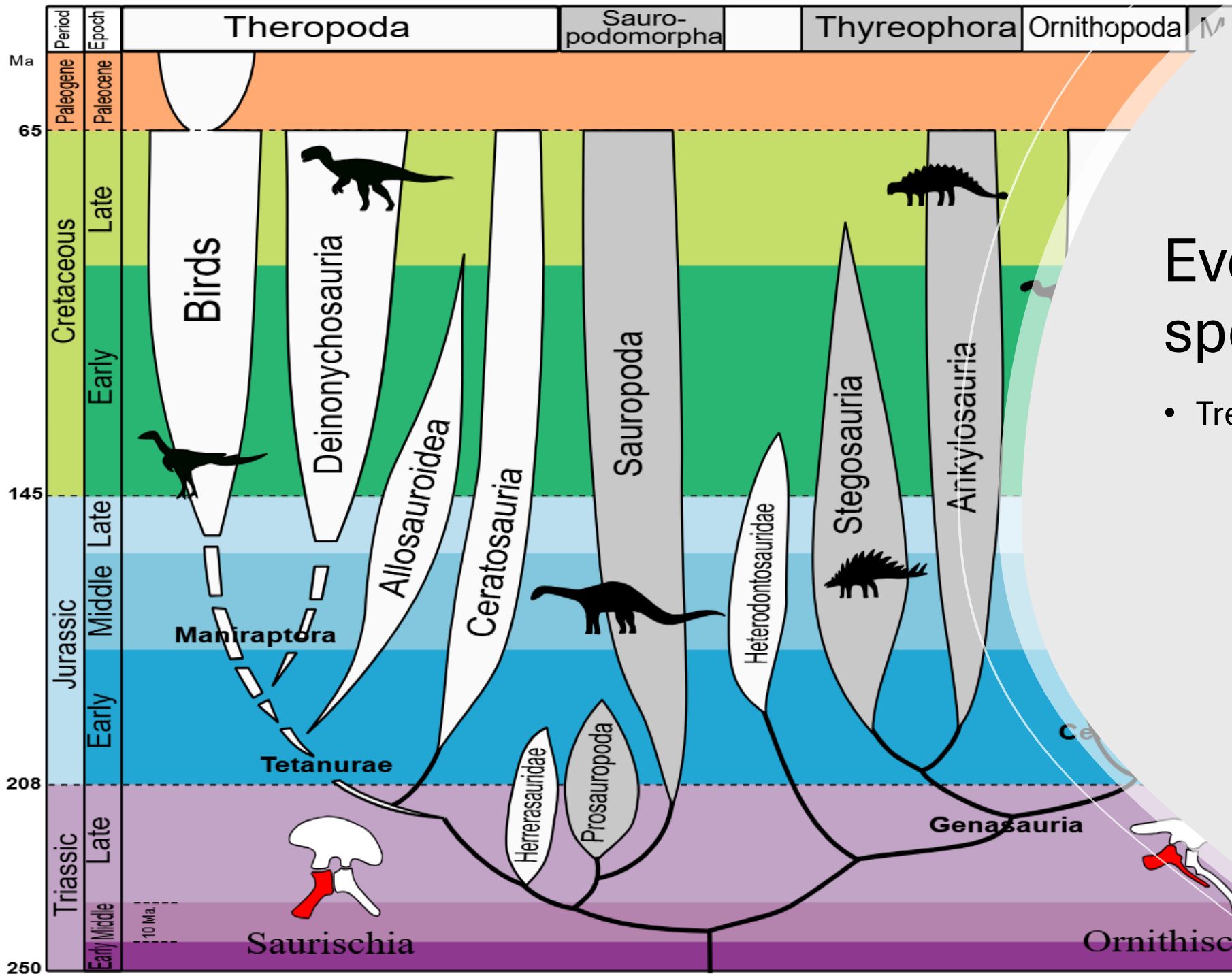
Engineering the Future of ELT Recycling

Integrating MTR and