Ford Site Green Manufacturing Reuse Study

Prepared for:

City of Saint Paul, Minnesota
Department of Planning and Economic Development

Minnesota Department of Commerce
Office of Energy Security

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PROJECT BACKGROUND AND PURPOSE

The Ford Motor Company has announced an intention to close its assembly plant in Saint Paul in 2011. The plant is located on a prominent site and contains a significant number of well-paying jobs. Due to the site's prominence and potential loss of jobs, this closure will have a profound impact on the neighborhood, the City, the region, and the State. Therefore, the City of Saint Paul has begun working with Ford Motor Company in planning for the site's reuse. Planning efforts to date have considered a wide range of possible reuses for the site. One possible reuse would be to continue use of the site as a location for manufacturing.

Although manufacturing in the United States and Minnesota has experienced sharp declines in recent years, several studies have suggested that emerging product lines that serve renewable energy and other green industries will surge in demand in coming years, thus increasing the need for domestic production. Moreover, given the 'green' aspect of these emerging product lines, it is assumed that manufacturers of these products will value and gain benefit from being located on a 'green' site as well. Given the City of Saint Paul's vision to prioritize sustainable development, there is a unique opportunity to leverage the Ford site's 'green' potential (i.e., building reuse, centralized location, access to renewable energy, etc.) to capture demand for space among green manufacturers.

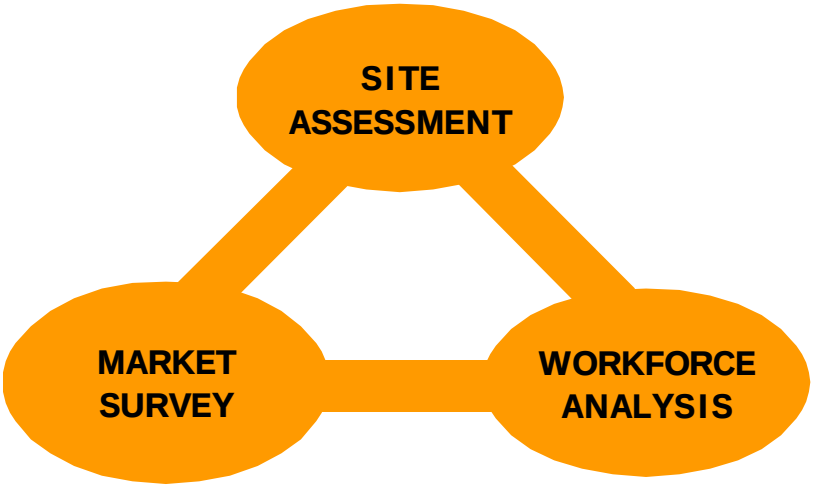
The purpose of this study, therefore, is to help understand the feasibility of reusing the Ford Motor Company site for green manufacturing.

METHODOLOGY

In order to determine the feasibility of reusing the site for green manufacturing, the consultant team conducted three separate, but related, analyses: 1) an assessment of the site and existing facilities to determine potential costs associated with needed improvements to make the site marketable as a location for green manufacturing; 2) an evaluation of the available workforce needed to support green manufacturing; and 3) a survey of green manufacturers to determine their site, facility, and workforce needs.

Each of the three analyses and their findings were compared to determine the feasibility of redeveloping the site and/or rehabilitating existing facilities. The figure that follows illustrates the relationship between the three analyses.

FIGURE 1: RELATIONSHIP OF FORD SITE STUDY ELEMENTS



DEFINITION OF GREEN MANUFACTURING

A good portion of this study was dependent on having a clear definition of green manufacturing. Green manufacturing is a relatively new term that remains open to wide interpretation. Therefore, in order to focus the research, the consultant team relied on input from the City of Saint Paul, which used the results of a study prepared for the Mayors' Initiative on Green Manufacturing. The study identified several green product types which would be highly desirable because of their forecasted growth, high wages, and density of employment. Added to this list were product types that appear well suited to the site itself. The list of product types is as follows:

- Hybrid or electric vehicles and their component parts
- Windmill generators and their component parts
- Heating Venting Air Conditioning (HVAC) controls
- Sensors and monitoring systems
- Bio-fuel processing systems

STUDY RESULTS

SITE ASSESSMENT

An assessment of the Ford Site was conducted in order to determine the approximate costs associated with bringing the site to the marketplace as a location for green manufacturing.

It should be noted that an environmental assessment was NOT performed as part of this assessment. The extent of possible environmental clean up will not be known until the Ford Motor Company ceases operation; at which time a thorough analysis can be undertaken. Therefore, this study makes no assumption

regarding the costs associated with potential environmental clean up.

Based on data collected during the site assessment and market survey, four different development scenarios were considered as possible options, which are as follows:

- Scenario 1: Demolish All Buildings
- Scenario 2: Reuse All Buildings
- Scenario 3: Reuse Paint Building Only
- Scenario 4: Reuse "Newer" Warehouse Building Only

Each development scenario has a number of strengths and weaknesses, though from a cost standpoint, Scenario 3 in which the paint building is reused and the remaining buildings are demolished has advantages over the other scenarios because of the paint building's modest rehabilitation cost, advantageous location on the site, overall good condition, potential desirable clear height, and ability to be subdivided.

WORKFORCE ANALYSIS

With assistance from the Minnesota Department of Employment and Economic Development (DEED), occupational information was analyzed from the existing Ford workforce and compared against the workforce needs of the targeted industries identified during the employer interviews. Although the most compatible workforce needs are among hybrid/electric vehicle manufacturers, the best overall opportunity is among manufacturers of HVAC controls and sensors and monitoring. These similar industries rely on occupations in which Ford employees could easily be retrained. Moreover, these industries benefit from a metropolitan location because of the ability to recruit and maintain highly skilled engineers and scientists. Also, the industry is well established in the Twin Cities Metropolitan Area. Therefore, local expansions are probable. Finally, these industries often integrate production with Research and Development, training, and some types of administrative functions. This matches well with several of the reuse scenarios in which buildings can be built new or easily adapted to incorporate such designs.

MARKET SURVEY

A survey of firms involved in the manufacturing of green products was conducted to determine site and facility needs of the targeted industries. Almost all of the targeted industries had site needs that matched up well with the Ford site, though it was especially strong if the firm was a start-up that produced a product that was marketed directly to consumers. These firms placed a greater emphasis on being located on a green site because of a corporate mission that stresses a green brand and because the new nature of the business allows the firm to adopt new, more green production

methods. One industry exception was wind turbine component manufacturers. In many ways, the Ford site has many advantages for wind turbine manufacturers due to its size and access to renewable energy. However, the logistical challenges associated with transporting wind mill components would make it very difficult for a manufacturer to locate on the site. Another key finding of the market survey was the importance placed on subsidies. Nearly all of the respondents felt very strongly that subsidies would be an essential component in the locating of their next manufacturing facility.

ANALYSIS OF RESULTS

Based on the conclusions from each of the three areas of study, a matrix was prepared to help identify how each development scenario compares to one another with respect to cost, market potential among green manufacturers, the potential to utilize the existing Ford workforce, and its alignment with the planning vision prepared for the City of Saint Paul in 2007. This matrix is summarized below. Each cell in the matrix includes a positive or negative value depending on the strength of the trait. For example, three negative symbols represent the most negative value possible, while three positive symbols represent the most positive value possible.

COMPARISON OF DEVELOPMENT SCENARIOS

Development Scenario	Cost	Market Potential Among Green Manufacturers	Potential to Tap Existing Ford Workforce	Alignment with 2007 Planning Vision
Scenario 1: Demolish All Buildings and Rebuild	+	+ +	-	+ +
Scenario 2: Reuse All Buildings	- - -	- -	+ +	- - -
Scenario 3: Reuse Paint Building	+	+ +	+	+ +
Scenario 4: Re-use "Newer" Warehouse Building	+ +	+	+	-

Based on the matrix above, each development scenario is ranked according to the feasibility of reusing the Ford site for green manufacturing.

#1 REUSE PAINT BUILDING ONLY (SCENARIO 3)

The feasibility of reusing the paint building is rather strong. Its size, shape, age, and location on the site, make it an excellent candidate for reuse among green manufacturers. Unlike other scenarios, it has the potential to be profitably modified in a manner to attract a diverse group of green manufacturers. Moreover, it's not so overwhelming of a project that it would risk a slow absorption or minimize the number of possible tenants.

#2 Demolish All Buildings and Rebuild (scenario 1)

The feasibility of demolishing all of the existing buildings and then rebuilding new structures to capture green manufacturing development is strong, but not nearly as strong as reusing the paint building. Scraping the site and starting new is by far the most flexible development scenario with respect to building placement, phasing of development, and introducing state-of-the-art facilities. However, it has limited potential to capture manufacturing operations focused primarily on production, which is the current situation with the Ford plant. This is because of the expense of building a new facility dedicated to production. Even among green manufacturers, such operations are much more cost effective in more exurban and rural locations or in other markets altogether. Furthermore, with vacancy rates among existing industrial properties at high levels, absorbing thousands of square feet of new industrial property would be risky for most developers without substantial subsidies. Despite these market related concerns, there is opportunity to capture demand for flex-space among green manufacturers who are dependent on a highly skilled workforce that want to be located at the heart of a major metropolitan area.

#3 Reuse Warehouse Building Only (scenario 4)

The feasibility of reusing the newer warehouse building is modest at best. In many ways, the cost advantages are similar to reusing the paint building. However, the position of the structure on the western side of the site presents many constraints for effectively introducing other non-industrial uses or even complementary industrial uses. Furthermore, the small size of the structure places it somewhat in limbo from a market standpoint as it is almost too small to subdivide and yet not large enough to attract a single user who might want to incorporate office or R&D functions.

#4 Reuse All Buildings (scenario 3)

The feasibility of reusing all of the existing buildings is low. The overwhelming size of the structure and limited potential to subdivide it efficiently presents a challenge that would be very difficult to overcome. Namely, the number of potential users would be small. Furthermore, such users are in huge demand by other locales with similar brownfields. This means that the cost to find such a user go well beyond simply improving the facility but would also likely require other significant subsidies. If the building were to be subdivided efficiently, this does not greatly diminish the risk as the sheer size of the structure suggests it would take considerable time absorbing all the space. However, if a large user were to be found it most likely would require the type of workforce already present at the plant. To make this happen, though, would require a prominent role on the part of the public sector as private developers would not assume such high level of risk.

RECOMMENDATIONS

Based on the findings, the consultant team considers it feasible to develop the Ford site in a manner that would be attractive to green manufacturers. However, there are challenges that need to be addressed in order to capitalize on the site's potential. The key challenges as well as opportunities are outlined below.

1. Expect Heavy Subsidies

Because manufacturing jobs are highly coveted among local and state governments, it has become *de rigueur* to offer heavy subsidies to manufacturers with significant jobs who are considering relocation or expansion. Based on the results of the market survey, the Ford site will be no exception.

Furthermore, the number of competitive redevelopment districts has increased sharply in recent years. Many local and state governments, as a result, have stepped up the amount of subsidies they are making available to revitalize their brownfields. Given this highly competitive environment, it will be essential that the marketing of the Ford site be well coordinated, professional, and backed by significant public subsidy to differentiate it in the marketplace.

To illustrate potential subsidy amounts, consider an extreme example where demolition and rehabilitation costs are subsidized. In such an example, expect dollar amounts to range from $8.2 million to $18.3 million for the Ford site, depending on the redevelopment scenario. This does not include potential rent subsidies.

The market survey found that the Ford site has characteristics that can differentiate it in the competitive marketplace, especially among certain manufacturers. Of particular value is the site's location at the heart of a major metropolitan area, which is instrumental for manufacturers to attract and retain a highly skilled workforce.

2. Focus the Marketing Effort

Though the site's characteristics make it an attractive location for some types of manufacturers, there are drawbacks for others. For instance, there are logistical challenges in quickly accessing the highway system and in transporting oversized products via rail. Also, some manufacturing sectors are dependent on a low-wage labor force that is not readily available in most major metropolitan areas.

As a result, it is recommended that marketing efforts should be focused in two ways: 1) industry-specific and 2) geography-

specific. The industry-specific focus should be on companies that manufacture HVAC controls, sensors and monitoring systems, and solar panels. These companies have production needs that match well with the existing Ford workforce and they often blend training, research and development, and management on the same site as production. This is very advantageous because these non-production activities often require occupations with higher skill sets, such as engineers and scientists, which are easier to attract and retain for companies with urban locations. Furthermore, these companies don't have the same level of logistical issues as say electric vehicle manufacturers or windmill component manufacturers.

The challenge will be in convincing these firms, particularly manufacturers of HVAC controls and sensors and monitoring systems, of the value of moving to a green site, as many of these businesses are long-established firms with proven production techniques in which relocation and green production techniques are not always an immediate consideration.

The geography-specific focus should be on firms located in the immediate region and northern Europe firms interested in establishing a North American operation. Firms located in the immediate region value the quality of the Minnesota workforce, which tends to require less company-initiated training than other places of the country, and are familiar with the culture and climate of the region.

For northern European firms who want to establish a North American operation, the site is extremely compelling for a number of reasons. Similar to local firms, the culture and climate is more familiar than other parts of the country. Second, they perceive the quality of the Minnesota workforce to be higher than other regions in the US. Third, the Minneapolis-Saint Paul metropolitan area offers many of the cultural amenities that can attract highly skilled professionals from northern Europe and other destinations.

Despite the importance of a focused marketing effort, it should be made clear that potential users who value the site will not be restricted to the industries mentioned above. Therefore, care needs to be taken to be flexible with a marketing plan and understand that many businesses make location decisions for reasons that are not always apparent or attuned to their bottom line.

3. Strategically Reuse Portions of the Site

In terms of reusing existing buildings, the paint building was demonstrated as having the greatest viability because of its versatility, high ceilings, relatively young age, competitive projected

rents, and relatively modest size, which would limit risk when considering the time needed to absorb the space. Furthermore, the paint building could be marketed as an adaptive reuse, which would add to the green qualities of the site. Despite these advantages, the paint building would represent somewhat of a challenge when incorporating new uses on the site, especially non-industrial uses in which new roads and infrastructure would have to be accommodated. Therefore, consideration should be given to the option of razing all existing structures and building new facilities. The benefits of this include maximizing the potential to integrate several types of uses on the site, if necessary, designing new industrial development with the highest green standards possible, and phasing development in a manner that would be most cost effective.

The consultants do not recommend rehabilitating the main production building or the attached warehouse because of the lack of market depth among manufacturing firms that would require so much space, especially given the cost to renovate the space. Nonetheless, if a commitment is made to market some or all of the site as a manufacturing park, then the marketing plan should be flexible enough to accommodate a single large user should they make themselves interested before the site is substantially altered.

At the northern end of the site is a training center that is less than 15 years old. The market survey did not yield strong demand among manufacturers for an on-site training facility. However, this assumed that the manufacturer would not necessarily share the facility with other firms. Thus, there may be demand for such a facility if, for example, several complementary businesses had training or research and development needs and could share the space, as well as continuing its use as educational space for local colleges and universities.

4. Track the Economy and Time Any Investment

A significant challenge will be gauging the short- and long-term impact of the global recession. It has been demonstrated that green products, especially those in the industries targeted in this study, will experience growing demand in the coming years. This is good. However, it is unclear what kind of trajectory this growth will take. If the growth lags well behind any substantial investment in the Ford site, this will lengthen the project's absorption period and put downward pressure on rents, both of which will reduce revenue and jeopardize the development.

Further complicating the timing of the market is the ample supply of competitive brownfield districts, which will lengthen absorption and put downward pressure on rents. This makes it critical that the

project be differentiated in the marketplace and marketed to the most attractive potential users.

5. Consider Creating a Park or District with Strict Green Standards

Many other industrial parks are trying to market themselves as green. One way to differentiate the Ford site from others would be to create design or use standards not found at other industrial parks. The market survey indicated that a number of respondents felt that being located in a green industrial park had some benefit because of the possibility of being located near complementary businesses in which economies of scale could be achieved through shipment of goods or ordering of parts. This would be especially true of firms that might be part of the same supply chain. Therefore, creating green standards may serve to agglomerate certain types of industries.

Typically, design standards are considered a barrier to development because they represent, in the minds of many businesses, unnecessary costs. However, if green design standards were subsidized, there would be minimal financial impact on the business and they would benefit from claiming to be located in an extremely green location. Therefore, subsidies targeted at creation of a green industrial park could be attractive to certain manufacturers and help differentiate the site in a competitive marketplace.

Background

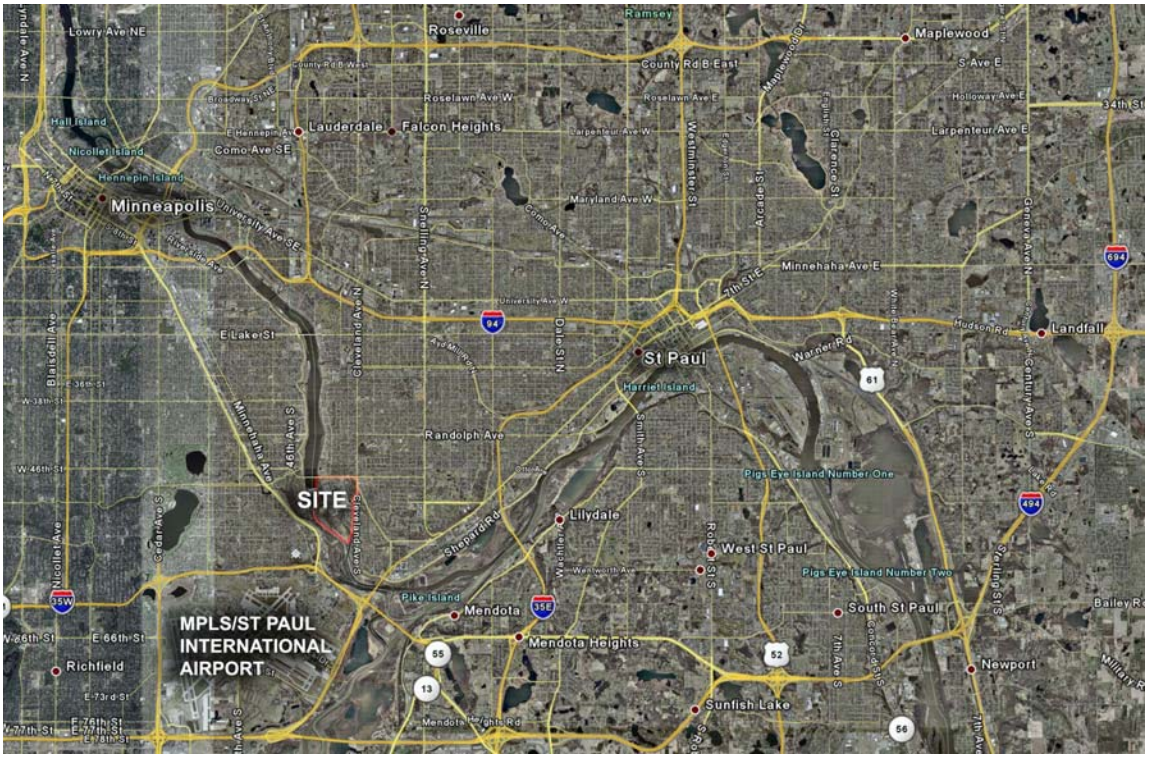
DESCRIPTION OF SITE

The Ford Motor Company plant site is located within the Highland Park neighborhood and adjacent to the Mississippi River in southwestern Saint Paul, Minnesota.

