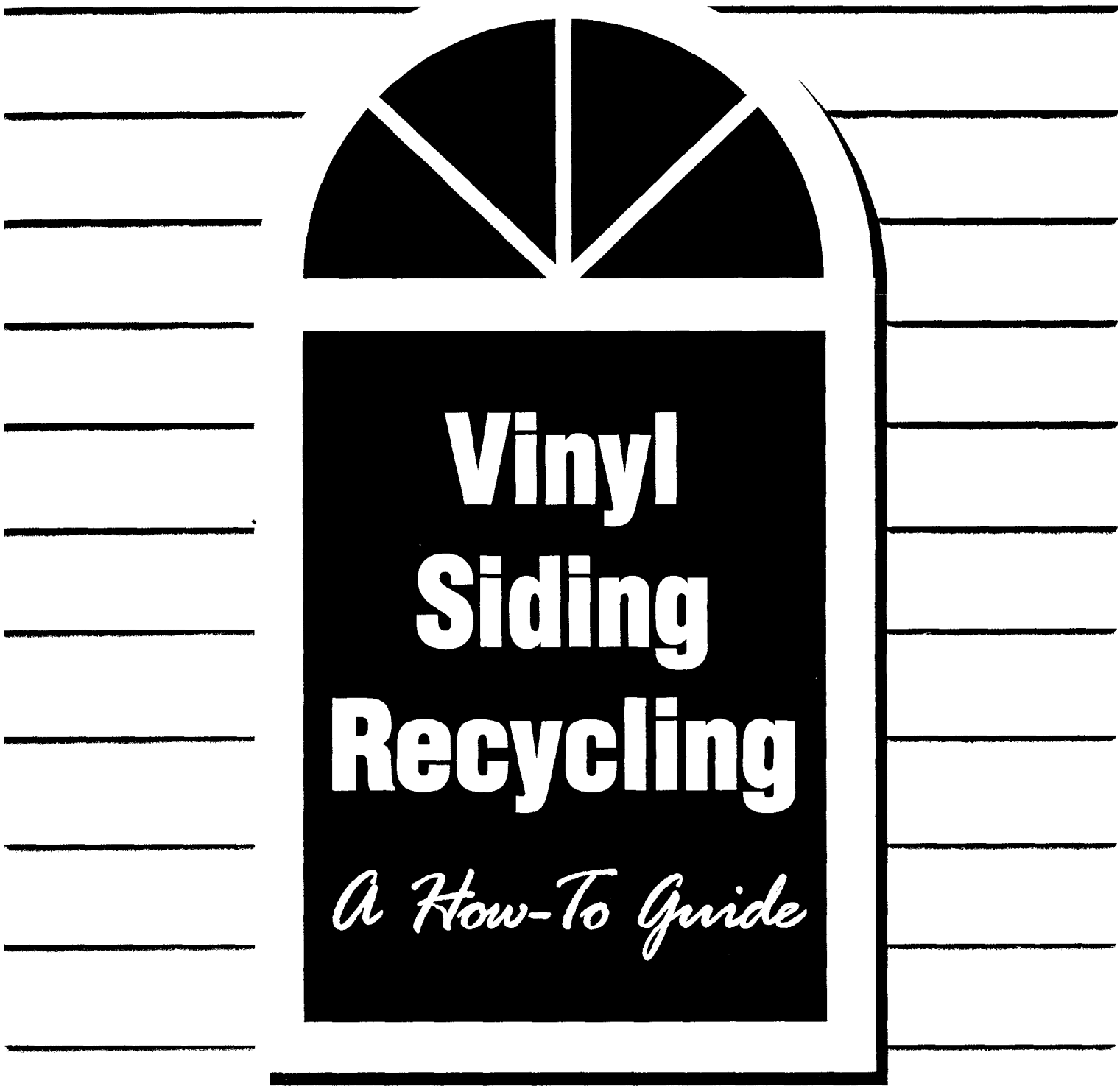
Vinyl
Siding
Recycling
A How-To Guide

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INTRODUCTION

Over the past ten years there has been growing interest in recycling a variety of plastic products and packages. As a result, a great deal of time, energy, and resources have gone into researching how to establish collection and processing systems for recycling everything from plastic milk jugs and soft drink bottles to plastic parts in durable goods and automobiles.

Another plastic product that has recently been identified as presenting potential recycling opportunities is vinyl siding. Vinyl siding lends itself to recycling because it is made from polyvinyl chloride (PVC)-- a thermoplastic that can be repeatedly ground up, I-e-melted, and formed into a variety of new products.

The industry already has some experience with recycling vinyl siding because, for years, manufacturers have been recycling their own in-house plant scrap. The trimmings, shavings, and rejected parts that result during the manufacturing process are simply ground up and used again to make new siding. The industry refers to this as recycling "in-house scrap" because the material never leaves the production facility.

