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ASH at work

Applications, Science, and Sustainability of Coal Ash

ACAA Celebrates 50 Years

Special Commemorative Edition

Future Coal Ash

What Lies Ahead for Beneficial Use of Coal Combustion Products?

By John Ward

What deep dive into an organization's past would be complete without at least a glance into its future?

I'm honored to be the American Coal Ash Association's designated soothsayer for this task. A caveat to begin: I rarely write in the first-person voice but feel compelled to do so now because what you are reading represents my own opinions and not necessarily those of ACAA or its members. Furthermore, ask anyone familiar with my track record predicting the outcome of 2016 U.S. elections or college football betting pools and you will know what a cracked crystal ball stands before you now.

James Baldwin said, "Know from whence you came. If you know whence you came, there are absolutely no limitations to where you can go." With that bit of real sage advice, let's consider the future of coal ash in terms of trajectories.

Trajectory #1—From waste to byproduct to product

This edition of *ASH at Work* chronicles a half-century of the evolution of our industry. In the beginning, the industry dealt with coal combustion wastes (CCWs.) As it became apparent that these wastes had value, terminology shifted to coal combustion byproducts (CCBPs.) When encouraging beneficial use of the materials became a high priority for both the public and private sectors, terminology shifted again to coal combustion products (CCPs.) (The regulatory adoption of the term coal combustion residuals—CCRs—in the context of the U.S. Environmental Protection Agency's 2015 rule governing disposal practices creates semantic confusion, in this author's opinion, but at least avoids sliding back into a characterization as "waste.")

The net of this evolution is that coal combustion products fully evolved from one man's trash into another man's treasure, setting the stage for the second trajectory.

Trajectory #2—From something to be sold to something in demand

When I began my adventure in coal combustion products two decades ago, I spent most of my time trying to persuade people to use CCPs. "Here's what they are. Here's what they're used for. Here's why they'll make your products perform better. Here's why it's good for the environment." I haven't given that presentation to a customer audience in probably eight years. When I dusted it off recently to help train some new industry employees, the PowerPoint graphics quality was hilarious.

Today, when I (and other ACAA representatives) meet with CCP users, they already know what the products can do for them. They like the products. More importantly, they now need the products to help them solve specific issues in their own industries.

We are no longer pushing products to other industries. CCPs are being pulled in and the users want to know how they can get more—with consistent quality and reliable supply. (For a deeper dive on how CCP markets work, see "CCP Marketing—Unique Industry Depends on Private Investment and Sensible Public Policy for Growth."[1])

Trajectory #3—From cinders to "toxic waste"

Not all trajectories are favorable. Fifty years ago, people had a more intimate and less fearful relationship with coal. (A few may even have had coal furnaces in their homes—or at least the coal chutes where the fuel used to be delivered.) Today, because of a couple of high-profile coal ash disposal site failures and relentless publicity by well-funded anti-coal environmental organizations, a Google search for "coal ash" produces results dominated by words like "toxic," "dangerous," "hazardous," and even "deadly." Recent jury decisions emerging from a personal injury case in Tennessee will only serve to accelerate this phenomenon.

The situation has potential to create cognitive dissonance at the end user level. Coal combustion products are incorporated in building materials that show up in every part of a person's home and community. "What? There's toxic waste in my home?" Dealing with this conundrum is tricky. Do you try to defend the coal ash by pointing out that in the world of toxic things, this stuff is pretty darned mild? (Just look in your garage, medicine cabinet, or under your kitchen sink if you want to see some really poisonous stuff.) Or do you focus on the "safe when properly used" aspects? Either way, it will need to be dealt with. Continually.

Trajectory #4—Regulatory policy matters

Another situation that requires continual attention is the ever-shifting regulatory landscape. Although beneficial use of coal combustion products remains specifically exempt from federal disposal regulations, every new debate over those regulations has potential to create uncertainty that can affect the beneficial use industry's ability to source material and attract capital to expand logistics.

