

PROCUREMENT STRATEGIES FOR ALTERNATIVE FUELS

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ABSTRACT

Entering into an Alternative Fuels program can be a daunting task requiring the commitment of significant resources by the cement manufacturer. These resources will include both personnel within the company as well as external expertise that is brought in to assist in the process along with the financial resources required through the trials, as well as installing the necessary equipment to burn the fuel. Many different aspects must be considered: local and national regulations and laws, local community reactions to both the use and transportation of the material, health and safety aspects for employees, impact upon the process and product quality and financial investment. In terms of the supply of the fuel the cement producer must consider the nature of the alternative fuel, its source, the necessary collection infrastructure together with its processing and homogenisation prior to use. One of the key processes that must be put in place at the very start of the program is to identify the strategy for the procurement of the selected fuel or fuels. Generally there is a capital investment requirement related to the use of the alternative fuel so it is essential that a secure supply of the fuel can be obtained both for a trial purpose and the longer term use. Decisions need to be taken as to whether the cement producer will use an external company to source the fuels or set up their own company to provide the fuels, as has been seen at many locations around the world. Considerations such as how quality control can be managed and what are the pricing agreements with the suppliers need to be addressed. This process should not be a continuous process which is deemed to be completed once the fuel is implemented but a continual process seeking out different fuels for use within the process as the economics within the waste industry change and the availability of certain fuels decreases.

Within this paper CPI will describe some of its experiences with using different alternative fuels, comparing developing alternative fuels markets with mature markets, outline strategies that have been successful with fuels suppliers and also describe how market trends and economics work in the alternative fuels markets to assist cement manufacturers to develop long term fuels strategies.



INTRODUCTION

The use of Alternative Fuels is not a new trend and in fact some of the fuels that were not “traditional” fuels (traditional fuels would be fuels such as coal and gas for example) a few years ago are now considered as such. Examples of this would be petroleum coke or tires/tire chips. However, cement producers have increased their usage of alternative fuels more recently for a number of reasons:

- Alternative fuels are generally derived from waste streams and cost less than the traditional fuels, and in certain cases command a fee from the waste producer to the cement producer to be used. Prices can vary dependent upon the legislation covering the production rates of the waste, the potential disposal routes for the wastes, the adaptability of other industries to take those wastes and the availability of new technology to do something different with the waste.
- Changes in European legislation governing the classification, collection and disposal of wastes, (Wastes Framework Directive) and the directive limiting CO2 emissions (EUETS) which also declared bio-degradable wastes, when used as a fuel, to be carbon and hence taxation neutral, have made the use of alternative fuels more attractive for cement producers. Many of the waste derived materials that are currently in use are deemed to be “carbon neutral” and therefore do not count towards the annual CO2 emissions calculations of a cement plant. A plant producing less CO2 (tonnes) than its government agreed “cap” achieved by efficiency improvements and by virtue of utilizing “carbon neutral fuels” will result in carbon credits being produced by the individual plant. Emissions Trading in the EU allows credits to be traded for financial gain with any EUETS participant.
- One-off incidents such as the outbreak of CJD, the so called “mad-cow disease” – in this case many of the European cement manufacturers and licensed incinerators were incentivised by the Governments of their respective countries to burn the resultant excess Meat and Bone Meal that could not longer return to the animal feed food chain or land fill route.
- Reduction in global CO2 emissions. As the issue of Global Warming has come more into the focus of the general public and become a political issue, the cement industry has become very conscious of its contribution to global CO2 emissions by the very nature of the raw materials that it uses. Therefore the industry is attempting to improve its image by demonstrating its proactive approach to playing its part in reducing global CO2 emissions.

It has already been mentioned that there are a number of different aspects that must taken into consideration when entering into an alternative fuels program, and it would be wrong to state that any one if these aspects is more important than the other. One of the aspects that is not often discussed and documented and that involves developing new relationships external to the plant (as well as a different mentality to normal customer/supplier relationships) is the development of the relationship with the supplier of the fuels and how the long terms supply issues should be addressed by the cement producer; and some of these issues are addressed in this paper.

