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A Utility Perspective: Subsidized Projects – How Much Should You Pay?

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ABSTRACT

It is obvious to utility managers that getting rid of coal combustion products (CCPs) off-site of a power plant at no cost or better is a good business decision. However, when the project calls for a subsidy, the decision becomes more difficult. Utilization of CCPs has numerous benefits. One of which is extending the life of disposal facilities, or possibly avoiding the need to use those systems all together. If the best market price one can get for their material is net zero or better, as stated, it would be a tremendous deal. Even at a subsidization of $0.01 per ton, it would likely be a great deal. But what about $0.50 per ton, or $2.00 per ton, or even $10.00 per ton? Where should the line be drawn? This decision will depend greatly on specific plant details and how the utility values their disposal facilities.

This paper will discuss different methods for assigning an economic value to on-site CCP disposal. Simple methods such as total system costs divided by volume will be used. Other more complex methods using time value of money and characterizing fixed, variable and sunk costs will also be discussed. In these more complex models, benefits from deferring or avoiding future costs will be used to offset subsidy payments.

Determining the value of a plant's maximum subsidy is extremely site specific and will also be subjective, based on the utility's management philosophy. However, the tools in this report will assist utility managers in acquiring a range of maximum subsidy values for beneficial CCP utilization projects. These values can then be used by managers to make better business decisions and improve their company's bottom line.

INTRODUCTION

Determining the economic value of storing a ton of CCP in one's current disposal facility is a difficult task. One might initially think that the answer is obvious. The value is the original cost to construct the disposal facility divided by the storage volume it created. That answer has useful benefits; it is easy to calculate, it is very accurate and it shows trends in storage facility construction costs. However, it ignores the fact that the capital required for that project is sunk. A sunk cost is a cost that cannot be changed by any present or future decision and therefore should not be used in business decisions[1] – the money has already been spent and cannot be retrieved. This method also does not take into account future costs that might be incurred if the current facility reaches its capacity.

There are numerous ways to look at valuing the storage of CCPs, the above example being just one. For each method discussed in this report, the results will have benefits as well as problems. No one method may be the correct answer; however, each answer will add another piece to the puzzle of determining a plant's maximum subsidy level.

Note that this report will focus on determining the maximum subsidy a plant should be willing to pay to dispose of their material. However, in certain circumstances, the subsidy value may be fixed. In those cases, one may have to vary the tonnage moved, the distance moved, or the term of the subsidy project to determine in which instances paying the subsidy is beneficial to the company. These issues will be briefly discussed later in the report.

PROJECT SETUP

To clarify the methodologies and calculations, a fictitious power plant will be assumed with given CCP disposal parameters. This information will be used as data for subsequent calculations throughout the report.

For simplicity, the plant information is limited to fly ash, and this product is disposed of in on-site ponds. However, the methods presented in this report are applicable to all types of CCPs, including bottom ash, boiler slag, flue gas desulfurization material and fluidized bed wastes. These methods are also applicable for other on-site storage options, such as on-site landfills, material stacking and other disposal practices where the plant invests capital to continue the specific disposal method. Also note that the term off-site disposal, used in this report, may include third party disposal, as well as other common beneficial reuses.

Plant Assumptions

- The plant consistently produces 80,000 tons of fly ash, per year
- The existing facility was built to store 1 million tons total, and originally cost $8 million
- The next planned facility will store 1.5 million tons, and cost approx. $14 million (in today's dollars)
- Variable O&M costs are $40,000 per year (or $0.50 per ton) – variable costs are costs that vary in total directly and proportionately with changes in activity level[3], and include items like equipment maintenance, fuel, and incremental power consumption
- Fixed O&M costs are $80,000 per year – fixed costs are costs that remain the same in total regardless of changes in the activity level[4], and include items

like labor, leases or rent, base power consumption, and environmental monitoring
- The current facility has 6 years of remaining capacity, if all generation is stored on-site

Other Assumptions

- The company's pretax cost of capital is 12% per year – the cost of capital is the rate of return that management expects to pay on all borrowed and equity funds[2]
- Inflation is assumed to be 3.5% per year
- It is estimated the variable O&M costs will escalate by 25% with the next facility. Fixed O&M costs will remain the same.
- Ancillary costs or benefits that will be ignored during computations, but discussed later include: environmental releases, land value, long-term liability, opportunity costs, etc.

