Coal as A Solution

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Sustainable Energy Solutions

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US Primary Energy Consumption by Source

Global Coal History and Projections

source: EIA International Energy Outlook, Sept. 2019
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Anatomy of a Solution

Carbon capture is essential to climate mitigation

Essential carbon capture characteristics:

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<thead>
<tr>
<th>Retrofit</th>
<th>Capable of high capture rate (99%)</th>
<th>Energy efficient</th>
<th>Economical</th>
<th>Synergistic with other sources</th>
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</thead>
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Coal Advantages

Global impact

Potential negative emissions
Biomass Aggressive Capture
Cryogenic Carbon Capture™

1. Flue gas is cooled
2. CO₂ is separated as a solid from the light gases
3. CO₂ is melted and prepared for transport
4. Light gases are reheated and released to atmosphere
Cryogenic Carbon Capture™ Concept
CCC Dramatically Decreases Energy and Cost

- Numbers based on NETL 2013 net 550 MW super critical pulverized coal plant
- Integration includes energy and cost savings from steam cycle improvements and offsetting cost and energy requirements for SO$_x$, NO$_x$, and Mercury controls.
- Additional value and revenues could be gained from CO$_2$ sales and energy storage.
Energy Storage
CO₂ captured from cement
January 22, 2018

CO₂ used in concrete
February 6, 2018
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BYU Students

SES Employees (10 mechanical, chemical, & industrial engineers, 1 economist/MBA)