Pyrolysis Requirements



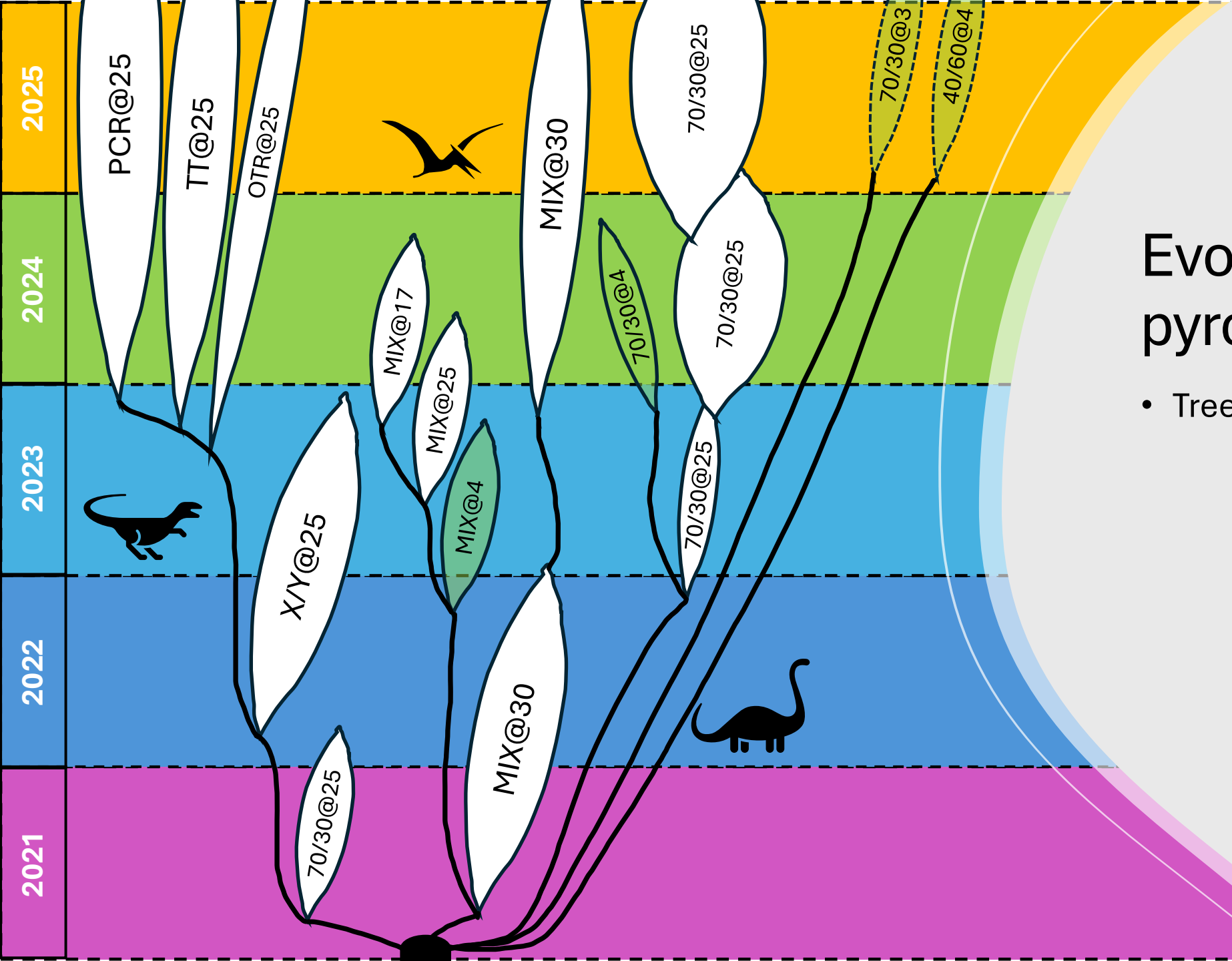
What is the state of play?





