



Waste Not, Want Not

Converting Household Garbage Into Renewable Energy

The old saying, “One man’s trash is another’s treasure,” aptly describes Covanta Energy’s business model. The Fairfield, New Jersey-based company has been converting municipal solid waste into energy for more than 17 years. In that time, it has safely converted more than 153 million tons of household garbage into environmentally sound, renewable energy, which is sold to local utilities and fed directly to the electric energy grid. That offsets the need for about 150 million barrels of oil. The electricity that is derived from this waste is enough to power about 875,000 homes on a continuous basis.

Given the current shortage of oil and natural gas, coupled with the increased demand for low cost energy, the services of waste-to-energy (WTE) companies like Covanta are in greater demand. Over the past 25 to 30 years, energy prices have been relatively flat or declining, according to Vince Bolognini, VP of operations for Covanta, and so most of the WTE business growth was fueled by the ever-growing garbage problem in the U.S. (The company currently disposes of waste for approximately 12 million people in communities across the country, conserving precious landfill space in the process.) But as

Covanta and other WTE companies built plants to deal with the waste issue, the growth in that business plateaued in the 1990s as the supply of waste disposal facilities, including waste-to-energy, caught up with demand. “We haven’t built a waste-to-energy facility in about ten years,” Mr. Bolognini reports, “primarily because of the changing business

“With increased demand for low cost energy, waste-to-energy companies are in greater demand.”

cycles in this industry.

“With the growth of energy prices,” he says, “and some increase in the level of waste that needs to be disposed of, along with the growing scarcity of resources such as carbon-derived fuels like natural gas, oil and coal, there’s been a push toward expansion in waste-to-energy in selected markets in the U.S. and abroad.”

One of the challenges in capitalizing on these growth opportunities is the time frame for bringing new WTE facilities on

line, which is much the same as for oil refineries. The process involves many of the same environmental and permitting issues, even though these plants are built with state-of-the-art pollution control equipment. Though this makes developing new projects more challenging, through proper communication with and education of government officials, investors and the public on the advantages and low environmental risk of waste-to-energy, companies like Covanta have been successful in implementing projects. “Typically, I’d say that getting a project on line,” says Mr. Bolognini, “including development, permitting, financing, construction and start-up, takes five to six years.”

As a result, Covanta has elected over the last ten years to grow its business primarily through the acquisition of existing facilities and investment in independent power plants, including coal, oil, hydro and biomass. Recently the firm acquired American Ref-Fuel, the third largest WTE holding company in the U.S., which added six more facilities to the 25 facilities Covanta already operates. This boosted processing capacity from 31,000 tons a day to 43,000 tons a day, a nearly 40% increase.

continued on page 2

In This Issue

Waste, continuedPg 2, 3
Progress ReportPg 3

N. Austin Medical CenterPg 3
The Lean EnterprisePg 4,5



Covanta operates nearly all of the facilities it owns and operates several others as an outside contractor. “The fact that you’re involved in the operation,” says Mr. Bolognini, “gives you control of the management of the asset to a large degree, which is why we like to operate what we own. We feel we have the management expertise for making these profitable enterprises. Our preference is to both own and operate facilities because it usually takes close to the same effort to own and operate a facility as it does to just operate one.”

The company can earn revenues in two ways, he explains. One is based on the fees Covanta receives for disposing of waste. The second is selling the energy derived from the waste disposal to power companies. In order to generate profits, the company needs to operate its facilities reliably, at high efficiency and low cost.

“There are many other choices of facility operators out there, so we have to run our plants efficiently. Our O & M agreements run the gamut from cost-plus to fixed bid, but it’s still important for us to be low cost. Even in the case of a cost-plus agreement, we must operate at the lowest possible cost for the clients we serve. Further, these contracts don’t run forever, so if there’s a re-bid for an operation, price is usually a key component.”

Cutting Waste

“We’ve got to be at our level best to be successful, which is one of the reasons we brought in USC Consulting Group to help us identify opportunities and practices to optimize our operations.”

