Carbon Capture, Use and Storage in the New Carbon Economy

USEA workshop
June 12th, 2018

www.centerforcarbonremoval.org
@CarbonRemoval
Pop Quiz: Art History
Pop Quiz: Art History

http://www.tate.org.uk/art/artworks/blake-cerberus-n03354
Center for Carbon Removal: NGO on a mission to build a growing economy that sequesters more carbon than it emits.

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**Initiative:** “Carbontech Labs” startup accelerator + impact fund

**Support tech commercialization**

Pipeline of innovations to bring from lab to market

**Catalyze R&D**

**Funding for R&D + deployment incentives**

**New champions for policy change**

**Change policy**

**Initiative:** “New Carbon Economy” R&D consortium
3 key takeaways

1. Carbon capture, use, and storage = broad portfolio of options

2. Progress in unconventional places = new capture and use options gaining traction

3. Policy happening now
## What is carbon capture, use and storage?

<table>
<thead>
<tr>
<th>Capture</th>
<th>Use and Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power plants</td>
<td>Enhanced oil recovery</td>
</tr>
<tr>
<td><img src="image" alt="Power plant" /></td>
<td><img src="image" alt="Enhanced oil recovery" /></td>
</tr>
<tr>
<td>Coal, gas, biomass</td>
<td>Oil production</td>
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### Industrial sources
- Fossil + bioenergy;
- Fuel refining, chemical manufacturing, cement/steel production

### Direct air capture
- Clean energy powered
Why carbon capture, use, and storage? Part 1 - for climate change, need to build a new carbon economy

Carbon capture, use and storage helps us achieve these goals faster, cheaper:

1. **Deeply decarbonize**

2. **Eliminate land use emissions**

3. **Scale carbon removal strategies**

Source: Rockstrom et. al in Science
Why carbontech?
Part 2 - huge economic opportunity... if we move first

Global market size, 2017

- **FOOD & AGRICULTURE**: $8B Total Available Market, $72B Serviceable Available Market
- **BUILDING MATERIALS**: $187B Total Available Market, $1,650B Serviceable Available Market
- **PLASTICS**: $67B Total Available Market, $483B Serviceable Available Market
- **FUELS**: $576B Total Available Market, $3,000B Serviceable Available Market
Where is carbon capture opportunity?
Part 1 - lots of places

EPA GHG Inventory 2016

- ELECTRICITY
- INDUSTRY
- FOSSIL FUEL PRODUCTION & USE
- MINERALS
- BIOGENIC
Where is carbon capture opportunity?
Part 2 - everywhere
Where is carbontech?
Where is carbontech commercial interest?

Carbontech has growing commercial traction

Corporate commitments: Interface

Accelerators: Y Combinator Carbontech Labs

Startups: Solidia, CarbonCure, Enerkem, Fulcrum, Newlight, Novomer

XPRIZE
Policy Outlook – US Federal

**Enacted**
- 45Q production tax credit includes wide range of capture, use, and storage
- Department of Energy research and development funding call for projects

**Introduced**
- USE IT Act (Senate)
- Carbon Utilization Act (Senate)
- Fossil Energy Innovation Act (House)
Policy Outlook – US State and International

State
• California:
  • Buy Clean Act for low carbon building materials procurement
  • Low Carbon Fuel Standard carbon capture rule making

International
• Europe:
  • UK funding $25M in research
  • Pilot projects in UK, Sweden, Norway, Netherlands
• Canada: research funding plus provincial carbon market opportunities
USE IT Act

Content

• Title 1: Research and development at EPA
  • $25M direct air capture innovation prize
  • $50M in carbon utilization research funding
• Title 2: permitting and regulations
  • Inclusion of CO2 infrastructure in FAST Act
  • Creation of task force to assess regulations related to carbon use and storage

Status

• Introduced with bipartisan co-sponsors (Barrasso, Capito, Whitehouse, Heitkamp)
• Passed Senate Environment and Public Works unanimously
• Hotlined for Senate floor vote
3 key takeaways

1. Carbon capture, use, and storage = broad portfolio of options

2. Progress in unconventional places

3. Policy happening now
Thank you!

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Initiative Overview: Carbontech Labs

A virtual *startup accelerator* for businesses turning waste carbon into valuable uses.

**The Accelerator:**
- Focus on customer discovery and product-market fit
- Host “bootcamps” with instruction and mentorship
- Specialized advisory network of 30+ investors, corporates, and subject experts
- Access to test facilities/labs

**The Impact Fund:**
- $20M evergreen seed fund to invest in most promising startups that graduate from the startup accelerator
- Estimated to make 5, ~$250k investments annually

Learn more at: [http://www.centerforcarbonremoval.org/carbontech-labs/](http://www.centerforcarbonremoval.org/carbontech-labs/)