Evolution of species

- Tree of evolution

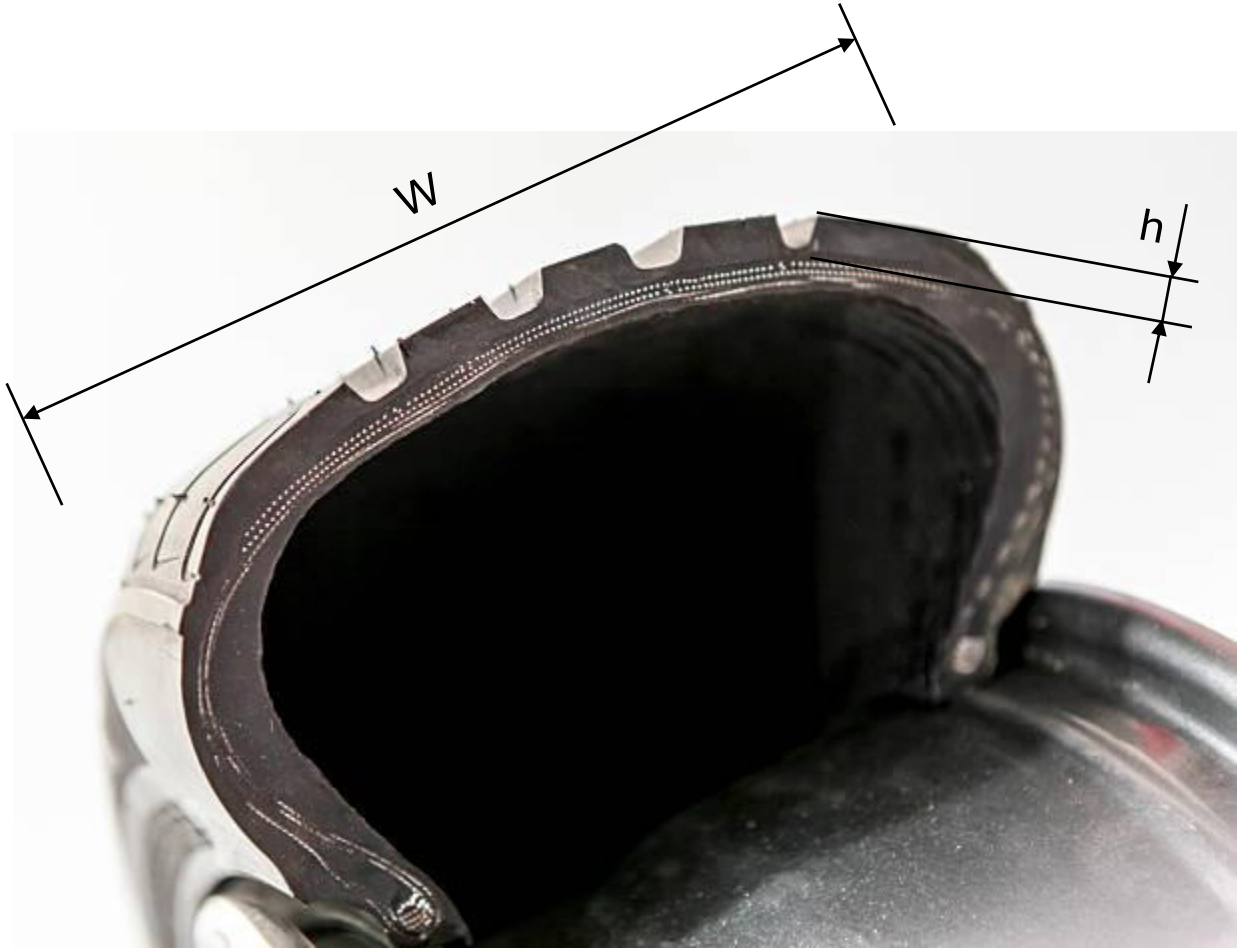


Evolution of pyrolisis feedstock

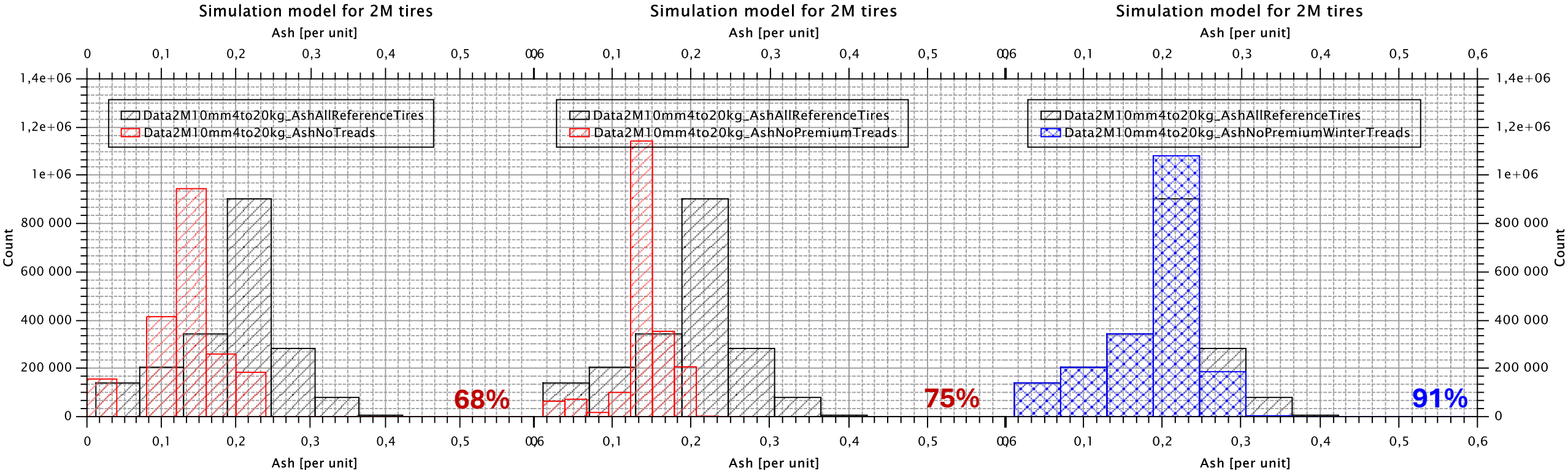
- Tree of evolution

Simulated deconstruction

- 2M tires
  - 16.910 tons of tires
  - 14.373 tons of rubber
  - 204 shifts of perpetual work
- Size, brand, season
- Tread, weight
- Silica content by tire part
- Innerliner removed
- Textile … not in the model