Proposed Project Assumptions

- A cement manufacturer would like to use 40,000 tons per year
- Direct expenses would be $6.00 per ton, which includes a transportation expense of $5.00 per ton (for a 50-mile round-trip haul) and marketing fee of $1.00 per ton.

PROJECT VALUATION METHODS

Two groups of methods for determining the value of storing CCPs will be discussed. These values will be used to determine if the subsidy project should be pursued. The first method utilizes the actual or projected costs of constructing storage facilities, and the associated volumes that have been, or will be, created. These will be referred to as *non-discounted methods*. The computations are simple, and can be done with minimal information. But their application is limited.

The second set of methods will be termed *discounted methods*. The discounted methods will utilize time value of money and an incremental cash flow analysis to determine break-even subsidy levels. In these methods, the deferring or avoiding of capital dollars associated with constructing new facilities will provide present value benefits that will offset future subsidy costs.

Non-Discounted Methods

There are three simple non-discounted methods for placing a value on storing CCPs. These methods are identified and discussed below.

Current Cost / Current Volume plus O&M

This value is calculated by dividing the original volume of the current facility into the actual cost, and then adding O&M costs. This value is easy to calculate and gives a unitized cost for using the current facility. However, when comparing to other alternatives, it does not take into account that the capital cost to construct the facility is sunk. Also, this value is not an actual future cash flow and therefore would not be impacted by the proposed project. Likewise, a portion of the O&M costs are considered fixed and are not relevant in a project analysis. Therefore, only variable O&M costs need to be considered for comparison purposes. However, if fixed costs are left out, the disposal costs will be artificially low, and although valid for comparison, will not reflect useful disposal values. These values may also not be acceptable for budgeting purposes, or comparing to other projects, which will be discussed later in this report. Including fixed O&M costs, the calculation is:

($8 million / 1 million tons) + ($120,000 / 80,000 tons) = $9.50 per ton
{unitized capital cost} {unitized O&M cost}

Future Cost / Future Volume plus O&M

This value is calculated by dividing the volume of the next planned facility into the estimated cost to construct that facility, and then adding the estimated O&M. Since the current facility cost is sunk, one could instead consider that the result of filling up the current facility would be the necessity to build the next facility. This value gives a unitized cost for the next planned facility. When comparing to other alternatives, this value could be considered the expected unit cost for continuing to dispose of CCPs on-site.

One benefit of this calculation is that it identifies the future trend of constructing more storage. The primary drawback is that it ignores the value of the remaining capacity in the current facility. Another problem is that future projections are used for all the input data. In some cases, the required input information may not be readily available since the facility will not be needed for many years, and the required planning is likely to be incomplete. Furthermore, if the current facility has many years of remaining capacity, the exclusion of time value of money may distort the results. The calculation is (note the escalation of variable O&M expenses):

($14 million / 1.5 million tons) + ($130,000 / 80,000 tons) = $10.96 per ton
{unitized capital cost} {unitized O&M cost}

Future Cost / Current Volume plus O&M

This value is calculated by dividing the total volume of the current facility into the estimated cost to construct the next planned facility, and then adding the current O&M costs. This simple calculation considers that the impact of filling up the current facility is that the next facility must be built. When comparing to other alternatives, this could be considered the unit cost of utilizing the remaining capacity in the current facility. The calculation is:

($14 million / 1 million tons) + ($120,000 / 80,000 tons) = $15.50 per ton
{unitized capital cost} {unitized O&M cost}

Of all these non-discounted methods, the authors believe the most appropriate quick calculation is the third method, future cost divided by the current total volume. The capital portion of this method is analogous to an asset depreciation expense. In simple terms, one could say that for every ton of material that is stored in the existing facility, the utility should put aside $15.50 dollars. When the current facility is full, they would have enough money set aside to build the next facility. The down side of this method, as well as the others in this group, is that they do not take into account the time value of money.

Another important concern in the second two methods is that they use the estimated cost and size of the next planned project. These numbers are subject to change and, depending on how many years out the capital costs are, they may change often.