Now, however, there also appears to be growing interest in recycling "pre-consumer" vinyl siding scrap-that is, the scrap that is generated by contractors, builders, and remodelers at the construction site. (The industry refers to this material as "pre-consumer" because it is has left the manufacturing facility but has not yet been used by the consumer.) The generators of this type of scrap have come to recognize that recycling it ma! be viable because it is generated in relatively large quantities, can be kept fairly clean, and diverting it can help lower disposal costs.

The following guide, therefore, was prepared to provide information to those interested in recycling pre-consumer vinyl siding scrap. It contains an overview of the basic steps necessary to design and implement a successful recycling effort, including how to identify potential markets, establish a steady source of supply, and design an effective collection system.

The guide also will help potential recyclers determine (1) what it would take to establish a processing system capable of turning vinyl siding scrap into a high-quality, valuable raw material and/or product, and (2) how to ascertain the economics of doing so. As is true with all recycling efforts, if there is no economic incentive for the involved parties to participate, then the recycling program will not succeed in the long run.

Finally, the guide includes a case study of one company that found a way to successfully recover and process pre-consumer vinyl siding scrap. This company's experience should help illustrate how a vinyl siding recycling program works and may serve as a model for those interested in setting up similar efforts. While the guide is not intended to answer every question about vinyl siding recycling, it does provide a good starting point for those who are seriously considering recycling opportunities.

WHY RECYCLE VINYL SIDING?

There are several reasons why it may make sense to recycle vinyl siding. First, the material is generated in significant quantities. According to an informal survey conducted by the Vinyl Siding Institute (VSI), approximately six percent of the total weight of vinyl siding used each year at job sites is thrown away.

What does that mean in actual numbers? In 1996, VSI reports that 34 million squares of vinyl siding were shipped in the United States,[1] with each square weighing approximately 46 pounds. That means that a total of 1.6 billion pounds of siding were shipped, and at a six percent average scrap rate, there could be as much as 96 million pounds of vinyl siding scrap available for recovery each year.

Second, there appears to be strong demand for recovered vinyl. *Recycling Times*[2], an industry trade publication, estimates potential demand for recycled vinyl at about 500 million pounds a year-more than five times the amount of siding that VSI found is potentially recoverable. Where is the demand coming from? Typically, recovered vinyl is sold to manufacturers of such things as sewer pipe, electrical conduits, irrigation pipe, outdoor furniture, fencing, non-electrical cable coatings, garden hoses, floor mat backings, molded tool handles, industrial sheeting, and tarps.

Third, in many situations, there may be an economic incentive to recycle vinyl siding. By diverting substantial amounts of siding scrap from landfills, generators can be saved from paying tipping, fees and expending the time and effort necessary to transport scrap to a different location for disposal.

It also appears that, when market situations are favorable, revenue can be generated from recycling vinyl siding scrap. According to *Plastics News*[3], at publishing time, market rates for recycled vinyl flake ranged from 13 to 21 cents per pound, meaning that the 96 million pounds of scrap available for recycling each year could bring between 12.5 and 20.2 million dollars in revenue. Obviously prices for all recovered commodities, including recycled vinyl flake, will fluctuate over time, by region, by type of market, and by quality, but this example demonstrates that it is possible in certain situations for vinyl recycling to generate revenue.

Finally, pre-consumer vinyl siding scrap has two additional desirable characteristics: (1) Several natural collection points already exist where relatively large volumes of scrap can be consolidated (such as construction sites, manufactured housing production facilities, landfills, and vinyl siding distributors), and (2) the material generated at these natural collection points is relatively free from contamination. Therefore, while recycling vinyl siding scrap may not make sense in every instance, there are some very good reasons why it may make sense on a case-by-case basis.

ESTABLISHING A VINYL SIDING RECYCLING PROGRAM

Before designing and implementing a vinyl siding recycling program, it is imperative that generators, processors, and end users understand how the overall recycling system works. If you look at the system chronologically, there are four key activities that must take place: (1) A supply of vinyl siding must be identified; (2) a system must be designed to collect the supply; (3) the collected material must be transported to a processor where it can be turned into flake form; and (4) the recycled flake must be sold to a manufacturer for use in a recycled product. Clearly, if any one of these points in the system is missing, then recycling will not work.

When designing a recycling program, however, it is difficult to approach it chronologically because the best place to start planning a program is at the end of the cycle--that is, by &arching potential end markets. Why should planners start there? Because if no markets for vinyl siding scrap have been identified, then it will not make sense to collect it. Thus, the first step to take in designing a recycling program is to research the types of markets available and the kinds of services they offer.

RESEARCHING POTENTIAL MARKETS

What Is a Market?

