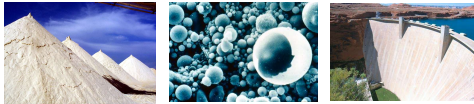


The Future of Fly Ash



Iowa Better Concrete Conference
November 10, 2021



2

American Coal Ash Association

- Founded in 1968 as the National Ash Association
- Headquartered in Denver, CO
- 105 members – utilities, marketers, contractors, material and equipment suppliers, consultants, academics
- Active with similar organizations around the world



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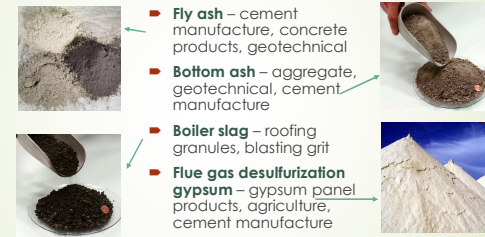
ACAA Mission

- The mission of the American Coal Ash Association is to encourage beneficial use of CCP in ways that are
 - *environmentally responsible,*
 - *technically sound,*
 - *commercially competitive,*
 - *supportive of a sustainable global community.*

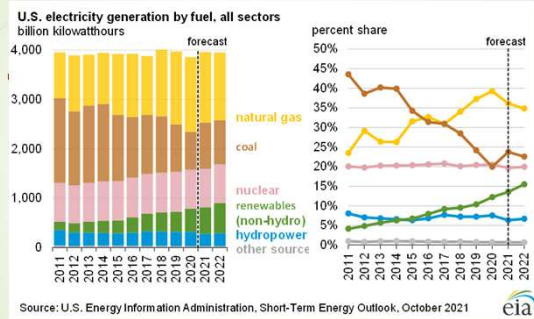


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Coal Combustion Products



But hasn't coal gone away?



What is the state of supply today and why?

- Across the U.S., some areas are experiencing a significant gap between supply and demand.
- Primary Reason for this gap: demand has been increasing while coal-fueled generation has been decreasing
- About 6 years ago, coal fueled about 50% of the generation of electricity
- Today, coal accounts for 20% to 25% of generation
- Base-load generation has declined
- Coal plants are now running mostly in very hot and very cold weather conditions

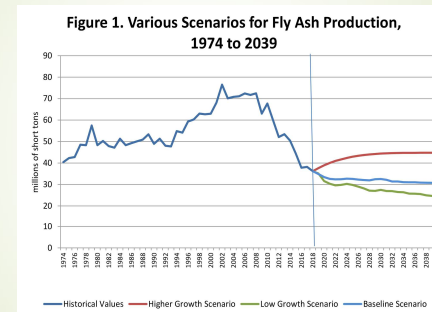


There is fly ash not in use

- Each year millions of tons of fly ash produced goes to disposal rather than into beneficial use.
- Primary Reason #1 – Dislocation
- Primary Reason #2 – Quality
- 2015 to 2019 185.9 m tons of fly ash produced
- 2015 to 2019 108.7 m tons of fly ash used in all beneficial uses
- 2015 to 2019 69.4 m tons of fly ash used in concrete
- 2015 to 2019 **77.2 m tons of fly ash not used**



Fly Ash Production Forecast



Fly Ash Production Forecast 2018 to 2039

Table 1. Fly Ash Forecast Scenarios (in millions short tons)

	Volume 2018	Projected Volume 2039	Projected Total Change	Projected Avg. Annual Growth Rate
Fly Ash Production				
Baseline Forecast	36.2	30.8	-14.9%	-0.8%
High Growth Scenario	36.2	44.8	23.8%	1.0%
Low Growth Scenario	36.2	24.9	-31.2%	-1.8%
Fly Ash Utilization				
	20.1	27.8	38.3%	1.6%



Imports to the U.S.

- Mostly bottom ash for use in cement production
- Some movements of fly ash into the country by individual concrete producers
- Efforts to bring fly ash to the U.S. in super sacks
- Large quantities available from China and India
- Some government subsidies in other countries



What is "harvesting"?

- "Harvesting" is the term selected by consensus to describe the process of removing coal ash from disposal – dry and wet – for beneficial uses.
- Why "harvesting"?
- Disposal of coal ash occurs in landfills and surface impoundments (a.k.a. ponds)
- Coal ash comingled with other materials is likely not to be a candidate for processing for concrete manufacture
- Coal ash in monofills is the target
- Over 2.5 billion tons in disposal in the U.S.



First Large Scale Project

- Santee Cooper Plant, Georgetown, S.C.
- The SEFA Group is providing the technology for processing ash harvested from ponds
- In commercial operation for 6 years
- Fly ash is processed even when the power plant is not producing electricity



Harvesting from Landfill

- Eastern Pennsylvania
- PPL landfill closed for over 10 years
- Over 2 million tons of good quality Class F fly ash
- PPL and Boral Resources petitioned the Pennsylvania Department of Environmental Protection for approval
- Harvesting has been underway for 2 years



State Mandated Harvesting

- North Carolina – 32 ponds will be closed eventually
- 3 very large ponds currently under closure required to process a minimum of 300,000 tons of fly ash per year from each pond suitable for sale into concrete production.
- Virginia – 4 sites to be closed
- Total coal ash to be removed = 27 million cyds.
- Minimum of 25% of coal ash removed to be processed for beneficial use.



States Considering Harvesting

- Georgia
- Illinois
- Ohio
- Tennessee
- Michigan
- Texas



Specifications

Recently activity and discussions in AASHTO, ACI, ASTM International have opened the door to changes in specifications to allow the use of materials which will increase the supply of fly ash and other SCMs.

- ❖ Blending of in-spec and out-of-spec fly ashes to make a blend meeting ASTM C 618
- ❖ Blending of fly ash and natural pozzolans
- ❖ Including ground bottom ash in C 618
- ❖ Allowing the blending of ground bottom ash with fly ash to make a blend meeting C 618



Summary

- There is fly ash being produced that is not being used.
- Fly ash production is expected to remain fairly constant for the next 15 to 20 years.
- Imports will continue to play a minor role in meeting market demand.
- Harvesting will close or eliminate the gap between supply and demand in some regional markets.
- Specification changes can assist with alleviating shortages in some markets.
- Beneficiation technologies are available but can be costly.



Thank You!

American Coal Ash Association

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