The site's location in the greater metropolitan area offers several strategic advantages including:

- Proximity to downtown Saint Paul and downtown Minneapolis and the Minneapolis/Saint Paul International Airport
- Proximity to several college and university facilities that provide a research base and educated population
- Views and recreational access to the Mississippi River and the larger regional park system
- Immediate adjacency to the successful Highland Park Business District
- Existing high quality, high value residential neighborhoods
- A large contiguous land area located within one of the major metropolitan areas of the country
- Rail access
- Adjacent to hydroelectric power plant
- On-site waste water treatment facility
- On-site facility heating plant (steam)

MAP 1: REGIONAL LOCATION OF THE FORD SITE

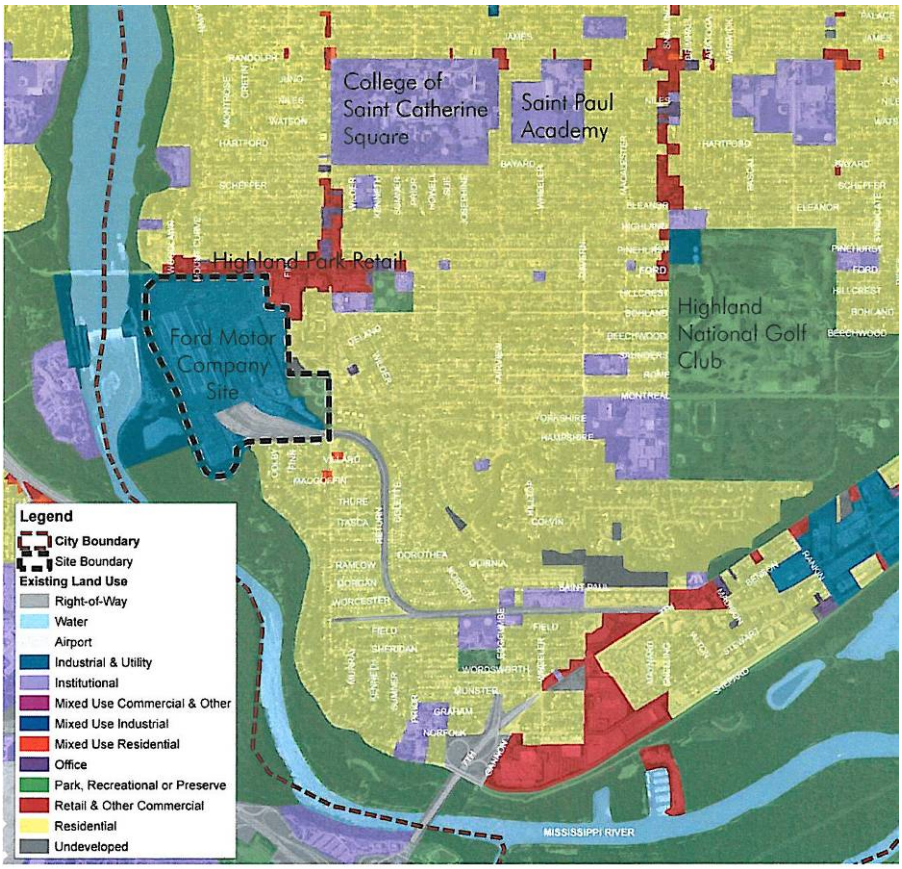


The primary component of the site is a 122-acre parcel of Ford Motor Company land utilized for the plant. It is mostly occupied by manufacturing, assembly and warehouse buildings, parking lots for employees, and new vehicles. The extreme eastern portion of the parcel, however, is being used as neighborhood ballfields.

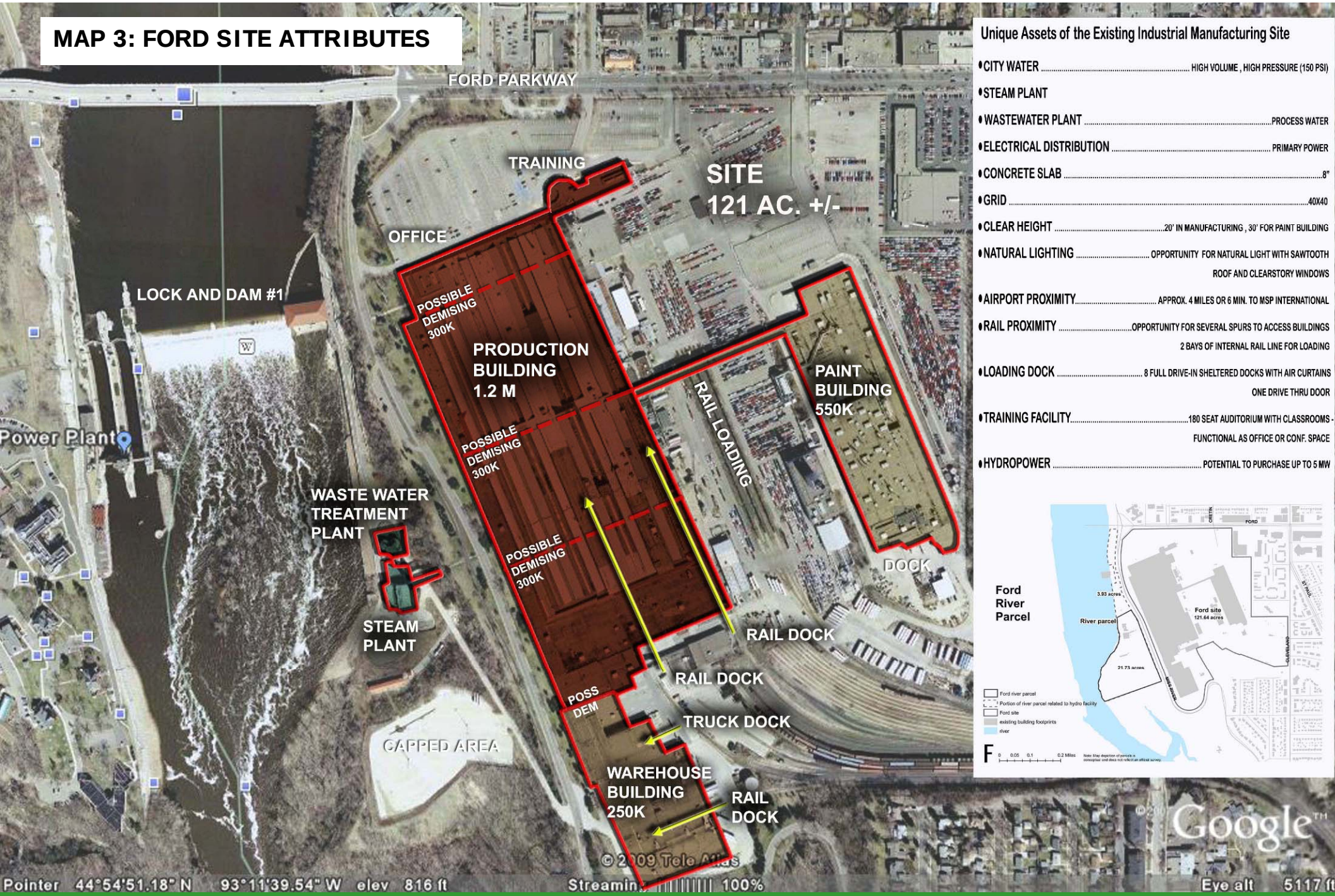
The Ford Motor Company also controls a 22-acre parcel situated along the Mississippi River. This river parcel contains a waste water treatment plant, a steam plant, and a former landfill that is currently capped. There are an additional 13 acres of Canadian Pacific Rail property that in many ways are considered a part of the site, though the land is not owned or controlled by the Ford Motor Company.

The site is bounded by Ford Parkway to the north, the Mississippi River to the west, the Mississippi River Boulevard and Hampshire Avenue to the south, and the alignment of Finn Street extended into the site and Cleveland Avenue to the east. The physical dimensions of the site are approximately 1,800 feet east to west and a half mile, or 2,640 feet, north to south. Surrounding the site are a mixture of commercial, residential, and recreational uses.

MAP 2: LAND USES SURROUNDING THE FORD SITE



MAP 3: FORD SITE ATTRIBUTES



Unique Assets of the Existing Industrial Manufacturing Site

- CITY WATER ..... HIGH VOLUME , HIGH PRESSURE (150 PSI)
- STEAM PLANT
- WASTEWATER PLANT ..... PROCESS WATER
- ELECTRICAL DISTRIBUTION ..... PRIMARY POWER
- CONCRETE SLAB ..... 8"
- GRID 40X40
- CLEAR HEIGHT ..... 20' IN MANUFACTURING , 30' FOR PAINT BUILDING
- NATURAL LIGHTING ..... OPPORTUNITY FOR NATURAL LIGHT WITH SAWTOOTH ROOF AND CLEARSTORY WINDOWS
- AIRPORT PROXIMITY ..... APPROX. 4 MILES OR 6 MIN. TO MSP INTERNATIONAL
- RAIL PROXIMITY ..... OPPORTUNITY FOR SEVERAL SPURS TO ACCESS BUILDINGS 2 BAYS OF INTERNAL RAIL LINE FOR LOADING
- LOADING DOCK ..... 8 FULL DRIVE-IN SHELTERED DOCKS WITH AIR CURTAINS ONE DRIVE THRU DOOR
- TRAINING FACILITY ..... 180 SEAT AUDITORIUM WITH CLASSROOMS - FUNCTIONAL AS OFFICE OR CONF. SPACE
- HYDROPOWER ..... POTENTIAL TO PURCHASE UP TO 5 MW

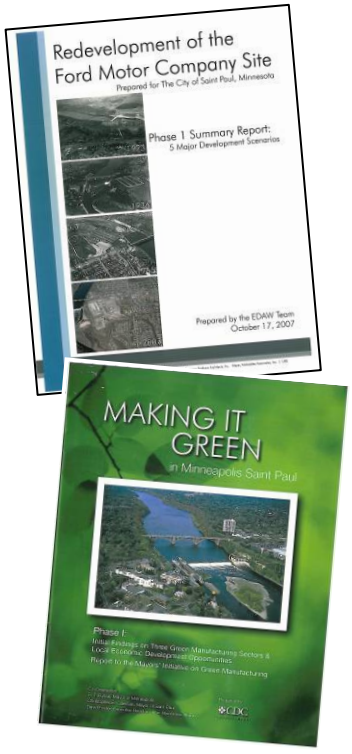
FORD MOTOR COMPANY

Due to rapidly changing economic conditions in the automotive industry, the general public, members of the state legislature, and officials at area economic development agencies have openly speculated on Ford Motor Company's intentions with their Saint Paul property. Although such speculation is understandable in uncertain economic times, no specific plan for reuse of the property has been discussed publically.

Because specific plans for the site remain very much open, this report was prepared with the understanding that Ford will close the facility and has no interest in reusing it, which it has stated publicly. As a result, the consultants assume Ford will sell the property at market rate and will mediate any necessary environmental concerns prior to sale. Through discussions between Ford Motor Company and the consultants, it is also understood that Ford has explored and is open to selling the property to a green manufacturer, if the manufacturer is able to pay a price that is competitive with other potential users. In addition to price considerations, it is Ford's hope that the purchaser will self-select based on support by the neighborhood, city, and state for the purchaser's intended use.

PREVIOUS RELATED STUDIES

Although this study includes a substantial amount of primary research, there have been several recent studies which helped provide context to the analysis.



REDEVELOPMENT OF THE FORD MOTOR COMPANY SITE (OCTOBER 2007)

In 2007, the City of Saint Paul commissioned a team of planning consultants to work with the general public, city officials, the Ford Motor Company, and adjacent property owners to develop a series of development scenarios for reuse of the Ford Motor Company property. Five different development scenarios were created, each reflecting the overarching vision for the site, which were supported by a list of goals that defined key physical, social, and economic objectives. The development scenarios were varied and ranged from maintaining an industrial use of the site to an entirely new vision, which depicted a mix of residential and commercial uses. Although the green manufacturing reuse study was not constrained by the development scenarios put forth in the 2007 plan, there was a conscious effort to learn from this previous study and to integrate, where appropriate, its important findings. (Report available at – www.stpaul.gov.)

MAKING IT GREEN IN MINNEAPOLIS SAINT PAUL (APRIL 2008)

Recognizing the potential to revitalize inner city industrial districts through the development of green manufacturing, the mayors of

Saint Paul and Minneapolis collaborated on an initiative called Making It Green. The initiative brought together leaders in both the public and private sectors to research which products and industries represented the greatest opportunities for the development of green manufacturing jobs. The study concluded that three broad product categories (building materials, transportation, and renewable energy) with 29 product types were the most promising areas for the development of green manufacturing jobs. (Report available at – www.stpaul.gov.)

GREEN CITIES GREEN JOBS MINNEAPOLIS SAINT PAUL (MAY 2008)

As a companion to the Making It Green study, Green Cities Green Jobs delved into the 29 product types to reveal which ones had the best characteristics for development in inner city industrial districts. Such characteristics included job density, occupational structure, average company age, wages, and growth trends. Results of the Green Cities Green Jobs study were instrumental in focusing the research of the current study in the product areas of HVAC control systems, sensors and monitoring systems, and bio-fuel systems. (Report available at – www.stpaul.gov.)

GREEN JOBS IN MINNESOTA: MARKET ANALYSIS (MARCH 2009)

Legislative action in 2008 led to the creation of the Minnesota Jobs Task Force, which was charged with developing a statewide action plan to optimize the growth of the green economy. The first step in developing this action plan was to perform a market analysis to identify business opportunities and needs created by key environmental policies previously adopted in Minnesota. (Report available at – www.mngreenjobs.com.)

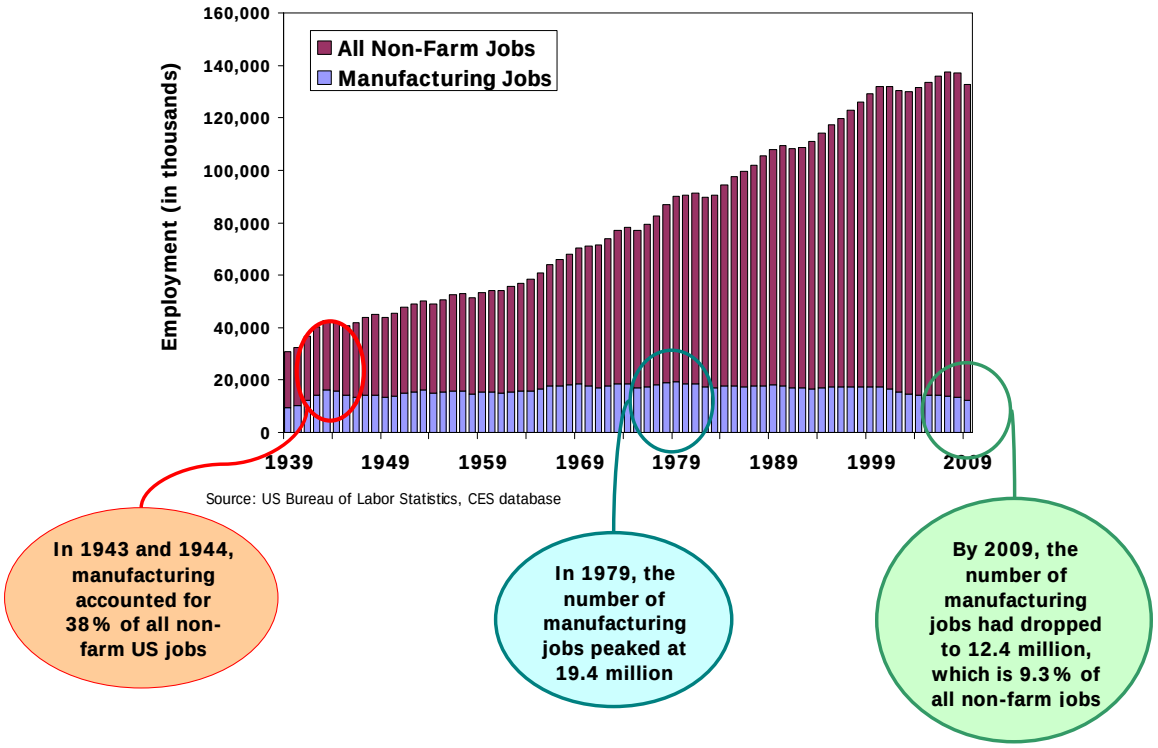
TRENDS IN MANUFACTURING

One of the foundational reasons for conducting this study is the long-term decline in the number of manufacturing jobs. Manufacturing jobs have historically been an important component of the US economy because of the sheer numbers of jobs and because such jobs have often provided livable wages to households and families. Therefore, as these types of jobs have declined, many communities, especially older, central cities, such as Saint Paul, have been impacted by lost employment and reduced incomes. The emerging green economy, however, represents an opportunity for Saint Paul to retain and possibly expand its manufacturing base, which would presumably attract residents and increase incomes.

Figures 2 and 3 illustrate the long-term decline of manufacturing jobs. Although the loss of manufacturing jobs has been evident since World War II, it began a precipitous decline 30 years ago when increased automation and the movement of manufacturing jobs to foreign countries combined to ravage many industries. Though losses ebbed during the 1990s, the 2000s have generally represented yet another period of sharp decline. Since 2000, nearly

5 million manufacturing jobs have been lost in the US. Currently, less than 10% of all non-farm jobs are manufacturing jobs.

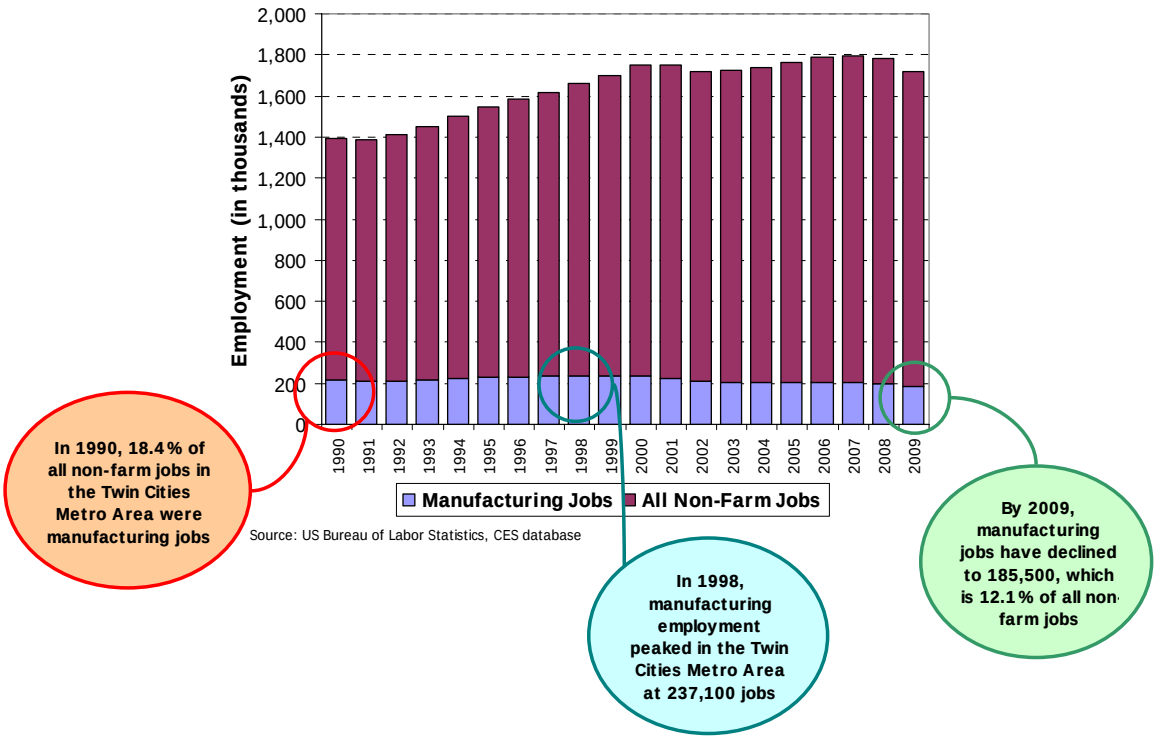
FIGURE 2: US NON-FARM EMPLOYMENT 1939-2009



Since 1990, manufacturing jobs in the Twin Cities Metro Area have followed a trend that is similar to the national experience. Throughout the 1990s, manufacturing jobs increased each year until 1998. Since 1998, manufacturing jobs have decreased nearly every year and currently are at their lowest point in more than 20 years. Although manufacturing jobs in the Twin Cities Metro Area are at 20-year lows, the region is still an important manufacturing center. Nationally, 9.3% of all non-farm jobs are manufacturing jobs, yet in the Twin Cities Metro Area that proportion is 12.1%.

It was noted previously that increased automation and outsourcing of labor to foreign countries has reduced the need for manufacturing jobs at both the national and regional level over the past 30 years. However, for central cities, such as Saint Paul, an added drain on the manufacturing job base has been the outward movement of manufacturing jobs within metropolitan regions. According to data from DEED, the number of 2008 manufacturing jobs in Saint Paul was just under 9,000, which is a 50% decline since 1992 and only represents 4.9% of all Saint Paul jobs.