In vinyl siding recycling, there are several types of "markets" into which material may be fed or sold. A market may be

- a *hauler* that collects siding scrap from the construction site;
- a *broker* that consolidates scrap from a variety of sources and sells it to a processor or end user;
- a *processor* that runs a facility; where the scrap is turned into a form in which it can be used to make new products; and/or
- an *end user* that uses reprocessed scrap to manufacture recycled goods.

Understanding the types of markets that are available and what those markets do with the recovered material is important, because it will dictate how you should design your program, what level of preparation will be expected of you, and what price, if any, you are likely to get for the material collected.

Understanding the types of markets available also is important, because it will influence with which ones you choose to work. For example, if you are a scrap generator that has little or no processing capabilities, then you will most likely want to work with a hauler, broker, scrap dealer, or processor. If, however, you have the ability to sort and/or grind scrap, then you may prefer to work with a processor or end user.

How Can Potential Markets Be Found?

One of the first tasks you will need to undertake when setting up a recyling program is to identify potential markets. How can you do that? One way is to use the American Plastics Council's (APC) *National Plastics Handle and Reclaimer Database.* Through APC's toll-free information line (l-800-243-5790) people interested in recycling can get information on companies across the country that are currently involved in recycling plustics. For example, in the APC database there are a few hundred handlers and reclaimers listed that currently accept PVC scrap, some of which may accept scrap siding. By calling the toll-free information line, you can get a listing of those companies along with a contact name, address, and telephone number, and begin the research process. You may also get a copy of APC's *Recycled Plastic Products Source Book* with information on companies using recycled plastic in their products. Another potential source of information is the Vinyl Institute's Vinyl Environmental Resource Center, also known as the VERCE, which can be reached at 1-800-969-vinyl (8469). From VERCE you can obtain a copy of their *Directory of U.S. and Canadian Companies Manufacturing Products From Recycled Vinyl* and *Directory of U.S. and Canadian Companies Involved in the Recycling of Vinyl Plastics.*

Conducting a Market Survey

Once you have identified a number of potential markets, you should conduct a market survey to determine which market is right for you. Keep in mind that, to be successful, a vinyl siding recycling operation must match material supply with the feedstock requirements of the market. That is, you must know the amount and quality of material espect-cd by the market and be capable of meeting those expectations.

Following are some of the questions you should ask during a market survey

- Where is the market located? (Remember, transportation costs can significantly affect the economics of recycling; therefore, the closer the market, the lower the 'transportation costs and the better the economics of your program.)
- How long has the market been in business?
- How long has the market been processing and/or using recycled PVC?
- Has the market worked with businesses like yours before? (If the market is willing to provide the names of two or three of its suppliers, it would be worth calling them to discuss the market, particularly its longevity and reliability.)
- How willing is the market to work with you to achieve quality material? (It may take some time to develop a system to recover clean material in sufficient quantities and of sufficient quality to meet the market's specification. Will the firm work with you to help meet these goals or does it expect it the first time material is delivered?)
- What additional services, if any, will the market provide? (Will it provide technical assistance, educational materials, staff training programs, collection containers, balers, and/or grinders?)

Once you have completed your market research, it is time to narrow your market choices down-usually to one or two viable options. (You can stay in contact with the market you do not select and think of it as a back-up should something happen to your first choice.) With the narrowed-down list of markets, you should then conduct a more in-depth interview to determine exactly what their expectations are and how your relationship will function. For example, you should consider asking the following questions:

- What are the market's specifications for the material? (How does it define "clean" or "acceptable" vinyl siding scrap. What levels of contamination are allowable?)
- What happens to material that does not meet the market's specifications? (Is the price reduced? If so, by how much and how are determinations made? Is the material landfilled? If so, who is responsible for transporting it to a landfill and paying for disposal?)

- How should the material be delivered to market? (Who is responsible for transporting the material? Who pays the transportation costs?)
- What quantities are required? (What is the minimum amount of material acceptable? Are there any maximum amount restrictions?)
- In what form should the material be? (Can the vinyl be transported loose? Arc bales of vinyl siding scrap acceptable? Or does the market require that the material be in flake form?)
- Are there any other requirements related to storing, shipping, and/or handling the material prior to marketing it?
- What is the current price paid for recovered vinyl siding (in loose, baled, and flaked form)? How often is the price subject to change?
- What has the price history been for the market? (Is data available showing the prices paid for the last year, two years, and/or five years?)
- What are the market's price projections in the short and long terms?
- What is the length of contract offered by the market? (Is it willing to make a long-term agreement to help even out price fluctuations?)

The answers to these questions will enable you to evaluate the practicality of becoming involved in a vinyl siding recycling program whether you are a scrap generator (i.e., a contractor, builder, or remodeler) or a siding recycler (i.e., a processor that turns vinyl siding scrap into a form in which it can be used to make a new product).