Simulation – Removing selected treads

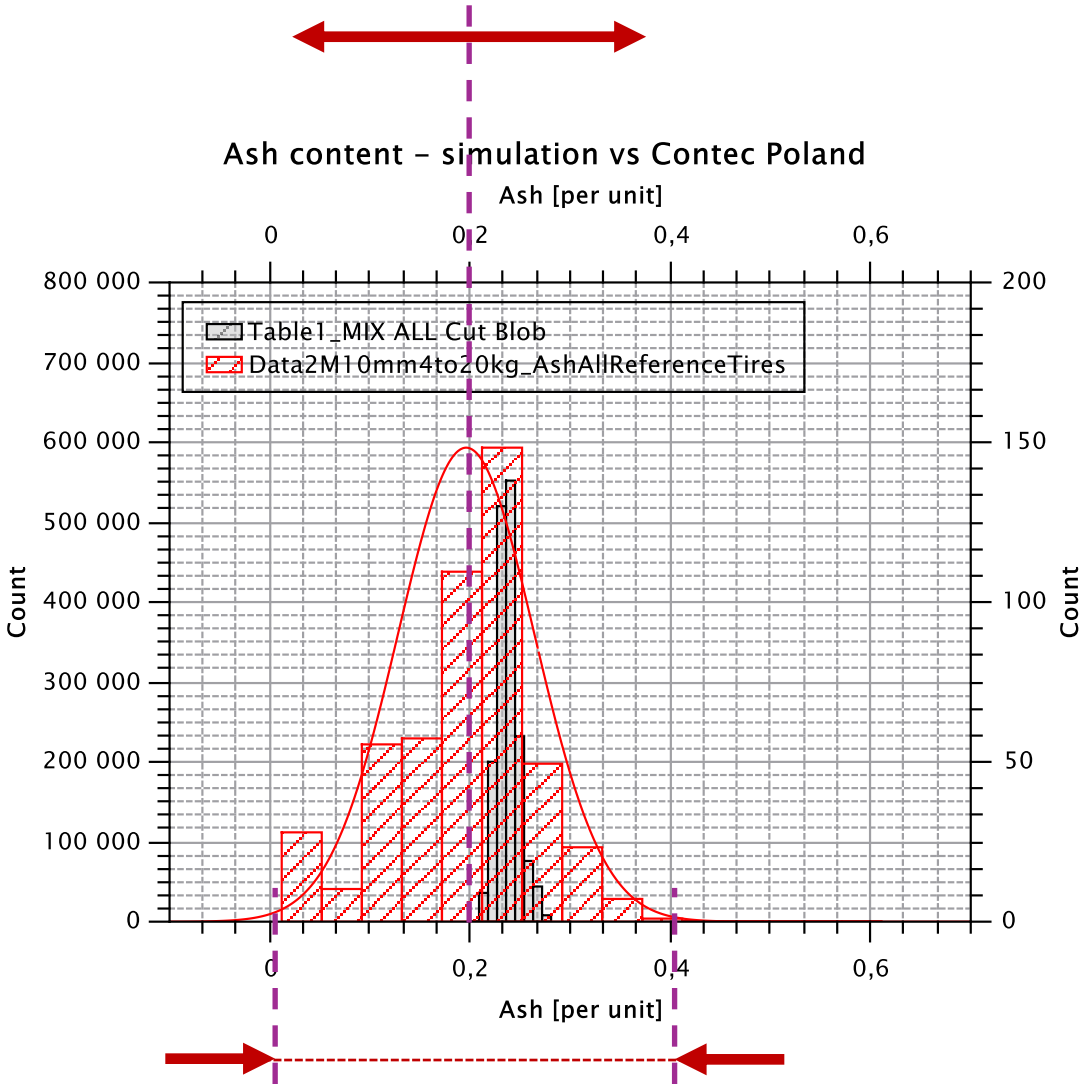


Takeaway – remove selected treads to narrow ash distribution

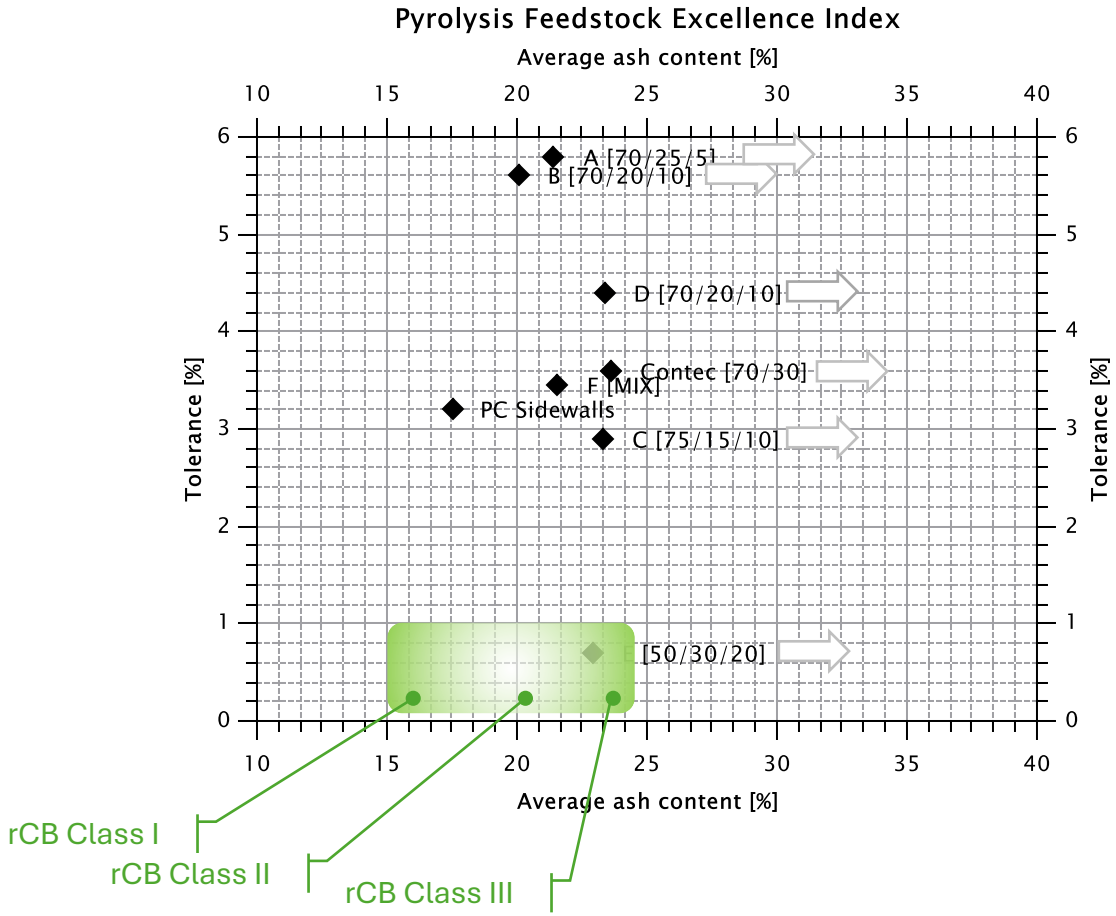
Final note

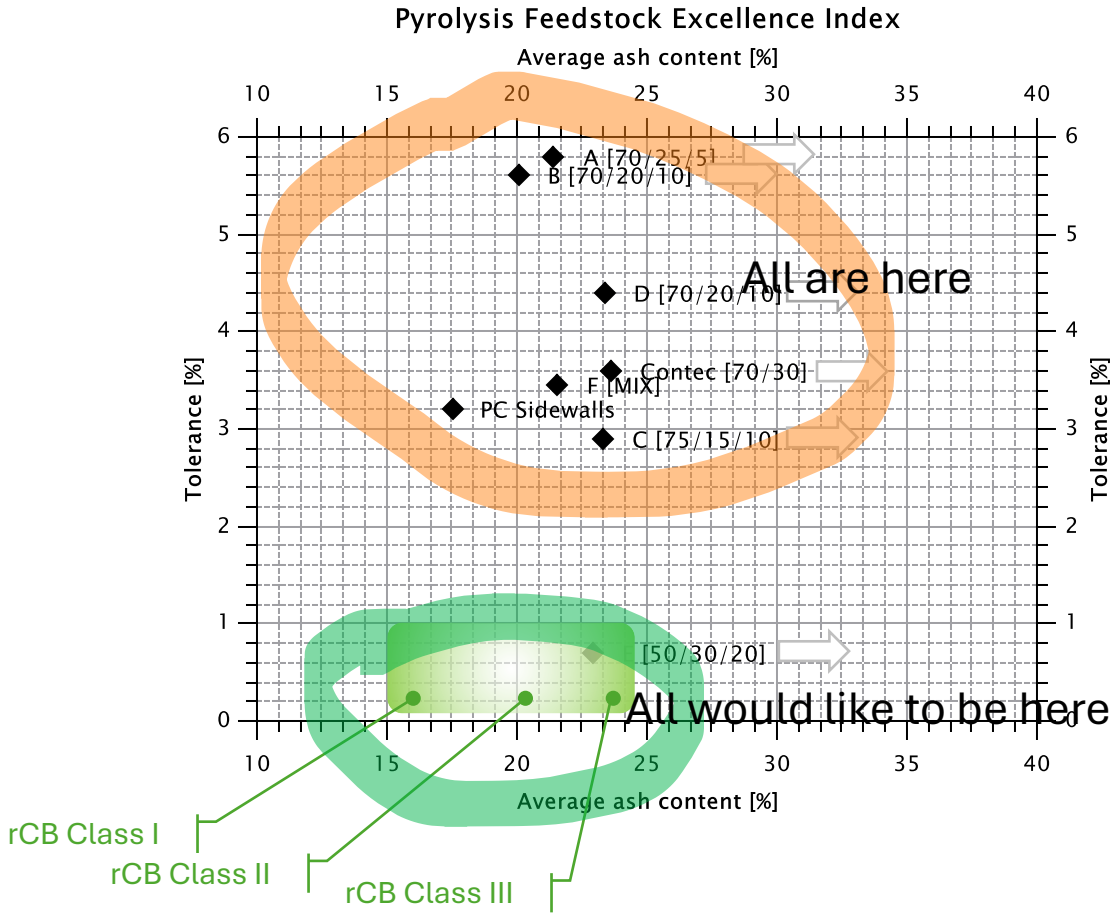
- **Innerliner** (IIR butyl) structural stability → resists cracking to low MW → becomes **char** in pyrolysis
- **Tread** highest aromaticity → highest **char** yield fraction
- **We can get 20% ash** by applying sorting & deconstruction
- **We can't get below ±0,5-1% ash** by any means
- **Max volume of tires** → 70/30 mix ratio with tendency to 85/15