DEFINING THE RELATIONSHIP

The cement manufacturing industry and the waste industry have traditionally not been industries whose paths have crossed. Both industries have operated under different sets of legislation, have had very different business models and barriers to entry into the waste industry have in the past been a lot lower compared to the cement industry. Therefore the waste industry, until more recently where regulations have been tightened, has had a large number of small players who compete with each other for the same waste streams. The two industries have been brought closer together through changes in legislation, which in turn have had an impact upon the costs associated with disposing of wastes, and a more competitive environment within the cement industry whereby there has been a much greater focus on the reduction of operating costs to maintain the high margins traditionally enjoyed by the cement manufacturers.

Operators within the waste industry can consider that their industry is relatively insecure in as much as:

- Industries do not want to produce wastes as this is an additional cost to the business. Therefore the producers will be continually trying to find ways of reducing the volume of waste or adding value to the waste that they produce.
- Those who produce the waste do not want to pay for its disposal. Waste disposal represents a cost to any business which the producer will try and minimise.
- Wastes are not produced to a specification so the waste industry has to cover a huge range of materials. The waste disposal industry must therefore be able to be extremely flexible in the wastes that it can accept to maximise business.

The waste disposal industry has a number of different routes for the treatment of wastes such as land-fill, incineration, recycling etc. The development of alternative fuels in the cement industry therefore provided an additional route for the waste suppliers, but one that would have to compete with the other disposal solutions. What the waste disposal industry requires is a legal, cost effective, secure and continuous solution to disposal. As the waste disposal company is usually paying for the disposal they demand a customer service ethos from those taking the waste. Therefore any cement company seeking to use waste as a fuel must be able to provide this service, even when the kiln is not running (as the waste is still being produced).

In the very early days when the cement industry realised the potential impact upon profitability by using alternative fuels, they adapted the traditional procurement approach and in some cases the almost arrogant cement industry approach of "We want the waste when we want it and when we don't want it, it's your problem". Furthermore, with very little appreciation of how the waste industry worked, cement producers demands in terms of revenues for using the wastes were high which understandably upset the waste industry, especially as the gains of the cement industry were immense for something that was, in their perception, secondary to the primary role of cement production.

The cement industry to some degree lost out because of this attitude, with the waste industry seeking to find different outlets for the waste streams and therefore forcing the cement industry to continually search for new materials to use. The approach is changing and generally the industry is recognising the need to modify its approach both attitudinally and organisationally. Cement manufacturers have understood that in current times, with the pressures on cost of production, that the fuel cost is one area where they can have a real impact. Waste fuel is key to long term sustainability and therefore to treat it as a sideline would be foolhardy. Cement producers now seem to have a much more strategic perspective of waste fuel supply as well as giving it the correct resource focus.

SUPPLIER CHARACTERISTICS

Once the cement producer has a good understanding of the recommended relationship with the fuel supplier, the next stage is to consider selecting a person or company that will provide the fuel. The cement producer may be faced with a range of possibilities, from large waste companies to very small local operators. To assist in the selection process, there are a number of characteristics that the cement producer should consider as being desirable in the supplier, some of which are described below:

- Credibility
- Reliability
- Understanding (of the cement producers needs)
- Commitment

Taking each of these attributes in turn in a little more detail:

Credibility

In order to implement the Alternative Fuels Program, the cement producer will normally require authorization from the local Environmental Authority. Naturally, as part of the agreement, the Authority will want to know who is supplying the fuel, where the fuel is coming from and what is going into the fuel. Therefore the supplier must be able to demonstrate to both the cement company and to the authority that its operations are above board and that the correct fuel is being produced for the cement producer within the legal regulations.