IDENTIFYING SOURCES 0F SUPPLY

Obviously, supply-related questions and concerns will vary with the type of organization to which you belong. If you are a contractor, builder, and/or remodeler that wants to separate its pre-consumer siding scrap for recycling, then you need to be able to tell your market how much material (i.e., supply) you generate on a specified time basis (usually weekly or monthly). That information will help determine the size of collection containers needed at the collection site and how often the containers need to be serviced.

If, however, you are a processor (or even a broker or end user) that wants to establish a comprehensive recycling program, then you need to research who is likely to generate scrap and how you can work with suppliers to establish a collection system to recover the material efficiently and effectively.

To make things simple, from this point on, this report will be targeted at *processors* that is, people interested in establishing a vinyl siding recycling business. It will walk through how processors can identify supply, establish a collection infrastructure, and turn the vinyl siding scrap into a form that can be used to manufacture recycled products. However, if you are a scrap generator, you may still find the information of use as it will help you understand what happens to your material once it leaves your facility.

Likely Scrap Generators

To ensure that your recycling business will succeed, you must be sure that it has a continual source of siding to recycle. Therefore, the second step in starting your business (after finding potential markets) will be to identify areas in which there is a high density of scrap generators, such as manufactured housing production sites, large housing construction projects, large home improvement companies, landfills, and vinyl siding distributors. Each of these sites represents a potential source of material for your recycling program. Of course, each source must be evaluated carefully to determine its viability as a supplier.

Manufactured Housing Production Sites

Perhaps the best source of supply is a manufactured housing production site. Why? Because (1) vinyl siding has become the material of choice in the manufactured housing industry, significantly reducing the chance of cross-contamination with other materials; (2) a significant number of units are assembled at one production site, which means that large volumes of vinyl siding scrap are generated in one place; (3) the production site is stationary and therefore represents a stable source of supply; and (4) the environment in which manufactured housing is assembled (i.e., the factory) is very clean, which means the material has low levels of contamination and therefore is of relatively high value. All of these characteristics are desirable for recycling.

In order to secure supply from a manufactured housing production site, you wilt need to locate one or more collection containers at the production factory and regularly haul the material back to the processing facility when the collection containers are full. You could contract with a hauling company to handle the transportation of the siding or provide the service yourself. To help ease transportation costs, you may want to ask that the

vinyl siding he baled at the production site, or if possible, granulated. (Granulating on-site *may* be acceptable with this type of supplier because the scrap is so clean. It probably is nut desirable in other situations, because it is extremely difficult to remove contaminants once the vinyl siding is in flake form.)

Why should a manufactured housing production site want to participate in recycling? Largely because it could reduce its landfilling costs, thereby improving the overall "efficiency" of its operation. Since the company has to put the scrap in dumpsters anyway for disposal, recycling should not represent any real increase in cost to the supplier (unless, of course, you ask them to bale or granulate the material, which would require an investment in equipment and labor).

Large Housing Construction Sites

Large contractors frequently build numerous homes in a particular neighborhood or geographic area, and very often the neighborhood or area will use vinyl siding exclusively. In those instances, the construction site may be a viable source of supply because it will generate relatively large volumes of scrap siding. You need to realize, however, that housing developments will move, or possibly even disappear, once construction is complete; therefore, to maintain the source of supply, it is imperative that you stay in close communication with the contractor (i.e., be prepared to move when the contractor moves) and keep your collection program flexible.

To obtain supply from large housing construction sites you will need to locate collection containers at the site, instruct construction workers about how and where to separate vinyl siding, and haul the contents of the containers away when they arc full. Again, you can provide the hauling service yourself or contract with an existing hauler.

Contractors probably will be open to recycling for two reasons. First, by recycling the material instead of landfilling it, they can avoid paying tipping fees, which in some places can be very high. In addition, they can use the fact that they recycle scrap as a selling point with potential home buyers as well as government officials and land developers.

Large Home Improvement Companies.

Typically, a home improvement company will have several crews that work out of its showroom. Those crews go out to perform remodeling jobs and usually will haul any remaining scrap from the job site to a local landfill. If, however, a home improvement company wants to participate in recycling, it could site one or more collection containers at its facility and encourage its crews to haul the vinyl siding scrap back to the company. Then you, as their processor, would come to the home improvement company and haul away the material.

Like large contractors, home improvement companies may want to participate in a recycling program because it will allow their crews to reduce landfill tipping fees, and it may give them a competition edge if they can tell potential customers that they have a recycling program.

Landfills

At present, most vinyl siding installers-whether they are large contractors or small independent builders-haul their pre-consumer siding scrap to local landfills, which makes a landfill a natural consolidation point for material. Therefore, consider contacting local/regional landfill operators to gauge their willingness to put a vinyl siding collection container on their site. Such an approach may generate a large, steady source of supply.

