

Biochar for Heavy Metal Removal on Industrial Sites

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US Biochar Initiative

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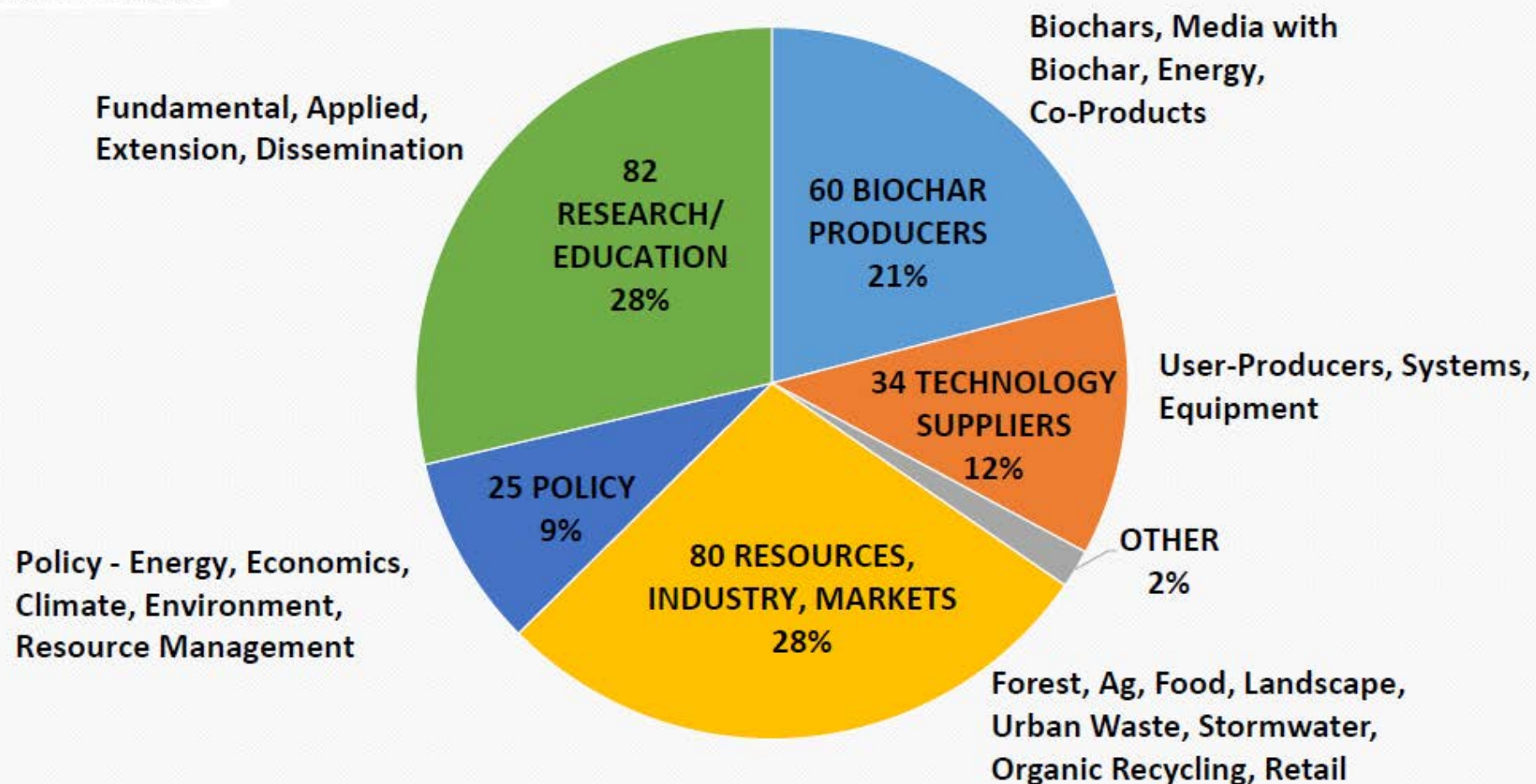
Sunmark Environmental
Portland, Oregon