Discounted Methods

The discounted methods can be divided into two categories: 1) unitized values, and 2) incremental cash flow analyses of alternatives. The first category follows the same logic developed in the non-discounted methods, but includes the time value of money. The second category compares the present value of actual cash flows associated with competing alternatives.

The principle of "time value of money" is basically the concept that a dollar received today is worth more than a dollar received at some point in the future, because the dollar received today can be invested and earn interest[5]. There are two basic components to this concept: 1) dollars are inflated over time to account for the growth in the economy, and 2) dollars are discounted over time to account for financing costs (interest). Discounting cash flows is expressing future cash flows in terms of equivalent present values[6]. For this project, the inflation rate is assumed to be 3.5% and the company's pretax cost of capital, or discount rate, is assumed to be 12%. The following two equations are useful in discounting cash flows:

$$\mathbf{FV = PV * (1+i)^y} \qquad \text{(used for inflating values into the future)}$$

where: FV is the future inflated value of a one-time cash expense or revenue
PV is the present value of a one-time cash expense or revenue
i = the appropriate inflation rate
y = the number of time periods the expense is being inflated, normally years

$$PV = FV / (1+r)^y \qquad \text{(used for discounting future cash flows)}$$

where: PV = the present value of a one-time expense or revenue
FV = the future value of a one-time cash expense or revenue
r = the company's appropriate cost of capital
y = the number of time periods the future cash flow is discounted

For illustration purposes, only the third non-discounted method from the previous section (future cost / current volume) will be demonstrated. The other non-discounted methods can be discounted in the same manner.

Discounted Future Cost / Current Volume plus O&M

In the example, the next facility will be required in six years. To obtain the present value of the future cost, the estimated facility cost in today's dollars is first inflated to determine the estimated cost in year six, and then discounted back to the present using the company's pretax cost of capital. The value shown below of $8.7 million is the amount that would have to be set aside today to be able to pay for the next facility, six years from now.

$FV = \$14 \text{ million} * (1+0.035)^6 = \$17.2 \text{ million}$
$PV = \$17.2 \text{ million} / (1+0.12)^6 = \$8.7 \text{ million}$

Discounted Value = ($8.7 million / 1 million tons) + ($120,000 / 80,000 tons) = $10.20 per ton
note: percentages are expressed in their decimal form

Note the disparity in values when comparing discounted methods to non-discounted ($10.20 vs. $15.50). By ignoring the time value of money, this plant could be overestimating its value for disposal by 50%. The problem with this method, however, as with all the unitized methods, is that it treats this value like an actual cash flow, which it is not. This method excludes the fact that the capital dollars are actually incurred in lump sums spaced many years apart. For example, if a subsidized project, at a cost below $10.20 per ton, survives for only one year, has the plant really benefited? And if so, how much?

The second category of discounted methods is incremental cash flow analyses of competing alternatives. This category provides a direct comparison of the net present values (NPV) for the two potential options: 1) continuing on-site disposal, and 2) continuing on-site disposal in conjunction with the proposed project. The present values of each project are determined by discounting all future cash flows back to the present with the company's appropriate cost of capital[7]. Expressing each project in their present value allows for comparison under similar conditions, namely today's dollars. Since the new project will include the subsidy value as a variable, the subsidy can be changed to force the NPV of each option to be the same. Doing this will find the break-even subsidy value.

Incremental Cash Flow Analysis

The real benefit for any subsidy project is avoiding or deferring future costs. For this project, not only can some variable O&M costs be avoided, but depending on the term of the project, future capital costs may also be deferred. Because the project proposes to use half of one year's production, it would take a minimum term of two years to defer the future capital costs one year. Furthermore, continually disposing of half the production off-site would essentially double the years of remaining capacity. This would result in the future pond being required in year 12. However, the project could be evaluated for any length of time between two and twelve years. For illustration purposes, this report will analyze a two-year subsidy project term.

When comparing two separate options, the length of years to compare must be sufficient to capture any differences in cash flows. Keep in mind that, due to discounting, the farther out a cash flow is, the less effect it will have on the present value of the option. For this two-year subsidy project, the cash flows will be compared as follows:

Cash Flows for Option #1 - No off-site disposal

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Tons Shipped	0	0	0	0	0	0	0	0	0	0
Capital Expense	$0	$0	$0	$0	$0	$17.2M	$0	$0	$0	$0
Variable Expense	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$50,000	$50,000	$50,000	$50,000
Fixed Expense	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000
Total Expenses	$120k	$120k	$120k	$120k	$120k	$17.3M	$130k	$130k	$130k	$130k

Some items to note about the cash flows:

- The pond cost is inflated to reflect the estimated cost in year six.
- The variable O&M expense increases by 25% with the new facility.