This is already happening to some extent because many states have programs that encourage or require landfills to recycle whenever possible. Some state governments even provide assistance to help landfills establish recycling programs. If a landfill does become a source of supply, you will need to help site one or more collection containers and be willing to haul the contents away whenever the containers are full.

You should keep in mind that there are advantages and disadvantages to collecting from landfills. On the positive side, a landfill is stationary and, therefore, represents a stable source of supply that is not likely to move or dry up. On the negative side, the quantities of vinyl siding going into a landfill will vary considerably over time (making it diffcult to predict the amount available and to determine the appropriate collection frequency), and the scrap has the potential for much higher levels of contamination. That is because it probably has been hauled from the construction site along with all other forms of construction waste. Thus, you will need to decide whether the potential benefits outweigh the potential drawbacks before counting on a landfill as a supplier.

Vinyl Siding Distributors

Vinyl siding distributors can play an important role in recycling because most of the vinyl siding procured by installers is purchased through distributors rather than direct from manufacturers. That means that distributors have daily contact with installers and can serve as an important information link.

If distributors were to participate in recycling, it would most likely be as a consolidation point. They could site collection containers at their facilities, and installers could haul vinyl siding scrap back to the distributors for recycling instead of to a landfill for disposal. The only problem is that installers typically do not dispose of materials at a distributor's facilities, and thus a change in their behavior would be required.

Additionally, there is not a great deal of incentive for vinyl siding distributors to participate in recycling. Perhaps the only real advantage would be a competitive one-where a particular distributor could encourage installers to purchase from them because they recycle, whereas their competitors do not. Therefore, while distributors may be a potential source of supply for processors, they probably are not the first or best source.

Understanding these potential collection sites and where they are located is important because it will help you determine where it makes sense to locate your processing plant. Ideally, you will want to be within close proximity (say 100 to 200 miles) of a fairly significant number of generators (say 50 to 75 depending on the size of your operation). This will help you keep transportation costs to a minimum and help ensure that you have a steady source of material to recycle.

DESIGNING A COLLECTION SYSTEM

Experience has shown that a vinyl siding recycling business works best when it is the center of a "hub and spoke" system. That means that you, as the recycler, will place containers at different collection points (as described earlier) and then transport, or have a hauler transport, the collected materials back to your facility for processing.

To do this, of course, means that you have to enlist the cooperation of scrap generators. One way to do that is to write a letter to potential suppliers explaining your desire to recycle vinyl siding scrap; then you should follow up with a phone call to assess their interest in participating.

To help answer questions and alleviate fears, you probably also should prepare something in writing that explains what you expect from suppliers, exactly what they have to do to participate, the services you will provide to assist them (i.e., training, educational materials, collection containers, regular hauling services, and so forth), and what you plan to do with the material following collection. The written explanation does not need to be long but should answer basic questions that potential suppliers are likely to ask.

In addition, before scheduling any meetings with or making telephone calls to potential suppliers, you should be prepared to discuss whether or not you intend to pay for the material they collect and be able to demonstrate what they might save by avoiding tipping fees (if applicable). You may also want to prepare a list of the reasons why it may be in their best interest to participate in a recycling program.

Selecting Collection Equipment

Once you decide to start a recycling program, you will have to determine whether to contract with a hauler to collect and transport the scrap siding to your processing facility or whether you will provide this service yourself. If you contract with a hauler, it will determine the kind of collection containers and vehicles that should be used. If, however, you decide to provide this service yourself, you will need to make some important decisions regarding collection equipment-decisions that cannot be made until you gather key information.

What information do you need? Most important, you need to know how much scrap each supplier generates within a given time period-usually weekly. (Some suppliers may be able to provide this information readily, while others may need to monitor the amount of scrap they generate for a short time before the program begins.) The amount of material generated will dictate, to a great extent, what size collection containers you need to place at the site and how frequently you will have to pull them. You also will need to know how much space the supplier has for siting collection containers and whether they have any equipment-such as a forklift-that can be used for unloading full containers onto your collection vehicle.

Once you have this information, you will need to match the needs and capabilities of your suppliers with your own needs and capabilities. For example, if you have a large generator with ample storage space, then a larger collection container may be appropriate, particularly since it will enable you to pick up from the site less frequently and, thus, potentially lower your transportation costs. If, however, you have a generator with little space available for collecting scrap, then a smaller container may be needed even if it means you have to collect more frequently.

Similarly, if you have generators that have their own forklifts, you can utilize large collection containers without purchasing your own lifting mechanism to empty them into your collection vehicle. If they do not have forklifts, you will have to provide one yourself or or use smaller collection containers that can be lifted manually.

The kind of collection vehicle you choose also will affect program decisions. For example, if you have several smaller sites, you may be able to collect from them in one trip with a regular flatbed truck. If, however, you have several larger sites, you will most likely need a larger truck with a specialized bed or be prepared to make more trips, which may, in turn, increase your transportation costs.