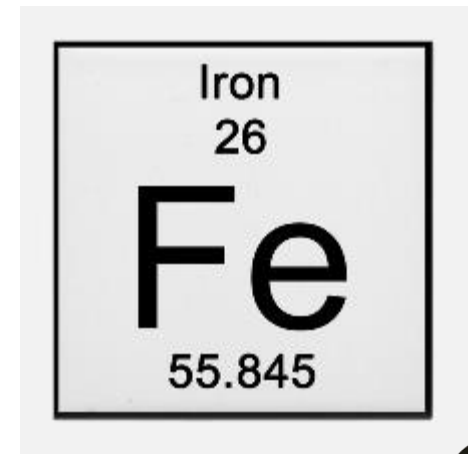
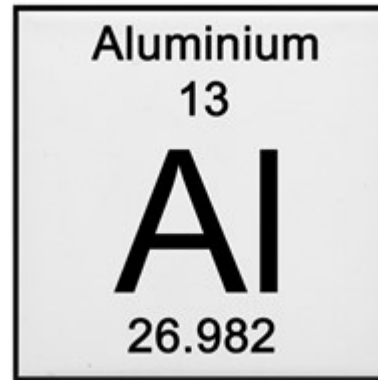
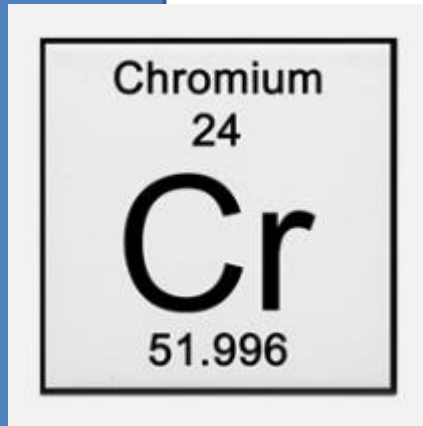
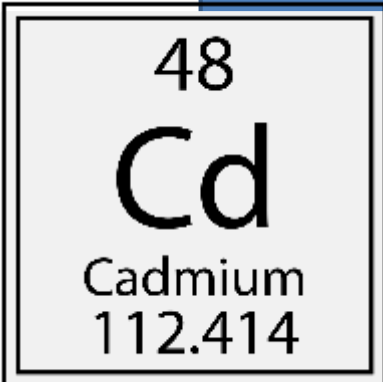
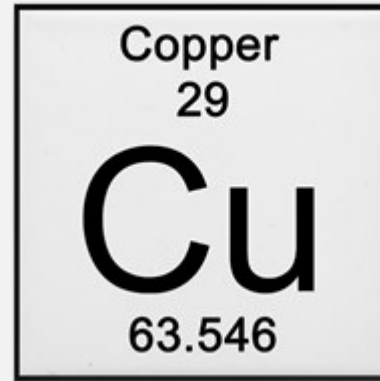
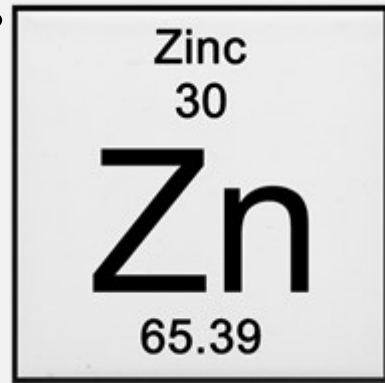
Who's Attending...



Biochar 2016 Participants by Sector



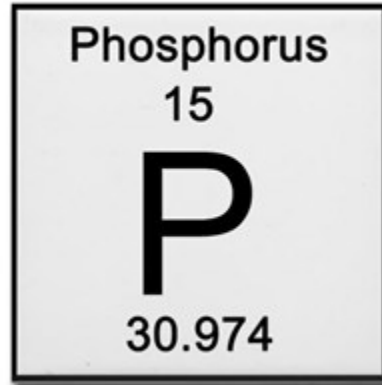
It Works!!



99% Removal Rates



& Limited Success Removing...