USCCG teamed up with Covanta’s leadership group in March to identify areas of opportunity and ultimately homed in on improving plant practices, according to USCCG Senior Project

Manager Tom Stanish. The pilot project began with four facilities with the goal of transferring opportunities identified to other Covanta U.S. facilities. Mr. Bolognini describes the objective of the work with USCCG as looking at Covanta’s operations with the specific goal of optimizing work practices.

“Improving work practices will improve productivity. Improved productivity will lead to less cost. If we can manage to work better, manage to get the work done more quickly or in a more procedural manner, the facility should stay on line longer and run more efficiently. This will benefit not only Covanta, but also

“This has proven to be a good audit of our facilities’ work practices.”

the client communities that we serve.

“Improving work practices has a number of benefits. Areas that we’ve been focusing on include overtime and outside contractor costs, because both are more quantifiable benefits.”

He cites labor as the highest single component of Covanta’s operational costs and overtime is a very big part of the overall labor cost.

“We have built-in overtime for holiday and sick days coverage, since our plants operate 24 hours a day, seven days a week. In addition, we’ve got maintenance outages, which require a significant amount of overtime so that we can get back on line as quickly as possible. Add some planned and unplanned outages

for such activities as installing new equipment, changing out or upgrading a system and you’ve got many instances where we bring in some extra help to get the job done in a timely manner, whether through the use of plant staff or outside contractors. It all adds up.”

To decrease overtime or outside contractor costs, USCCG helped Covanta implement a new management operating system at each facility that provides a system of checks and balances, plus feedback, that will allow more scrutiny and more care in assigning overtime or bringing in outside contractors.

“We’ve also looked at specific areas in how these plants are operated to identify possible improvement opportunities. For example, we examined our maintenance systems and our work order systems to determine where work could be spread out over time to help reduce overtime.

“We also looked at how shifts were set up and when certain tasks are done on shifts, such as training and maintenance. We’re now in the process of moving training to periods of less activity during shifts, when workers can free up to train, instead of using overtime. In a few situations, we’ve even identified potential savings in other operating costs, such as electrical costs, by running certain equipment at different times.”

Mr. Stanish noted another example where a facility hired a relief operator who was qualified to run the control room as well as fill a number of other positions so that he could cover sick days and holidays for other employees, instead of expending overtime or hiring contract workers.

Up to this point, USCCG has transferred opportunities and best practices that it has identified to 13 of the 28



Waste continued

Covanta facilities. The process should be completed in two to three more months.

“We have had a very good experience with USCCG,” reports Mr. Bolognini. “We were impressed with the operations people from the beginning and we had nothing to lose by proceeding with the initial feasibility, which was done at no cost to us. The results from that were favorable to the extent that we decided to proceed, with the understanding that, if we didn’t like what we were getting, we could stop the process at any time.

“The USCCG team has been flexible. They’ve deviated from the feasibility study plan where it has made sense to do so and we’ve had them take on some special studies related to overall work practices that were a bit removed from the original scope. They’ve been responsive whenever we’ve had an issue or question. To date, we’ve gotten good value from the process. We would definitely call on USCCG again if we decided we needed an outside resource.”

Mr. Bolognini recapped the experience by saying, “Aside from identifying

opportunities, this has proven to be a good audit of our facilities’ work practices. Most of our facilities are doing very, very well and this exercise proved to be a good verification of that fact. I don’t believe we found any major issues with our plants, but we nevertheless found some opportunities and introduced some new best practices that were well worth the effort and have so far produced the desired benefit. This effort has been part of a continuing process to maintain our status as a world class operator.”

Progress Report

Jill Szymanski New Business Consultant



Jill M. Szymanski has joined USC Consulting Group’s public sector practice as a business consultant.

As an officer in the Navy Nurse Corps for over 12 years, Ms. Szymanski held such prestigious positions as career planner and placement administrator with the U.S. Bureau of Naval Personnel, director of ambulatory services with the U.S. Naval Hospital in Sigonella, Italy, and casualty receiving nurse on the USNS Comfort during Operation Desert Storm. Most recently she was a senior consultant on clinical performance improvement with Baptist Health South Florida, a nonprofit healthcare organization based in Coral Gables. Prior to that she was director of health services

consulting at Soza & Company, Ltd., a government information technology company. She has also been regional cardiac program manager for Kaiser Permanente (Mid-Atlantic States).