FIGURE 3: TWIN CITIES METRO AREA NON-FARM EMPLOYMENT 1990-2000



Source: US Bureau of Labor Statistics, CES database

GREEN MANUFACTURING TRENDS

Although manufacturing jobs as a whole have experienced dramatic declines in recent years, the emerging green economy has demonstrated that there is potential for the development of thousands of new manufacturing jobs that are focused on green products.

The Pew Charitable Trusts released a report June 2009 with data indicating that the number of clean energy jobs in the US increased 9.1% from 1998 to 2007 whereas total US jobs only increased 3.7%[1]. Although the number of clean energy jobs is somewhat small, this suggests that job growth related to the green economy is outpacing the overall economy, which means the demand for green products necessary for the green economy is increasing as well.

In Minnesota, this same Pew Charitable Trust report paints an even more impressive picture. The rate of growth for clean energy jobs in Minnesota between 1998 and 2007 was 11.9%, which far exceeded the State's overall job growth rate of 1.9%.

[1] The Pew Charitable Trusts, The Clean Energy Economy: Repowering Jobs, Businesses, and Investments Across America, June 2009

On the other hand, the Blue Green Alliance, a national partnership of labor unions and environmental organizations dedicated to expanding the number and quality of jobs in the green economy, released a recent report that focuses specifically on manufacturing jobs related to the expansion of renewable energy. The report indicates that as many as 850,000 manufacturing jobs would be created over the next 15 years if 25% of the country's electric capacity was switched to renewables[2]. It should be noted that although clean energy is an important component of the green economy, jobs needed to support its growth are not always manufacturing jobs.

TRENDS IN GREEN BUSINESS PARK DEVELOPMENT

Commensurate with the growth in the green economy and green manufacturing has been a recent boom in the development of green manufacturing parks. The move to build green manufacturing parks has been driven by economic developers and private entities who desire to create job growth through the recruitment of energy-related companies. This desire is somewhat motivated by a combination of forces including sharp declines in manufacturing jobs, growth in the number of obsolete facilities, various political motivations, as well as public attention on the energy sector. The development boom has resulted in a large supply of green manufacturing parks and, with continued development, an anticipated oversupply in the near future. Although the earliest green manufacturing parks are generally considered successful, many of these parks are still largely vacant and in many instances not financially viable. This is due to the extremely stiff competition in recruiting the world's growing, but still very limited number of green companies, and other businesses in the energy sector.

Economic development officials have stated that every community in the country is trying to develop their abandoned industrial properties. This means that virtually every greenfield and brownfield property in the US that is visible or being actively marketed will compete with a potential green manufacturing park on the Ford site. More than 180 parks are highly-visible and estimates, according to the consultant team, are that more than 20 times this number of properties in North America (3,600) are actively being marketed to this study's target industries[3].

Existing parks offer a diverse range of choices for manufacturers including greenfields and brownfields, and various labor, transport, and other service situations. These diverse parks have a commonality in generous government support and increasingly

[2] Blue Green Alliance, Clean Energy Economy Report: How to Revitalize America's Middle Class with the Green Energy Economy, 2009

[3] Generate Companies, June 2009 study of energy-related industrial parks (completed for an unnamed economic development company)

competitive pricing in response to a flooded market. In some instances, businesses have been known to have all land costs and/or first year rents entirely subsidized[4].

State and local economic development agencies in the most successful regions have been given significant resources to aggressively market these green manufacturing parks, and to market all vacant properties to green manufacturers. Therefore, given the highly competitive environment, it is essential that the marketing of the Ford site be well coordinated, professional, and backed with significant public subsidy in order to differentiate it in the marketplace. Keep in mind, though, the Ford site compares well to other green manufacturing parks. Thus, if the economy takes a turn and green industry becomes an engine for substantial job creation, Saint Paul would be well positioned to meet this growing demand with a Green Manufacturing Park on the Ford site and perhaps elsewhere in the City.

Successful models for green manufacturing parks, such as the Naval Yard in Philadelphia or the Flagship Enterprise Center in Anderson, IN, appear to be those that accommodate a diversity of uses but have a common theme that is often industry-specific. Furthermore, the most successful parks are privately owned but often start with a public-private partnership, which transitions as the park is filled with occupants.

[4] Generate Companies, June 2009 study of energy-related industrial parks (completed for an unnamed economic development company)

Site Assessment

INTRODUCTION

A detailed assessment of the Ford Site was conducted in order to determine the costs associated with bringing the site to the marketplace as a location for green manufacturing. The assessment included a tour of the existing facilities, including the main assembly building, the warehouse building, the paint building, the steam plant, and the waste water treatment plant. Key infrastructure servicing the site was also examined, such as road and rail access to the site, capacity of nearby highways, sanitary service, water systems, and gas and electric service. Costs associated with demolition, construction, prevailing land prices, and lease rates were then considered to determine overall project costs as well as impact on the tax base. The results of the site assessment were then compared to the results of the workforce analysis and employer interviews to determine feasible options for redevelopment.

It should be noted that an environmental assessment was NOT performed as part of this assessment. It is understood that the extent of possible environmental clean up will not be known until the Ford Motor Company ceases operation; at which time a thorough analysis can be undertaken. Therefore, this study makes no assumption regarding the costs associated with potential environmental clean up.

SUMMARY OF FORD PLANT ISSUES AND ASSETS

In February 2009, the consultant team toured the Ford plant to determine the facility's issues and assets, which are summarized below.

UNIQUE ASSETS OF THE EXISTING FACILITY & SITE

1. City Water: High volume, high pressure water (2.5x the typical municipal level volume with 150 psi).[5]
2. Steam Plant: Currently used in combination with RTU forced air to supply heating. Existing operations only use one of three steam boilers.[6]
3. Wastewater Plant: Currently handles the process water from the paint building (phosphate water), not designed for human effluent.

[5] A SAC charge analysis was not performed to determine use in cap and trade.
[6] A detailed capacity analysis was not performed.

4. Electrical Distribution: Facility has primary power (own transformers). This allows for power redundancy or split usage.
5. Concrete Slab: 8" throughout the production and paint buildings.
6. Grid System: 40' x 40' grid is usable.
7. Clear Height: 20' in manufacturing areas and 30' for paint area (if mezzanine removed).
8. Natural Lighting: Opportunity for natural lighting with saw tooth roof and clearstory windows.
9. Airport Proximity: Approximately 4 miles or a 6 minute drive to MSP International Airport.
10. Rail Proximity: Opportunity for several spurs to access parts of the buildings if subdivided. Three bays of internal rail line for loading.
11. Loading Dock: 8 full drive-in, sheltered docks with air curtains and one drive-thru door.
12. Training Center: 180 seat auditorium, 12 classrooms, computer lab and robotics lab, that could function for education, training, office or conferencing. Total square feet is approximately 40,000.
13. Hydropower: Potential to direct up to 5 Megawatts of power from adjacent hydropower plant for purchase at market price.
14. Paint Building: Current building is 25 years old; useful life for a metal building is typically about 40 years. Deep steel girder system supports mezzanine, which can be removed for ceilings with a 30' clear height. Total square feet is approximately 550,000.
15. SW Warehouse addition: Building is logistically functional. Includes high bay storage area. Total square feet is approximately 250,000.

ISSUES FOR THE FACILITY

1. Multi-tenancy options: There are options for multi-tenant access to the paint building and the manufacturing building on the north side. The building wants to subdivide North to South because of the entry points and roof line, but an E/W division might be more functional.
2. Poor highway access: Logistically, it is not well located for truck access. The shortest and most likely route to access the regional freeway system has 16 stoplights: Ford Parkway to Snelling to Montreal to 7th St W to I-35E. However, there is a rail line to the plant.

NEUTRAL (HAVE NO APPARENT POSITIVE OR NEGATIVE IMPACT)

1. Gas Service: High capacity gas line. Typically provided at no cost to large customers by gas company.

2. Tunnels: An extensive network of tunnels run below the site, which were developed many years ago for the plant's earlier uses. The tunnels do not present any structural issues and have been closed to the Mississippi River.

3. Conversion of wastewater plant to handle municipal waste: For most industrial users, conversion of the wastewater plant to a municipal waste facility is not a requirement and thus would not be an issue. For the rare industrial user who would require this conversion, all 8 waste water treatment facilities (WWTF) in the metro are controlled by Metropolitan Council Environmental Services (MCES). Therefore, any conversion of the wastewater plant from industrial to municipal would need the Met Council's approval. The existing facility has 3 clarifiers where flocculant is added to settle out the contaminants. To convert to a traditional facility, the following would need to be added -- bar screen, grit removal, primary clarifier, aeration, and chlorine disinfection -- requiring 3 or 4 times the space.

SUMMARY OF DEVELOPMENT SCENARIOS

Based on information from the tour of existing facilities, four different development scenarios were considered as possible options for bringing the site to the marketplace as a green manufacturing site, which are as follows:

- Scenario 1: Demolition of All Buildings
- Scenario 2: Reuse All Buildings
- Scenario 3: Reuse Paint Building Only
- Scenario 4: Reuse "Newer" Warehouse Building Only

Cost estimates were derived for each scenario based on an assumed scope of work that takes into consideration numerous variables including existing code standards, prevailing prices for demolition and construction, and intended uses, to a name a few. The scope of work for each scenario, code standards, and costs associated with specific tasks are included in Appendices B through D. What follows are detailed descriptions of each development scenario, including highlights of the intent of each scenario along with its advantages and disadvantages.

SCENARIO 1: DEMOLITION OF ALL BUILDINGS

INTENT OF SCENARIO:

- Spatial use layout consistent with past commissioned redevelopment studies.
- Ford Parkway business redevelopment opportunities to capitalize on traffic exposure and accessibility.
- Showcase river view opportunities for residential redevelopment with an open space green boulevard corridor.
- Identifies the level of industrial use opportunities with existing and future proposed residential districts.
- Civic use opportunities involving recreational assets to benefit the adjacent residential areas.

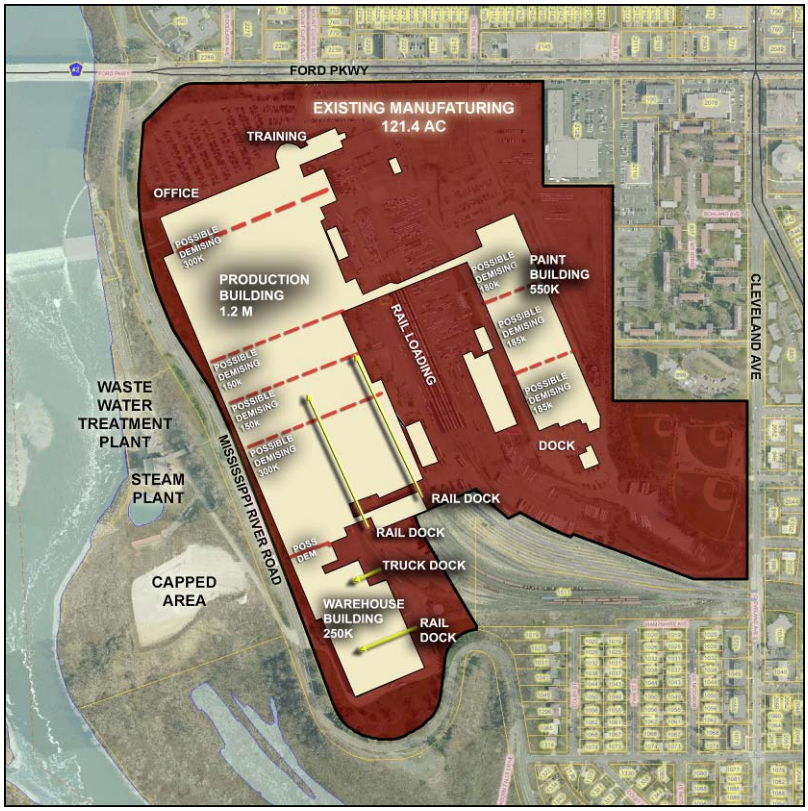
ADVANTAGES

Flexibility for different uses could generate a high tax base and purchase price for Ford and allows for a phasing schedule that can accommodate the market volatility of the various mix of uses. Future industrial buildings can be sized to accommodate build-to-suit opportunities or smaller leased spaces for green businesses, rather than attempting to re-tenant a very large manufacturing building.

DISADVANTAGES

Removes the iconic signature building of the Ford Motor Company from the neighborhood.

SCENARIO 2: REUSE ALL BUILDINGS



INTENT OF SCENARIO:

- An attempt to reuse an existing local land asset without additional redevelopment or change of operational uses as compared to current.
- Preservation of historical character of various elements of the facility, such as the Ford Parkway facade.
- Showcase the large, diverse facility spaces for future occupancy users.
- The reuse of facility in concert with the local development goals of “like” use operations and employment opportunities.

PRODUCTION BUILDING ANALYSIS

8 inch slab on grade, 40 ft x 40 ft column spacing, clear height 20 ft in old warehouse, major work required to replace wood plank decking and roofing, ESFR sprinkler systems (onsite fire pumps), two internal rail loading areas, assembly line pits would likely need to be filled in for new operations, onsite training facility, restrooms on mezzanine, elevated tunnel to paint building. A 15-year life span is assumed for watertight expectation.

ADVANTAGES

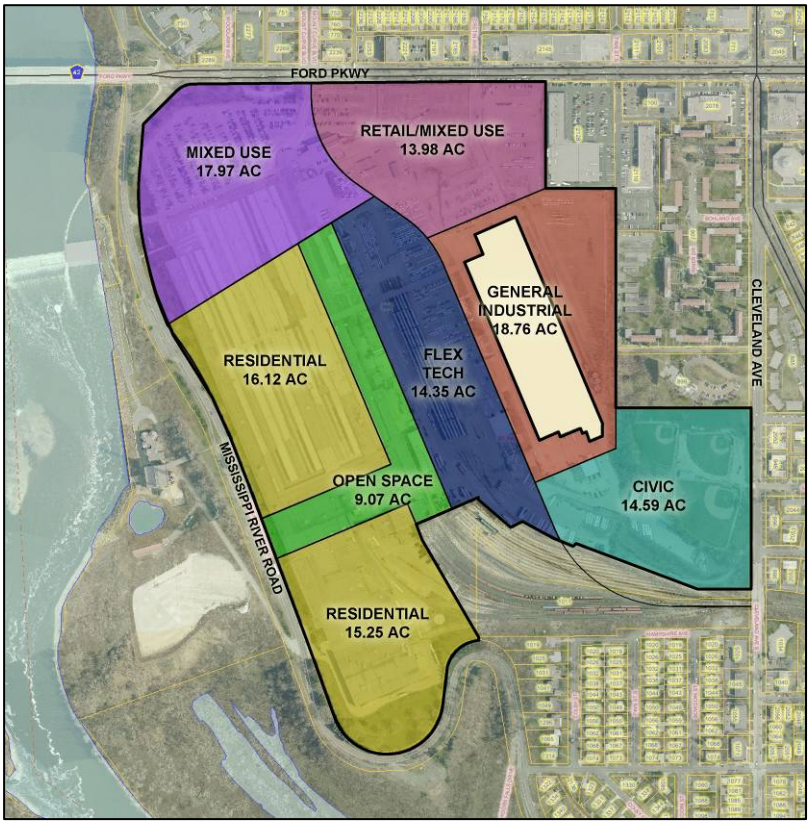
Large amount of building area and has several options for tenant space considerations. Old warehouse has natural lighting opportunities. Internal rail loading dock in old warehouse and

newer warehouse. Eight enclosed truck loading docks. Retains an iconic signature in the local area.

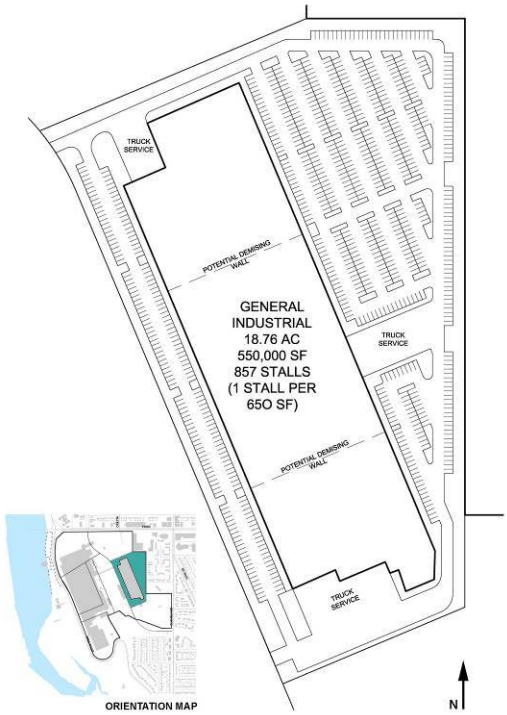
DISADVANTAGES

Two million square feet of space would be extremely difficult to occupy. Multi-tenancy options are limited due to entry locations, roof line and specific building code considerations. The rehabilitation of an existing building relies on many primary infrastructure elements of the facility that may tend towards the end of a practical life cycle benefit valuation. A higher level of maintenance effort and expense should be anticipated as compared to a newly constructed facility. Additional land use optimization may be encumbered by the existing facility. Future industrial users of existing space will likely have different vehicle traffic patterns as compared to the familiar Ford transportation influences; likely additional infrastructure burdens to be anticipate.

SCENARIO 3: REUSE PAINT BUILDING ONLY



CONCEPTUAL SITE PLAN FOR REUSE OF PAINT BUILDING



INTENT OF SCENARIO

- To reuse a component of an existing asset coupled with a new redevelopment opportunity.
- Showcase the river view opportunities for residential redevelopment with an open space green boulevard corridor.
- Create development "use" buffering between river front residential and existing Paint Building with transitional flex use developments.
- Ford Parkway business redevelopment opportunities to capitalize on traffic exposure and accessibility.
- Southern land parcel river view and balance of proposed residential density lends to a multifamily residential use with limited traffic flow exposure, such as senior housing.
- Designate proposed land tracts to support the land use buffering aspect of the existing, easterly residential and the Paint Building.

PAINT BUILDING ANALYSIS

550,000 square feet, 8 inch slab on grade, 40 ft x 40 ft column spacing, clear height potential of 30 ft, ESFR sprinkler systems (onsite fire pumps), extensive mezzanines for Ford operations, building built in the 1980's, painting waste water treated at onsite WWTP, large gas service for paint operations. A 15-year life span is assumed for watertight expectation.

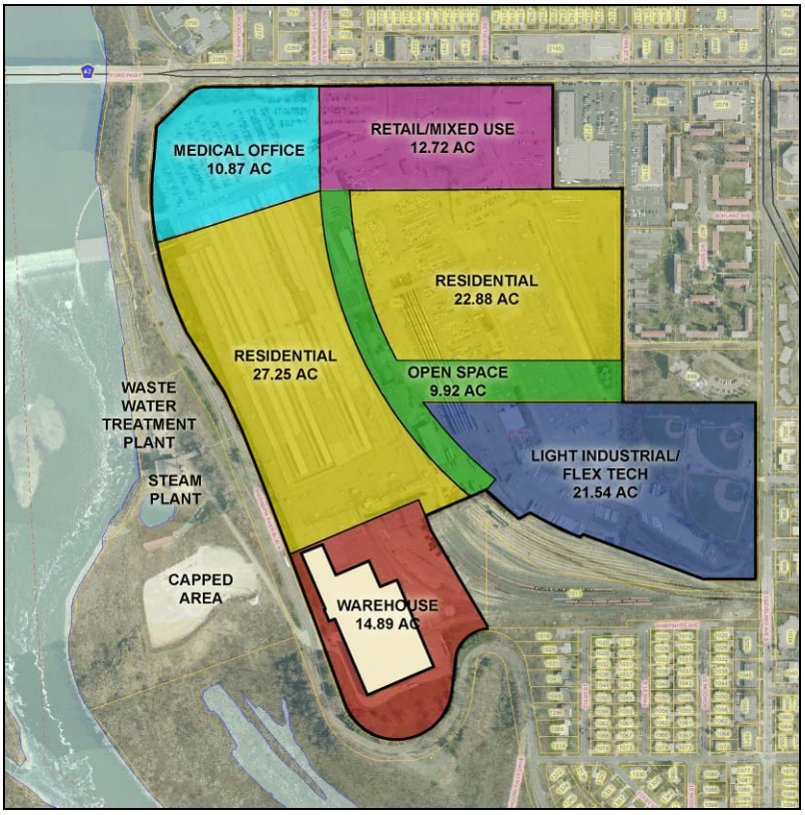
ADVANTAGES

The paint building was constructed during the 1980s and includes functional mezzanines throughout. Removing mezzanines gives the opportunity of 30’ clear height. Stout structural steel framing in the facility may provide tenant build-out flexibility and cost efficiencies. Exterior skin of facility appears in good condition to limit concerns of atypical or accelerated maintenance efforts.