Not only is this credibility important for the Authorization of the trial and the long term use of the fuel from the supplier, but it is also important for the reputation of the cement manufacturer. The use of Alternative Fuels is often perceived by the public as using materials that are going to be more harmful to both the environment and to public health than traditional fuels, despite the fact that many Alternative Fuels are produced to a much tighter specification than materials such as coal. Therefore the cement producer, in announcing to the local population that they are going to use alternative fuels, are putting their reputation on the line to burn these materials in a safe and responsible manner. As such the supplier of these fuels must have a good reputation and be credible. And this credibility extends to the whole of the fuel suppliers business – not just the supply of fuel to the cement plant. Should the fuel supplier not be able to demonstrate that all of the business is well managed and above board there is a risk that the reputation of the cement producer be tarnished by any adverse publicity in another part of the fuel suppliers business. Some suggestions to assist the cement manufacturer is the selection of the fuel supplier would be regular audits of the fuel preparation site, suggesting to the fuel supplier that they implement ISO schemes for quality assurance and environmental management to demonstrate good business practice and also commitment to the supply of the alternative fuels.

Reliability

The Alternative Fuels supplier must be able to re-assure the cement producer that they can deliver both the quality (see above) and quantity of fuels that are required. This is particularly important during the trials phase, as the fuels trials generally require a continuous burn of the fuel over a number of weeks to demonstrate the impact upon emissions from the process. Any failure to supply during the middle of a trial may result in the trial being suspended and additional costs being incurred along with the resultant loss of credibility for not being able to run the trial let alone long term use due to lack of material.

A particular example of this was in the supply of tires to a UK cement producer for the trial and long term use. There were a number of people involved in the recycling and disposal of tires in the area, and a number of know tire “mountains” in the area. The cement producer had completed a market study to identify current stocks of tires as well as waste arising and compared these with the quantities of tires that the proposed tire suppliers were quoting. There was a huge mismatch in the numbers, either indicating that the markets study was wrong and there were some undiscovered tire “mountains”, or that there was a problem with the supplier figures. As it turned out, all of the potential suppliers were chasing after the same tire “mountains” even though they had no formal, commercial agreement with the owner of the tires. In this case a local resource from the cement company was put in with one of the local tire suppliers to tie up all existing supplies and to put in place supply agreements for the on-going arisings.

Without ensuring that a long term supply of the fuel is available (and in the world of alternative fuels long term can mean two to three years) the project will stand little chance of success. For trials one of the key recommendations is to ensure that a stockpile of the fuel is available and has been seen by the cement producer so at least this phase of the project can be completed.

Understanding

It has already been stated that the cement industry and the waste industry are very different. To the waste industry the cement industry is very simple – digging some rock, grinding it, burning it and grinding it again (although we know it is not this simple). To the cement industry

the waste industry may seem very simple – collecting waste, separating it, putting it in a hole in the ground or burning it etc. A good supplier needs to understand both what is required of them and how the cement manufacturing process works, what are the regulations, what are the quality and output implications of their supply of fuel and how does the equipment that will feed the fuel work.

The cement producer needs to educate the fuel supplier in each of the above elements, explaining how important both the chemical and physical impacts are of the specification are to the process, what could happen to the cement properties if the fuel is wrongly supplied, what potential can happen to emissions and what powers the Environmental Regulator possesses.

A simple Cement Process description course is often an easy way to deal with this issue, but obviously with a heavy accent on the above areas. It is also worthwhile to indicate to the fuel supplier the impact that they can have on the process on a financial basis – for example if the kiln has to be stopped due to a high chloride fuel supply which has caused a cyclone blockage then what is the cost impact to the cement producer. If the supplier understands the cement manufacturing process he should then be able to supply a consistent and suitable product.

The Alternative Fuel supplier (the wastes industry), on the other hand, needs to educate the cement producer that he is paying for disposal of his wastes arising and that the cement industry is supplying a service to them which once the supply chain has been established can not just simply be turned off and on to meet short or long term cement plant outages without their being some supply chain backlash.