For instance, the volume of coal ash utilization stalled between 2009 and 2013 as EPA pursued a protracted rulemaking process that posed the threat of a "hazardous waste" designation for coal ash that is disposed. (See Figure 1.) Even though beneficial use was exempt from the proposed regulation, ash producers, specifiers, and users restricted coal ash use in light of the regulatory uncertainty and publicity surrounding EPA's activities. Once regulatory certainty was restored, utilization growth rebounded. Conversely, the most rapid expansion of coal combustion products beneficial use in history occurred when regulators actively worked with industry to encourage responsible beneficial use through the Coal Combustion Products Partnership (C^2P^2 program). In 2000, when EPA issued a Final Regulatory Determination that coal ash should be regulated under "non-hazardous" RCRA Subtitle D and subsequently initiated the C^2P^2 program, beneficial use volume was 32.1 million tons. Just eight years later, when the C^2P^2 program was terminated and EPA initiated the aforementioned ash disposal rulemaking, beneficial use volume had nearly doubled to 60.6 million tons.

Trajectory #5—Track record of consistent innovation

Whenever someone accosts me with the latest existential threat to the CCP beneficial use industry (i.e., "The power plants are closing!

The ash marketing industry at this moment is like the proverbial dog that caught the car and now has to figure out what to do with it. The beneficial use rate in 2017 hit 64%; concrete producers would use more fly ash if they could get it; numerous key markets can be characterized as "under-supplied."

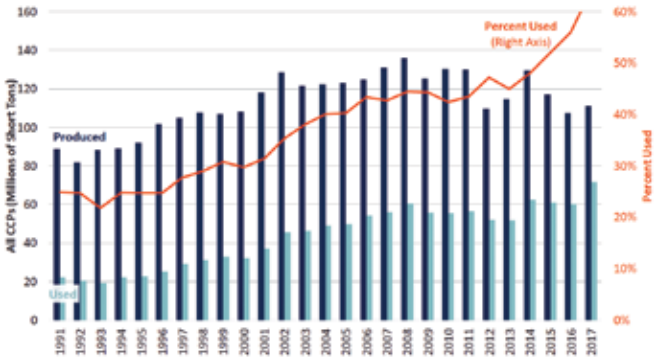

Figure 1. ACAA 2017 Coal Combustion Products Production and Use Survey, all CCPs production and use with percent.

The power plants are closing!"), I remind them of the litany of previous existential threats. Fuel switches. Low-NOx burners. Selective catalytic reduction. Mercury injection. Economic dispatch. The list goes on, and each time some new strategy or widget affecting power plant operations comes into play, naysayers predict the end of CCP marketing. But take another look at Figure 1. What happened?

For one thing, CCP marketers are a pretty resourceful bunch. They've never had direct control over manufacturing of the product they sell and, out of necessity, have learned to adapt quickly to changing situations. This includes deploying a wide array of technologies that address whatever complications are created by shifting power plant operations. Beneficiation technologies such as carbon removal, carbon passivation, and ammonia slip mitigation are examples. More recently, CCP users have taken an expanding role in this innovation. (See Trajectory #2.) Two decades ago, ash users tended to be very picky about their specifications. Now that they truly want and need the materials, ash users are actively working with marketers to allow new strategies for blending materials, processing materials, and harvesting previously disposed materials.

Grand Prognostications[2]

So what happens next? If (my interpretation of) the past can be relied upon, here are three predictions for our industry:

Prediction #1—Markets will continue to drive beneficial use

CCP marketers will continue to do what they've always done: adapt to shifting market conditions. That means the markets, not the materials themselves, are the drivers.