DISADVANTAGES

High cost to remove internal mezzanines to afford greater space utilization efficiencies for future use. Existing mezzanines are configured specifically to current use, highly unlikely for alternate future uses. A metal skin facility eventually has a higher degree of wear and deterioration as compared to other industrial focused exterior skins, such as masonry or concrete. Achieving consensus with a wide variety of community interests groups may be challenging if redevelopment opportunities do not align with expectations.

SCENARIO 4: REUSE "NEWER" WAREHOUSE BUILDING ONLY



INTENT OF SCENARIO:

- To reuse a component of an existing asset coupled with a new redevelopment opportunity.
- Showcase river view opportunities and accessibility of various levels of residential bifurcated with an open space green boulevard corridor. A growth extension of the existing residential district.
- Ford Parkway business redevelopment opportunities to capitalize on traffic exposure and accessibility.
- Light industrial space to provide an operational and visual transition to the adjacent easterly residential districts.

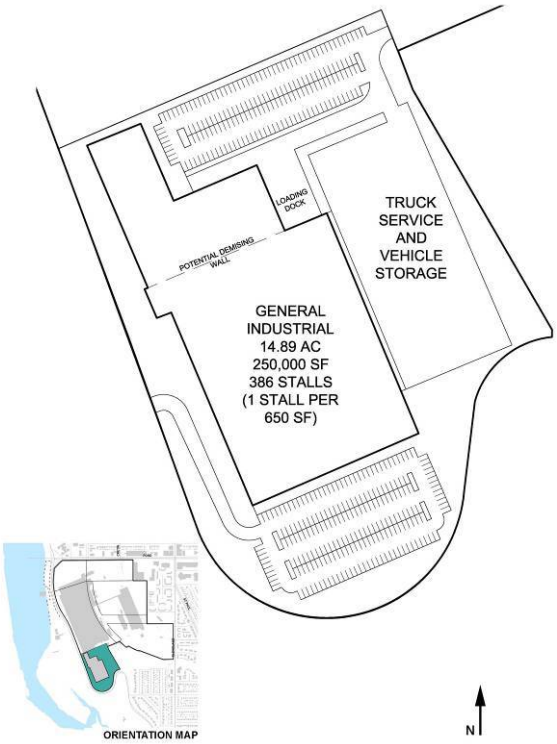
NEWER WAREHOUSE BUILDING ANALYSIS

250,000 square feet, 8 inch slab on grade, 40 ft x 40 ft column spacing, clear height 20 ft, one internal rail loading bay with two tracks, Armadillo plate around rail loading, covered drive in trailer dock areas, major roof repairs needed, mixed metal halide / high pressure sodium high bay fixtures, ESFR sprinkler systems (onsite fire pumps), automatic-retrieval / automatic-storage automation capabilities, no office space, no restrooms. A 15-year life span is assumed for watertight expectation.

ADVANTAGES

New warehouse is in decent condition and provides an internal rail connection. Also has good clear height for typical warehouse space.

CONCEPTUAL SITE PLAN FOR REUSE OF "NEWER" WAREHOUSE BUILDING



Several truck drive in dock doors providing shelter. Internal rail loading dock area.

DISADVANTAGES

The existing footprint is not ideal for total floor area utilization; areas will likely be kept dark or under-utilized. The facility's greatest value is dependent on existing available rail service. If demand for rail service is not high enough to support retention of the line, loss of the rail greatly diminishes facility use value and may require higher construction costs to modify structure for other uses.

SUMMARY OF COST ESTIMATES

Table 1 displays a summary of the cost estimates for bringing the Ford site to the marketplace as a location for green manufacturing. In addition to the four development scenarios, the table also includes an example of a suburban and rural greenfield site for comparative purposes. Consideration was given to comparing the Ford site to a comparable site located in another major metropolitan area. However, due to the wide array of variables that affect development costs from state to state, such as utility rates, labor costs, and local land use regulations, it was too difficult to create a meaningful comparison.

The top half of the table provides information on demolition and rehabilitation costs. The bottom half of the table indicates the cost per square foot for construction, as well as assumptions for tenant build-out, land, and soft costs. The final line shows the lease rate needed to make the development feasible. According to Table 1, therefore, the lease rates needed for the three reuse scenarios are very competitive with a suburban or rural site. It should be noted, however, that the environmental costs are not included because it is assumed Ford would clean the site to an industrial standard. This is assumption is made because if Ford were to sell the land without cleaning it to an industrial standard, it is likely they would need to reduce the selling price to reflect such costs.

TABLE 1: SUMMARY OF COST ESTIMATES

	Scenario 1 Total Demo	Scenario 2 Total Reuse	Scenario 3 Paint Building	Scenario 4 Warehouse	Comparable Suburban Site	Comparable Rural Site
Environmental	*Included in land price*	*Included in land price*	*Included in land price*	*Included in land price*	--	--
Demolition Costs	$8,159,579	$742,003	$5,359,971	$5,894,221	--	--
Rehabilitation Costs	Included Above	$17,582,649	$5,818,469	$2,682,472	--	--
Total Construction	$8,159,579	$18,324,652	$11,178,440	$8,576,693	--	--
Facility SF of Scenario	2,000,000	2,000,000	550,000	250,000	N/A	N/A
Cost per SF	N/A*	$9.16	$10.58	$10.73	$35	$35
Tenant Build-out	N/A*	$25	$25	$25	$25	$25
Land	N/A*	$8	$8	$8	$14	$10
Soft Costs	N/A*	$12	$10	$10	$10	$10
Total Development Cost	**N/A***	**$54**	**$53**	**$54**	**$84**	**$80**
Lease Constant	N/A*	11%	9.5%	9.5%	8.00%	8.00%
Lease Rate	**N/A***	**$5.95**	**$5.06**	**$5.08**	**$6.72**	**$6.40**

Source: Ryan Companies

* It is assumed that a total razing of the Ford site for purposes of redevelopment would include other non-industrial uses. Because of the mixing of uses, the comparison of build-out costs to the other development scenarios as well as the comparable suburban and rural sites would be like comparing apples to oranges and may be potentially misleading.

Comparing the findings from Table 1 to Table 2, which lists market rents for industrial space, it is evident that the rents needed to make the Ford site reuse scenarios feasible are within the going rate for older industrial buildings. This suggests that there would be incentive from developers to redevelop some or all of the existing

buildings, provided appropriate tenants can be found to occupy the space.

TABLE 2: MARKET RENTS FOR INDUSTRIAL SPACE

Building Clear Height	Industrial Rents (Older Building)			Industrial Rents (New Building)		
	St Paul/Mpls	Suburbs	Rural	St Paul/Mpls	Suburbs	Rural
14'	$4.00-$5.50	$4.00-$6.00	$3.50-$5.00	$6.00-$8.50	$6.00-$8.50	$4.50-$7.00
24'	$4.50-$5.50	$4.50-$6.50	$3.50-$5.50	$6.00-$8.50	$6.00-$8.50	$4.50-$7.00

Source: Ryan Companies

JOBS AND TAX BASE ANALYSIS

To help the City of Saint Paul to best understand the potential impact of a manufacturing reuse of the Ford site, the consultant team prepared a brief analysis of the possible jobs that could be accommodated on the site for each development scenario as well as the amount of tax base that would be created at full build out. The findings of this analysis are presented in Table 3.

TABLE 3: JOBS AND TAX BASE ANALYSIS

	Scenario 1: Demolish All Buildings and Rebuild	Scenario 2: Reuse All Buildings	Scenario 3: Reuse Paint Building	Scenario 4: Re-use "Newer" Warehouse Building
OFFICE USES				
Acres	12	0	17.1	10.9
Bldg SF	260,000	0	250,000	150,000
Jobs	780	0	750	450
Tax Base	$36,400,000	$0	$35,000,000	$21,000,000
INDUSTRIAL/FLEX USES				
Acres	34.8	121.4	33.1	36.4
Bldg SF	686,000	1,220,000	675,000	550,000
Jobs	1,029	1,830	1,013	825
Tax Base	$54,880,000	$97,600,000	$54,000,000	$44,000,000
MIXED USE/RETAIL USES				
Acres	11.6	0	15.8	12.7
Bldg SF	194,000	0	135,000	125,000
Jobs	504	0	351	325
Tax Base	$21,340,000	$0	$14,850,000	$13,750,000
NON-COMMERCIAL USES				
Civic (acres)	13.8	0	15.4	0
Open Space (acres)	11.9	0	9.0	9.9
Residential (acres)	36.0	0	31.4	50.1
SUMMARY of ALL USES				
Total Acres	120.0	121.4	121.7	120.1
Total Jobs	2,313	1,830	2,114	1,600
Total Tax Base	$112,620,000	$97,600,000	$103,850,000	$78,750,000

Source: Ryan Companies

Notes:
(1) Office job density estimated at 1 job per 300 gross square feet of building
(2) Retail job density estimated 2.6 jobs per 1,000 gross square feet of building.
(3) Light industrial job density estimated at 1.5 jobs per 1,000 gross square feet of bldg.
(4) Office tax base value estimated at $140 per SF
(5) Retail tax base value estimated at $110 per SF
(6) Light Industrial tax base value estimated at $80 per SF

FINDINGS

According to Table 3, Scenario 1, in which all the existing buildings would be demolished and replaced with a mix of commercial, residential, and industrial buildings, yields the greatest number of jobs and the largest tax base. However, under Scenario 1, less than half of the total jobs would be manufacturing jobs. Scenario 3, which reuses the paint building, has a similar profile to Scenario 1 with over 2,100 new jobs and a tax base in excess of $100,000,000. Scenario 2, which reuses all of the site's existing buildings, would generate 1,800 jobs and have a tax base just below $98,000,000. Scenario 4 generates the fewest jobs and tax base because it reuses only 250,000 square feet of the existing facilities and somewhat constrains the development of new industrial or commercial space.

Workforce Analysis

INTRODUCTION

In evaluating the five target industries from a workforce perspective, the consulting team was charged with evaluating the alignment between the incumbent workforce and the prospective industries, and identifying the potential for retraining. Kyle Uphoff, Regional Analysis and Outreach Manager with the Minnesota Department of Employment and Economic Development (DEED) provided an analysis of the occupations and skills of the existing workforce and five prospective industries based on the industry classification (NAICS code); the typical staffing matrix for that industry group; and ONET – a clearinghouse of occupations and the knowledge, skills and abilities related to those occupations. This information served as a foundation for discussions with representatives of the five prospective industries, who provided greater insight into staffing patterns, skills, issues and priorities.

This section is organized as follows:

- Ford workforce in Saint Paul
- On-site Minnesota State Colleges and Universities (MNSCU) training facility
- Targeted industry workforce needs and alignment with current Ford workforce

EXISTING WORKFORCE

At its peak, Ford employed 2,000 people. During the spring of 2009, the company reportedly employed approximately 800 people, with periodic plant shutdowns due to low volume sales in the automotive sector.

Detailed information regarding the existing workforce is not available due to state data confidentiality regulations.

The Ford operation in Saint Paul is devoted to production and supported by related shipping, maintenance and repair functions. Sales, design, engineering and management functions are located elsewhere.

The list of the top fifteen occupations at Ford's Saint Paul operation was developed by DEED and serves as the basis for analyzing the alignment between current staffing patterns at Ford and the five prospective industries. Information on the occupations and related ONET information was used to explore retraining potential.

Ford Plant
Top Fifteen Occupations
(In order of largest number of employees)

- Team Assemblers
- Engine & Other Machine Assemblers
- Electricians
- First-Line Supervisors/Managers of Production & Operating Workers
- Millwrights
- Painters, Transportation Equipment
- Automotive Body & Related Repairers
- First-Line Supervisors/Managers of Mechanics, Installers, & Repairers
- Welders, Cutters, & Welder Fitters
- Tool & Die Makers
- Tank Car, Truck, & Ship Loaders
- Inspectors, Testers, Sorters, Samplers, & Weighers
- Pipe Fitters & Steamfitters
- General Maintenance & Repair Workers
- Cleaners of Vehicles & Equipment

Source: MN DEED

UAW – FORD - MNSCU TRAINING FACILITY

The main entrance to the 40,000 square foot training facility adjoins and is accessed through the main entrance to the Ford plant. Built in 1997, the Robotics and Technical Training Facility was funded by the State of Minnesota to provide Ford employees and MNSCU students with training and education programs on the use of robotics methods in manufacturing, and with training and education programs in other subjects. It is governed by a board consisting of representatives of the Minnesota Department of Administration, MNSCU, Ford Motor Company and UAW Local 879.

The building was paid for by a $5 million appropriation from the State of MN. Ford contributed a $1.6 million match, providing fixtures, machinery and equipment for the facility, including the following:

- Robotics laboratory
- Apprenticeship trades refresher training equipment (pneumatic, hydraulic, mechanical, and electrical)
- Toolmaker machine shop
- Welding shop
- Woodworking shop
- Millwork shop
- Forklift repair training
- Metal finish and paint repair shop,
- Engine repair, powertrain and vehicle electrical troubleshooting,

- Classrooms, offices, multi-media center, 180-seat auditorium, computers, monitors, printers, interactive learning materials, and software.

The facilities are maintained by Ford employees and the UAW. Saint Paul College provides an instructor in the multi-media area and maintains the computers. Dislocated worker counseling, apprenticeship training and certification of trades are available on-site.

Two documents – a 25-year Ground Lease, and a 25-year Use and Management Agreement between Ford and the State of Minnesota were signed on February 13, 1997. Key provisions include:

- Repayment of the $5 million cost of the building over the 25-year term of the ground lease;
- The option for Ford to terminate the lease at any time with repayment of the balance of the cost of the $5 million facility in accordance with this formula - $5 million x (number of months remaining/300);
- A requirement for Board consent for any customized training by MnSCU intended primarily for current employees of Ford competitors or suppliers in the automotive manufacturing industry;
- A provision giving MnSCU the right to access and use the laboratories and high technology equipment at least 20% of "prime time" for educational purposes.

WORKFORCE OCCUPATIONS FOR TARGETED GREEN INDUSTRIES

ELECTRIC VEHICLE MANUFACTURING

Of the five targeted green industries, electric vehicle manufacturing shows the greatest compatibility with workforce skills of current Ford employees.

Depending upon the size of the operation and a company's approach to manufacturing/assembly, there may be an undersupply of workers with CNC machining experience.

It is likely that a hybrid electric vehicle facility would not be devoted exclusively to production and would require more highly trained, industrial engineers with design experience. Interviews with hybrid electric vehicle manufacturers revealed that they place a high degree of importance on industrial engineers.

There is a trend among manufacturers to create greater proximity, communication and teamwork between design, engineering and production. Smaller, emerging operations with new technology are less likely to separate these functions than more mature companies with numerous facilities devoted exclusively to production. Because Ford does not house design and engineering functions here in the Twin Cities, there is likely to be an undersupply of industrial engineers with automotive experience who would need to be attracted to the area.

Electric Vehicle Manufacturing
Top Fifteen Occupations
(In order of largest number of employees)

- **Team Assemblers**
- ***Welders, Cutters, Solderers, & Brazers***
- **Inspectors, Testers, Sorters, Samplers, & Weighers**
- Helpers--Production Workers
- **Supervisors of Production & Operating Workers**
- **Painters, Transportation Equipment**
- Structural Metal Fabricators & Fitters
- Sales Representatives, Wholesale & Manufacturing
- ***Hand Laborers & Freight, Stock, & Material Movers***
- Lathe & Turning Machine Tool Setters, Operators, & Tenders
- Metal & Plastic Cutting, Punching, & Press Machine Setters, Operators, & Tenders
- Shipping, Receiving, & Traffic Clerks
- Truck Drivers, Heavy & Tractor-Trailer
- Industrial Engineers
- Stock Clerks & Order Fillers

Source: MN DEED

Bold = Same as an existing "top 15" occupation at Ford
Italic and Bold =High potential for retraining of Ford workers based on ONET skills

WIND COMPONENT MANUFACTURING

Wind component manufacturers use a team approach to metal fabrication and assembly of relatively large components. This aligns well with the occupations of existing Ford employees.

Many wind component manufacturers are likely to structure operations differently than a very large corporation like Ford. An operation in Saint Paul would likely involve at least regional sales and possibly general operations management in addition to production.

Because wind components are very large, shipping logistics are typically complex. Interviews revealed the critical nature of highly skilled shipping and receiving personnel for this industry.

Wind Component Manufacturing
Top Fifteen Occupations
(In order of largest number of employees)

- **Team Assemblers**
- Metal & Plastic Cutting, Punching, & Press Machine Setters, Operators, & Tenders
- Machinists
- ***Welders, Cutters, Solderers, & Brazers***
- Plating & Coating Machine Setters, Operators, & Tenders
- Computer-Controlled Machine Tool Operators, Metal & Plastic
- **Supervisors of Production & Operating Workers**
- Metal & Plastic Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders
- Helpers--Production Workers
- **Tool & Die Makers**
- General & Operations Managers
- ***Hand Laborers & Freight, Stock, & Material Movers***
- **Inspectors, Testers, Sorters, Samplers, & Weighers**
- Shipping, Receiving, & Traffic Clerks
- Sales Representatives, Wholesale & Manufacturing

Source: MN DEED

Bold = Same as an existing "top 15" occupation at Ford
Italic and Bold =High potential for retraining of Ford workers based on ONET skills

SENSORS AND MONITORING EQUIPMENT MANUFACTURING

Manufacturers of sensors and monitoring equipment need highly skilled workers including electrical, mechanical, structural, and industrial engineers, master plumbers, master electricians, and project managers. They also have a significant appetite for workers skilled in electrical and electronic equipment assembly, electromechanical equipment assembly as well as electrical and electronic engineering technicians.

Based on an analysis of critical skills associated with various occupations, some employees - particularly those in automotive body and engine and other machine assembly - appear to be well suited for retraining in electrical and electronic equipment assembly and electromechanical equipment assembly.

One HR professional indicated that although they need a larger number of production workers, the ability to attract a smaller contingent of young engineers is more critical. The company is located in third/fourth ring suburb and prefers to hire engineering and technical talent right out of college. While the suburban location is attractive to families raising children, it is very challenging to recruit young management, engineering, professional and technical personnel right out of college. The HR professional felt the urban location of the Ford plant would be a competitive advantage to employers seeking young well educated workers as well as the production workforce.

Sensors & Monitoring Equipment
Top Fifteen Occupations
(In order of largest number of employees)

- ***Electrical and Electronic Equipment Assemblers***
- **Team Assemblers**
- Coil Winders, Tapers, and Finishers
- Electrical and Electronic Engineering Technicians
- Industrial Engineers
- Electrical Engineers
- Computer Software Engineers, Applications
- Mechanical Engineers
- Shipping, Receiving, and Traffic Clerks
- Mechanical Engineering Technicians
- **Supervisors of Production and Operating Workers**
- **Inspectors, Testers, Sorters, Samplers, and Weighers**
- Engineering Managers
- ***Electromechanical Equipment Assemblers***
- Purchasing Agents

Source: MN DEED

Bold = Same as an existing "top 15" occupation at Ford
Italic and Bold =High potential for retraining of Ford workers based on ONET skills

HVAC Controls Manufacturing

The top four occupations associated with HVAC controls (by number of employees) align well with the skills of the existing ford workforce, or show high potential for retraining of Ford workers. Interviews indicate that both Sensors and Monitoring Equipment and HVAC Controls Manufacturers place a great deal of emphasis on the ability to successfully recruit for high skill professions especially electrical engineers and purchasing agents. Mechanical and industrial engineers, electrical and electronic engineering technicians are also important occupations in this industry.