Commitment

The commitment of the fuels supplier is something that should be demonstrated over the longer term of the use of the fuel. However, in the short term and certainly in the initial phases of the supply, the willingness of the supplier to commit to any or all of the proposed items above such as ISO schemes and being trained on the cement manufacturing process should be an initial indication of how committed to the Alternative Fuels program the supplier is.

One further way in which the fuels supplier can be asked to demonstrate their commitment is to invest in the process equipment that is required to use the fuel. By the fuel supplier putting in some or all of the capital to install the equipment they are financially committing themselves to the long term use of the fuel.

PRICING AND RELATIONSHIP

Once the supplier has been selected and the requirements of the supply are clear, commercial terms with the fuel supplier must be addressed. As already mentioned earlier, the fuel supplier is now considered as a customer and not a supplier due to the very fact that the fuel supplier is generally paying for an outlet for the material. In addition to this, the balance of power within the relationship is shifted due to the fuel supplier having a product which possesses an extremely high value in relation to conventional fuels and in some cases there being a limited supply of the best material for use as an alternative fuel. Therefore for the cement producer this is important to bear in mind and to treat the fuel supplier with more “delicacy” than would normally be shown to a cement industry supplier.

This, however, does not mean to say that the cement producer needs to be unduly soft in the price negotiations and the normal business rules apply in terms of both parties trying to find a deal which is acceptable to both and ensures a profit for both parties. The fuel supplier may well be aware of the price of the traditional fuel used and therefore will be trying to maximize the price received for the alternative fuel by stating the saving that the cement producer is gaining. However, from the cement producer's side there are a number of cards that can be played to indicate to the fuel supplier that it is not all saving, such as:

- Potential loss of output from using the fuel.
- Capital cost of installing the plant.
- Additional personnel required in the laboratory for testing the fuel.
- Additional process personnel on plant may be required, for example for calciner and riser cleaning.
- Additional health and safety requirements at the site.
- Additional stack testing due to the use of the fuel etc.

Therefore the cement producer has a number of tools to push the price downwards. Furthermore, the additional benefits to the fuel supplier are:

- There is no waste from the cement manufacturing process as there is with say incineration.
- The cement process offers an almost continuous outlet for the waste, and the majority of long stops are planned such that the fuel supplier can store the waste during those short periods.
- The cement industry represents a best end solution for many wastes which could enhance the reputation of the fuel supplier.

The cement producer must therefore negotiate a price which will cover the above additional costs, will deliver a satisfactory return on the investment but always bear in mind that as time goes on it is likely that the size of the revenue will decrease over time and that new fuels will have to be sought.

LONGER TERM SUPPLY

Once the first fuel has been successfully implemented, the cycle must start again with the cement manufacturer investigating other available fuels to be implemented as the second, third and fourth fuel. This is necessary to ensure that there is a steady increase in the amount of alternative fuels that the cement producer is using along with the fact that in most cases the market dynamics will change with each of the fuels that is being used. Other industries will come along which will be interested in using the fuel – either as a fuel itself, as a raw material for its own process or simply new technology may come along which will allow a new product to be made from the waste.

What often happens is that the revenue stream (or differential revenue between the price of a traditional fuel and the alternative fuel) is greatest at the start of its use and then will steadily decrease as both supply reduces (as it is going to new markets) and the waste producer has a greater power to increase price once the cement producer has become more reliant on its use. Therefore the cement producer should maximize its use in the early stages but have a “production line” of new materials ready to use so that it can reduce the levels of one fuel and increase the level of the second fuel to find the most economically beneficial solution. The cement producer needs to ensure that the fuels follow in relatively close succession to each other – perhaps one new fuel per year – as it takes time to complete the trial, install the equipment and optimize the process using the new fuel. In many cases the introduction of a new fuel will cause the process to operate differently and output to drop, and time is required to adapt to the new operating situation and to bring output levels back up to previous levels.