Cash Flows for Option #2 - Two years off-site disposal, 40,000 tons/year

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Tons Shipped	40,000	40,000	0	0	0	0	0	0	0	0
Capital Expense	$0	$0	$0	$0	$0	$0	$17.8M	$0	$0	$0
Variable Expense	$20,000	$20,000	$40,000	$40,000	$40,000	$40,000	$40,000	$50,000	$50,000	$50,000
Fixed Expense	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000
Total Expenses	$100k	$100k	$120k	$120k	$120k	$120k	$17.9M	$130k	$130k	$130k

Some items to note about the proposed project cash flows:

- Variable expenses are reduced with less on-site storage, in years one and two.
- The cost of the next facility is now inflated to seven years.
- Subsidy expenses are not yet included in this project, since they are not yet determined.

Note that the cash flows are similar from year eight through year ten. For comparison of these two alternatives, the cash flows in these years would cancel each other out. Any project length greater than seven years would still be acceptable, but this report will use a seven year project. Actually, any year where the costs in both projects are identical, the costs would cancel each other out, and could be ignored for comparison purposes. Again, the fixed expenses could be ignored, bur for the reasons stated before, we will include them in the calculations. Therefore, the net present value will be calculated for all cash flows during the first seven years. (Notice that if the subsidized project continued for four years, the cash flow analysis would have to extend out to eight years, since the pond, in option #2, would be built in year eight.)

To determine the break-even subsidy for this proposed project, perform the following steps:

1. Calculate the net present value of option #1.

   The most rigorous method of calculating the NPV of each option is to use the discounting formula for the total net expenses of each year, bringing each year's expense into present day values. Note that there are formulae that would ease the discounting of annually recurring similar expenses, or annuities, but that is another report. Consult a finance book or a company accountant for those formulae. Regardless, spreadsheets are the preferred way to do these calculations. They are very flexible, and can immediately calculate many discounting equations.

   The calculations were done outside of this report, and the NPV value for option #1 is ($9,266,230).

2. Calculate the net present value of option #2 ignoring the subsidy payments.

   Again, the NPV can be calculated by individually discounting each year's total net expenses. This calculation was done outside of this report, and was determined to be ($8,565,666).

3. Calculate the difference between the net present values of the two projects. In this case, the value is $700,564. This is the present value of expenses that was saved by participating in the off-site disposal option, ignoring any possible subsidy costs. Part of the savings was due to the decrease in variable

expenses. The majority of the savings were due to the financial benefit of deferring the pond construction by one year. What this means is that if the ash could be moved at no expense to the utility, the utility would realize a positive value of over $700,000, in today's dollars, for this project.

4. Determine the break-even subsidy for the project. To calculate this, use trial and error guesses with subsidy values until the NPV of only the subsidy cash flows equals the $700,564 savings. In other words, all the savings are used to subsidize the 40,000 tons of ash shipped, for two years. At that calculated subsidy cost, the project would be at the break-even point. The cash flows for the subsidies are shown below.

Year	**1**	**2**
Tons Shipped	40,000	40,000
Subsidy Cost	$40,000 * S	$40,000 * S

Where S is the subsidy cost.

The discounting equations have been used to determine the break-even subsidy level. The appropriate subsidy is $10.36. It is coincidental that this number happens to be close to the value of $10.20 per ton discounted storage cost, as calculated above (future cost / current volume).

For comparison, the same exercise was performed assuming a four-year subsidy project, and the resulting break-even subsidy level was $11.12 per ton.

Since the project will require only $6.00 per ton for transportation and marketing, the ash manager should make the deal, and on a strictly financial decision basis would be willing to pay up to $4.36 per ton additional if it was required to complete this project. If the project required a subsidy over $10.36, it would probably not be a good business decision, today.