Depending upon the operation, cutting, punching and press machine operators, welders and solders may be a significant component of the workforce.

Similar to Sensors and Monitoring Equipment manufacturing, employees - particularly those in automotive body and engine and other machine assembly - appear to be well suited for retraining in electrical and electronic equipment assembly and electromechanical equipment assembly.

The location of the Ford Plant may be attractive to an employer seeking to attract both a production workforce and young engineering talent that is difficult to attract to many suburban settings.

HVAC Controls Manufacturing
Top Fifteen Occupations
(In order of largest number of employees)

- **Team Assemblers**
- ***Electrical & Electronic Equipment Assemblers***
- ***Welders, Cutters, Solderers, & Brazers***
- ***Electromechanical Equipment Assemblers***
- Coil Winders, Tapers, & Finishers
- Electrical & Electronic Engineering Technicians
- **Supervisors of Production & Operating Workers**
- Mechanical Engineers
- Metal & Plastic Cutting, Punching, & Press Machine Setters, Operators, & Tenders
- Computer Software Engineers, Applications
- Electrical Engineers
- Purchasing Agents
- **Inspectors, Testers, Sorters, Samplers, & Weighers**
- Industrial Engineers
- Shipping, Receiving, & Traffic Clerks

Source: MN DEED

Bold = Same as an existing "top 15" occupation at Ford
Italic and Bold =High potential for retraining of Ford workers based on ONET skills

BIOFUELS COMPONENTS MANUFACTURING

Team assembly is used by both the biofuels component industry and the automotive industry. However, the biofuels components manufacturing sector typically involves a greater concentration of skilled metal fabrication personnel including welders, machinists, plating and coating personnel, and CNC tool operators.

Most biofuel components companies maintain a more diversified staffing pattern than exists at Ford's production-focused operation in Saint Paul. Non-production occupations that are important include general and operations management, mechanical engineers, and sales.

The workforce issue of greatest concern to a prospective company is likely to be the need for stainless steel welders. Many biofuel components are made of stainless steel – and welding the material is a highly skilled specialty that is not easy to learn and not likely to be addressed through a retraining program according to officials at DEED.

In addition, most biofuel components are sold to companies in rural areas located near agricultural and forest products. Many of the Midwestern companies that currently do stainless steel welding for the biofuels industry started up and grew in rural areas, where they fabricated stainless steel tanks and components for dairy farmers, truckers, and food processors. It may be difficult to compete against a location with a lower cost rural workforce, particularly a workforce with stainless steel welding capabilities.

Biofuels Components Manufacturing
Top Fifteen Occupations
(In order of largest number of employees)

- **Team Assemblers**
- Welders, Cutters, Solderers, & Brazers
- **Machinists**
- Plating & Coating Machine Setters, Operators, & Tenders
- **Supervisors of Production & Operating Workers**
- Metal & Plastic Computer-Controlled Machine Tool Operators
- Metal & Plastic Cutting, Punching, & Press Machine Setters, Operators, & Tenders
- Industrial Machinery Mechanics
- Mechanical Engineers
- **Inspectors, Testers, Sorters, Samplers, & Weighers**
- General & Operations Managers
- Sales Representatives, Wholesale & Manufacturing
- Metal & Plastic Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders
- Helpers--Production Workers
- Shipping, Receiving, & Traffic Clerks

Source: MN DEED

Bold = Same as an existing "top 15" occupation at Ford
Italic and Bold =High potential for retraining of Ford workers based on ONET skills

FINDINGS

Electric Vehicle Manufacturing and HVAC Controls Manufacturing demonstrate the greatest alignment with the skills of existing Ford employees.

- Five of the top six occupations in Electric Vehicle Manufacturing align with the occupations of existing Ford workers or demonstrate high potential for retraining, based on an analysis of skills associated with existing occupations at the Ford plant.

- The four top occupations in HVAC Controls Manufacturing align well with existing occupations at the Ford plant, or show strong retraining potential based on existing workforce skills.

Certain occupations typically showed strong alignment or retraining potential:

- Team assemblers
- Supervisors
- Inspectors
- Electrical and Electronic Equipment Assemblers
- Welders, Cutters, Solderers, and Brazers
- Electromechanical Equipment Assemblers

Ford's "production only" staffing pattern seems unlikely to continue for several reasons:

- There is a trend among manufacturers to create greater proximity, communication and teamwork between design, engineering and production.

- Smaller, emerging operations with new technology are less likely to separate these functions than more mature companies with facilities devoted exclusively to production.

- Most of the green companies interviewed maintained a more diversified staffing pattern than exists at Ford's production-focused operation. Non-production occupations that are important include general and operations management, engineering and sales.

- Reuse of the site for multiple tenants is a more realistic scenario for absorption of such a large volume of space. Multiple tenants are also likely to create a more diversified staffing pattern.

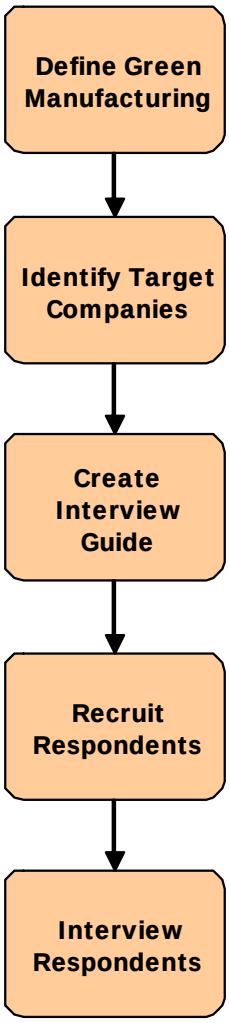
- The location of the Ford plant is likely to be attractive to employers seeking to attract both a production workforce and young engineering talent that is difficult to attract to many suburban settings.

Market Survey

INTRODUCTION

Successful real estate developments are predicated on two things: 1) an appropriate site that fits the intended use; and 2) excess demand from the marketplace for the site's intended use. Measuring demand, however, is difficult to do since green manufacturers are only just beginning to emerge in large enough numbers to be reflected in quantifiable data, such as the statistics compiled by the Bureau of Labor Statistics. Furthermore, traditional statistics that track manufacturing trends often miss some of the nuances surrounding company needs when it comes to siting a facility, reusing an existing structure, or utilizing a local workforce. Therefore, the Consultant team conducted a qualitative analysis of market demand through a series of in-depth interviews with companies that manufacture green products. These interviews led to a better understanding of what green manufacturers are demanding in the marketplace with respect to where to locate, site needs, facility needs, and workforce needs. The results of the interviews were then integrated with an assessment of the Ford Site and the available workforce to determine the feasibility of reusing the site for a manufacturing purpose.

INTERVIEW PROCESS DIAGRAM



SURVEY METHODOLOGY

This section explains the method by which the consultant team identified the pool of potential respondents, recruited respondents, and conducted interviews.

STEP 1: DEFINING GREEN MANUFACTURING

Green manufacturing is a relatively new term that remains open to wide interpretation. In a recent study prepared for the Minnesota Green Jobs Task Force, green products were defined as industries related to the manufacture of products that reduce environmental impact and improve the use of resources such as energy efficiency, water conservation, and materials use and re-use. Although this is a very useful definition, for purposes of identifying individual businesses appropriate for in-depth interviews, it is too broad and would be somewhat cumbersome as a guide. Therefore, in order to focus the research, the consultant team relied on input from the City of Saint Paul, which used the results of a study prepared for the Mayors' Initiative on Green Manufacturing. The study identified several green product types which would be highly desirable because of their forecasted growth, high wages, and density of employment. Added to this list were product types that appear well suited to the site itself. The list of product types is as follows:

- Hybrid or electric vehicles and their component parts
- Windmill generators and their component parts
- HVAC controls
- Sensors and monitoring systems
- Bio-fuel processing systems

Step 2: Recruitment of Respondents

The consultant team worked with the City of Saint Paul and the Saint Paul Port Authority to build a list of companies that are known to manufacture products in the targeted green industries. The list served as a basis from which to recruit interview respondents.

Other factors considered in recruitment were company location and size. Recruitment was focused toward firms located in Minnesota or the Upper Midwest because expansion often occurs regionally before occurring nationally or internationally. Despite this focus, geography was not considered a deciding factor in every case because some industries are new enough or have a sufficiently dispersed market that they have yet to expand any type of operation into the state or even the region.

Regarding company size, both large and small firms were sampled. Because many green products have only recently transitioned from R&D into production, the size of the firm often dictates the awareness of manufacturing needs. Small firms, though clearly focused on a green product, often lack the institutional experience to accurately estimate future site, facility, and workforce needs related to expansion. Large firms, on the other hand, have the institutional experience to estimate such needs, but often have a wide array of product lines that include green products as well as non-green products. Therefore, from a manufacturing needs standpoint, it is often difficult to discern the exact manufacturing needs related to a green product because of shared resources.

The primary means of recruitment was via phone and email. In order to improve response rates, a letter signed by Mayor Chris Coleman explaining the purpose of the study was forwarded to potential respondents. Senior company officials or those familiar with the company's manufacturing needs were recruited.

A total of 2,500 firms were profiled as part of the study. Based on the type of products manufactured, company location, and company size, 349 firms were prioritized and, of those, 74 were contacted. Among the 74 contacted firms, 15 agreed to participate in the study, though only 13 completed interviews, and 59 declined or did not respond to the request.

The resistance to participate in the study on the part of businesses is indicative of the stiff competition for job creation between states and countries. Green businesses of all types are currently being

Recruitment Statistics

Firms Profiled	2,500
Researched & Prioritized	349
Contacted	74
Accepted	15
Interviewed	13
Declined/No Response	59

Letter From Mayor's Office Requesting Participation in the Study

CITY OF SAINT PAUL
Mayor Christopher B. Coleman

March 12, 2009

Dear Green Manufacturer:

The City of Saint Paul, Minnesota requests your participation in a research study that will help determine the economic viability of reusing the Ford manufacturing operation, which is slated to close in 2011, as a location for manufacturing "green" products.

In 2007, the City of Saint Paul completed a community planning effort to consider a wide range of possible reuses for the Ford site. One possible use was to attract new manufacturing to all or part of the site by leveraging the site's many assets in the emerging "green" economy.

Although the site's many assets seem compelling, the City of Saint Paul is trying to better understand what type of "green" product manufacturers might be a strong fit for the site, based on their site and workforce needs. Your responses will help us to gauge the viability of reusing the Ford site and reengaging Ford workers.

We recognize the importance of confidentiality and assure you that any findings will be reported in aggregate and not be identified with your organization. To help protect your privacy and achieve a high level of objectivity, the City of Saint Paul hired a team of consultants to collect and analyze your responses. The team is led by Jay Demma of Bonestroo and includes professionals from Ryan Companies, Generate Companies, and Economic Development Services.

With your concurrence, a member of our consultant team will contact you about setting up a time at your convenience to conduct an interview.

We greatly appreciate your cooperation. By better understanding the needs of businesses such as yours, we will be prepared to realistically evaluate the reuse opportunities for our industrial properties and prepare strategies to attract great companies and employers to our vibrant City. If you wish to speak with someone at the City of Saint Paul regarding this study, you may direct your questions to Merritt Clapp-Smith in the Department of Planning and Economic Development. Merritt can be reached directly at 651-266-6547.

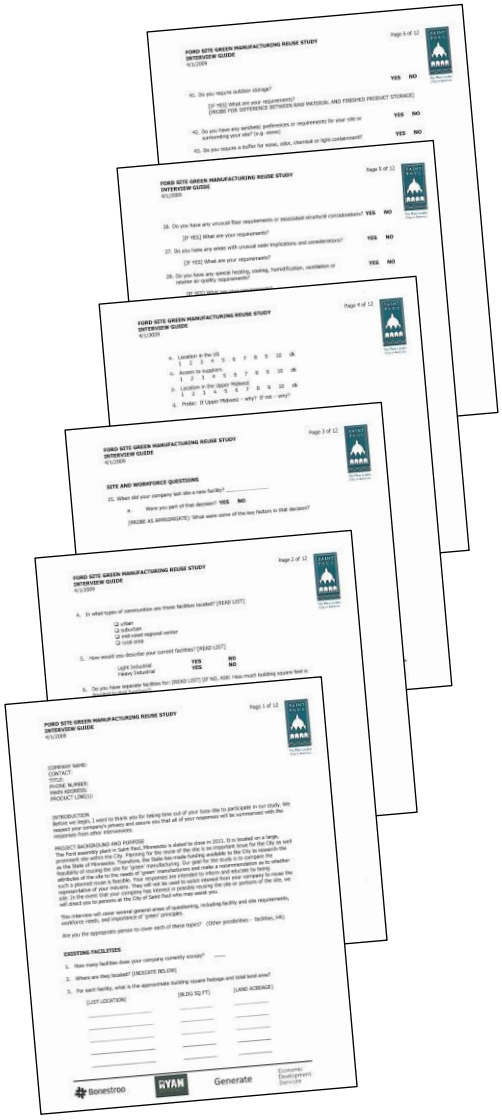
Thank you for your consideration.

Sincerely,

Christopher B. Coleman
Mayor

flooded by propositions from real estate brokers, economic development agencies, and private firms that are marketing these sites. The Midwest region alone has more than 180 highly visible green manufacturing parks and other sites as found in a survey conducted by members of the consultant team in early 2009.

PAGES FROM THE QUESTIONNAIRE



STEP 3: CONDUCTING THE INTERVIEWS

The interviews were conducted via phone or in-person by a member of the consultant team. A survey instrument was prepared that included questions concerning the company's manufacturing needs related to location, facility design, and workforce.

The survey instrument consists of approximately 55 questions with a mixture of both closed and open ended questions. The average time to complete an interview was approximately 45 minutes. In several instances, though, respondents did not have enough time to complete the entire interview. In these instances, an abbreviated survey was conducted with approximately one-half the number of questions. In such cases, every attempt was made to maintain consistency in the types of questions asked. However, due to differing product types and the qualitative nature of the interview, some discrepancies occurred.

The survey instrument along with a detailed summary of responses is included in the Appendix.

SURVEY RESPONDENTS

ELECTRIC VEHICLES AND COMPONENTS MANUFACTURERS

- Phillips and Temro Industries
- Entegris
- Two companies that manufacture electric vehicles elected to remain anonymous

WIND COMPONENT MANUFACTURERS

- Amaris Ventures
- Entegrity Wind Systems

HVAC CONTROLS MANUFACTURERS

- Entegris
- One company that manufactures HVAC control systems elected to remain anonymous

SENSORS AND MONITORING SYSTEMS MANUFACTURERS

- One company that manufactures sensors and monitoring systems elected to remain anonymous

BIOFUELS COMPONENTS MANUFACTURERS

- Novus Energy

OTHER GREEN MANUFACTURERS

- tenKsolar (solar)
- Novan Solar (solar)
- Bellcomb (wall panels)

KEY FINDINGS

The in-depth nature of the interview provided ample opportunity to collect detailed information regarding a manufacturer's site and facility needs. The following are key findings from the interviews:

"The site is clearly too large for any purpose we might have."

- Respondents generally require some space at their manufacturing facilities for purposes other than production, such as administrative offices, R&D, or training. This differs from the existing Ford facility, which is overwhelmingly devoted to production, except for the MnSCU training facility.

- The structural and infrastructure needs of the respondents, regardless of their industry, would not be considered exceptional and typically match most industrial space that is available in the marketplace. For example, few respondents, if any, noted any special demands or needs with respect to electrical loads, gas pressure, or water treatment. The only exceptions are firms involved in vehicle assembly, which often require an amount of space well beyond the needs of most other manufacturers.

"If the site were located in California, it would be a 9. But location is everything, so its overall rank is a 1." [1 is lowest, 10 is highest]

- Most respondents consider an eco or energy park to be favorable, but stopped short of claiming it to be desirable. For firms that manufacture a product that is part of a supply chain, such as vehicle parts, the benefits of being located in an energy park were related to having complementary suppliers be located there as well. In such instances, money could be saved on shipping and possibly R&D. For other firms, in which their branding was tied to consumer perception of them being a 'green' company, then being located in an energy park had some potential benefit, but not substantial. For firms outside of a supply chain that do not sell a product direct to consumers, then the benefits of an energy park were considered negligible.

"It is too large for us - don't need paint room; might be interested in smaller part of large facility. State incentives are really important. Inexpensive batteries need to bring cost down - obstacle to commercialization - therefore need government support."

- Truck traffic is substantial for many respondents. Vehicle assembly firms tend to have the greatest volume of truck traffic at nearly 150 trucks per week. However, other respondents could have significant truck traffic as well with responses varying from 20 to 100 per week. Overall, the average truck traffic is estimated at 85 to 90 trucks per week or 16 to 18 per day.

- When asked whether it would be beneficial to be located on a site that could be marketed as being green, two-thirds of respondents said that it would be beneficial. However, several respondents cautiously noted that although they want their

customers to see their company as green, locating on a green site is not essential. Several others, though, who market their product directly to consumers, felt that being on a green site was very important because it was part of their brand and showed their commitment to green principles. For the other one-third of respondents who felt it was not important, comments fell into one of two categories. For some, it is not important because their customers are scattered all over and would not have any particular interest in the greenness of their location as long as their product is green. For others, they have not felt the push from their customers for them to be at a green site. In other words, their clients have not indicated a willingness to pay a premium for their green product if it were manufactured on a green site.

Although the survey was qualitative in nature, important themes became evident that did not correspond to the targeted industries. Company attributes, such as its age or its location along a supply chain, reveal a great deal about how a green manufacturer approaches the siting of a new facility. Figure 4 depicts how these attributes can affect location decisions.

FIGURE 4: MANUFACTURER ATTRIBUTES AND SITE NEEDS

Critical Attribute of Manufacturer ➡	**Country of Origin**		**Product Weight**	
	Domestic	**Foreign**	**Heavy**	**Light**
Primary characteristic(s) that defines site and facility needs ➡	Expansion plans are tied to rapidly growing markets and cheap, low skilled labor (i.e., southern US, southwest US, or China). Smaller privately owned companies may be heavily influenced by owner preferences.	Expansion plans are tied to location of resources, access to skilled workforce, and culture consistent with HQ country.	Desire large spaces, tall ceilings, and rail access; require consistent truck and/or rail traffic.	Desire flexible spaces

Critical Attribute of Manufacturer ➡	**Age of Organization**		**Location on Supply Chain**	
	Established	**Start-Up**	**Direct to Consumer**	**Supplier**
Primary characteristic(s) that defines site and facility needs ➡	Desire to leverage existing economies of scale among proven manufacturing techniques; corporate culture is more entrenched and harder to commit to 'green' initiatives.	Very little space needed in near-term future; corporate mission is highly associated with 'green' initiatives; status as a credit worthy tenant and access to financing likely to be a challenge.	Green initiatives are integral to the corporate brand.	Green initiatives are secondary. Often dependent on location of complementary suppliers.

Conclusions

In determining the feasibility of reusing the Ford site for green manufacturing purposes, the consultant team evaluated the costs associated with four development scenarios, the benefits associated with the available workforce, and the detailed site, facility, and workforce needs of green manufacturers in select industries. This section reviews key findings and conclusions from each of these three areas of research and then analyzes the relationship among the findings to determine which options are most feasible.

SITE ASSESSMENT

Each of the four development scenarios, not surprisingly, has various strengths and weaknesses relating to cost, ability to leverage marketable site attributes, and conformity with previous planning efforts. These strengths and weaknesses are presented below.