Clearly, each decision you make regarding collection containers and vehicles will affect your program in a different way. Therefore, before you begin, you need to gather pertinent information from your suppliers, evaluate your equipment options, and then carefully weigh the pros and cons of each potential decision. Some organizations that may be able to help you more fully explore equipment options include APC (l-800-2-HELP-90), the Vinyl Institute (201-898-6699) and the Vinyl Siding Institute at The Society of the Plastics Industry (202-974-5200). In addition, *Resource Recycling*, an industry trade publication, annually publishes a list of recycling equipment manufacturers; you can contact these companies directly to obtain more detailed information about their products.

EDUCATING ABOUT QUALITY CONTROL

Another factor that will affect the success of your recycling program is quality control. Obviously, if you want to make a good-quality flake to sell to a product manufacturer, then you need a good-quality feedstock. How do you ensure that the material you collect is of high quality? A comprehensive education program that reaches every person who participates in the recycling chain is your best bet.

Quality Control During Collection

The logical place to start education is at the collection site. Each collection container should be clearly designated as the recycling bin for vinyl siding. If you label the container as "plastics only," then you will probably draw *all* kinds of plastics; therefore, be sure to label your collection containers "vinyl siding only." Color-coding collection containers may also be helpful, as would attaching a sample of acceptable siding to the front of the container for comparison purposes.

In addition, your collection containers should (1) be located near garbage containers so that collectors do not have to go to "extra trouble" to recycle; (2) have a cover to keep out contamination and moisture; (3) be locked after hours so that others cannot contaminate the site; and (4) if possible, be staffed or periodically inspected so that any contamination can be quickly spotted and removed. In addition, instructions for recycling the vinyl siding scrap should be clearly printed on the cover of the collection bin where the vinyl siding is deposited. This serves as a final reminder of what collectors need to do to properly prepare their material.

Collection frequency and container size also will play a role in quality control. If you do not collect often enough from a given site, the collection container will overflow, which could have several consequences. First, the material that does not fit into the container will likely be deposited on the ground (which increases the chance of contamination) or thrown in the garbage (which lowers the quantity available for recycling). Second, if people stuff siding into an overflowing container, the lid will not stay closed, and the chance for contamination and moisture will increase. Third, if the collection site is not well maintained, there will be little incentive for participants to practice quality control measures. A clean, well-maintained site, on the other hand, will encourage participants to follow suit.

Quality Control During Transport and Processing

Quality also can be improved or maintained during transport of the material from the collection site by keeping your collection vehicle clean, dry, and free of contaminants (such as gravel or dirt). In addition, you should always clean out balers and/or granulators between loads, particularly if the equipment is used for processing other materials.

At the processing level, you can ensure quality by storing the vinyl siding scrap inside, in a clean area, off the ground. (If you have to store vinyl outside, make sure that it is covered with a tarpaulin or put in containers with lids.) Maintaining a clean tipping floor--where the material is sorted prior to processing--will also help preserve the quality of the material.

If you implement all of these quality control measures (from collection through processing) and educate and train your collectors, haulers, and processing staff, then you should be able to generate a good, high-quality material for sale or for use in your own products. If you do not, you will find that the siding scrap you collect and process will have a lower value to your markets and thereby undermine the economic viability of your program.

DESIGNING A PROCESSING LINE

After sources of supply have been identified, a collection program designed, and a quality control program developed, the next step in establishing a vinyl siding recycling business is to develop a processing line. The line is necessary to transform scrap siding into PVC flake, which can then be sold to the markets you identified earlier.

Typically, a vinyl siding processing line will consist of several key pieces of equipment:

- Conveyors, which are needed for sorting and transporting the siding from one piece of equipment to another.
- A pre-grinder metal removal system, which is needed to remove both ferrous and non-ferrous metals prior to grinding. Such a system is necessary because any metal contamination from the collection site will dramatically increase the wear and tear on your grinder-your most expensive and critical piece of equipment-and can cause serious damage to your customer's manufacturing equipment. Aluminum is the most prevalent form of metal contamination in vinyl siding because of the presence of coil stock, which is used in conjunction with siding and typically is the same color; therefore, it is extremely difficult to remove through visual inspection alone.
- A granulator or grinder-the heart of your processing line-which is necessary to transform siding into flake form so that it can be sold to your customers.
- A post-grinder metal removal system, which is needed to remove any metals or fines that remain after grinding. Vinyl siding scrap processors indicate that this is the most serious form of contamination that they encounter and that extra precautions should be taken to remove metals and fines prior to marketing recycled material.
- Potentially, a washing system, which may be needed to clean the siding scrap prior to processing. A washing system could be as simple as using a garden hose to rinse the scrap or as sophisticated as a built-in spray washer system. The need for such a system, as well as the level of sophistication needed, will depend on (1) the quality of material coming into your facility and (2) the specifications that your markets expect you to meet (which will vary depending on the product they produce with the PVC flake).