North Austin Medical Center and USCCG Tackle Throughput Enhancements

North Austin Medical Center (NAMC), a 210-bed, full service hospital in Austin, TX, has engaged USC Consulting Group to identify opportunities and design solutions in four critical areas:

- emergency department efficiencies;
- bed management;
- case management to promote timely discharge; and
- operating room turnaround time.

“No matter how well a hospital is managed,” says NAMC COO Sheri Wallace, “there is always an opportunity to

improve the patient’s experience, while providing care in a cost effective manner. As demand for medical services continues to grow, the need for more capacity to take care of these patients also increases.

“At NAMC, we recognize the value of reassessing our operations to make changes that will improve processes for our customers and caregivers. To that end, we have engaged USC Consulting Group to help us stay ahead of the needs of our patients.”

Ms. Wallace reports that NAMC selected USCCG for this assignment based on the firm’s experience with implementing patient management systems at a number of similar facilities, as well as their long history of success in the area of business performance improvement.

The 12-week engagement is being supervised by USCCG Healthcare Practice Leader John D’Alessandro and Senior Project Manager Patrick Jaeger. They expect to be able to capture more than a million dollars in savings for NAMC.



The Lean Enterprise



By Paul Harker,
Senior Operations
Manager

Just as mass
production was
recognized as the

production system of the 20th century, Lean production has emerged as the dominant processing paradigm for the 21st century.

Lean gets its name from the fact that it reflects the elimination of waste, therefore requires less to do more. This is possible because there is always a better way to organize and manage customer relations, the supply chain, product development and production operations. Within this mentality, waste is not allowed to stand. It is attacked using a variety of simple and effective tools designed to drive its permanent elimination.

Lean's appeal across many industries and services lies in two distinct and important areas.

Of primary importance is its effectiveness, both in financial performance and improved responsiveness to customers. Manufacturers and service providers that were previously of the "batch and queue" school, once they implemented Lean practices, have experienced as much as 50-plus percent reductions in lead time and defects, while doubling productivity and slashing inventories. Improvements like that are tough to ignore.

A second critical element of Lean is its relative ease of employment. The tools and techniques that Lean uses to transform an organization are based on common sense, which makes them readily grasped by people in any process. With such an easy-to-adopt tool set, results can be seen quickly and clearly, making effective Lean

implementations self-feeding continuous improvement processes.

Lean is a way of life. It is a mindset that drives behavior and ultimately becomes a defining element of an organization's culture.

Lean Principles

The authors of *Lean Thinking*, James Womack and Daniel Jones, cite five key principles that serve as a guide to action for companies wishing to implement Lean.

1. Precisely define value by specific product.

Lean processors are able to do more with less by eliminating waste and that begins by recognizing waste for what it is. To do that accurately, it is of primary importance to first define value, which can be whatever a customer is willing to pay for. Or, from another perspective, find process steps that customers do not want or need, and therefore have no value.

2. Identify the value stream for each product.

Most improvement initiatives focus on "vertical" improvement by repairing each function or process independently. This tends to create "islands of optimization" that often have little or no impact on the bottom line and are invisible to customers.

Lean navigates horizontally across all processes and functions as they impact a product line. This allows better focus both on the processes within a node and on the transactions between these nodes in the value stream.

The financial performance of that product line and the responsiveness to the customer are both felt quickly. The identification of the value stream is typically depicted in a *value stream map*.

3. Make value flow without interruption.

Creating flow essentially means attacking waste in all of its forms. It is here that people need to rethink work practices, backflows, scrap and stoppages in the areas of product design, process planning, order management, production and delivery.

To be effective at this, it is important to ignore the traditional boundaries of departments, functions and even other firms within the supply chain. To the degree that these boundaries become irrelevant, flow accelerates.

4. Let the customer pull value from the producer.

Waste is driven primarily by the anticipation of requirements that never materialize. This traditionally pushes more material procurement, more labor resources, and more inventories to be injected into the flow. In a pull system, the signal to replenish comes only when the last items produced have been consumed. All processing is demand-based rather than forecast-based.