SCENARIO 1: DEMOLISH ALL BUILDINGS AND REBUILD

- Up front costs for demolition are estimated at $8.2 million, plus additional or added costs for new construction at approximately $35 per square foot
- Highest amount of flexibility for working with the site to make it marketable
- Highest amount of flexibility to design spaces that meet current market demand
- Potential to phase development based on market demand, which would reduce risk and lower total development costs
- The site has many inherent advantages – proximity to the airport; access to transit served, dense population with diverse workforce skills – including production, management, technical & professional talent; access to the University of MN and private colleges. In recent years suburban employers have reported difficulty recruiting young engineering, technical and professional talent. This makes the site attractive to corporate headquarters; companies that value management, technical and engineering talent; and manufacturers with a more integrated operation involving management, technical, sales & production. [Ford's "branch plant" operation on the site has been devoted strictly to production.]
- Because of the flexibility of designing new buildings and the need to incorporate more flex-space into production facilities, the site could accommodate the highest density of jobs and generate the highest tax base

- Although upfront costs associated with demolition and rehabilitation are below the other development scenarios, there would need to be substantial investment in new buildings with higher finishes in order to attract firms that have office and R&D needs as well as production needs

- New construction prevents capitalizing on the 'green' aspect of reusing existing buildings – however, most green manufacturers do not consider building reuse a high priority; furthermore, a new building could be built to much higher green standards than a retrofit

SCENARIO 2: REUSE ALL BUILDINGS

- High up front cost – it is estimated that $18.3 million would be needed to bring to minimum code

- Cost for improvements slightly exceed marketable rents, therefore a gap of approximately $2 million would have to be covered in order to attract tenants

- Space would be hard to subdivide, which would push up potential costs and risk not achieving an acceptable level of job density: similar project in Iowa (former Whirlpool plant) filled with new users, but public money had to be spent to subsidize small firms using large spaces

- Users most likely to reuse all of the existing buildings, such as electric vehicle manufacturers, match well with the existing Ford workforce; however, the number of such users is limited and would require significant subsidies in order to be attracted to the site

- Amount of space would take a long time to be absorbed if subdivided, which would increase project risk

- Attracting a single user (or a small number of users) would be highly competitive – additional incentives beyond facility improvements would be needed

- Logistics are very difficult with the site - therefore firms dependent on a high volume of truck traffic will not find the site attractive

SCENARIO 3: REUSE PAINT BUILDING

- Moderate up front cost – it is estimated that $11.2 million would be needed to bring to code and demolish the unused buildings

- Rents needed to cover up front costs are achievable, relative to comparable properties, and would likely attract developer interest

- Removal of the other buildings frees up space on the site for other uses, which translates to a higher potential tax base than other development scenarios
- At 550,000 square feet, the paint building could accommodate a large single user or several smaller users
- With 30-foot ceilings, opportunities exist to add office or R&D space into the building in a manner that would increase its marketability to firms looking for more than production space
- Firms that manufacture HVAC systems or sensors and monitors would fit well with a retrofitted paint building because 1) such firms often integrate R&D with production spaces, 2) they need highly skilled engineering and science workers who are more likely to be attracted to urban settings, and 3) they also could tap into the Ford workforce because of overlapping occupational skill sets
- Because the paint building is only ¼ the size of the existing facility, there would be less market risk in absorbing the space in a timely manner
- The building is 25 years old and still has many years of functional life expectancy
- The building is located on the eastern side of the site, which leaves more valuable areas open for other types of development
- Potential environmental remediation needed on portions of the site not used for industrial activities is currently unknown

SCENARIO 4: REUSE WAREHOUSE BUILDING

- Moderate up front cost - $8.6 million to bring up to code
- Rents needed to cover up front costs are very achievable in today's market and would likely attract developer interest
- Frees up space on the site for other uses, though the potential tax base is not as high as Scenario 3
- The clear height, rail access, and number of truck docks support the needs of most green manufacturers, despite poor highway access to the site
- At 250,000 square feet, though, the space could accommodate a single, large operation, but would be more difficult to subdivide into spaces that are marketable
- Very difficult to incorporate office or R&D space demanded by today's green manufacturers, especially since the warehouse

building is somewhat removed from the training center or other site areas that could be used as flex-space

- The building is situated near the river, which would limit development of higher valued properties for residential purposes
- Because the warehouse building is only 1/8 the size of the existing facility, there would be less market risk in absorbing the space in a timely manner
- The building is 25 years old and still has many years of functional life expectancy
- Environmental remediation on portions of the site not used for industrial activities is unknown

WORKFORCE ANALYSIS

With assistance from DEED, occupational information was analyzed from the existing Ford workforce and compared against the workforce needs identified during the employer interviews. The following is a brief summary of the compatibility of Ford workers to the industries represented in the survey.

HYBRID / ELECTRIC VEHICLE MANUFACTURING

Based on the DEED analysis, hybrid/EV vehicle manufacturing was the best opportunity to take advantage of the employee skill sets of current Ford workers. This is not surprising since vehicle manufacturing is currently taking place at the Ford plant. However, the results of the site assessment and market survey suggest that attracting a large, prominent vehicle assembly firm would be very competitive. Furthermore, the cost of rehabilitating the space for a single, large user would be high relative to other development scenarios. Of course, this does not preclude the possibility of spending resources to attract a hybrid/EV vehicle manufacturer to occupy the space, but it does introduce a higher level of financial risk than other reuse options.

HVAC CONTROLS AND SENSORS & MONITORING SYSTEMS MANUFACTURING

The next industry categories with the best occupational fit to the existing Ford workforce are manufacturers of HVAC controls and sensors and monitoring systems. These industries have similar occupational structures and represent good opportunities with which to retrain Ford workers to occupations needed by these manufacturers. The challenge in recruiting such firms is that they tend to be well established companies with proven manufacturing techniques that take advantage of substantial economies of scale. Therefore, although green principles are important to such firms, it is not a requirement to be located on a green site, which lessens

the competitive appeal of the Ford site. However, the Ford site can have very strong appeal to manufacturers of HVAC controls and sensors and monitoring systems because they often blend their R&D with production and require highly skilled engineers and scientists. These needs work well on the Ford site for three reasons. One, several of the reuse scenarios examined in this study can accommodate flexible manufacturing designs in which production space is integrated with R&D, training, or even some types of administrative activities. Second, although these professions are not necessarily a large component of the current Ford workforce, the location of the Ford site at the heart of a major metropolitan area would help many manufacturers of HVAC controls and sensors and monitoring systems to recruit and maintain highly skilled workers. Three, the Twin Cities Metropolitan Area is strongly represented in these industries and expansion locally has a high probability due to the existing talent pool and knowledge base.

WIND TURBINE COMPONENT MANUFACTURING

The occupational needs of wind component manufacturers aligns well with the Ford workforce because of a similar team assembly approach. However, transporting large wind components requires highly skilled shipping and receiving personnel. This would be especially true of a firm located at the Ford site, given its relatively poor access to the freeway system and issues surrounding the low heights of bridges crossing over the tracks leading to the site. Such issues may likely preclude the possibility of locating a wind mill component manufacturer on the Ford site altogether, especially of the components are towers, blades, or nacelles.

BIOFUEL COMPONENT MANUFACTURING

The DEED analysis revealed that the biofuel component manufacturers rely heavily on skilled metal fabrication personnel, especially stainless steel welders, which is not present in the existing Ford workforce. Moreover, existing biofuel component manufacturers sell to companies located in rural areas, closer to the biomass needed for energy production and that the workforce has historically been related to the manufacture of steel tanks used in dairy farming, trucking, and food processing, which has been largely a rural workforce. Therefore, it may be difficult to compete against a lower cost, largely rural workforce.

MARKET SURVEY

A survey of firms involved in the manufacturing of green products was conducted to determine site and facility needs of such firms. Almost all of the targeted industries had site needs that matched up well the Ford site, though it was especially strong if the firm was a start-up that produced a product that was marketed directly to consumers. These firms placed a greater emphasis on being

located on a green site because of a corporate mission that stresses a green brand and because the new nature of the business allows the firm to adopt new, more green production methods. One industry exception was wind turbine component manufacturers. In many ways, the Ford site has many advantages for wind turbine manufacturers due to its size and access to renewable energy. However, the logistical challenges associated with transporting wind mill components would make it very difficult for a manufacturer to locate on the site. Another key finding of the market survey was the importance placed on subsidies. Nearly all of the respondents felt very strongly that subsidies would be an essential component in the locating of their next manufacturing facility.

Below is a summary of the conclusions drawn from the results of the survey for each of the industries represented in the interviews. Please note that results from interview with solar panel manufacturers have been included here, but were not included in the workforce analysis. This is because solar panel manufacturers were not initially identified as a target industry, and, therefore, did not have any DEED-related workforce data that could be inserted into the survey questionnaire.

HYBRID / ELECTRIC VEHICLE MANUFACTURING

Advocates for manufacturing reuse of the Ford site have logically focused on recruiting like manufacturers including electric vehicle (EV) manufacturers. While sensible, this reuse possibility brings several significant challenges to question. There are a limited number of viable EV manufacturers in existence and the industry will likely contract from current levels as acquisitions happen and the greater automotive industry experiences further mergers and closures. While several manufactures were contacted in this study, most have already chosen locations, or have a large surplus of retired automotive facilities to choose from in North America. In addition, the Ford site is not suited for the vast majority of new automotive manufacturing needs and would need to be scraped clean for a new plant. Manufacturing of vehicle components at the Ford site is a likely option for companies needing to transition out of the supply chain of Midwestern companies that manufacture gasoline automobiles. However, the majority of this occurs abroad in the auto industry, and manufacturers are targeting the US for light assembly plants only. Saint Paul and the State of Minnesota will need to conduct an immediate and well-resourced marketing campaign with an established and full-fledged incentive package in order to win an EV manufacturer.

WIND TURBINE COMPONENT MANUFACTURING

Large wind components such as nacelle assembly, towers, and blades will not locate on the Ford site due to its urban location and

the transportation challenges associated. The largest components were ruled out in this study due to the lack of clearance on surrounding roads and train bridges as well as direct feedback from manufacturers. Internal components of utility scale wind turbines, small external parts such as bolts and construction equipment parts, and micro or commercial scale wind equipment are viable possibilities for the Ford site. These manufacturing groups are scarce at present because the market is still relatively limited and manufacturers in existence today are vertically integrated. Manufacturers are beginning to outsource various supply chain components in the Midwest. It is feasible that Saint Paul could attract new foreign entrants and transitioning local companies to use a small portion of the Ford site. Several of these components are considered heavy manufacturers and may not align with residential neighborhood concerns.

HVAC Control and Sensors and Monitoring Systems Manufacturing

HVAC controls, sensors, and monitoring systems require light manufacturing with high paying skilled labor and would be a good fit with the Highland neighborhood. New manufacturers are emerging rapidly but the industry will likely remain concentrated in the long term after acquisitions by current industry leaders such as Johnson Controls and Honeywell. Several companies were interviewed and expressed interest in new facilities although were hesitant about the Ford site due to its size and lack of clarity in the site's future.

Biofuel Component Manufacturing

Biofuel production has experienced a temporary decline due to low gasoline prices, high input prices created by food-based ethanol production, and a declining reputation worldwide. Biofuels will certainly have their place in the future energy market, and specifically will continue to grow in the Midwest region. Feedstock will shift to primarily "waste" stream inputs as will the associated technologies. There are currently many new entrants into small and local scale production units. It remains to be seen which technologies are viable. Saint Paul could study this industry to choose likely industry winners and recruit from this selection for a potential park at the Ford site.

Solar Panel Manufacturing

The solar industry has recently experienced a boom in demand and supply. Many new solar manufacturers have entered the market within the last ten years. Experts predict a worldwide glut of solar panels and a short-term shakeout of the U.S. sun-power industry that could slow investment in factories of the type states are scrambling to attract. US and foreign government incentives have been traditionally unreliable, this combined with the economic

slowdown and tight credit for homeowners creates a very competitive marketplace for solar manufacturers. Going forward, experts predict demand to increase as the US and international communities demand more energy from renewable sources. Minnesota is home to several large solar equipment manufacturers and several panel startup companies that may have interest in being part of a green manufacturing park.

ANALYSIS OF RESULTS

Based on the conclusions from each of the three areas of study, a matrix was prepared to help identify how each development scenario compares to one another with respect to cost, market potential among green manufacturers, the potential to utilize the existing Ford workforce, and its alignment with the planning vision prepared for the City of Saint Paul in 2007. This matrix is summarized as Table 4. Each cell in the matrix includes a positive or negative value depending on the strength of the trait. For example, three negative symbols represent the most negative value possible, while three positive symbols represent the most positive value possible.

TABLE 4: COMPARISON OF DEVELOPMENT SCENARIOS

Development Scenario	Cost	Market Potential Among Green Manufacturers	Potential to Tap Existing Ford Workforce	Alignment with 2007 Planning Vision
Scenario 1: Demolish All Buildings and Rebuild	+	+ +	-	+ +
Scenario 2: Reuse All Buildings	- - -	- -	+ +	- - -
Scenario 3: Reuse Paint Building	+	+ +	+	+ +
Scenario 4: Re-use "Newer" Warehouse Building	+ +	+	+	-

Based on the matrix in Table 4, the feasibility of reusing the Ford site for green manufacturing is ranked as follows:

#1 REUSE PAINT BUILDING ONLY (SCENARIO 3)

The feasibility of reusing the paint building is rather strong. Its size, shape, age, and location on the site, make it an excellent candidate for reuse among green manufacturers. Unlike other scenarios, it has the potential to be profitably modified in a manner to attract a diverse group of green manufacturers. Moreover, it's not so overwhelming of a project that it would risk a slow absorption or minimize the number of possible tenants. Unfortunately, reusing only the paint building forgoes the potential to leverage any of the historic character of the existing facility.

#2 Demolish All Buildings and Rebuild (scenario 1)

The feasibility of demolishing all of the existing buildings and then rebuilding new structures to capture green manufacturing development is strong, but not nearly as strong as reusing the paint building. Scraping the site and starting new is by far the most flexible development scenario with respect to building placement, phasing of development, and introducing state-of-the-art facilities. However, it has limited potential to capture the type of manufacturing operations that can tap into the skill set of the Ford workforce and thus maintain those types of similar jobs. The barriers to this are primarily due to the expense of building new and that many green manufacturers interested in siting a facility focused on production require the type of rents more often found in older buildings or buildings situated in more exurban or rural locations. Nonetheless, there is great opportunity to capture demand for flex-space among green manufacturers who are dependent on a highly skilled workforce that want to be located at the heart of a major metropolitan area.

#3 Reuse Warehouse Building Only (scenario 4)

The feasibility of reusing the newer warehouse building is modest at best. In many ways, the cost advantages are similar to reusing the paint building. However, the position of the structure on the western side of the site presents many constraints for effectively introducing other non-industrial uses or even complementary industrial uses. Furthermore, the small size of the structure places it somewhat it limbo from a market standpoint as it is almost too small to subdivide and yet not large enough to attract a single user who might want to incorporate office or R&D functions.

#4 Reuse All Buildings (scenario 3)

The feasibility of reusing all of the existing buildings is low, but not out of the question. The overwhelming size of the structure and limited potential to subdivide it efficiently presents a challenge that would be very difficult to overcome. Namely, the number of potential users would be small. Furthermore, such users are in huge demand by other locales with similar brownfields. This means that the cost to find such a user go well beyond simply improving the facility but would also likely require other significant subsidies. If the building were to be subdivided efficiently, this does not greatly diminish the risk as the sheer size of the structure suggests it would take considerable time absorbing all the space. However, the building has cultural significance, and if a large user were to be found it most likely would require the type of workforce already present at the plant. To make this happen, though, would require a prominent role on the part of the public sector as private developers would not assume such high level of risk.

RECOMMENDATIONS

Based on the findings, the consultant team considers it feasible to develop the Ford site in a manner that would be attractive to green manufacturers. However, there are challenges that need to be addressed in order to capitalize on the site's potential. The key challenges as well as opportunities are outlined below.

1. Expect Heavy Subsidies

Because manufacturing jobs are highly coveted among local and state governments, it has become *de rigueur* to offer heavy subsidies to manufacturers with significant jobs who are considering relocation or expansion. Based on the results of the market survey, the Ford site will be no exception.

Furthermore, the number of competitive redevelopment districts has increased sharply in recent years. Many local and state governments, as a result, have stepped up the amount of subsidies they are making available to revitalize their brownfields. Given this highly competitive environment, it will be essential that the marketing of the Ford site be well coordinated, professional, and backed by significant public subsidy to differentiate it in the marketplace.

To illustrate potential subsidy amounts, consider an extreme example where demolition and rehabilitation costs are subsidized. In such an example, expect dollar amounts to range from $8.2 million to $18.3 million for the Ford site, depending on the redevelopment scenario. This does not include potential rent subsidies.

The market survey found that the Ford site has characteristics that can differentiate it in the competitive marketplace, especially among certain manufacturers. Of particular value is the site's location at the heart of a major metropolitan area, which is instrumental for manufacturers to attract and retain a highly skilled workforce.

2. Focus the Marketing Effort

Though the site's characteristics make it an attractive location for some types of manufacturers, there are drawbacks for others. For instance, there are logistical challenges in quickly accessing the highway system and in transporting oversized products via rail. Also, some manufacturing sectors are dependent on a low-wage labor force that is not readily available in most major metropolitan areas.

As a result, it is recommended that marketing efforts should be focused in two ways: 1) industry-specific and 2) geography-

specific. The industry-specific focus should be on companies that manufacture HVAC controls, sensors and monitoring systems, and solar panels. These companies have production needs that match well with the existing Ford workforce and they often blend training, research and development, and management on the same site as production. This is very advantageous because these non-production activities often require occupations with higher skill sets, such as engineers and scientists, which are easier to attract and retain for companies with urban locations. Furthermore, these companies don't have the same level of logistical issues as say electric vehicle manufacturers or windmill component manufacturers.

The challenge will be in convincing these firms, particularly manufacturers of HVAC controls and sensors and monitoring systems, of the value of moving to a green site, as many of these businesses are long-established firms with proven production techniques in which relocation and green production techniques are not always an immediate consideration.

The geography-specific focus should be on firms located in the immediate region and northern Europe firms interested in establishing a North American operation. Firms located in the immediate region value the quality of the Minnesota workforce, which tends to require less company-initiated training than other places of the country, and are familiar with the culture and climate of the region.

For northern European firms who want to establish a North American operation, the site is extremely compelling for a number of reasons. Similar to local firms, the culture and climate is more familiar than other parts of the country. Second, they perceive the quality of the Minnesota workforce to be higher than other regions in the US. Third, the Minneapolis-Saint Paul metropolitan area offers many of the cultural amenities that can attract highly skilled professionals from northern Europe and other destinations.

Despite the importance of a focused marketing effort, it should be made clear that potential users who value the site will not be restricted to the industries mentioned above. Therefore, care needs to be taken to be flexible with a marketing plan and understand that many businesses make location decisions for reasons that are not always apparent or attuned to their bottom line.

3. Strategically Reuse Portions of the Site

In terms of reusing existing buildings, the paint building was demonstrated as having the greatest viability because of its versatility, high ceilings, relatively young age, competitive projected

rents, and relatively modest size, which would limit risk when considering the time needed to absorb the space. Furthermore, the paint building could be marketed as an adaptive reuse, which would add to the green qualities of the site. Despite these advantages, the paint building would represent somewhat of a challenge when incorporating new uses on the site, especially non-industrial uses in which new roads and infrastructure would have to be accommodated. Therefore, consideration should be given to the option of razing all existing structures and building new facilities. The benefits of this include maximizing the potential to integrate several types of uses on the site, if necessary, designing new industrial development with the highest green standards possible, and phasing development in a manner that would be most cost effective.

The consultants do not recommend rehabilitating the main production building or the attached warehouse because of the lack of market depth among manufacturing firms that would require so much space, especially given the cost to renovate the space. Nonetheless, if a commitment is made to market some or all of the site as a manufacturing park, then the marketing plan should be flexible enough to accommodate a single large user should they make themselves interested before the site is substantially altered.

At the northern end of the site is a training center that is less than 15 years old. The market survey did not yield strong demand among manufacturers for an on-site training facility. However, this assumed that the manufacturer would not necessarily share the facility with other firms. Thus, there may be demand for such a facility if, for example, several complementary businesses had training or research and development needs and could share the space, as well as continuing its use as educational space for local colleges and universities.

4. Track the Economy and Time Any Investment

A significant challenge will be gauging the short- and long-term impact of the global recession. It has been demonstrated that green products, especially those in the industries targeted in this study, will experience growing demand in the coming years. This is good. However, it is unclear what kind of trajectory this growth will take. If the growth lags well behind any substantial investment in the Ford site, this will lengthen the project's absorption period and put downward pressure on rents, both of which will reduce revenue and jeopardize the development.

Further complicating the timing of the market is the ample supply of competitive brownfield districts, which will lengthen absorption and put downward pressure on rents. This makes it critical that the

project be differentiated in the marketplace and marketed to the most attractive potential users.