Some other pieces of equipment you may have to purchase for your recycling facility include a forklift for transporting bales or bins of siding scrap, vertical or horizontal balers for use in densifying scrap at the collection point, and blowers and cyclones to convey flake to storage containers after grinding.

Depending on your level of expertise, you can design a processing system yourself or seek the services of an engineering firm experienced in designing plastics recycling facilities. You may also want to tour other vinyl siding recycling facilities (if they will allow you) to see how a system looks and learn what works and does not work in recycling vinyl. Then, once you have completed this last step-designing and building your processing line--you will be ready to open your doors and put your previous market research and collection efforts to work.

CASE STUDY: POLYMER RECLAIM & EXCHANGE

Following is a case study of one successful vinyl siding recycling program. It is included in this report to show you how all of the pieces of a comprehensive program tit together. The company in the case study is Polymer Reclaim & Exchange (PRE), which is located in Mebane, North Carolina. It began processing pre-consumer vinyl siding scrap in 1993 with assistance from VSI and APC.

The Collection Process

In PRE's recycling program, vinyl siding scrap is collected from SO to 75 manufactured housing producers, as well as several large vinyl siding installers, and, more recently, a few landfills. PRE estimates that about 90 percent of its scrap is generated by the first two types of suppliers, leaving about 10 percent to come from landfills. At present, PRE is processing about 3.4 million pounds of vinyl siding scrap each year.

In order to secure supply, PRE makes separate arrangements with each of its suppliers for the purchase, transportation, and collection of their scrap. PRE is willing to travel as far as 400 miles one way for a load of baled vinyl scrap, and as far as 200 miles one way for a load of loose scrap. In most cases, transportation is provided by PRE free of charge.

The company also typically provides collection containers at no cost to the supplier. For small generators, it fabricates various size metal containers (based on the amount of scrap they generate) for the collection of their vinyl material. For larger generators, PRE provides a small, manual feed, vertical baler that can store and densify the siding. While there is no direct cost for the baler, the supplier does incur indirect costs associated with operating and maintaining the equipment at the collection site. In both instances, PRE asks that generators provide a forklift so that it can load and unload the bins and bales onto its collection vehicle.

The number of employees at PRE who are assigned to collection activities is fairly small: one full-time person is responsible for collecting and transporting siding scrap to the processing facility in Mebane; and one part-time person makes all of the necessary collection and transportation arrangements.

Processing

PRE uses a 5,000-square-foot area of its 95,000-square-foot facility to process vinyl siding scrap. When the scrap arrives at the plant, it is dumped onto a concrete tipping floor where contaminants (e.g., aluminum siding, cardboard, soda cans, nails, and so forth) are removed by hand. Then the vinyl siding scrap is fed by conveyor into the granulator and the ground flake is airveyed with a blower and cyclone into gaylords for storage and eventual shipment to market. PRE does not have a washing system because it determined that such a system was not necessary to meet market specifications.

Typically, PRE runs its system for two eight-hour shifts each day, with four laborers working each shift. Two laborers sort through the vinyl siding scrap to remove any visible contaminants; one feeds the incline conveyor, monitors the granulator, and watches PRE's

proprietary post-granulate metal and fines removal system; and the fourth operates the forklift, which is used to move bales and bins of scrap to the tipping floor and to remove gaylords of product, fines, and residue.

As with any process, PRE generates residuals that need to be disposed of. The residue consists primarily of non-vinyl contaminants, pre-granulator discards, and post-granulator metals and fines. Not surprisingly, PRE reports significantly greater levels of contamination (and, hence, residue) from its landfill suppliers than from manufactured housing producers and vinyl siding installers. PRE estimates that disposal costs around Mebane average about $35 per ton-a cost it must absorb as part of doing business.

Sales

Once the vinyl flake is produced, PRE markets the majority of it to profile extrusion manufacturers throughout the South, Northeast, and Midwest. PRE has invested considerable time and effort in (1) identifying these markets, (2) building viable working relationships with them, and (3) supplying them with high-quality flake. It is this latter issue-quality-that PRE believes is critical to its success (and something that anyone entering the vinyl siding scrap recycling business will have to contend with).

Program Costs

The table on page 17 illustrates how the PRE process works from an economic standpoint. It presents a range of costs per pound for the key components of PRE's collection and processing system, including capital, operational, and administrative costs, as well as revenue from the sale of scrap. The range was used to give you an idea of how the economics might work under different circumstances.