5. Pursue perfection.

The final principle makes it clear that Lean is a journey, not a destination. Perfection entails the complete elimination of waste. A Lean organization has identified a prioritized list of wastes that it is attacking and has a timetable for achieving each item on the list. As customers, products and technologies change, this list evolves as well. Lean at this stage becomes a relentless drive toward continuous improvement that engages every employee every day in identifying and eliminating waste.



Lean continued

Lean creates an environment that challenges employees' capabilities and creativity. Every one of them is asked to participate in the transformation process as a part of their work routine. This relentless pursuit of a better way by all hands is a powerful improvement process that scoops up improvement in both large and small chunks.

Management's commitment to the process requires challenging traditional manufacturing and processing conventions and metrics. To eliminate the waste in the transitions between areas, departmental and functional barriers must be removed. In that same vein, organization structures will require realignment to speed transactional work.

Benefits of Lean

Here are the Lean benchmarks to be attained when a company moves from "batch and queue" to continuous flow via pull:

- 100% improvement in total labor productivity
- 90% reduction in cycle time
- 90% reduction in inventory
- 50% reduction in errors reaching customers
- 50% reduction in scrap
- 50% reduction in job-related injuries
- 50% reduction in time to market
- 50% increase in capacity in current facilities
- More products at modest cost
- Little capital expense

Stated differently, the benefits of Lean translate to:

- Higher quality
- Higher profits
- Higher system flexibility in reacting to changes
- More strategic focus
- Improved cash flow

Lean Timetable

All of this rapid improvement can be achieved in the first one or two years of Lean implementation, depending on the complexity of the organization

and the speed at which it embraces the improvement initiative.

Beyond the initial burst, incremental improvements toward perfection which occur in the ensuing two to three years will again double productivity and halve inventory, errors and cycle time. By continually focusing on waste reduction, no organization has yet found the end to the benefits that can be achieved.

Most organizations expend about three years to establish an unshakeable foundation of Lean. They then find that another two years or so are required to educate enough employees that Lean becomes self-sustaining.

Characteristics of a Lean Organization

- There is a strong understanding of the fundamental concepts of waste, value, non-value-added, flow, pull, *takt* time and problem solving.
- Employees are actively involved every day in trouble-shooting and problem-solving to eliminate waste through team-based work groups with multi-skilled people who are empowered to make decisions and improve operations.
- The company focus is on the entire value stream rather than just results or an isolated part of the value stream.
- An integrated single-piece continuous workflow has been achieved through the breakdown of departmental and physical barriers, equipment set up time reductions, attention to equipment and workforce reliability, and an orderly, clean work place.
- The organization has a distinct system structure and control mechanisms which support and perpetuate the Lean environment.
- The organizational structure is characterized by flexible product line teams that have total responsibility for driving value to their customers and to the organization's profitability.
- The whole value chain, from raw material to finished product, is closely integrated through partnership-oriented

relations with suppliers and distributors.

- The order-to-ship cycle time is very short because small batch production capability has been synchronized to shipping schedules.
- Production is based on orders rather than forecasts. Production planning is driven by customer demand or "pull" and not to suit machine loading or inflexible work flows on the shop floor.
- Minimal inventories exist only where customer expectations exceed the responsiveness of the processes.
- The physical layout of the organization is based on the flow of the product or service.
- The focus is on defect prevention rather than inspection. Rework has been eliminated by building quality into the process and implementing real-time quality feedback procedures.
- Lean is viewed as a mindset, not a technique. It is a culture, not the latest management tool.

The performance profile of a Lean enterprise beats its batch-and-queue counterpart at every turn. Lean responds more quickly, with higher quality products and at less cost. Responsiveness is also enhanced as the Lean organization listens intently to its customers, responds rapidly with new products, and can flex the production schedules on a dime. When extended up and down the supply chain, all stakeholders come up winners.

To keep people engaged and invested in the improvement, it is important that they cannot improve themselves out of a job. Therefore, emphasis is on absorbing additional work and dramatically increasing new sales. As growth comes, the enterprise retains the ability to reward its workforce's improvements through job retention and gain sharing.





First we make it work. Then we make it last.®

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