5. Consider Creating a Park or District with Strict Green Standards

Many other industrial parks are trying to market themselves as green. One way to differentiate the Ford site from others would be to create design or use standards not found at other industrial parks. The market survey indicated that a number of respondents felt that being located in a green industrial park had some benefit because of the possibility of being located near complementary businesses in which economies of scale could be achieved through shipment of goods or ordering of parts. This would be especially true of firms that might be part of the same supply chain. Therefore, creating green standards may serve to agglomerate certain types of industries.

Typically, design standards are considered a barrier to development because they represent, in the minds of many businesses, unnecessary costs. However, if green design standards were subsidized, there would be minimal financial impact on the business and they would benefit from claiming to be located in an extremely green location. Therefore, subsidies targeted at creation of a green industrial park could be attractive to certain manufacturers and help differentiate the site in a competitive marketplace.

Appendix A

Summary of In-Depth Interview Results

EXISTING FACILITIES

1. How many facilities does your company currently occupy?
   Minimum = 1
   Maximum = 6
   Average = 2.3
   [Please note that several respondents have a wide range of product lines that include both 'green' and non-green products. As much as possible, we tried to limit the interview to products that are within the focus of this study. If we were to include all product lines manufactured, several respondents would have many more facilities than the numbers noted above.]

2. Where are they located?
   Six respondents have one or more facility located in Minnesota.
   Four respondents have facilities located in states other than Minnesota (AZ, CA, CO, TX, WY).
   Two respondents have facilities located in Canada (MB, QC, PE).
   Two Respondents have facilities located in China.
   One respondent has a facility located in a foreign country other than China (Norway).

3. For each facility, what is the approximate building square footage and total land area?
   Minimum = 2,000 sf
   Maximum = 210,000 sf
   Average = 75,000 sf

   Among respondents reporting the size of their facilities, they fell into two distinct sizes; those under 15,000 sf and those over 100,000 sf.

   Acreage amounts were rarely reported because many respondents either occupied space in a multi-tenant building or they didn't know their acreage because such needs were driven more by local land use regulations and less by their business production needs. In other words, zoning laws requiring setbacks and parking, for instance, typically required way more acreage than what was necessary for production. Thus, respondents often claimed acreage was more dependent on local zoning than anything else and could be different from municipality to municipality.

4. In what types of communities are these facilities located?
   33% of firms have an urban location
   100% of firms have a suburban location
   17% of firms have a mid-sized regional center location
   33% of firms have a rural location

5. How would you describe your current facilities?
   Windmill and car manufacturers were the only types of respondents to describe their facilities as heavy industry; all other respondents describe their facilities as light industry.

6. Do you have separate facilities for headquarters, R&D, other office functions, or training?
   Respondents with separate headquarters tend to have several production facilities. Regardless, most production facilities still have space devoted to other office functions and training, which usually require about 10% of the building size.

   Respondents with only one production facility often have headquarters functions as well. In these instances, the amount of non-production activities typically requires anywhere from 20% to 50% of the building space.

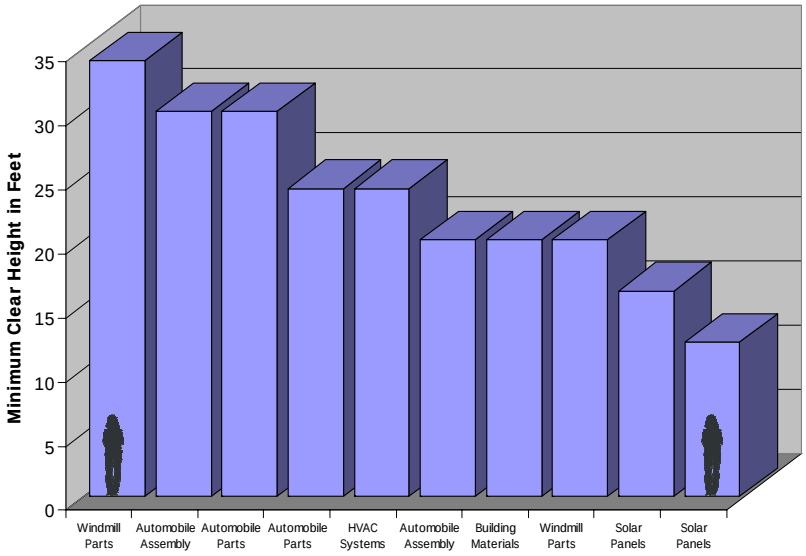
PROSPECTIVE FACILITIES

7. What would be the minimum acreage your company would need to function effectively?
   Car manufacturers have the best sense of their acreage needs. They require anywhere from 30 to 60 acres for a new facility. All other respondents, regardless of the type of product they manufacture, are unclear as to their acreage needs for a new facility. In many instances, respondents noted that local zoning and land use laws often dictate acreage needs regardless of their production needs. Therefore, it is considered variable and dependent on the local jurisdiction they are considering to operate within.

8. Do you have any general shape requirements of your buildings or structures?
   Respondents either had a rectangular building shape requirement or no requirement at all. The rectangular shape was often cited as being the most flexible shape to accommodate varying types of production.

9. What is your estimate of the size range for a new facility (square feet)?
   Car manufacturers require the most building space for a new facility. It is between 500,000 and 800,000 square feet with the ability to expand. All other respondents typically require between 100,000 and 200,000 building square feet for a new facility.

10. What is the structural interior clear height required for production space?
There is a great deal of variation among respondents regarding the clear heights required for production. Most respondents require at least 20 feet with the average being around 24 feet. Interestingly, though, the lowest clear heights required are among solar panel manufacturers, which require clear heights well under 20 feet.



11. Do any other areas (warehouse, office, R&D) have clear height requirements?
Most respondents do not require higher clear heights for areas other than production. The only exception is one respondent that manufactures solar panels. This particular firm requires 20 feet in their warehouse space instead of the 12 feet needed for production.

12. Is visibility important for your business?
Visibility is not important to most respondents, though several cited the need to be accessible because of regular client visits.

13. Do clients/customers come to your facility often?
Roughly one-half of respondents noted that customers regularly visit their production facilities.

14. Would being a part of an "Eco or Energy Park", sharing an overall site with other similar users, be viewed favorably?
Most respondents consider an eco or energy park to be favorable, but stopped short of claiming it to be desirable. For firms that manufacture a product that is part of a supply chain, such as vehicle parts, the benefits of being located in an energy park were related to having complementary suppliers be located there as well. In such instances, money could be saved on shipping and possibly R&D. For other firms, in which their branding was tied to consumer perception of them being

a 'green' company, then being located in an energy park had some potential benefit, but not substantial. For firms outside of a supply chain that do not manufacture a product direct to consumers, then the benefits were considered negligible.

15. When did your company last site a new facility? Were you part of that decision? What were some of the key factors in that decision?
Every respondent, except one, has sited a production facility within the past 10 years. Four respondents have sited a facility within the past year, and two respondents are currently in the process of a siting a facility.

As anticipated, there were a number of key factors that determined the location of new production facilities. Often cited factors include cost, quality of workforce, employee retention, need for office space, and public subsidies. Interestingly, the most commonly cited factors were employee retention and quality of workforce. For smaller, start-up firms, the location of a strategic partner was often a critical factor in siting a production facility. Conspicuously absent from most respondents were the need to be close to certain infrastructure demands, such as power, water, and waste treatment.

16. On a scale from one to ten, with ten being most important, how important do you think each the following factors would be to your company's ***next site location decision***?
Not surprisingly, public subsidies topped the list of most important factor for respondents when considering the location of their next production facility. Interestingly, although a location in the US was almost as equally important, a location

		Low Rank	High Rank	Average Rank
m.	Public subsidies or financial incentives	1	10	8.8
n.	Location in the US	5	10	8.7
b.	Quality of the workforce	7	10	8.4
o.	Access to suppliers	7	10	8.2
a.	Availability of a skilled workforce	5	10	7.8
h.	Access to the Interstate system	3	10	7.5
f.	Operating in a right to work state	1	10	6.5
k.	Rail service to your facility	1	9	6.4
i.	Access to an International Airport	1	9	6.0
g.	Proximity to a major university & other higher education resources	1	8	5.7
l.	Transit service to your facility (bus or light rail)	2	7	5.7
c.	Access to workforce training resources within 30 minutes	1	8	5.6
p.	Location in the Upper Midwest	1	10	5.6
d.	On site training facility affiliated with state university and technical college education and training resources	1	8	4.9
j.	Port or barge access	1	8	3.4
e.	Working with a unionized workforce	1	8	2.7

in the Upper Midwest was well down on the list. When probed about the general lack of importance to locate in the Upper Midwest, respondents cited reasons such as "the market for our products is moving south and west" or "we already have a major presence in the Midwest." Despite some of these negative reasons, some respondents were bullish on the Upper Midwest and noted that it is close to key sources of alternative energy, has an excellent workforce, or simply is an untapped market for their product.

17. Do you have any special electrical load or redundancy requirements?
    Few respondents, except for automobile manufacturers, have a need for special electrical requirements.

18. Do you have any special natural gas consumption and pressure requirements?
    None of the respondents require special natural gas consumption or pressure requirements.

19. Do you have any special water source quality requirements?
    None of the respondents have special water source quality requirements, except for one solar panel manufacturer who installs a water purifier.

20. Do you have any special sanitary waste processing requirements?
    None of the respondents have special sanitary waste processing requirements.

21. Do you have special needs treating or recycling waste water?
    None of the respondents have special needs treating or recycling waste water.

22. Do you have any special telecommunications requirements (e.g., high-speed Internet)?
    None of the respondents have special telecommunication requirements.

DETAILED FACILITY NEEDS

23. Do you have any hazardous materials storage requirements?
    Only one respondent requires hazardous materials storage, which was described as an interior storage room for blow out panels.

24. Do you have any "special" room or "highly atypical" space requirements?
    One respondent cited the need for a "cold" room, which is below -40 degrees Celsius. However, this room can be arranged anywhere with 24' ceiling heights. All other respondents do not have a need for any highly atypical spaces.

25. Do you have any heavy industrial/assembly areas requiring hoisting systems?
    A little more than half of the respondents, including all of the car and windmill manufacturers, require hoisting systems.

26. Do you have any unusual floor requirements or associated structural considerations?
    Approximately half of the respondents require floors that can handle heavy equipment.

27. Do you have any areas with unusual code implications and considerations?
    None of the respondents was aware any need for areas with unusual code implications or considerations.

28. Do you have any special heating, cooling, humidification, ventilation or interior air quality requirements?
    One respondent requires a cold room and another requires a clean room. Both respondents, though, noted that as long as ceiling heights are appropriate, these spaces can be self-contained and be arranged anywhere. Two other respondents noted that they have painting facilities which require climate control. One of the solar panel manufacturers noted that their process requires humidity to be between 40% and 50%.

29. Do you have any underground space needs (e.g., storage or research)?
    None of the respondents have any underground space needs.

30. On a scale of one to ten, with ten being very important, how important would it be that your facility heating come from an on-site source, such as a steam plant?
    70% of respondents ranked the importance of an on-site heating source as 1 out of 10. Only two respondents ranked the importance above a 2.

31. Do you prefer any special windows or natural light requirements?
    Half of the respondents prefer special windows or natural light, most of which were car or windmill manufacturers.

32. Do you require elevated mezzanines connected to structure?
    Only one respondent requires an elevated mezzanine structure.

33. How many shift changes do you have per day?
    Most firms noted that they operate two shifts per day.

34. What's your best estimate of parking needs for employees, visitors, etc.?
    Most respondents stated that parking needs are rarely an issue because local zoning codes almost always far more than needed.

35. What is your volume of over-the-road trucks per week?
    Truck traffic is substantial for many respondents. Car manufacturers tend to have the greatest volume of truck traffic at nearly 150 trucks per week. However, other respondents could have significant truck traffic as well with responses varying from 20 to 100 per week. Overall, the average truck traffic is estimated at 85 to 90 trucks per week or 16 to 18 per day.

36. Do you have any queuing requirements for trucks?
    Only one respondent stated the need to queue trucks, though this area would also double as a staging area in which store a 1 to 2 week supply of materials. All other respondents noted that they do not require a staging area for trucks.

37. How many truck docks/bays do you require?
    Car manufacturers require anywhere from 10 to 30 truck dock/bays. All other respondents require anywhere from 2 to 7 truck docks/bays.

38. How many rail docks do you require?
    About 40% of respondents stated they could use at least 1 or 2 rail docks. One respondent noted that they do not have enough volume of business currently to support a rail dock, but that it is conceivable in the future. None of the car manufacturers stated a need for rail docks. Interestingly, though, one car part supplier noted most car manufacturers prefer trucks to rail because of the g-force stress put on cars during rail shipment.

39. Do you have any tall structure requirements that may be impacted by proximity to an airport?
    Only one respondent, a solar panel manufacturer, has any tall structure requirements that may be impacted by proximity to an airport.

40. Do you have any climate requirements? (e.g. warm all year, dry, sunny, windy)
    None of the respondents have any climate requirements, though one respondent noted dry weather is helpful for painting.

41. Do you require outdoor storage?
    The car and windmill manufacturers require outdoor storage for both raw materials and finished product. None of the other respondents require outdoor storage.

42. Do you have any aesthetic preferences or requirements for your site or surrounding your site?
    None of the respondents have any aesthetic requirements for their site.

43. Do you require a buffer for noise, odor, chemical or light containment?
None of the respondents require a buffer of any kind.

IMPORTANCE OF BEING GREEN

44. Would it be beneficial to your company to be located on a site that could be marketed as being 'green'? Why or why not?
70% of respondents said that it would be beneficial. However, several respondents cautiously noted that they want to their customers to see their company as green, but that locating on a green site is not essential. Several others, who market their product directly to consumers, felt that being on a green site was very important because it was part of their brand and showed their commitment to green principles.

For the 30% of respondents who felt it was not important, comments fell into one of two categories. For some, it is not important because their customers are scattered all over and would not have any particular interest in the greenness of their location as long as their product is green. For others, they have not felt the push from their customers for them to be at a green site. In other words, their clients have not showed the willingness to pay a premium for their product if they were to locate on a green site.

45. On a scale of one to ten, with ten being very acceptable, how acceptable would it be to locate on a remediated brownfield site and facility?
Several respondents could not answer this question because they were unable to gauge the risk or associate a cost. Among those who did respond, it was generally considered acceptable to locate on a remediated brownfield site. For those who did respond, the average rating of acceptability was 8.4 with 10 being most acceptable.

46. Would it be beneficial to be located in an officially designated 'green' district or similar affiliation, such as a university research center?
Three respondents commented that being located in an official green district or research center would be beneficial. Two other respondents noted that it could be beneficial, but did not consider it particularly important. The remaining respondents did not consider it beneficial. One respondent summed up their lack of interest by stating that they already know how to produce their product and being located in a research center would not add a lot to their business model.

47. On a scale of 1-10, how important is it that…
    a. The company's power comes at least partially from a renewable resource?
    Windmill and solar panel manufacturers rated this very high, 9 or 10. Respondents with more established products

or production methods did not rate this high at all, often as a 1.

b. The company reuse existing buildings to the greatest extent possible?

Similar responses as the previous questions, expect for the reaction among windmill manufacturers. Because of their large, awkward size windmill manufacturers find it difficult to use existing space.

EXISTING WORKFORCE

48. Considering your existing workforce, how many *full-time* workers are employed by your company? How many contracted, seasonal, and part-time workers?
Respondents range in size from 3 full-time workers to 2,000 full-time workers. Companies involved in manufacturing products for energy production (e.g., windmills, solar, bio-fuel) tend to be smaller and younger firms. Companies with more established products that reduce waste and increase efficiencies tend to be much larger. Very few respondents have any contracted or part-time workers. The largest firms have some seasonal workers, though they rarely exceed 5% of the workforce.

49. Approximately, what proportion of your total workforce would be classified as...

a.	Management?	*5% to 15%*
b.	Sales?	*5% to 30%*
c.	Scientific/technical?	*10% to 30%*
d.	Production?	*40% to 75%*
e.	Distribution?	*Often considered a part of production*

The small start-up firms tend to be more weighted toward management, sales, and R&D. The established have a much more traditional distribution in which production accounts for about 70% of workers.

50. Do you forecast significant growth or decline in YOUR US employment in coming years in any of these areas?
All of the respondents reported forecasted growth in their US employment in coming years, but for two different reasons. Among the larger, established firms, the recent downturn in the economy has resulted in workforce reductions. Therefore, once the economy picks up, they expect growth. For smaller start-up firms, their business plans all indicate they will be growing in the next five years.

51. What general benefit packages are in place for your employees (insurance/medical/retirement)?
Smaller, start-up firms often do not have a benefit package to offer employees, though they have every intention of adding benefits in the future. Established firms note that they offer

competitive benefit packages that are consistent with the industry.

52. How does your company currently handle employee training – especially for production workers?
Most respondents state that their training is handled on-site. Some respondents note that for certain certified occupations they may send employees off-site for training, but that this tends to be exception and not the norm.

DETAILED WORKFORCE – PROSPECTIVE FACILITY

53. If your company were to site a new facility in a major metropolitan area in the US, what type of operations might be located in that facility?
- ❑ US Headquarters *70% of firms*
- ❑ R & D *60% of firms*
- ❑ Other data/office functions *40% of firms*
- ❑ Production *100% of firms*
- ❑ Shipping, receiving *40% of firms*

54. What type of employees would you be likely to seek:
a. HEADQUARTERS OPERATION: *Most respondents looking to add a headquarters operation want persons with global business experience.*

b. R & D: *Applied engineering related to the industry or product type (e.g., electrochemistry for batteries, or aerodynamics for windmills, etc.)*

c. OTHER DATA/OFFICE FUNCTIONS: *Respondents typically do not require special skills in these areas.*

d. PRODUCTION: *Respondents look primarily for skills that are related to the industry or product being manufactured.*

e. SHIPPING, RECEIVING: *Most respondents do not seek persons with specific skills related to shipping and receiving, except for windmill manufacturers and other businesses that have global markets. For windmill manufacturers advanced logistics skills are paramount because of the cost of shipping large towers. For firms with global markets, skills at coordinating international shipments are highly valued.*

55. We have worked with the State of MN to identify the occupations of people typically employed in your industry. We'd like to review some of the major groups quickly to get your feedback on the importance of workers with these occupational skills to your company and identify any special skills your business may require. [IDENTIFY WHICH OF THE FOLLOWING INDUSTRIES THE INTERVIEWEE REPRESENTS AND ASK ABOUT THOSE OCCUPATIONS ONLY.]