BOD

COD



Versatile

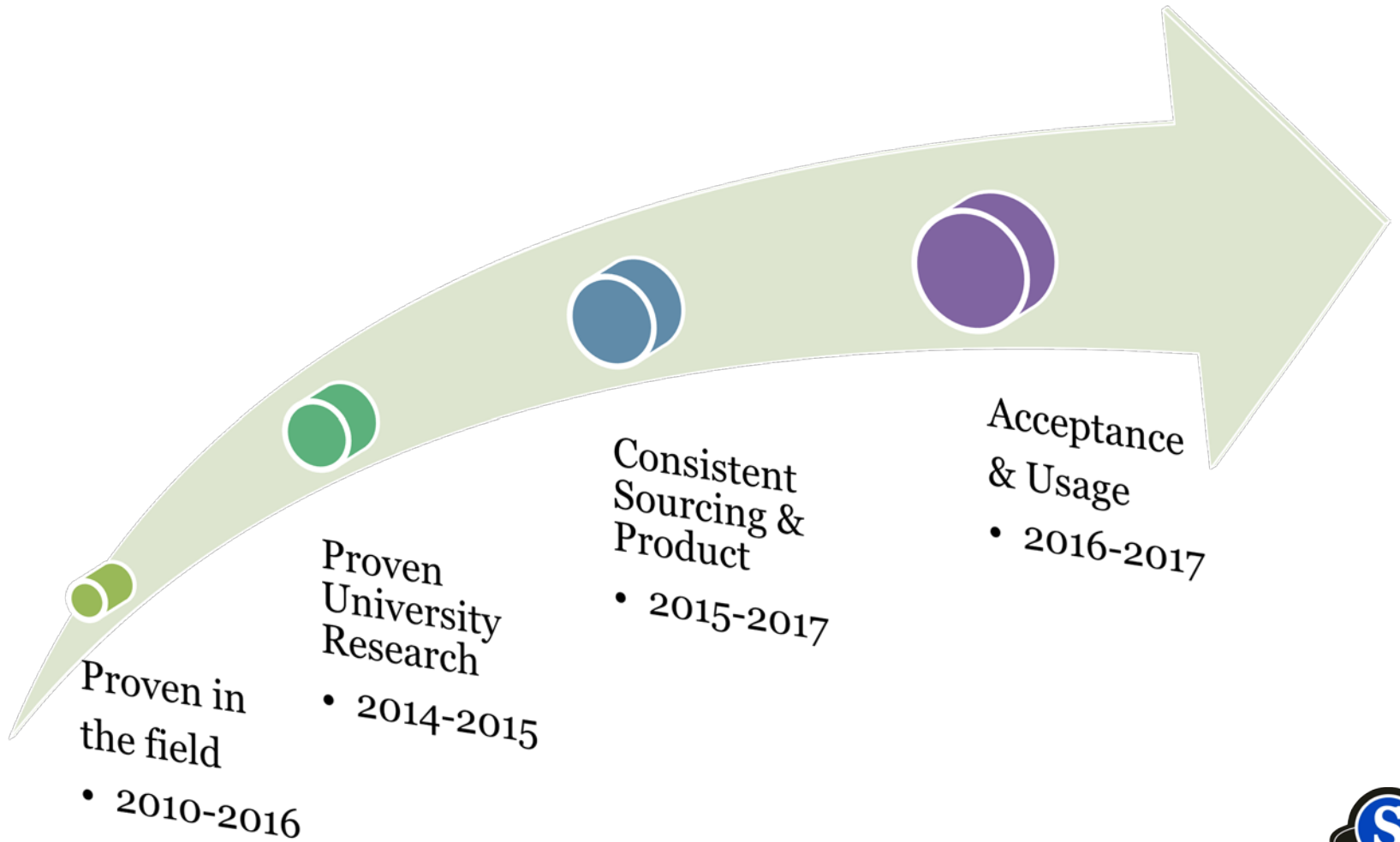
Easy to deploy on sites keeping costs affordable and workable.