Some interesting points to understand regarding subsidies:

- The break-even subsidy is contingent on project parameters, not just plant information.
- If the same question is asked next year (how much would the plant be willing to pay to get rid of 40,000 tons of ash for two years), the break-even subsidy would change to $11.54 per ton, due to the pond construction project getting closer in time. This means that as a capital project draws near, one should be willing to pay more to get rid of the ash off-site, to avoid that impending capital expense.
- These calculations can also be done for a project that gets rid of all the ash for perpetuity. In that case the future pond is avoided completely, and those savings would be used for possible subsidy payments. (Note that one would

have to pick a discrete project length with which they were comfortable, but it's important to understand that the existing capacity would need to survive the remaining plant life for the future pond to be avoided). This variation was calculated for a seven year project, and the resulting break-even subsidy was around $132 per ton.

- If, after a specific off-site disposal project has begun, another proposal comes up, the same exact methods can be used to determine the validity of the second project. In that instance, the new base case (option #1) would include the off-site disposal parameters and expenses of the first project.

SUMMARY

The following table shows the results of all of the calculations that were done above.

Project Description	**Break-Even Subsidy**
Non-Discounted Methods	
Current Cost / Current Volume + O&M	$9.50
Future Cost / Future Volume + O&M	$10.96
Future Cost / Current Volume + O&M	$15.50
Discounted Methods	
Future Cost / Current Volume + O&M	$10.20
40,000 tons disposal for two years	$10.36
40,000 tons disposal for four years	$11.12
40,000 tons for two years, evaluated next year	$11.54
80,000 tons for perpetuity (7 yr. project)	$132

As has been stated before, the first three numbers in the table can be very useful since they are easy to calculate, but do not fully address the value of future expenses and savings. The first discounted method is better than the non-discounted methods since it is easy and incorporates time value of money; however, it still does not represent an actual cash flow.

The last four discounted methods are the most useful, depending on the project parameters and timing. They do represent actual cash flows, and the associated expenses and savings are compared similarly on a present value basis.

INTERNAL RATE OF RETURN

The methodologies above all center around determining a break-even subsidy level. The logic is that subsidies above this level are not justified, but below this level would benefit the company. However, these methods do not tell how bad, or how good the project really is.

There is a method called "internal rate of return" (IRR) that many companies use with NPV analyses to help determine which projects are justified. The IRR on an investment is the required return that results in a zero NPV when it is used as the discount rate[8]. In the methods above, the authors used the company's pretax cost of capital to find a break-even subsidy, which forced the NPV to be zero. That means the pretax cost of capital at the break-even point is the IRR. However, if the subsidy could be negotiated below the break-even point, the IRR would correspondingly increase, meaning the higher the IRR, the better the project.

Some companies set hurdle rates for IRR, instead of using break-even NPV analyses (and some require both methods to be considered). A hurdle rate is usually set by starting with the company's specific cost of capital and then adding in risk premiums. Different levels of risk premium may be applied depending on details such as the type of project, the project term, the project financing, or the project location. By increasing the IRR hurdle, one is, in essence, lowering the maximum subsidy level, which is more conservative.

Calculating the IRR for a project is very difficult, and will not be shown in this report. There are also some problems with the IRR method, especially with erratic cash flows. However, it is important to understand that as the subsidy of a project goes down, the IRR goes up. The NPV analysis requires the subsidy to be below the break-even level, and the IRR analysis requires the return to be above the hurdle rate.

CHANGING OF OTHER PARAMETERS

In all the examples above, the project parameters were fixed and a break-even subsidy was calculated. In the real world, there may be limits on the subsidy value due to management philosophy, budgeting, customer requirements, etc. Therefore, the instance may arise when the subsidy value is fixed but other project parameters are flexible, such as tonnage of ash moved, the project term or hauling distance.

The trial and error method is best used for these types of calculations, since multiple cost items will change by changing each parameter. For instance when tonnage is an independent variable, variable O&M expenses, the total annual subsidy payments, and the year that the next facility construction will take place, all may change. Similar problems would exist when the project term becomes an independent variable. This trial and error method is also convenient for conducting a sensitivity analysis. For example, if the tonnage quantity and price are negotiable, then they each can be varied to determine the corresponding changes in break-even costs.