A-1. VEHICLE MANUFACTURING

	Importance		
Occupation	*High*	*Med*	*Low*
1) Industrial Engineers	*33%*	*67%*	*0%*
2) Sales representatives	*33%*	*33%*	*33%*
3) Shipping, receiving & traffic clerks	*0%*	*33%*	*67%*
4) Stock clerks & order fillers	*0%*	*0%*	*100%*
5) Supervisors of production and operating workers	*33%*	*67%*	*0%*
6) Structural metal fabricators and fitters	*33%*	*0%*	*67%*
7) Team assemblers	*33%*	*33%*	*33%*
8) Cutting, punching and press machine operators & tenders, metal & plastic	*33%*	*0%*	*67%*
9) Lathe & turning machine tool setters, operators & tenders	*0%*	*33%*	*67%*
10) Welders, cutters, solderers & brazers	*33%*	*33%*	*33%*
11) Inspectors, testers, sorters, samplers, & weighers	*0%*	*67%*	*33%*
12) Painters	*0%*	*0%*	*100%*
13) Helpers to production workers	*0%*	*0%*	*100%*
14) Truck drivers – heavy & tractor/trailer	*0%*	*33%*	*67%*
15) Laborers & freight, stock & material movers – hand	*0%*	*0%*	*100%*

A-2. Are there other occupations that are important to your organization that we haven't already mentioned?
Engineers with design experience, production workers, and operators of CNC machines

B-1. WIND COMPONENT MANUFACTURING

	Importance		
Occupation	*High*	*Med*	*Low*
1) General & Operations Managers	*50%*	*50%*	*0%*
2) Sales representatives	*50%*	*0%*	*50%*
3) Shipping, receiving & traffic clerks	*100%*	*0%*	*0%*
4) Supervisors of production and operating workers	*50%*	*50%*	*0%*
5) Team assemblers	*0%*	*100%*	*0%*
6) Computer-controller machine tool operators, metal & plastic	*0%*	*50%*	*50%*
7) Cutting, punching and press machine operators & tenders, metal & plastic	*0%*	*0%*	*100%*
8) Grinding, lapping, polishing & buffing machine tool setters, operators & tenders, metal & plastic	*0%*	*0%*	*100%*

9) Machinists	*0%*	*0%*	*100%*
10) Tool & Die Makers	*0%*	*50%*	*50%*
11) Welders, cutters, solderers & brazers	*0%*	*0%*	*100%*
12) Plating & coating machine setters, operators & tenders	*0%*	*0%*	*100%*
13) Inspectors, testers, sorters, & samplers	*0%*	*50%*	*50%*
14) Helpers to production workers	*50%*	*0%*	*50%*
15) Laborers & freight, stock & material movers – hand	*0%*	*100%*	*0%*

B-2. Are there other occupations that are important to your organization that we haven't already mentioned?
Test engineers, fiberglass workers

C-1. SENSORS & MONITORING MANUFACTURING

	Importance		
Occupation	*High*	*Med*	*Low*
1) Engineering Managers	*33%*	*67%*	*0%*
2) Purchasing agents	*33%*	*33%*	*33%*
3) Computer software engineers, applications	*33%*	*0%*	*67%*
4) Electrical engineers	*67%*	*33%*	*0%*
5) Industrial engineers	*67%*	*0%*	*33%*
6) Mechanical engineers	*100%*	*0%*	*0%*
7) Electrical & electronic engineering technicians	*67%*	*33%*	*0%*
8) Mechanical engineering technicians	*33%*	*67%*	*0%*
9) Shipping, receiving & traffic clerks	*0%*	*100%*	*0%*
10) Supervisors of production workers and operating workers	*67%*	*33%*	*0%*
11) Coil winders, tapers & finishers	*33%*	*0%*	*67%*
12) Electrical and electronic equipment assemblers	*33%*	*0%*	*67%*
13) Electromechanical equipment assemblers	*67%*	*0%*	*33%*
14) Team Assemblers	*50%*	*50%*	*0%*
15) Inspectors, testers, sorters, samplers & weighers	*0%*	*67%*	*33%*

C-2. Are there other occupations that are important to your organization that we haven't already mentioned?
Master plumbers, master electricians, structural engineers, mechanical engineers, electrical engineers, engineering design, project managers

D-1. HVAC CONTROLS MANUFACTURING

	Importance		
Occupation	*High*	*Med*	*Low*
1) Purchasing agents	*100%*	*0%*	*0%*
2) Computer software engineers, applications	*50%*	*0%*	*50%*
3) Electrical engineers	*100%*	*0%*	*0%*
4) Industrial engineers	*50%*	*50%*	*0%*
5) Mechanical engineers	*50%*	*50%*	*0%*
6) Electrical & electronic engineering technicians	*50%*	*50%*	*0%*
7) Shipping, receiving & traffic clerks	*50%*	*50%*	*0%*
8) Supervisors of production workers and operating workers	*0%*	*100%*	*0%*
9) Coil winders, tapers & finishers	*0%*	*0%*	*100%*
10) Electrical and electronic equipment assemblers	*0%*	*50%*	*50%*
11) Electromechanical equipment assemblers	*0%*	*0%*	*100%*
12) Team Assemblers	*0%*	*50%*	*50%*
13) Cutting, punching & press machine setters, operators & tenders, metal & plastic	*50%*	*0%*	*50%*
14) Welders, cutters, solderers & brazers	*50%*	*0%*	*50%*
15) Inspectors, testers, sorters, samplers & weighers	*0%*	*100%*	*0%*

D-2. Are there other occupations that are important to your organization that we haven't already mentioned?
Materials science, vacuum technicians

E-1.BIOFUELS COMPONENTS MANUFACTURING

	Importance		
Occupation	*High*	*Med*	*Low*
1) General and operations managers	*100%*	*0%*	*0%*
2) Mechanical engineers	*100%*	*0%*	*0%*
3) Sales representatives,	*100%*	*0%*	*0%*
4) Shipping, receiving & traffic clerks	*100%*	*0%*	*0%*
5) Industrial machinery manufacturing	*100%*	*0%*	*0%*
6) Supervisors of production workers and operating workers	*100%*	*0%*	*0%*
7) Team Assemblers	*100%*	*0%*	*0%*
8) Computer controlled machine tool operators, metal & plastic	*100%*	*0%*	*0%*
9) Cutting, punching & press machine setters, operators & tenders, metal & plastic	*100%*	*0%*	*0%*
10) Grinding, lapping, polishing & buffing machine tool setters, operators and tenders, metal &	*100%*	*0%*	*0%*

plastic			
11) Machinists	*100%*	*0%*	*0%*
12) Welders, cutters, solderers & brazers	*100%*	*0%*	*0%*
13) Plating & coating machine setters, operators and tenders	*100%*	*0%*	*0%*
14) Inspectors, testers, sorters, samplers & weighers	*100%*	*0%*	*0%*
15) Helpers – production workers	*100%*	*0%*	*0%*

E-2. Are there other occupations that are important to your organization that we haven't already mentioned?
Scientific talent

55. Given the attributes of the Ford site, on a scale of one to ten, with ten being a very good fit, how would you rate the site as a location for your company?
The average rating among all respondents is 4.5 out of 10. However, solar and bio-fuels firms rated the site an 8 or 9. Specific comments noted from respondents are as follows:

"The site is clearly too large for any purpose we might have."

"If the site were located in California, it would be a 9. But location is everything, so its overall rank is a 1."

"It is too large for us - don't need paint room; might be interested in smaller part of large facility. State incentives are really important. Inexpensive batteries need to bring cost down - obstacle to commercialization - therefore need government support."

"For nacelle production, the rating is a 4. Heavy equipment (80-ton cranes) probably limits capability of site and the need for higher clear heights. For blade production, the rating is a 6. Blades are not as heavy and require a lot of space. For tower production, the rating is a 9 because of the ample space and the need for a lot of power in the welding of towers, which is available on-site." [Respondent was not aware of the height limitations associated with rail travel due to low bridge crossings leading to the site. Such height limitations prevent the transfer of many windmill products via rail from the site. Because of this reason, the consultants ultimately concluded that it was not a high priority to attract windmill component manufacturers to the Ford site, although such manufacturers generally agreed the site had a number of excellent attributes.]

"Possibly good, but can't rate because would need to see the site in person."

"Primary drawbacks of site are that they like to be close to other corporate facilities because they can share a lot of resources. Also, any expansion would utilize a fair number of existing employees to get it going and a site in St. Paul would mean they would lose a lot of employees. Finally, the site is too large."

"A rating of 4 is for raw land. If the buildings had to be reused, it would be a 1."

Appendix B

Assumed Scope of Work
to determine cost estimates of the four development scenarios

SCENARIO 1: DEMOLITION OF ALL BUILDINGS

- Estimate has assumed the existing facilities, pavements and operations equipment to be entirely removed by a salvage / demolition contractor. Concrete and bituminous pavements to be ground up as best possible for on-site granular fill materials for later development considerations.
- The areas designated as the "tunnels", “steam plant”, “capped area” and “waste water treatment plant” to be left as is; no work assumed within the estimated scope.
- The estimate includes the current property owner, Ford, to be responsible for the expenses and associated abatement processes associated to all materials considered as Hazardous per EPA regulations, assumption includes both below and above grade considerations.
- The existing train track to be removed by the rail carrier, not assumed to be included within the estimated costs. Removal of track within interior of building included.
- To meet anticipated EPA erosion control standards; re-seeding of native grass vegetation has been included for all disturbed areas associated with site demolition activities.
- Site utility services to be capped below grade and abandoned in place.
- On-site schedule duration to be 4 months.

SCENARIO 2: REUSE ALL BUILDINGS

- The existing buildings will be interior power washed with appropriate haz-mat liquid cleanup procedures to collect potential oils from entering the eco-system.
- The existing buildings will be exterior power washed and painted with a spray on textured coating.
- The areas designated as the "tunnels", “steam plant”, “waste water treatment plant”, “capped area”, and “elevated paint

tunnel" to be left as is; no work assumed within the estimated scope.

- Estimate includes selective demolition of miscellaneous stand-alone structures around primary warehouse building (frame shop, etc).
- Estimate includes removal of wood roof planking and replacement with a corrugated metal deck.
- Estimate includes reasonable assumptions to support a "water tight" shell expectation. No structural enhancements or significant structural rework included. Roofing system to be replaced with new membrane system on warehouses. Old warehouse skylights to be replaced with a new skylight product for water tightness.
- Minor repairs to concrete floor and infill of assembly line pits.
- Existing light fixtures to be re-lamped or selectively replaced as necessary for sufficient interior light quality.
- Limited fire protection repairs anticipated to current system. Existing system design to assume a "like" user to avoid code dictated adjustments.
- Plumbing system (for restrooms) to be modified for multiple users as required by code.
- Existing office area to be left as is for use by a similar user. An allowance has been included for clean up only.
- Heating and ventilation systems will be repaired for use by a similar user. No cooling is provided except for office spaces.
- Removal of production equipment within the buildings scheduled for demolition has been included within the current estimate. It is unknown which equipment Ford will remove/salvage.
- The existing rail spur assumed to remain as is. No work associated with the train tracks.
- The estimate includes the current property owner, Ford, to be responsible for the expenses and associated abatement processes associated to all materials considered as Hazardous per EPA regulations, assumption includes both below and above grade considerations.
- Training facility and above ground paint tunnel remains as is.
- The ARAS room to be left as is, structure is supported by racking.

- On-site schedule duration to be 4 months.

SCENARIO 3: REUSE PAINT BUILDING ONLY

- The paint building will be interior power washed with appropriate haz-mat liquid cleanup procedures to collect potential oils from entering the eco-system.
- The paint building will be exterior power washed and painted with a spray on textured coating.
- Estimate has assumed the existing facilities (except for paint building), pavements and operations equipment to be entirely removed by a salvage / demolition contractor. Concrete and bituminous pavements to be ground up as best possible for on-site granular fill materials for later development considerations.
- Estimate has assumed that existing mezzanines in paint building will be removed to provide a greater clear height.
- The areas designated as the "tunnels", “steam plant”, “capped area”, and “waste water treatment plant” to be left as is; no work assumed within the estimated scope.
- Estimate includes reasonable assumptions of limited concrete repairs, roofing repairs and new exterior doorways to support a "water tight" shell expectation. No structural enhancements or significant structural rework included.
- Existing light fixtures to be re-lamped or selectively replaced as necessary for sufficient interior light quality.
- Limited fire protection repairs anticipated to current system. Existing system design to assume a "like" user to avoid code dictated adjustments.
- Minimal plumbing modifications to allow restrooms as required by code.
- Existing office area to be left as is for a similar user.
- Heating and ventilation systems will be repaired for similar user. Cooling only provided for the office areas.
- Removal of production equipment within the buildings scheduled for demolition has been included within the current estimate. It is unknown which equipment Ford will remove/salvage.
- The existing rail spur assumed to remain as is. No work associated with train tracks.
- The estimate includes the current property owner, Ford, to be responsible for the expenses and associated abatement

processes associated to all materials considered as Hazardous per EPA regulations, assumption includes both below and above grade considerations.

- Existing pavement to be re-striped to provide code required parking spaces.

- On-site schedule duration to be 4 months.

SCENARIO 4: REUSE "NEWER" WAREHOUSE BUILDING ONLY

- The newer warehouse building will be interior power washed with appropriate haz-mat liquid cleanup procedures to collect potential oils from entering the eco-system.

- The newer warehouse building will be exterior power washed and painted with a spray on textured coating.

- The areas designated as the "tunnels", "steam plant", "capped area", and "waste water treatment plant" to be left as is; no work assumed within the estimated scope.

- Estimate has assumed the existing facilities (except for newer warehouse), pavements and operations equipment to be entirely removed by a salvage / demolition contractor. Concrete and bituminous pavements to be ground up as best possible for on-site granular fill materials for later development considerations.

- Estimate includes reasonable assumptions of limited concrete repairs, roofing repairs and new exterior doorways to support a "water tight" shell expectation. No structural enhancements or significant rework included.

- Existing light fixtures to be relamped or selectively replaced as necessary for sufficient interior light quality.

- Limited fire protection repairs anticipated to current system. Existing system design to assume a "like" user to avoid code dictated adjustments.

- Estimate includes adding restrooms as required by code.

- Office space included with the tenant build-out allowance.

- Heating and ventilation systems will be repaired for similar user.

- Removal of production equipment within the buildings scheduled for demolition has been included within the current estimate. It is unknown which equipment Ford will remove/salvage.

- The existing rail spur assumed to remain as is. No work associated with train tracks.
- The estimate includes the current property owner, Ford, to be responsible for the expenses and associated abatement processes associated to all materials considered as Hazardous per EPA regulations, assumption includes both below and above grade considerations.
- Existing pavement to be re-striped to provide code required parking spaces.
- On-site schedule duration to be 4 months.

Appendix C

Ford Reuse Assessment - Schedule of Values

7/15/2009

Description	Scenario 1 Demo Existing Buildings Totals	%	Scenario 2 Salvage Existing Buildings Totals	%	Scenario 3 Salvage Paint Bldg Only Totals	%	Scenario 4 Salvage Newer Warehouse Only Totals	%
General Conditions	$ 119,037	1.5%	$ 261,047	1.4%	$ 159,225	1.4%	$ 122,154	1.4%
Site & Building Demolition	$ 6,967,471	85.4%	$ 742,003	4.0%	$ 8,159,971	73.0%	$ 5,894,221	68.7%
Environmental	$ -		$ -		$ -		$ -	
Slab Repair / Fill in Pits	$ -		$ 1,007,000	5.5%	$ -		$ -	
Precast Concrete	$ -		$ -		$ -		$ 44,520	0.5%
Roof Decking / Wood Plank Demo	$ -		$ 3,577,500	19.5%	$ -		$ -	
Roofing	$ -		$ 3,975,000	21.7%	$ 31,800	0.3%	$ 477,000	5.6%
Joint Sealers, Caulking	$ -		$ 79,500	0.4%	$ 15,900	0.1%	$ 10,600	0.1%
Doors, Frames & Hardware Repair	$ -		$ 26,500	0.1%	$ 15,900	0.1%	$ 10,600	0.1%
Overhead Door Repair	$ -		$ 37,100	0.2%	$ 26,500	0.2%	$ 15,900	0.2%
Skylights	$ -		$ 2,938,320	16.0%	$ -		$ -	
Tenant Separation Walls	$ -		$ 457,920	2.5%	$ 152,640	1.4%	$ -	
Painting	$ -		$ 285,186	1.6%	$ 110,240	1.0%	$ 63,600	0.7%
Dock Equipment Repairs	$ -		$ 31,800	0.2%	$ 15,900	0.1%	$ 10,600	0.1%
Interior Cleaning	$ -		$ 551,200	3.0%	$ 261,820	2.3%	$ 184,440	2.2%
Fire Protection	$ -		$ 381,600	2.1%	$ 116,600	1.0%	$ 53,000	0.6%
Plumbing	$ -		$ 477,000	2.6%	$ 145,750	1.3%	$ 66,250	0.8%
HVAC	$ -		$ 954,000	5.2%	$ 291,500	2.6%	$ 132,500	1.5%
Electrical Systems	$ -		$ 1,431,000	7.8%	$ 437,250	3.9%	$ 198,750	2.3%
Asphalt Paving Repairs	$ -		$ 132,500	0.7%	$ 53,000	0.5%	$ 26,500	0.3%
Seeding	$ 279,350	3.4%	$ 0	0.0%	$ 250,200	2.2%	$ 266,100	3.1%
Site Utility Services	$ 689,000	8.4%	$ 318,000	1.7%	$ 530,000	4.7%	$ 689,000	8.0%
SUBTOTAL BUILDING & SITE:	**$ 8,054,859**	**98.7%**	**$ 17,664,176**	**96.4%**	**$ 10,774,196**	**96.4%**	**$ 8,265,735**	**96.4%**
Design Costs	$ -		$ 435,078	2.4%	$ 265,374	2.4%	$ 203,590	2.4%
Permits	$ 65,040	0.8%	$ 138,382	0.8%	$ 85,795	0.8%	$ 66,649	0.8%
Insurance, Bonds, & Misc	$ 39,679	0.5%	$ 87,016	0.5%	$ 53,075	0.5%	$ 40,718	0.5%
SUBTOTAL INDIRECT COSTS:	**$ 104,719**	**1.3%**	**$ 660,476**	**3.6%**	**$ 404,244**	**3.6%**	**$ 310,956**	**3.6%**
TOTAL CONSTRUCTION COSTS:	**$ 8,159,578**		**$ 18,324,652**		**$ 11,178,440**		**$ 8,576,692**	
TOTAL PROJECT COSTS:	**$ 8,159,578**	**100.0%**	**$ 18,324,652**	**100.0%**	**$ 11,178,440**	**100.0%**	**$ 8,576,692**	**100.0%**

Appendix D

Code Analysis

The Ford Facility "re-use" considerations and associated scenarios outlined in the site assessment incorporated the primary building and land use codes as outlined below. The proposed re-use applications of the Ford Facility were heavily weighted towards manufacturing and logistic operations to aid in defining a baseline model of understanding.

The re-use scenarios of the existing facilities were highly influenced by the following macro considerations.

- Emergency travel distance of building occupants.
- Area separation walls in concert with pedestrian travel distances and current facility shell construction.
- Heavy redevelopment expenditure to create high density "tenant condominium" spaces with typical ownership and tenancy operation agreements.

The market interviews gathered during the facility assessment study generally supported the report scenarios to be defined as:

- Demolition of all buildings
- Re-use of all buildings
- Re-use paint building only
- Re-use newer warehouse only

Defining the assessment report in concert to the appropriate building code elements affords broad re-use considerations within the noted four defined evaluations.

Applicable Building Code: 2007 Minnesota State Building Code

Required Enforcement
Chapter 1300 Administration of the State Building Code
Chapter 1301 Building Official Certification
Chapter 1302 Construction Approvals
Chapter 1303 Minnesota Provisions of the State Building Code
Chapter 1305 Adoption of the 2006 International Building Code
Chapter 1307 Elevators and Related Devices
Chapter 1309 Adoption of the 2006 International Residential Code
Chapter 1311 Adoption of the Guidelines for the Rehabilitation of Existing Buildings
Chapter 1315 Adoption of the 2005 National Electrical Code
Chapter 1325 Solar Energy Systems

Chapter 1335 Flood proofing Regulations
Chapter 1341 Minnesota Accessibility Code
Chapter 1346 Adoption of the 2000 International Mechanical and Fuel Gas Codes
Chapter 1350 Manufactured Homes
Chapter 1360 Prefabricated Buildings
Chapter 1361 Industrialized/Modular Buildings
Chapter 1370 Storm Shelters (Manufactured Home Parks)
Chapter 4715 Minnesota Plumbing Code
Minnesota Energy Code – consists of Minnesota Statutes 16B.617 (7670) and Minnesota Rules chapters 7672, 7674, 7676 and 7678

Building Height Allowed: per Ibc table 503 and Mississippi Overlay District (note all buildings are existing)

Travel Egress Requirements: per IBC table 1016.1

Fire alarm Design Requirements:

Fire Protection Design Requirements: ESFR (existing)

Smoke evacuation Design Requirements: none required with ESFR system

Snow Design Criteria: NA (existing Building)

Wind Speed / Exposure design Criteria – NA (existing facility)

Seismic Zone Design Criteria: NA

ADA Compliance enforcement agency: Minnesota Accessibility Code 1341

Zoning: Property is currently zoned I-1 (light industrial) – see attached

Site: 135 ac +/-

Existing buildings: 2 million + s.f.
1.2 million s.f. (original and current production facility) approx. 20' clear
250,000 s.f. (warehouse) approx. 24' clear
550,000 s.f. (multi level paint facility) approx 40' clear after removal of mezz.

Existing Parking: NA (there is ample parking space available due to current vehicle storage)

Required Parking: Per Industrial , mfg – sec 63.207 " parking req'd by use St. Paul municipal code"
1 space per 650 s.f. GFA or 1 space per 2000 s.f. GFA if more than 50% of production floor
Space is occupied by automated machinery