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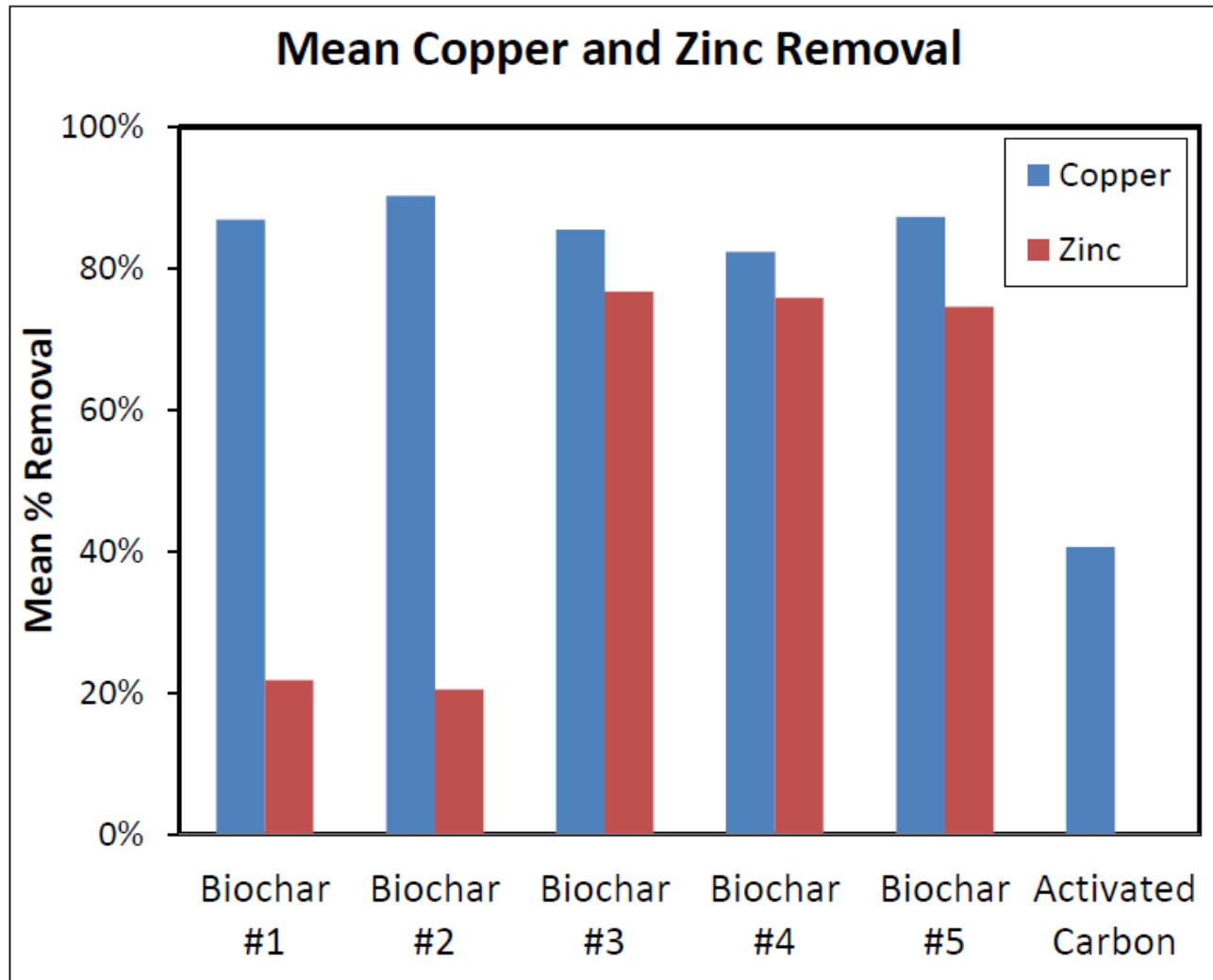
Timeline



We have had multiple Universities help us with the research on the biochar we currently use for both efficiency and other ways to utilize the benefits of biochar for stormwater.



Not all Biochar is Equal!



So Many Feedstocks & Other Factors

Feedstock

- Peanut Husks @ 500 C
- Waste wood @ 520 C
- Soybean stalks @ 700 C
- Paper Mill waste @ 600 C
- Pine wood (temp unstated)
- Spruce @ 1100-1200 C
- Soybean stalks @ 700 C
- Pine sawdust @ 680 C
- Spent Coffee Grounds @ 400 C
- Waste wood @ 520 C
- Wheat straw @ 650 C
- Sewer Sludge @ 300 C