Twenty years ago, if a local market was short on ash, the marketer would find the most economical way to supply it. (Find a new


SOURCE: SEFA Group


SOURCE: Boral Resources

Santee Cooper's Winyah Generation Station (l) uses the SEFA Group's Staged Turbulent Air Reactor (STAR) technology to reclaim coal ash from on-site ponds for its primary raw feed. Dry stack harvesting is carried out (r) at Boral Resources' Washingtonville, Pennsylvania, monofill.

local source? Transport materials from farther away?) Today, the process is exactly the same, but the tool box has grown bigger. (Beneficiate lower-quality materials? Blend materials? Harvest previously disposed CCPs? [See examples in photos above.] Import CCPs?) Different geographic markets will see different solutions based on their individual economic opportunities.

Prediction #2—Technology will continue to address challenges

It's worth noting that the innovation addressed in Trajectory #5 is not exactly rocket science. For the most part, the CCP marketing industry has become adept at evaluating technologies used in other industries and then adapting them to address specific challenges. This provides solutions that come to market more quickly and with less risk. Odds are that these kinds of step-change innovations will continue to find favor over breakthrough technologies in the CCP beneficial use industry.

However….if you want to invent the machine/pixie dust that eliminates performance variability among ash types and sources, that would be a true breakthrough—enabling the CCP world to shift from a series of local markets to a single fungible commodity market. So—calling all rocket scientists—there's your brass ring.

Prediction #3—Current market conditions do not necessarily reflect future market conditions

In some respects, the ash marketing industry at this specific moment in time is like the proverbial dog that caught the car and now has to figure out what to do with it. As reported elsewhere in this publication, the beneficial use rate in 2017 hit 64%—blowing well past the previously mentioned C^2P^2 program goal of 50%. Concrete producers would use more fly ash if they could get it. Numerous key markets can be characterized as "under-supplied."

That situation imposes risks. First of all, it creates opportunities for competing materials to step in. (Natural pozzolans and ground glass are two examples currently taking a run at it.) It also imposes risks associated with whipsawing from shortage to oversupply. (With several large ash harvesting operations scheduled to come online in the near future, some local markets could quickly become swamped with material, potentially undercutting market conditions necessary to sustain investments in expanding distribution infrastructure.)

Grand Conclusions

Fifty years of ACAA experience demonstrates that coal combustion products are here to stay. Despite potential competition, CCPs remain the most abundant and accessible materials for the job. Furthermore, the role of CCPs in enhancing performance of end-use products and providing significant environmental benefits cannot be talked about enough.

Similarly, CCP marketers over the decades have proven to be resilient and adaptable to rapidly changing market conditions. Right now, a great deal of focus is on the supply side, finding ways to get more materials to market. Because I fully expect these efforts to succeed, I recommend returning our focus very soon to the demand side—building support for beneficial use applications that have declined while materials were in "short supply" for high-value applications, such as fly ash in concrete.

The job of ash marketing is never done. Stay nimble, my friends.

Footnotes

1. "CCP Marketing—Unique Industry Depends on Private Investment and Sensible Public Policy for Growth," *ASH at Work,* Issue 1, 2017. https://www.acaa-usa.org/Portals/9/Files/PDFs/ASH01-2017.pdf

2. I chose the word "prognostications" because it sounds so much more impressive than "predictions" or "forecasts." Plus, I wanted you to picture me wearing a coat with tails and a very tall hat, standing on the back of a colorfully painted 1880s wagon hawking a small bottle of cure-all. Plus, this is an article in *ASH at Work,* so I felt like it needed more than one footnote.

John Ward entered the coal ash marketing business in 1998 as Vice President, Marketing and Government Affairs, for ISG Resources (later Headwaters). For the past decade, he has served as president of John Ward Inc., a public affairs consultancy to the coal ash and energy industries. He is the longstanding chairman of ACAA's Government Relations Committee and was the first recipient of ACAA's Champion Award. He is the author of ACAA's weekly *Phoenix* newsletter and introduces himself the way his son did at a seventh-grade career day 12 or so years ago—as a used coal salesman.