One of the more common approaches being taken in the more developed alternative fuels markets is the use of a single supplier of all of the alternative fuels to a tailored specification. The process works as follows:

- The cement producer is using a number of different alternative fuels for the process, with a specification and addition rate for these fuels. From this the producer can define what the ideal specification for a single fuel is (bearing in mind there may be two fuels specifications if front end and calciner burning is being used) and this is the specification against which the fuel supplier must operate.
- The fuel supplier is then clear on the single fuel that he must produce in terms of chemical and physical properties that are required. The fuel supplier then has the flexibility to enter into the waste marketplace and seek out a wider range of materials

that can be incorporated into this fuel mix. The fuel supplier can therefore take into account the availability and price of the different wastes available to produce the batch of fuel for the cement producer.

- Producing the fuel in this way has a number of benefits for all parties concerned; for the cement producer there is one fuel with one price and one specification. The fluctuations of the price of one particular waste stream from one source can be negated by the fuel supplier being active in the marketplace seeking out his “ingredients” for the fuels mix. For the supplier it may be the case that small volumes of materials that were previously not financially attractive take on a new perspective, as the combination of many small waste streams with the right components will result in a larger business, improved margins and a constant price for the cement producer. In pre-treating some of the smaller streams the fuel supplier may end up by taking the desirable parts which can be sent to other outlets, once again widening the business scope for the fuel supplier.

As can be seen such a way of managing the supply of fuels removes some of the supply worry and day to day management issues for the cement producer and can allow longer term business and sustainability for the fuel supplier.

SUPPLY CHAIN DEVELOPMENTS

As a final comment upon the developments within the waste fuel supply area, some cement producers have taken an even more proactive approach to the supply of waste fuels to their cement plants by either entering into the waste fuel markets themselves or by creating strategic alliances with companies with the aim of extracting the maximum value from the supply chain, ensuring that the supply of materials can be better controlled and that there is a better control of the materials that can be supplied to the cement plants. In taking such an approach, it has allowed the cement producer to understand the market forces within a completely different industry and from that point to be able to react to these market forces. Some examples of these developments along with the rationale behind them are given below:

- In the UK, following legislation banning tires from landfill, there were large numbers of smaller collectors with no national structure. In this case one cement company entered the market strategically allied to a tire manufacturer to gain insights and leverage in the tire retailer and disposal markets and to take its first steps into a new business turning a predominantly landfill oriented disposal business into a predominantly alternative fuel oriented business. Ultimately, this stabilized the disposal market, infrastructure and processing of tires for its own and other cement manufacturers benefit.
- Another UK cement manufacturer stabilised a declining solvents recovery market by a number of strategic acquisitions within the solvent collection and treatment market. This allowed volumes to be tied to the cement industry as well as having a better control of the alternative fuels that were produced.
- One major cement manufacturer has set up its own waste company, which uses a number of processing stations, which allows wastes arising to be feed at relatively short distance a larger processing unit. Transporting processed materials bulked up and homogenised to a cement factory offers better collection and distribution efficiency than processing those wastes on a cement factory. This also allows for different specification wastes for different factories to be produced in one location, can reduce the storage requirements at the cement plants and can allow for the switching of fuels from one cement plant to another during periods of annual maintenance.

If the wastes collection, treatment and infrastructure is well developed and consolidated within a smaller number of larger players operating across a range of waste streams, then selecting a business partner for the longer term may be the most expedient way to develop an AF sourcing strategy.

CONCLUSION

Since the start of Alternative Fuels programs, the cement industry has made huge advances in the technical understanding of their use, the public perception of the use of waste materials and of the cement industry in general, as well as the supply and demand dynamics of the waste industry. Whilst the industry has not always had the right approach in terms of the relationships with the waste suppliers, it has learnt how to work with the waste industry to achieve its objectives of cost reduction, reduction in overall environmental emissions and create a long term solution for the elimination of wastes. Around the world there are many countries and cement producers who are not yet using Alternative Fuels and therefore the lessons learnt by those that started early should be transferrable to make the supply side of any Alternative Fuels program much simpler.