Mean value == Sorting + Deconstruction



Tolerance == MTR Feedstock Homogenisation


Pyrolysis Feedstock Excellence Index
Average ash content [%]
10
15
20
25
30
35
40
Tolerance [%]
0
1
2
3
4
5
6
A [70/25/5]
B [70/20/10]
D [70/20/10]
Contec [70/30]
F [MIX]
PC Sidewalls
C [75/15/10]
[50/30/20]
rCB Class I
rCB Class II
rCB Class III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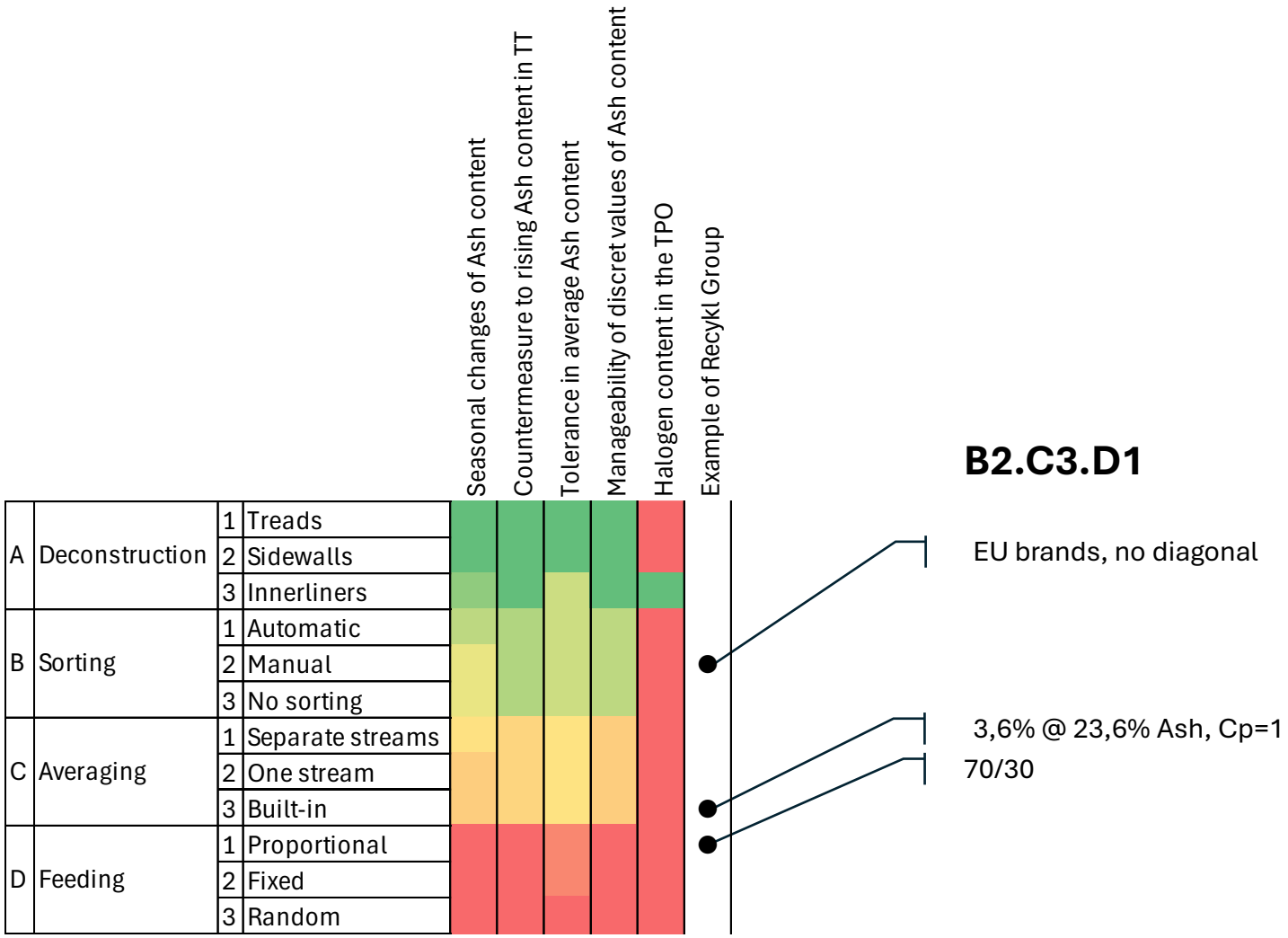
D [70/20/10]
Contec [70/30]
F [MIX]
PC Sidewalls
C [75/15/10]
[50/30/20]
All are here
All would like to be here
rCB Class I
rCB Class II
rCB Class III


Seasonal changes of Ash content
Countermeasure to rising Ash content in TT
Tolerance in average Ash content
Manageability of discret values of Ash content
Halogen content in the TPO
Example of Recykl Group
A
Deconstruction
1 Treads
2 Sidewalls
3 Innerliners
B
Sorting
1 Automatic
2 Manual
3 No sorting
C
Averaging
1 Separate streams
2 One stream
3 Built-in
D
Feeding
1 Proportional
2 Fixed
3 Random
B2.C3.D1
EU brands, no diagonal
3,6% @ 23,6% Ash, Cp=1
70/30