Pollutant Reduction

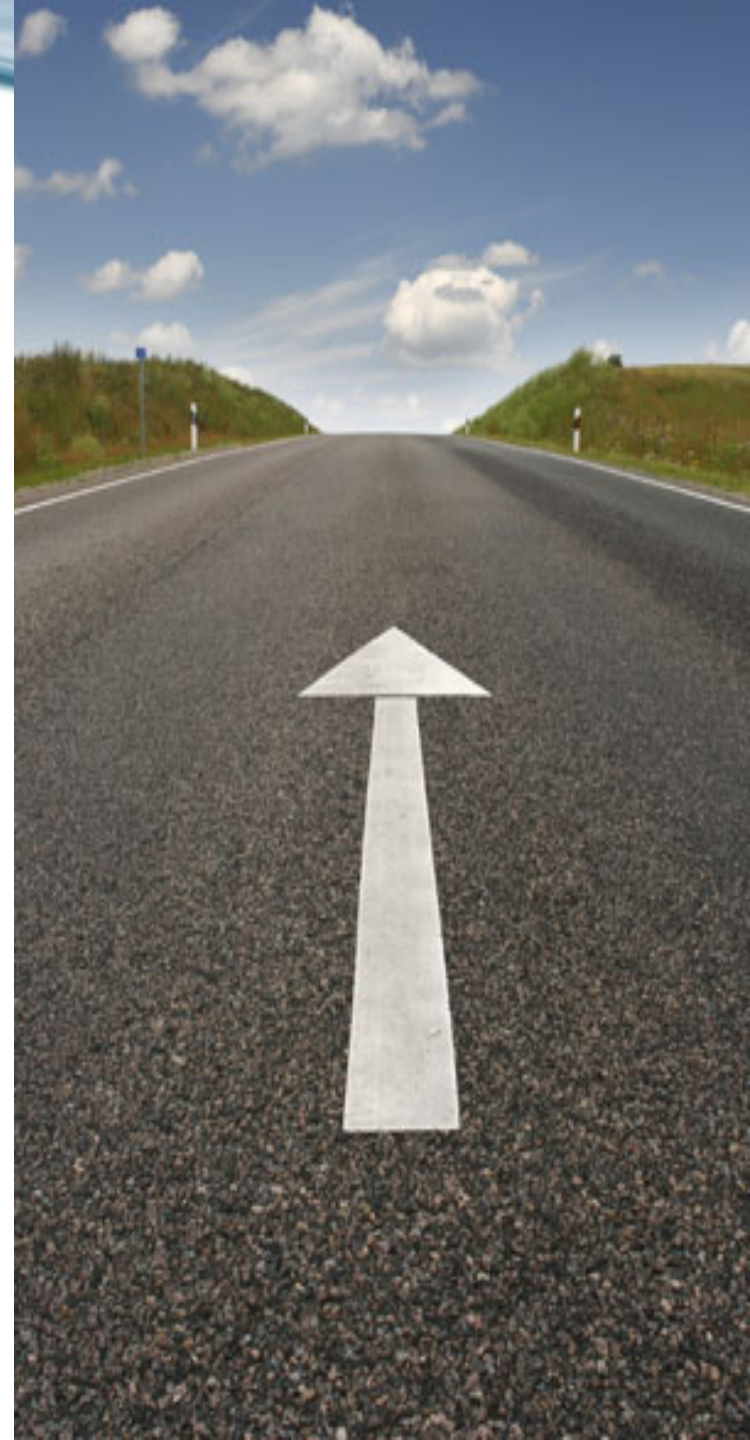
- 99.2% Cadmium
- 18% Cadmium
- 99.5% PAH
- 20% PAH
- 100% Magnesium
- ADDED 25% Magnesium
- 86.4% Mercury
- <1% Mercury
- 100% Zinc
- 24% Zinc
- 24.6% Chromium
- 99% Chromium



Looking Ahead

- Affordability
- Consistency
- Availability
- Particle Size
- More Research


KEEP MOVING
FORWARD



Others Needed

28 58.69
Ni
Nickel

34
Se
Selenium
78.09

27
Co
Cobalt
58.933

47
Ag
Silver
107.868

12
Mg
Magnesium
24.305

80
Hg
Mercury
200.59

33
As
Arsenic
74.922

NO₃



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Questions? coming!