Transportation hauling distance, however, can be calculated directly from the break-even subsidy and the project parameters. Take for instance the two-year project above where the break-even subsidy is $10.36. As already stated, the haul distance was given as 50 miles, and the hauling cost is $5.00 per ton, therefore, the hauling rate is $0.10 per ton-mile (ignoring economies of scale and special back haul rates etc.) Assuming no revenues from the customer, and a $10.36 per ton maximum subsidy with $1.00 going to the marketing firm, there is still $9.36 remaining that can be utilized for transportation. The ash could be hauled approximately 94 miles at $0.10 per ton-mile. This hauling distance may bring many other potential customers into the market.

OTHER ISSUES NOT CAPTURED IN THESE ANALYSES

Even though discrete answers are obtained by performing the exercises discussed in this report, they may not lead directly to the final answer. There are other intangible issues that could impact the decision to enter into a subsidized project.

There are benefits that can be realized from off-site disposal or beneficial reuse of CCPs, even if the cost is more than what has been determined to be the break-even financial cost. The continuing on-site disposal of CCPs will require more land. Once used, the land will have limited value, and may be considered lost. That land, if not used for a disposal facility, might have been available for leasing, additional coal storage, or other financially beneficial projects. Some environmental monitoring and reporting may also be avoided through off-site disposal.

There are potential future liabilities with storing CCPs on site. Governmental regulations are constantly being altered to reflect present and future environmental conditions and philosophies. Laws could potentially be changed in a manner that would require large capital expenses to deal with previously ponded CCPs. This risk can be mitigated with beneficial reuse. There are also positive public relations aspects that can be gained by reuse. Utilities can be viewed as more environmentally friendly.

There are some potential down sides to subsidizing projects, even at values less than the break-even subsidy. There is an opportunity cost on the money spent to subsidize a project. In other words, if limited funds are available to a power plant, and some of it is used for a subsidized project, those funds can not be used for other endeavors. The upside potential of the other endeavors may have produced much higher financial returns than the subsidy project. Remember that if this project is being compared to other projects, it is imperative that all expenses are included in the financial calculations and similar discounting methods are employed.

The authors have used a pretax cost of capital for discounting pretax cash flows. However, it is important to understand that some utilities may prefer to use an after-tax cost of capital and discount after-tax cash flows to more accurately reflect the differing impacts that capital and O&M dollars have on the utility's earnings. Furthermore, some utilities may even prefer to use an after-tax cash flow analysis from an equity perspective, to capture the return on the equity portion of the investment. While any of these methods are valid for project comparison, it is imperative that ash managers consult their financial personnel and use their company's preferred method. This will ensure the project results can be accurately compared to other company projects when assigning project priority.

In some utility budget schemes, it may be harder, for various reasons, to justify spending additional O&M dollars in lieu of capital dollars, even if the amount of O&M is considerably less than the capital dollars. This issue depends greatly on management philosophy and the utility's regulatory environment. Plant managers are often faced with the decision of either spending considerable O&M dollars to extend the lives of existing assets or spending capital to replace the assets. This applies to practically all aspects of generating units. The authors contend that spending O&M subsidy dollars to extend the usable life of a disposal facility is very similar, and should be considered in the same manner.

The intangible project benefits and detriments discussed above, may be hard to assign a value to, but should be considered when evaluating proposed projects.

CONCLUSIONS

As has been stated throughout this report, determining the maximum amount a power plant would be willing to pay for a subsidized project is very subjective. Values can be calculated many different ways, as shown, but the final determination is subjective based on management philosophy and the details of anticipated future capital projects. The tools presented herein will provide a range of potential values that will aid in determining the ultimate maximum subsidy level.

The authors recommend using the simple discounted method utilizing the future capital cost divided by the current storage capacity plus O&M for tracking ash management performance. These values are not actual cash flows, and should not be used in making subsidy decisions, but they are easy to calculate and will give trends for total plant disposal costs.

The incremental cash flow analysis should be used to justify discrete projects that may involve a subsidy. Ash managers should do a thorough job researching current and future expenses that will be used in the calculations. A subsidized project will likely be one of the hardest sells to a plant manager. Convincing a plant manager to spend additional O&M dollars (in times of limited funds) for off-site disposal of CCPs, when adequate short- to long-term storage is available, is difficult. However, these tools can be used to help ash managers and plant managers understand that subsidized projects can improve the overall company's bottom line.

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