As the data demonstrate, vinyl siding scrap recycling is an economically viable activity for PRE. At the low end of the range, it costs PRE 10 cents per pound to collect and process vinyl siding scrap and it receives 13 cents per pound from its market, resulting in a 3-cent-per-pound profit. At the high end of the range, it costs PRE 17.5 cents per pound to collect and process the scrap and it receives 21 cents per pound, resulting in a 3.5-cent-per-pound profit.

PRE cautions, however, that the economic success of its program does not guarantee the viability of other programs. Its success depends largely on four factors: (1) PRE's proximity to a large concentration of manufactured housing producers that supply large quantities of relatively homogenous scrap; (2) its relatively low labor and building rental costs; (3) its hard work in cultivating strong relationships with suppliers and markets; and (4) its ability to produce high-quality flake, which translates into a higher value product. If any one of these factors were to change, it would affect PRE's ability to continue recycling vinyl siding.

Economic Case Study[1]

Polymer Reclaim & Exchange

Vinyl Siding Scrap Recycling

Description	Cents/Pound[2]	
	low Range	High Range
Capital[3]		
100 HP Granulator, Feed Conveyor, Blower	0.3	0.3
Forklift	0.1	0.1
Baler Supplied to Generator	0.7	0.7
Collection & Transport[4]	0.3	4.8
Operations (Annual)		
Building Lease	0.9	
Labor	3.0	4.9
Granulator Maintenance	1.1	1.1
Metals & Fines Removal	0.3	
Residue Disposal	0.2	0.3
Forklift Fuel & Maintenance	0.1	0.4
Electricity	0.4	
Administrative		
Overhead	0.9	0.9
Sales	0.9	0.9
Account Management	0.8	
Total Cost (cents/pound)	10.0	17.5
Recycled Vinyl Flake (cents/pound)[5]	13.0	21.0

1 Costs are on an annual basis.
2 Costs are divided by the number of pounds/year processed by PRE.
3 Purchased equipment has been depreciated over a 7- to 10-year period.
4
5 Cents/pound price for recycled vinyl flake at publishing time.

ASSESSING YOUR COSTS

Using the data from the case study table (pg. 17), you can begin to identify some of the costs associated with running a vinyl siding recycling operation; determine potential revenues; and with that information, evaluate whether it might be feasible for you to launch your own recycling business. You should also be aware that there may be an initial investment required to get started collecting and processing scrap, which will be unique to your business situation, and that this should be factored into your decision.

Following are some other factors that will affect the economic viability of your program:

- The efficiency of your collection system
- Your proximity to large generators of vinyl siding scrap
- The potential for avoided disposal costs, which will make it more attractive for generators to participate and, perhaps, allow you to charge for hauling away the scrap for recycling (instead of paying for the material)
- The efficiency of your sorting system
- The efficiency of your residue removal system, which will minimize wear and tear on your equipment (thereby lessening maintenance and replacement costs) and improve the quality of your flake (which may bring a higher value)
- Your ability to develop strong working relationships with your customers (i.e., those that purchase and use your flake)

Control of these key factors will help ensure that collection and processing costs stay at the low end of the range while sales revenues stay at the high end. This, in turn, will help provide an adequate margin so that your vinyl siding recycling operation will remain profitable.

CONCLUSION

If you are interested in recycling vinyl siding scrap, this guide should give you a good idea of the parameters that are involved. It also should provide you with enough information to start researching and developing your own business plan. The intent, as mentioned eartier, is not to answer every question about vinyl siding recycling, but to give you a good overview of the basics-from researching potential markets and identifying sources of supply to developing collection systems, quality control programs, and a processing line. It also, where possible, includes organizations you can contact for additional information as your understanding of, and commitment to, vinyl siding recycling grows. It is hoped that, once armed with this information, you will be able to make better, more informed decisions about the viability of starting your own vinyl siding recycling business.

ACKNOWLEDGMENTS

Many thanks go to..

- Members of the American Plastics Council, who reviewed and provided technical information for this document;
- The Vinyl Siding Institute for numerous contributions in providing draft documentation and enabling the completion of this document;
- Polymer Reclaim & Exchange, which provided significant input into this document and served as an excellent case study;
- DSM Environmental, which compiled and analyzed the data presented in the case study and supplied editorial support.

A special thank-you to..

- Headley Pratt Consulting, which was instrumental in writing and editing the document to make sure that it was understandable and as comprehensive as possible, given the information currently available on vinyl siding recycling.

The study could not have been completed without the help of these organizations.

1 By companies reporting their annual sales to VSI

2 Waste Age's Recycling Times, July 25, 1995

3 Prices used in this calculatiion were taken from the June 30, 1997, issue of Plastics News.

4 According to the American Plastics Council, a "handler" is defined as a facility that sorts and densifies plastics for recycling either by baling or granulating it. A "reclaimer" is a facility that washes and/or pelletizes plastics for use in the manufacturing process.

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